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### **4-H ONTARIO PROJECT**



Goat

**REFERENCE MANUAL** 

#### 4-H Ontario

#### **Provincial Office**

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#### **The 4-H Pledge** I pledge my Head to clearer thinking, my Heart to greater loyalty, my Hands to larger service, my Health to better living, for my club, my community, my country and my world.

#### The 4-H Motto

Learn To Do By Doing

#### **Project Resource Information:**

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## Thank you to the 4-H Goat Advisory Committee members who assisted with the creation of this resource:

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4-H Ontario is pleased to be able to provide project resource reference manuals for use by volunteers in clubs. 4-H Ontario screens and trains volunteers to equip them with the tools to serve as positive role models for youth. With so many topics to choose from, 4-H volunteers are trusted to use these resources to provide safe and quality programming while using their judgement to assess the appropriateness of activities for their particular group of youth. By downloading any 4-H resource, you agree to use if for 4-H purposes and give credit to the original creators. Your provincial 4-H organization may have restrictions on the types of 4-H projects or activities which can be completed in your region.

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### 4-H Inclusion Statement

4-H in Canada is open to all\* without discrimination based on race, national or ethnic origin, colour, religion, sex, age or, mental or physical disability.\*\*

4-H is dedicated to providing a safe and inclusive environment that allows for universal access and participation. Where barriers to participation are identified, 4-H will, with reasonable accommodation, adapt programs, rules, policies, or expectations to reduce or remove the barriers.

Any accommodations, changes or exceptions will be assessed on an individual basis, taking into account the individual experience of the member and their family. The physical safety and emotional well-being of members, leaders, staff and volunteers is 4-H's highest priority, and is the ultimate consideration in final decisions.

4-H Canada and local 4-H organizations consider inclusion a priority. Leaders are encouraged to work with individuals and their families to identify and discuss accommodations as required, and to reach out to provincial or national office staff for help with unresolved concerns.

\*This applies to youth members (ages 6 to 21), volunteers, leaders, staff and professionals.

\*\*Definition of discrimination as per Canadian Charter of Rights and Freedoms.

### Déclaration sur l'inclusion des 4-H

L'adhésion aux 4-H au Canada est ouverte à tous les jeunes\* sans discrimination fondée sur la race, l'origine nationale ou ethnique, la couleur de la peau, la religion, le sexe, l'âge ou le handicap mental ou physique. \*\*

Les 4-H ont pour mission d'offrir un environnement sécuritaire et inclusif qui permet l'accès et la participation de tous. Lorsque des obstacles à la participation sont décelés, les 4-H adapteront, à l'aide de mesures d'adaptation raisonnables, les programmes, les règles, les politiques ou les attentes afin de réduire ou d'éliminer ces obstacles.

Toute mesure d'adaptation, modification ou exception sera évaluée au cas par cas, en tenant compte de l'expérience personnelle du membre et de sa famille. La sécurité physique et le bien-être émotionnel des membres, des animateurs et des animatrices, des membres du personnel et des bénévoles sont la priorité absolue des 4-H et constituent le facteur ultime à considérer lors de la prise des décisions définitives.

Les 4-H du Canada et les organisations locales des 4-H considèrent l'inclusion comme étant une priorité. Les animateurs et les animatrices sont encouragés à collaborer avec les personnes et leurs familles afin de définir et d'examiner les mesures d'adaptation, selon les besoins, et de communiquer avec le personnel du bureau provincial ou national pour obtenir de l'aide en cas de préoccupations non résolues.

\*Ceci s'applique aux jeunes membres (âgés de 6 à 21 ans), aux bénévoles, aux animateurs, aux membres du personnel et aux professionnels.

\*\*Selon la définition de discrimination en vertu de la Charte canadienne des droits et libertés

#### Learn To Do By Doing

#### Apprendre en travaillant

#### Welcome to 4-H Ontario's Goat Project!

This resource was developed to introduce members to the goat industry and to strengthen the knowledge that members already have. The goat industry can be broken down into many different markets, including meat, fiber, and milk. This resource has been created to cover all these topics across a variety of non-purpose specific sections:

- Section 1 Health
- Section 2 Nutrition
- Section 3 Housing
- Section 4 Reproduction, Genetics and Showing
- Section 5 Business and Marketing

Each section has 6 meetings which are meant to provide plenty of information for many years. Meetings have been broken down into an Introduction with Sample Meeting agendas, References and Resources, Topic Information and Activities. Sample Meeting Agendas: are at the beginning of each meeting. The agendas give suggestions for topic information, activities and judging and/or communications activities along with suggested times for each section. These are only suggestions – you will know your group best and will know the skill and attention level of your members. There is more topic information and activities than what can be completed in a two hour meeting. Be creative! Activities: should be used in combination with the discussion of topic information to teach members in a hands-on, interactive learning environment.

#### **INCLUDING STEM IN THE 4-H GOAT PROJECT**

#### WHAT IS STEM AND WHY IS IT IMPORTANT?

Since 1915, 4-H in Ontario has engaged youth in science, technology, engineering, and math (STEM). This has traditionally meant a solid focus on agricultural science, mechanics, entrepreneurship, natural sciences and household science. Today, 4-H has grown to include rocketry, robotics, computer science, environmental sciences, and more. 4-H provides hands-on learning experiences to encourage learning about the world around us. Our lives are completely immersed in science and technology. Understanding how science, engineering, and technology impact our lives, solve problems and create new ones makes it easier to navigate our modern world.

In school, science classes need to cover a broad range of topics in a limited amount of time while STEM in 4-H allows members and leaders time to dig deeper into ideas and concepts and to spend as much time as desired to work on projects based on personal interests, questions, and skills.

STEM in 4-H allows a person to work on their own questions, design their own tests, create their own models, build their understanding, and share their work with others – learn to do by doing. That's what science and engineering are, trying to understand the natural universe and develop solutions to the problems faced in our world today. Science is inquiry that uses a specific approaches and skills. But all learning is an inquiry process so working with science helps develop your learning muscles.

Within 4-H, the STEM process can go even further to include the Arts, thus changing the acronym to STEAM – Science, Technology, Engineering, Art & Math.

#### **STEAM IN 4-H ONTARIO PROJECTS**

As you work through the Goat Projects, you will see STEAM integrated throughout the project within almost all of the activities that members will be completing. STEAM can be challenging but it can also be fun! Be sure to try out the activities. Observe what works and what doesn't and how activities can be changed slightly to get different results. It's all a part of the STEAM learning process!

#### **Planning a Meeting**

Plan your meetings well. Review all the information well in advance so you are prepared and ready!

#### **Before Each Meeting:**

• Read the topic information and activities and photocopy any relevant resources for the members' Record Books.

• Be familiar with the topic information for each meeting. Think of imaginative ways to present the information to the members. Do not rely on just reading the information out loud. Review available resources, plan the meetings and choose activities and themes that complement the ages and interests of your members.

• Gather any equipment and/or resources that will be needed to complete the meeting.

• At least 12 hours of club meeting time is required for every project; including club business, specific project information and social recreation. The delivery format for that material is left to the discretion of the leaders. Before each meeting, create a timeline to ensure that you are providing an adequate amount of instructional time for club completion. Note: the best practice recommendation is that a club have multiple meeting times for each project.

Included on the following page is a Leader's Planning Chart to help with the planning of meetings. In addition to the chart, keep track of what went well and what should be changed next time. That way, each time this project is run, the content of the meetings can be different!

When planning each meeting, a typical 4-H meeting agenda should include the following:

- Welcome & Call to Order
- 4-H Pledge
- Roll Call
- Parliamentary Procedure:
  - o Secretary's Report
  - o Treasurer's Report (if any)
  - o Press Report

o New Business: local and provincial 4-H activities/opportunities, upcoming club activities

- Meeting content and activities
- Clean-up
- Social Recreation and/or refreshments
- Adjournment

#### Judging and Communications:

Each meeting must include either a judging or public speaking activity.

- Judging gives the members an opportunity to use judging techniques as part of the learning process. Through judging, members learn to evaluate, make decisions and communicate with others. They also develop critical thinking skills, confidence and self-esteem. Many examples are used in this reference book but use your imagination! As long as members are setting criteria and critically thinking about where items fit within that set of criteria, they are learning the basic skills of judging!
- A communications activity has been provided for each meeting but can be included in the Roll Call or social recreation time. These activities do not need to involve the topic of goats as the outcome is more about understanding the concepts of effective communication.

#### Leader's Planning Chart

Mtg.#	Date/Place	Topics Covered	Activities	Materials Needed

#### As a club volunteer your responsibilities are to:

• Be a Volunteer in Good Standing by completing the volunteer screening process, attend a volunteer training session and adhere to the 4-H Code of Conduct.

• Notify the local association of the club, arrange a meeting schedule and participate in club meetings, activities and the Achievement program, assuring that all meetings and activities are accessible and inclusive for all participants.

• Review the project material in the Reference Manual and Activity Guide to familiarize yourself with the information and adapt it to fit your group. Be well organized and teach the material based on your group's age, interest and experience level.

- Organize the club so members gain parliamentary procedure, judging and communication skills.
- Ensure that members are registered for the club using the online registration system.

• Review the Participant Agreement Form (PAF) that members will be completed when registering online. Ensure that all members, leaders and parent helpers know the appropriate actions during any emergency. Check with members for any food allergies or dietary restrictions and plan snacks accordingly.

#### As a club member your responsibilities are to:

• Participate in at least 2/3 of his/her own club meeting time. Clubs must have a minimum of 12 hours of meeting time.

- Complete the project requirement to the satisfaction of the club leaders.
- Take part in the project Achievement Program.
- Fill in and complete the Record Book.
- Complete any other project as required by the club leaders.
- Adhere to the 4-H Code of Conduct at all times.

#### Achievement Program Ideas/Suggestions

• Get members to train a project animal and have a club/county show to show off the work of the members.

• Design a goat facility and as a club, go through a mock process to figure out how much it is going to cost.

• Create a business plan for a potential goat business and pitch it for your club.

• Make a display about a topic relating to goats and display it at a local fair, in the mall, in a store front, etc.

#### **Goat Project References and Resources**

#### Section 1- Health

http://www.omafra.gov.on.ca/english/livestock/goat/health.html https://www.hubbardfeeds.com/species/lifestyle/goat/tips-tools/health-issues https://www.merckvetmanual.com/management-and-nutrition/health-management-interactiongoats/common-diseases-of-goats https://www.gov.mb.ca/agriculture/livestock/goat/pubs/goat-health-management.pdf https://goats.extension.org/goat-general-health/ https://www.nadis.org.uk/disease-a-z/goats/goat-health-1-the-healthy-goat/ https://ontariogoat.ca/producer-info/resources/ https://www.extension.purdue.edu/extmedia/as/as-595-commondiseases.pdf https://www.aces.edu/blog/topics/sheep-goats/common-diseases-of-dairy-goats-and-sheep/ https://diseases.canada.ca/notifiable/ https://www.ontario.ca/laws/regulation/180135 https://www.nfacc.ca/codes-of-practice/goats

#### Section 2- Nutrition

http://www.animalbehavioronline.com/deerinsnow.html#:~:text=Browsers%20glean%20 leaves%2C%20bark%2C%20and,at%20or%20near%20ground%20level.&text=Grazers%2C%20 such%20as%20sheep%20and,meristematic%20regions%20of%20the%20grasses. https://nature.berkeley.edu/classes/espm-186/Unit\_II\_(cont)\_files/grazer%20v.%20browser.pdf https://goats.extension.org/goat-pastures-and-forages/ https://site.extension.uga.edu/forageteam/2018/06/more-than-a-tin-can-forage-systems-forgoats/ https://www.gov.mb.ca/agriculture/livestock/goat/index.html http://www.omafra.gov.on.ca/english/crops/field/forages.html https://www.extension.iastate.edu/dairyteam/files/page/files/ DairyGoatColostrumManagementFactsheet.pdf https://goats.extension.org/goat-transition-or-late-dry-period/ Nutrient Requirements of Small Ruminants: Sheep, Goats, Cervids, and New World Camelids, National Research Council (2007)

#### Section 3- Housing

https://extension.psu.edu/programs/courses/meat-goat/basic-production/general-overview/ goat-housing-and-facilities#:~:text=Goats%20will%20need%20shade%20and,per%20goat%20 to%20be%20comfortable.

https://ontariogoat.ca/producer-info/resources/

https://www.nfacc.ca/codes-of-practice/goats

http://www.omafra.gov.on.ca/english/livestock/goat/housing.html https://goats.extension.org/goat-related-resources/ https://www.canr.msu.edu/news/winter-management-tips-for-goats

#### Section 4- Breeding Genetics and Showing

https://ontariogoat.ca/producer-info/resources/ https://academic.oup.com/tas/article/1/4/498/4780406 https://extension.psu.edu/dairy-goat-production https://www.goats.ca/ https://www.canadianmeatgoat.com/ Section 5- Business and Marketing http://www.omafra.gov.on.ca/english/livestock/goat/dairy goats.html https://www.progressivedairycanada.com/topics/management/5-key-metrics-for-dairy-goatoperations-to-improve-profitability https://www.gayleafoodsmembers.com/membership/#:~:text=Goat%20producers%20are%20 eligible%20for,October%201%20%E2%80%93%20September%2030th. https://www.ontariodairygoat.com/ https://ontariogoat.ca/producer-info/resources/ https://www.nfacc.ca/codes-of-practice/goats https://ontariogoat.ca/ https://www.canadianmeatgoat.com/

# The 4-H Pledge

I pledge my Head to clearer thinking, my Heart to greater loyalty, my Hands to larger service, my Health to better living, for my club, my community, my country and my world.



**CANADA** 4-H Ontario

### **SECTION 1: HEALTH**



# MEETING 1 – HEALTHY GOATS AND NORMAL BEHAVIOUR

#### **Setting Objectives**

To create an understanding of what contributes to good health and normal goat behaviour to understand when things are not right.

Suggested Lesson Outcomes

- $\Box$  To learn what is normal for healthy goats.
- □ To learn about vital signs, body condition score and normal animal behaviour

#### Suggested Roll Call Questions:

- Why is animal health important?
- What do you think a healthy animal looks like?
- What causes stress to goats?

#### Sample Meeting Agenda Time: 2 hours and 30 minutes

Welcome, Call to Order & Pledge		10 min
Roll Call		5 min
Parliamentary Procedure	Minutes, Elections and Business	20 min
	New Executive:	
	President	
	Vice President	
	Secretary	
	Press Reporter	
Topic Information Discussion	Topic Information	10 minutes
	The Importance of Health and Tools to	
	Check Normal Vital Signs	
Activities Related to Topic	Activity #1- Can you check the Vital Signs?	20 minutes
Topic Information Discussion	Eight Strategies to Maximize Goat Health	20 minutes
Activities Related to Topic	Activity #2- An Ounce of Prevention	20 minutes
Topic Information Discussion	Spotting Disease Early	20 minutes
Activities Related to Topic	Activity #3- Identify "Normal" vs Non-	15 minutes
	Normal	
Wrap up, Social time and		10 minutes
adjournment		

#### Topic Information- The Importance of Health and Tools to Check Normal Vital Signs

#### What is Healthy?

Everyone has different perspectives of what constitutes good health for goats. While some may look at only a couple of factors when examining a goat's health, it is important to understand that both physical changes and behavioural changes may develop when a goat is unwell. Therefore, it is important to think about these normal physical conditions and behaviours to recognize the abnormal ones. Many times producers will not identify abnormal health signs and as a result will assume that goats are healthy. This will take time to hone these skills, but this meeting will focus on some of the key diagnostic tools you can use to evaluate your goat's health.



#### **Normal Vital Signs**

A good way to identify signs of abnormal goat health is the physical condition of a goat. This can be in the form of body condition score or in the vital signs of the goat.

For Senior members: If you have ever taken a first aid course, this is like the airway, breathing, and circulation (ABC) check that you would use to determine human vital signs. We pair these ABC checks with the animal's temperature as this will help us determine if the goat might be running a fever or might have some other ailment.

#### Did you Know?

TPR is a term that means temperature, pulse and respiration rate and is often used in an animal and human health context.

In general, it is important to recognize the normal ranges of your goat. For those values that fall outside of the range (either higher or lower), this can indicate a problem with your goat. The table below summarizes the normal range of vital signs for both a goat and a kid (adolescent goat):

Vital Sign	Goat	Kid
Temperature	39.0-40.0°C	39.0-40.0°C
Respiration Rate	15 to 30 breaths per minute	20 to 40 breaths per minute
Heart rate (pulse)	70 to 90 beats per minute	May be 2x higher

#### **Diagnostic Techniques to Determine Vital Signs**

A glass or digital thermometer can be used to check the goat's temperature:

(1) If glass, shake the thermometer down to ensure an accurate reading.

(2) Apply a lubricant to the end of the thermometer with petroleum jelly or a waterbased lubricant.

(3) Ensure the goat/kid is restrained (at the most minimal level) and lift the tail to gently insert the thermometer partway into the rectum and hold it there for at least 20-30 seconds.

(4) Remove the thermometer and read the results and verify the temperature falls within the appropriate range.

(5) The goat mustn't be stressed or hot when taking the temperature as this can change the reading to read outside of the normal range.

To check the respiration rate:

(1) Ensure the goat is calm and place a hand on its side (especially if there is a lot of hair). Count each breath that the animal takes (movement outward of the chest; or expansion of the chest wall) for 1 minute.

(2) Check the normal range in the chart above.

To check the heart rate or pulse:

(1) Ensure the goat is as calm as possible.

(2) Find the goat's artery below and slightly inside the jaw with your fingers

(3) Watch a clock (preferably a watch with hands) and count the number of heartbeats observed in 15 seconds (older members can use a stopwatch on their phone to count the time and a calculator for subsequent calculations).

(4) Multiply that number by 4 to get the number of beats per minute.

(5) Remember that the rate can be up to 2x higher for goat kids.

By looking at these signs and those found in Activity #1, you can better assess the goat's health. The numbers are important to record at an individual goat level, ideally before any conditions occur. However, these numbers can be skewed by environmental factors, so it is important to look at an animal's health with all aspects in mind.

#### **Other Important Vital Signs**

In addition to temperature, respiration rate and pulse, it is also important to assess other key factors:

Rumen movements and sounds:

(1) You can place your fist or palm onto the left flank of the goat to feel for rumen movements. The normal response should be a feeling of churning or rumbling 1-2 x per minute.

(2) You can also use a stethoscope to hear movements more clearly. A stethoscope is used in a variety of circumstances for

determining the physical condition of animals. A veterinarian is a great resource and should always be part of the herd care team and maintain a good relationship with the producer.

By looking at these signs and those found in Activity #1, you can better assess the goat's health. The numbers are important to record at an individual goat level, ideally before any conditions occur. However, these numbers can be skewed by environmental factors, so it is important to look at an animal's health with all aspects in mind.

#### Discuss It!

What does normal look like? Does the goat look uncomfortable? Do the vital signs point to abnormal physical signs which might explain an underlying condition or disease?

#### **Comparison to Humans**

When comparing the vitals of goats and humans, it is essential to remember that there are some significant differences. Firstly, humans are monogastric (one stomach), while goats are ruminants (four-chambered stomach). The difference means that goats will have rumination bouts, while monogastrics will not.

Additionally, as you will see from the table below, humans have relatively lower respiration and pulse rates than goats. This is due to the size of the animal. In the animal kingdom, a general rule is that the larger the animal, the lower the pulse and respiration rates. For example, shrews and mice commonly have pulses over 200 beats per minute! See the table below for an overview of the differences in vitals between goats and humans. Adolescents also generally have higher rates (due to their smaller size when compared to their adult counterparts).

Vital Sign	Goat	Adult Humans
Temperature	39.0-40.0°C	36.1- 37.2°C
Respiration Rate	15 to 30 breaths per minute	12 to 16 breaths per minute
Heart rate (pulse)	70 to 90 beats per minute	60 to 100 beats per minute

#### **Biosecurity Break!**

Make sure that you wash your hands before and after you take an animal's vital signs. You can spread diseases from one animal to the next on your hands (consider gloves or other personal protective equipment (PPE)).

#### ACTIVITIES #1 CAN YOU CHECK THE VITAL SIGNS?

		Split into groups with around equal numbers of
	Time: 20 minutes	both older and younger members
	Time: 20 minutes Materials Needed: record-keeping sheet, rectal thermometer, lube/jelly, timer (if the thermometer does not automatically time), recording device	<ul> <li>Split into groups with around equal numbers of both older and younger members</li> <li>Assign each group a goat/kid and take vital signs</li> <li>To take vital signs:</li> <li>Temperature <ul> <li>(1) If glass, shake the thermometer down to ensure an accurate reading.</li> <li>(2) Apply a lubricant to the end of the thermometer with petroleum jelly or a water-based lubricant.</li> <li>(3) Ensure the goat or kid is restrained at the most minimal level, lift the tail, gently insert the thermometer under the tail partway into the rectum, and hold it there for at least 20-30 seconds</li> </ul> </li> </ul>
		(more time if a glass thermometer). (4) Remove the thermometer and read the
DO		results and verify the temperature falls within the appropriate range.
		(5) The goat mustn't be stressed or hot when taking the temperature as this can change the reading to read outside of the normal range.
		TIP: To avoid any discomfort or loss of thermometer, attach a string to the thermometer
		Respiration Rate
		<ul> <li>(1) Ensure the goat is calm and place a hand on its side (especially if there is a lot of hair). Count each inhalation (move outward of the chest; or expansion of the chest wall) for 1 minute.</li> <li>(2) Check the normal range in the chart above.</li> </ul>

#### ACTIVITIES #1 CAN YOU CHECK THE VITAL SIGNS?

	Heart Rate
DO	<ul> <li>(1) Ensure the goat is as calm as possible.</li> <li>(2) Find the goat's artery below and slightly inside the jaw with your fingers.</li> <li>(3) Watch a clock (preferably a watch with hands) and count the number of heartbeats observed in 15 seconds.</li> <li>(4) Multiply that number by 4 to get the number of beats per minute.</li> <li>(5) Remember that the rate can be up to 2x higher for kid goats.</li> <li>Other Measures</li> <li>(1) Read over the other measures and observations and highlight any that you might be unsure about.</li> <li>(2) Throughout the rest of this project, you will find more about these techniques, which will help improve your knowledge.</li> <li>(3) Count up the number of answers that fall within the grey section.</li> </ul>
REFLECT	The objective is to learn how to take the vital signs of your goat and other animals. This will help determine how to identify normal vital signs to identify any abnormal signs.
APPLY	Why is it important to look at animal vital signs? How did the vital signs differ between animals? Were the goat/kid's vital signs in the normal range? How many items fell within the grey boxes? Do you think this might be a sign of bad health? How do goats' vital signs compare to humans?

Healthy Goat Check List (Adapted from: General Health Guidelines for Meat Goats; Rachael Boyle; K-state Research and Extension Phillips-Rooks District)

Healthy Goat Checklist	No	Yes
Are the eyes dull or cloudy?		
Are the eyes or nose very runny?		
Is the goat standing hunched up?		
Have diarrhea?		
Coughing or breathing hard without exercise?		
Coat rough and flaky or any bald spots?		
Lameness or stiff moving?		
Poor appetite?		
Depressed or weak and uninterested in surroundings?		
Rumen movements or sounds (normal number)?		
Temperature (normal)?		
Respiration rate (normal)?		
Heart rate (normal)?		

#### **Topic Information**

#### **Overview of Organ Systems**

"An ounce of prevention is worth a pound of cure." Most farmers know that many diseases can be prevented through sound management practices. On the next page are some of the practices that we can use to ensure that we have well-managed, healthy goats.



#### **1. KEEP CLEAN**

Keep pens, feeders and waterers clean and dry. The air should be fresh and not too humid due to appropriate ventilation systems. This can prevent the growth of bacteria and viruses that cause disease.

Example: the organisms that can cause mastitis often live right in the goat's stall. Under the right conditions, these organisms invade the goat's udder and cause a serious infection. Cleanliness helps to limit the number of parasites that can infect a goat. These can be external parasites (those on the skin) and internal parasites (those that live inside the goat).

HOW TO DO IT

- From spring through to fall, clean out stalls at least once or twice a week.
- Do not allow stalls to become damp.
- In winter, you may allow bedding to build up into a deep litter to hold the warmth, but be sure that the stall is clean and dry on top. Clean stall out completely before springtime and fly season.

• Make sure that the barn is properly ventilated to bring in fresh air, remove humidity, ammonia, and other gasses.

• Build feeders and waterers so goats can't get feet into the food or water.

#### 2. KEEP FLIES UNDER CONTROL

Flies can spread diseases by walking on an infected surface and then walking on another to transfer the infection.

Example: A fly can spread an eye infection such as "pinkeye" by walking on the eye area of an infected goat and then flying to another goat's face.

#### HOW TO DO IT

- Locate the manure pile well away from the barn or pasture.
- Wash down all milk spills in the barn immediately after they happen.
- Put screens on all windows and air vents in the barn.
- Hang up fly stickers from the barn ceiling.
- Keep stalls clean especially during fly season.
- Try a trap that uses a fly attractant mixed with water to attract and kill flies. Flies go into the trap and are drowned without the use of pesticides.

#### **3. PROPER FEEDING AND WATERING**

Many diseases are caused by improper feeding and watering. "Improper" can mean poor quality feed, irregular feeding times, sudden changes in quantity or type of food. All of these things can disturb the delicate balance of good bacteria that live in a goat's stomach and help digest food. Example: Mouldy or dirty feed can cause several deadly diseases such as listeriosis (circling disease) or polio. Poisonous moulds or bacteria can grow in mouldy hay or grain. The goat eats the feed and becomes very sick or may even die.

#### HOW TO DO IT

- Select regular feeding times.
- Make all feed changes gradual.

• Turn goats out onto pasture only after letting them become accustomed to the rich grass over increasing periods each day.

• NEVER feed mouldy or dirty feed. Mouldy hay should always be discarded – a bale of hay costs a lot less than a new goat.

#### **4. CONTROL PARASITES**

External parasites such as lice or mites like to bite the goat's skin. This can be very uncomfortable for the goat, just like when you are bitten by many mosquitoes. Internal parasites live in the goat's body in areas such as the digestive system and the lungs.

These internal parasites can be either one of many types of worms or microscopic parasites such as coccidia. Almost all parasites feed on the goat's body and drain away nutrients. In large numbers, most parasites can kill the host (the animal that they live on). Haemonchus also known as berberpole worms are a common internal parasite.

#### HOW TO DO IT

• In the winter, a dusting with a lice or mange treatment, such as rotenone powder, will usually kill most external parasites. Ivermectin wormer (given as an injection or orally) also kills many of the blood-sucking types of external parasites.

• Internal parasites are controlled by using certain types of worm medications. Before worming, it is best to collect droppings from your goat and have these analyzed to find out which worms are causing problems. Your veterinarian can then help you choose the best medication to do the job correctly.

#### Do it!

Check your Water and Feeders. Water must always be available. Check water frequently and if soiled, scrub pail and provide fresh clean water. Goats will refuse to drink water with poop or grunge in it or drink less and encounter problems.

#### **5. TRIM HOOVES REGULARLY**

As mentioned, clipped hair will discourage external parasites in the summer months. Poorly trimmed feet will cause joint problems in the goat's legs. Also, untrimmed hooves can fold over the sole and lead to hoof rot – a disease that decays the hoof and cripples the goat. Hoof rot has a very strong and unpleasant odour. The sole of the hoof will usually be black and very soggy instead of pink and firm (as it should be healthy foot).

#### HOW TO DO IT:



Hoof wall has grown too long and is bending out at the toe. Heels are very thick and overgrow. Hoof wall is bent inwards over the sole.

TO TRIM: Trim heel down even with sole. Trim away excess hoof wall until even with sole.



Sole should be completely flat. The hoof walls should be trimmed even with the sole.



From the side, a well-trimmed hoof looks neat and compact. The angle of the sole should be almost the same as the hairline at the top of the hoof.

#### 6. VACCINATE GOATS TO PREVENT DISEASES

The threat of some diseases can be partly eliminated by vaccinating the goat.

For example: Tetanus is caused by a toxic organism that lives in the earth. It can easily enter a goat's body through a cut or puncture wound. A vaccinated goat stands a much better chance of fighting off tetanus.

#### HOW TO DO IT

Talk to your veterinarian about recommended vaccinations. If you have only a few goats, you might have your veterinarian vaccinate them. If you have several goats, you might want to learn how to give vaccinations yourself.

<u>NOTE: RABIES</u> vaccination may be very important in your part of Ontario. Speak to your veterinarian about the need for rabies vaccination.

#### 7. PREVENT EXPOSURE TO DISEASE

Many diseases of animals are spread by contact with other animals.

For example: Orf, a contagious skin disease, is very easily transmitted from one goat to another.

#### HOW TO DO IT

• Learn to recognize the most common diseases of goats. Learn how these diseases are spread and how to prevent their spread.

• Try to purchase goats from a farm that has few health problems.

• Isolate all new goats from the rest of the herd for at least two weeks. Observe them for any signs of disease. Do not put them into your herd until you are sure that they are healthy.

• When treating sick goats, keep them separate from the rest of the herd. At chore time, handle the sick goats last. Milk any goats with mastitis last.

#### 8. PREVENT STRESS

Be sure that stress levels are kept to a minimum. Many diseases stay dormant (inactive), but become active when goats are under abnormal stress.

#### HOW TO DO IT

- Don't overcrowd goats in stalls.
- Isolate a very aggressive goat from the rest of the herd so that it can't cause trouble and injury.
- Keep insects (flies and mosquitoes) away from the goats.
- Goats like a constant routine try to do the chores at the same time and in the same way.
- Handle goats in a calm manner;
- Do not keep a goat by itself goats are social creatures and must be able to see and hear other goats.
- Buddy system introduce a pair of goats to new pen (single smaller goat may get bullied)

#### ACTIVITIES: #2 AN OUNCE OF PREVENTION

		Ask members what they think the saying, "An
	Time: 20 minutes	ounce of prevention is worth a pound of cure"
		means?
	Materials needed:	
	Chart paper, markers,	Can they think of anything that they have learned
	case scenario	that they might apply to this saying? Checking vital
	and supporting	signs, minimizing stress.
	documentation	
		Through Charades, get each member to act out
		one of the following scenarios and get members
		to classify the scenarios into one of the previous 8
		"tactics". Members can call out their answers:
		1. A goat gets skin irritation on its udder from
		damp bedding. What would you do about it?
		(lactic 1 – Clean out the stall, or if it is winter, put
		down lots of fresh bedding).
DO		2. A goat gets foot rot because dirt gets stuck
		the seles of its fact. What would you do? (Tastia
		The soles of its feet, what would you do? (factic
		them).
		3. A goat is going to be going out onto pasture
		soon. What should vou do? (Tactic 3 – turn it out
		for a little while each day until it is used to the
		fresh grass).
		4. You hear that there is a lot of pink eye infection
		being spread from goat to goat. It is summer, and
		there are a lot of flies around. What will you do
		about it? (Tactics 2 and 7 – Do your best to control
		flies around the farm. Do not let your goats come
		into contact with infected goats. Be sure that the
		barnyard is kept clean to discourage flies from
		coming around).

#### ACTIVITIES #2 AN OUNCE OF PREVENTION

		6. You bought a new goat and have just brought
		it home. What should you do before putting it in
		with the rest of your goats? (Tactic 7 – isolate it for
		at least one or two weeks to ensure it isn't ill or
		even a little longer if possible. When you are sure
		that it is healthy, it can be added to your herd).
		7. Your goats are scratching themselves against
		walls and feeders. They seem to be losing patches
		of hair. What would you do? (Tactic 4 – the goats
DO		probably have lice. If the weather is warm, you
		would trim the goats. Dust them with rotenone
		powder to kill lice. You could also give an
		ivermectin compound orally or by injection to kill
		the blood-sucking type of lice).
		8. Your goat might get cut or scratched by
		something in your barnyard. What could you do
		to prevent the goat from getting tetanus from the
		cut? (Tactic 6 – Vaccinate the goat with a tetanus
		vaccine).
		The objective is to apply some key tactics to
		improve goat health that can be easily applied to a
		farm operation.
		What tactic do you fool is the most important to
		maintaining goat boalth?
	Discuss the following	
APPLY		How might you apply those goet took since to a
	prompts as a group	now might you apply these goat techniques to a
		goal operation?

A goat gets skin irritation on its udder from damp bedding. What would you do about it? (Tactic 1 – Clean out the stall, or if it is winter, put down lots of fresh bedding).	A goat gets foot rot because dirt gets stuck underneath the hoof walls that have folded over the soles of its feet. What would you do? (Tactic 5 – trim the feet properly so that dirt can't stick to them).
A goat is going to be going out onto pasture soon. What should you do? (Tactic 3 – turn it out for a little while each day until it is used to the fresh grass).	You hear that there is a lot of pink eye infection being spread from goat to goat. It is summer, and there are a lot of flies around. What will you do about it? (Tactics 2 and 7 – Do your best to control flies around the farm. Do not let your goats come into contact with infected goats. Be sure that the barnyard is kept clean to discourage flies from coming around).
You have an aggressive goat that is fighting with some of your other goats. What are you going to do? (Tactic 8 – make sure that your goats aren't overcrowded. If necessary, take the bully out of the pen and put it in a stall by itself).	You bought a new goat and have just brought it home. What should you do before putting it in with the rest of your goats? (Tactic 7 – isolate it for at least one or two weeks to ensure it isn't ill even a little longer if possible. When you are sure that it is healthy, it can be added to your herd).
Your goats are scratching themselves against walls and feeders. They seem to be losing patches of hair. What would you do? (Tactic 4 – the goats probably have lice. If the weather is warm, you would trim the goats. Dust them with rotenone powder to kill lice. You could also give an ivermectin compound orally or by injection to kill the blood-sucking type of lice).	Your goat might get cut or scratched by something in your barnyard. What could you do to prevent the goat from getting tetanus from the cut? (Tactic 6 – Vaccinate the goat with a tetanus vaccine).

#### **Topic Information – Spotting Disease Early**

Remind members prevention is most important when discussing goat health. However, as much as we try to keep down the population of disease-causing organisms and reduce stress, illness is bound to occur at some time. Early recognition is essential.

This section includes information on some of the ways in which we can recognize health problems before they become too serious. Observation is the most important tool that we have. However, there are some testing procedures that can be of use to us as well.

#### OBSERVATION

#### **Observe it!**

The best way to detect disease is by spending a little time watching your goats each day.

- A goat that does not seem to have an appetite.
- A goat that stands away from the rest of the herd.
- Any unusual movements or motions i.e. repeatedly walking in circles, holding the head in an unnatural position, unusual breathing or cries.
- Diarrhea or other digestion problems.
- In dim light, a goat usually has large, square-shaped pupils. A goat with a fever will often have small, thin pupils that look more like a slit than a square.

#### TESTING

• Fecal samples: Used to check for levels of internal parasites such as coccidia or worms. Sometimes used to diagnose illness.

- Blood samples: Used to detect many types of diseases.
- Milk samples: Used to detect mastitis and to identify the type of mastitis infection in the udder. Sometimes, used for pregnancy testing.
- Urine samples: Used to detect pregnancy toxemia (ketosis) in pregnant does.
- Temperature: Normal temperature can range between 39°C-40°C. A low temperature or one above 40.0°C may be a sign of illness.

#### ACTIVITIES #3 IDENTIFY "NORMAL" VS NON-NORMAL

	Time: 15 minutes	Keep everyone together, watch and watch the goats or
	Matorials poodod:	pull up videos of some goats (if unable to go on farm).
DO	Goats or Videos of	Tell the youth to watch what the goats are doing.
	Goats	
REFLECT		The objective is to identify normal behaviours of the goats to be able to identify abnormal ones.
		Organizational behaviour (heads down and engaging
	Discuss the following	other goats)?
	prompts as a group	Goats are herd animals, typically led by a dominant
		female (queen) and a dominant male. In nature, the
		the way when foraging for food and will be first in
		line for the most highly desired nutrition and housing
		areas.
		In addition to the dominant queen, the rest of the
		goats will establish a pecking order based on their
		ability to challenge other goats. Goats display their dominance by lowering their head and pointing their
		horns at a more subordinate animal. This behaviour
ΑΡΡΕΥ		occurs until an animal of equal or undetermined
		dominance has been ranked at the herd level.
		When novel goats are added to the herd, fights can
		occur to establish their place within the pecking order.
		the importance of limiting regrouping stress to avoid
		prolonged dominance clashes.
		If you were in the area with goats, were they curious
		about you?
		What would be some abnormal behaviours you might
		observe if there was a problem?
		Can members identify the boss/bully goats?

# MEETING 2 – ANATOMY AND WELFARE

#### **Setting Objectives**

To describe the anatomy of the goat, understand the different functions of the organ systems and define illness and how it can be prevented.

Suggested Lesson Outcomes

- $\Box$  To understand the anatomy of a goat.
- □ To describe the major organ systems of the goat, what they do and what might happen when things go wrong.
- $\hfill\square$  To define illness and understand the importance of prevention.

#### Suggested Roll Call Questions:

- What is a part of a goat that you already know, and what does it do?
- What are some ways you can prevent illness in your goat?
- How can you ensure your goat has good welfare?
## Sample Meeting Agenda Time: 2 hours 5 minutes

Welcome, Call to Order & Pledge		10 min
Roll Call		5 min
Parliamentary Procedure	Minutes and Business	10 - 15 minutes
Activities Related to Topic	Activity #1- Label me!	25 minutes
Topic Information Discussion	Organ System Overview	20 minutes
Activities Related to Topic	Activity #2- What does what?	10 minutes
Topic Information Discussion	Importance of Animal Welfare	10 minutes
Activities Related to Topic	Activity #3- Preventing Illness and Maximizing Welfare	20 minutes
Wrap up, Social time and adjournment		10 minutes

## ACTIVITY #1 LABEL ME!

	Time: 20 minutes	AT HOME (VIRTUAL) OR NO ACCESS TO
		GOATS:
	Materials needed:	
		In pairs (try to pair up older and younger youth), give
	numbered anatomy	each pair a numbered anatomy of the goat picture,
	of the goat picture,	the word bank and the fill in the blanks.
	the word bank and	
	the fill in the blanks.	Get each pair to go through the goat and label it the
		best they can (15 minutes).
		At the end of the 15 minutes, go around and go
		through each number on the goat (blue = easy;
DO		green = hard) (10 minutes).
		For each hard answer that is correct assign 2 points
		and for each easier answer award 1 point.
		Sum all points together and see how everyone did!
		ON FARM WITH GOATS:
		Get all members to look at one goat and go over the
		anatomy of the goat. In 15 minutes, how many parts
		of the goat can they name.
		Go over the additional anatomy that members
		missed and the sample questions below (10
		minutes)
		The objective is to learn the anatomy of the goat to
KEFLECT		judge health and conformation.
		Why do you need to know the anatomy of your
		goat?
	Discuss the following	
APPLY	prompts as a group	Why else might your goat anatomy be important?
		What connections were you looking for?



# **UnLabelled Goat Anatomy**



# Numbered Goat Anatomy (Blue and Green)



Fill in the Blanks			
1.	2.		
3.	4.		
5.	6.		
7.	8.		
9.	10.		
11.	12.		
13.	14.		
15.	16.		
17.	18.		
19.	20.		
21.	22.		
23.	24.		
25.	26.		
27.	28.		
29.	30.		
31.	32.		
33.	34.		
35.	36.		
37.	38.		
39.	40.		
41.	42.		
43.	44.		
45.	46.		
47.	48.		
49.	50.		
51.	52.		

Word Bank:

Neck Back **Nostrils** Barrel **Point of Shoulder Bridge of Nose** Poll **Brisket Dew Claw Rear Udder** Ribs Ear **Shoulder Blade** Eye Sole **Fore Udder** Forehead Tail Teat **Heart Girth** Thigh Hip Throat Hock Toe Jaw **Udder Floor** Knee Muzzle Orfice **Cannon Bone Chest floor** Pastern Chine Pin Bone Crop Point of elbow **Rear Udder Attachment** Dewlap Flank Rump Forearm Stifle Fore udder attachment Tail head Heel Tendon Loin Thurl **Milk Vein** Withers

Answer Key	
1. Poll	2. Neck
3. Shoulder Blade	4. Withers
5. Crop	6. Chine
7. Back	Barrel
Loin	Rump
Нір	Thurl
Tail Head	Tail
Pin Bone	Rear Udder Attachment
Thigh	Stifle
Rear Udder	Medial Suspensory Ligament
Tendon	Hock
Dew Claw	Pastern
Heel	Udder Floor
Orifice	Teat
Fore Udder	Fore Udder Attachment
Milk Vein	Flank
Ribs	Sole
Тое	Cannon Bone
Knee	Fore arm
Chest Floor	Point of Elbow
Brisket	Heart Girth
Point of Shoulder	Dewlap
Throat	Jaw
Muzzle	Nostril
Bridge of Nose	Eye
Forehead	Ear

## **Topic Information**

## **Overview of Organ Systems**

The goat is made up of millions of cells that are organized into tissues and organs. These cells belong to the following systems:

- Nervous System
- Circulatory System
- Respiratory System
- Musculoskeletal System
- Digestive System
- Urinary System

## **Nervous System**

- Reproductive System
- Lympho-reticular System
- Sensory System
- Integumentary system

The nervous system of the goat is composed of three parts: the nerves (long fibres), the brain and the spinal cord. These nerves allow for signals (or messages) to be relayed back to the spinal cord and the brain. These signals can then be acted on moving muscles and bones or causing different biological functions to occur.

## **Circulatory System**

The circulatory system includes the heart and blood vessels. This organ system is responsible for transporting blood around the body to carry nutrients and exchange oxygen for carbon dioxide. The heart is a muscle that pumps blood around the body from the chest cavity. Blood vessels that leave the heart are called arteries, while the ones that return blood to the heart are called veins. The capillaries are what link these two types of vessels with the other cells in the body. Ensuring blood and nutrients can make it to cells around the body is very important. This is why determining a pulse rate is one of the essential skills covered in Meeting 1 of the Health Section.

## **Respiratory System**

The circulatory system ensures that oxygenated blood goes around the body, and the respiratory system ensures that blood is oxygenated. The respiratory system includes organs such as the lungs, nose, mouth, trachea, and bronchioles. These components work together to perform the gas exchange within the lungs through tiny sacs known as alveoli. This interconnection of these alveoli with blood vessels is why these two systems are often linked together to form the circulo-respiratory system as one needs the other in good function to help the body stay at balance (also referred to as homeostasis). The respiratory system was evaluated in Meeting 1 of the Health

### Musculo-Skeletal System

While bones provide the structure, form and protection for internal organs, the muscles allow for the movement of those bones. They also further reinforce the strength of the body by further helping to protect the internal organs. The musculoskeletal system relies on blood from the circulatory system (as these processes require oxygen and energy) and signals from the nervous system to function.

### **Digestive System**

These organs allow for food to be digested, starting with the mouth and the teeth that allow for mechanical digestion of their feed (breaking it into smaller pieces). The bolus then passes into the ruminant stomach, which is very different than the monogastric stomach. This system will be covered in depth in Section 2 of the Goat Project- Nutrition.

### **Urinary System**

The urinary system is the way that the body deals with waste in the body as urine is excreted. The urinary system helps detoxify the body and maintains homeostasis with their environment and nutrition. The key organs include the bladder and the kidney.

### **Reproductive System**

The reproductive system allows for individuals to propagate and carry on the genes of their species. The male organs include the testes, penis, and scrotum. The testicles (testes) produce semen. The female reproductive system consists of the vagina, ovaries, and other organs. The female reproductive system contains the "eggs," which are fertilized by the male sperm to create the offspring. This topic is covered in Section 4 of the Goat Project (Genetics and Reproduction).

### Lympho-Reticular System

This system includes the lymph nodes and bone marrow which help detoxify and make red blood cells for the blood.

### Sensory System

This organ system is responsible for the senses (touch, smell, taste, vision, and hearing). These organ systems are often classified under the nervous system as their response is regulated by the brain. Still, they are often separated as they do not conform only to that system.

## Integumentary System

This is the organ system composed of the skin, hair, nails, and exocrine glands. It protects the organs from the outside, but it can also be a sign of underlying health problems (if the coat appears rough or dull in appearance).

## ACTIVITY# 2 WHAT DOES WHAT?

DO	Time: 10 minutes Materials needed: "What does What?" worksheet, pencil or writing instrument, ruler.	Ensure each person gets a copy of the "What does What?" worksheet, which has three columns. In the first column, there are functions; in the middle are organ systems, and in the third is a list of organs. The task is to match the function(s) to the corresponding organ system and those organ systems to the organ(s) involved with that system.
REFLECT		The objective is to understand the organ systems present in the goat and identify those organ system's normal functions.
APPLY	Discuss the following prompts as a group	Did you identify all of the organ systems? Did you identify all of the organs within organ systems? Some of the organs belong to more than one system. How can organ systems work together to maintain good health?

## WHAT DOES WHAT?

Job or Function	Organ Systems	Organs
Provide support, structure	Nervous System	Bladder
and movement		Blood Vessels
Digest and absorb nutrients	Circulatory System	Bones
	Respiratory System	Brain
Uses blood to carry	Musculoskolotal System	Ears
substances around the body	inusculoskeletai system	Eyes
Responsible for gas exchange	Digestive System	Heart
(breathing)	Urinary System	Kidneys
Remove poison and waste		Lungs
from the body	Reproductive System	Lymph Nodes
Controls the body carrying	Lympho-reticular System	Muscle
signals	,	Nerves
	Sensory System	Nose
Senses and detects things outside the body	Integumentary system	Ovary
,		Skin
To produce and feed young		Spinal Cord (CNS)
To protect against disease and		Spleen
to produce blood		Testes
To cover the body and provide		Trachea
protection		Udder

# WHAT DOES WHAT? (ANSWERS)

Job or Function	Organ Systems	Organs
	1. Nervous System	Bladder (6)
Provide support, structure	2 Circulatory System	Blood Vessels (2)
and movement (4)	2. Circulatory System	Bones (4)
Digest and absorb nutrients	3. Respiratory System	Brain (1)
(5)	4. Musculoskeletal System	Ears (9)
Uses blood to carry		Eyes (9)
substances around the body	5. Digestive System	Heart (2)
(2)	6. Urinary System	Kidneys (8)
Responsible for gas exchange		Lungs (3)
(breathing) (3)	7. Reproductive System	Lymph Nodes (8)
Remove poison and waste	8. Lympho-reticular System	Muscle (4)
from the body (6)	· / · · · · · · · · · · · · · ·	Nerves (1)
	9. Sensory System	Nose (9)
signals (1)	10. Integumentary system	Ovary (7)
		Skin (10, 8)
Senses and detects things		Spinal Cord (CNS) (1)
outside the body (9)		Spleen (8)
To produce and feed young (7)		Testes (7)
To protect against disease and		Trachea (3)
to produce blood (8)		Udder (7)
To cover the body and provide protection (10)		

### **Topic Information**

## What is animal welfare?

The National Farm Animal Care Council supports the following definition of animal welfare: Animal welfare means how an animal is coping physically, physiologically and psychologically with the conditions in which it lives. Physically includes pain and injury; physiologically includes environmental or disease stressors; and psychologically includes stressors that affect the senses, especially those that result in fear, fighting, distress or stereotypic behaviours due to either frustration or boredom. Animal welfare refers to the state of the animal; the treatment that an animal receives is covered by other terms such as animal care, animal husbandry, and humane treatment (NFACC).

There are good and bad states of welfare indicated by the scientific literature through studies and observations.

To ensure that animals achieve a good state of welfare: diseases must be prevented; veterinary treatment must be administered; appropriate shelter, nutrition, management, handling and slaughter practices. However, thoughts about what is good welfare may vary from individual to individual.

The scientific literature is most often referred to when discussing animal welfare. One of these documents is the Code of Practice developed with the help of the National Farm Animal Care Council (NFACC).

## **Code of Practice**

## Define State of Welfare!

A good state of welfare is further defined as "healthy, comfortable, well-nourished, safe, able to express innate behaviour, and if it is not suffering from unpleasant states such as pain, fear, and distress."

The Canadian Agri-Food Research Council (CARC) produced codes of practice starting in 1980. Today the NFACC (which followed CARC) has 16 species codes, either current or under revision (as of 2020). These codes undergo review every 5 years to ensure that they meet the current research within the field. This review can institute nothing, an addendum or a full review. The first goat manual was drafted in 2003 by CARC, and it is currently going through a revision from 2020-2021. The Code of Practice will be explored throughout the sections of this manual, with specific emphasis on those practices that promote positive animal welfare.

# Within the Code of Practice, there are Requirements and Recommended Practices. NFACC defines these as:

**Requirements** are considered to reflect practices essential for the delivery or maintenance of responsible care and handling. Requirements are often animal-based. These are most directly linked to animal welfare and can be applied in a wide range of production systems. Since requirements often state necessary outcomes, producers have the flexibility to determine how the outcomes can be achieved using individual management and husbandry practices.

**Recommended Practices** encourage continuous improvement in animal care and are intended to support Code requirements (though failure to implement Recommended Practices does not imply that acceptable standards of animal care are not being met).

The next activity in this meeting will cover Section 1- Role and Responsibilities and the importance of a policy that explains the commitment to animal welfare.

# ACTIVITY# 3 MAXIMIZING WELFARE

	Time: 20 minutes	As a group, read through the requirements and
		recommended practices (and potentially start with
	Materials needed:	the housing or feeding chapter if the youth are
	Chart Paper or	unfamiliar with the code).
	Markers (if required)	
		Ask the group how many have seen the Code of
		Practice in the past?
		Next, get the group to look over the policy for
		ensuring good animal welfare. Is that something that
		you think would be good to ensure you meet the
		requirements with your goats?
		The objective is to understand how the Code of
REFLECT		Practice is structured and the importance of animal
		welfare.
		What areas do you think are important to ensure
		animals have good animal welfare?
		What animal welfare practices might apply to meat
	Discuss the following	vs. dairy vs fibre goats?
	prompts as a group	How might you oncure good welfore for your
APPLI		animal(s)2
		Would you put the policy into practice?

# MEETING 3 – NO DISEASE, PLEASE!

## **Setting Objectives**

Setting Objectives: To create an understanding of contagious diseases that affect goats and how those can be prevented.

Suggested Lesson Outcomes

- $\hfill\square$  To learn the conditions that can affect goats.
- $\Box$  To identify how those diseases can be prevented.

## **Suggested Roll Call Questions:**

- What diseases do you know affect goats?
- How can diseases be controlled?

## Sample Meeting Agenda Time: 2 hours 5 minutes

Welcome, call to order, pledge		10 minutes
Roll call		10 minutes
Parliamentary procedure	Minutes and Business	10-15 minutes
Topic Information Discussion	Categories of Illness and Types	15 minutes
Activities Related to Topic	Activity #1- Three Types of	15 minutes
	Diseases	
Topic Information Discussion	Reportable and Notifiable	15 minutes
	Diseases	
Activities Related to Topic	Activity #2- Can you Contain the	30 minutes
	Outbreak	
Topic Information Discussion	Activity #3- Containment and	15 minutes
	Biosecurity Case Study	
At-Home Activity	Review an illness from the list	5 minutes
	provided before activity 1 and	
	come up with a diagnostic	
	method for the illness	
Wrap up, Social time and		10 minutes
adjournment		

## **Topic Information**

## **Categories of Illness and Types**

In the previous two meetings, normal goat signs, functions and welfare were explored, but it is also important to recognize those signs that a goat might be sick.

The Goat Code of Practice (NFACC) defines factors that influence a goat's ability to stay healthy, including:

- Meeting nutritional requirements
- Good feeding management, preventing contamination and spoilage
- Preventing nutritional and metabolic diseases
- Good air quality
- Adequate shelter
- Strong immunity, including passive transfer of immunoglobulins in newborn kids
- Low-stress environment
- Low risk of exposure to pathogens
- Husbandry and management practices that promote health (i.e., hoof care)
- Genetic susceptibility to disease

Goats are usually relatively healthy animals. But, like humans, goats do become ill from time to time. Most of the illnesses that affect goats fall into one of three categories – Infectious, Nutritional (Metabolic), or Parasitic. Some of these diseases can also be zoonotic, meaning that they can transfer from animals to humans (these include Q-fever, pink eye, ringworm, etc.). Therefore, it can be very important to maintain good hand washing and hygiene practices.



Although many of these factors will be explored in later sections of this manual, the topic information presented hereafter gives a summary of the common diseases:

1. Pregnancy Toxaemia/Ketosis: A disease of late pregnancy and early lactation occurring in the last 6 weeks of gestation in does with multiple fetuses (and not enough nutrition provided) or in the first 4 weeks for heavily lactating does (metabolic disease).

2. Milk Fever (Periparturient Hypocalcaemia): Starts one to three weeks post-kidding in high producing dairy goats with goats appearing uncoordinated, nervous and hyperactive before the doe stops eating and their ears get cold. The disease is based on calcium mobilization to support early lactation (metabolic disease).

3. Acidosis: When the proportion of grain to forage ratio changes suddenly, this can lead to an accumulation of lactate, leading to acidosis (or acidification of the rumen). The result can be the death of the bacteria within the rumen preventing leading to no ability for the rumen to do its job (nutritional disease).

4. Urinary Stones: If a diet is deficient in calcium and high in phosphorus (typical high grain diets), this can block the male urinary tract (metabolic disease).

5. Posthitis (Pizzle Rot): When the urine becomes too alkaline (mainly due to excess nitrogen in the urine in the form of urea), the urine can allow certain bacteria to infect the male urinary tract (nutritional disease).

6. White Muscle Disease: Caused due to a deficiency of the antioxidants, Vitamin E and Selenium (which are not available in Ontario Soil). When deficient, it causes acute muscle necrosis. Mainly manifests in young kids (nutritional disease).

7. Iodine Deficiency Abortion: Similarly to selenium, the Great Lakes basin is also deficient in iodine. Does require the highest amount of iodine during pregnancy, so when it is limiting, the result is either abortions or kids that appear weak (nutritional disease).

8. Polioencephalomalacia: Normally caused due to high carbohydrate diets that may cause an upset in the rumen bacteria. Ultimately, this change is a real or relative thiamine deficiency that can lead to softening of the brain (nutritional disease).

9. Clinical Coccidiosis: Adult goats shed coccidia into feces contaminating the environment for the kids. This is because the kids are exposed to more coccidia as the infection pressure builds up, leading to diarrhea, loss of condition, general frailness, and failure to grow adequately.

Although the cause is animal housing and health-related, the problem can be counteracted by adding coccidiostats to the water or feed (infectious disease).

10. Helminthiasis: The scientific term referring to infection with parasitic worms commonly observed in yearling that is turned out on pasture, but there are also cases with older does. Overall, parasite presence should be monitored and controlled if noticed (parasitic disease).

11. Clostridium perfringen type D: Associated with a change in quality and quantity of feed. In problem herds, there need to be vaccinations (potentially every 4-6 months). If left untreated, this can lead to acute enteritis (severe diarrhea, depression, milk yield drops and death even within 24 hours) (infectious disease).

12. Contagious ecthyma: Also referred to as sore mouth (orf), is an infectious disease that spreads through nursing, milking or handling. A topical vaccination can be applied to prevent this disease from spreading and allows goats to go to show (infectious disease).

13. Chronic Wasting: This is not caused by a single disease but rather due to multiple factors (also referred to as a syndrome). If goats are well fed, kept in a stress-free environment, has good teeth and a low parasite load, they will avoid this syndrome. If not, the affected goat should be removed from the herd and culled immediately (Multifactor Syndrome).

14. Paratuberculosis: Also referred to as Johne's Disease. It results from Mycobacterium avium subspecies paratuberculosis (MAP). This bacteria can survive countless environmental stresses and can live for longer than 1 year on pasture and even longer in water. The infection is acquired through the fecal-oral route early on in life. However, clinical signs rarely develop right away, and sometimes there are no clinical signs before a goat dies suddenly. The control program is to eliminate those positive for Johne's from the herd to prevent its spread to the younger kids (infectious disease).

15. Caprine arthritis and encephalitis (CAE): caprine= goats; arthritis = inflammation of joints, and encephalitis = inflammation of the brain and spinal cord. swollen joints are a sign, which can occur with no apparent lameness. Other tissues can be affected, such as the udder (hard, very little milk) and lungs. Kids affected by progressive paralysis of their limbs and usually have a normal appetite and have no fever.

Research has pointed to the spread of this retrovirus from the dam to kid through colostrum and milk. The treatment against this disease is to separate the offspring from the dam and feed heat-treated colostrum and pasteurized milk.

CAE eradication involves raising your own virus-free goats from within your own herd. This is done by separating all replacement kids from their mothers right at birth (before the mother cleans the kid off or the kid suckles her). The kid is then raised on one of the following:

- Heat-treated goat colostrum milk followed by pasteurized goat milk.
- Cow colostrum followed by pasteurized goat milk.
- Cow colostrum followed by cow milk.

Heat treating milk destroys some of the immunoglobulins in the colostrum. Still, the danger of CAE infection is such that most goat breeders choose to heat-treat milk OR feed cow colostrum and then pasteurized goat milk, cow milk or milk replacer.

These goat kids must be kept separate from the rest of the herd. They must be fed and watered separately using their own feeders and waterers. They must not be turned in with infected goats at any time. The separation between virus-free and infected goats should be at least several feet. Still, it is preferable to have a separate barn or section of a barn to prevent any accidental contact between the groups of goats.

However, this disease can be challenging to get rid of as infection can also spread between does. This means that rigorous culling is the only way to eradicate the disease (infectious disease).

# ACTIVITY# 1 THREE TYPES OF DISEASES

	01 0102/1020	r
	Time: 15 minutes	Again, ask members what they think the saying, "An ounce of prevention is worth a pound of cure"
	Materials needed:	means? This question was first asked in meeting 1 so
		this provides a way of checking in.
		Ask members to think about the last time they were
		sick – how did they feel – how is it different from
		when they felt healthy?
		Let members be aware that factors causing goat
		diseases are similar to what causes people to be
		sick. Comparing the flu as an infectious disease and
		illness might help clarify similarities.
DO		
		Also, to keep the relative size of these organisms
		in perspective, you can hold up the end of a pencil
		bacteria can fit on the end of the pencil. Also, their
		reproduction is so fast under ideal conditions that
		one bacteria can reproduce/divide to give over
		8,000,000 cells in 12 hours, the period between two
		miikings.
		With the chart paper, online board or 3-panel display
		board, classify those diseases that affect goats into
		Infectious, Nutritional or Parasitic based on the
REFLECT		The objective of this activity is to get to know the
		umerent diseases that affect goats.
		How can you best prevent illness?
	Discuss the following	Is this different for the different kinds of illnesses?
APPLY	prompts as a group	
		Was there anything surprising on the list?

Disease	Signs	Causes and	Prevention	Treatment	Economic
		Spread			Loss
Caprine	• Kids - paralysis	• Virus is present in	• Feed kids	Culling	• animals
Arthritis and	adults - swollen	milk and colostrum	pasteurized milk		culled or die
Encephalitis	joints, paralysis,	of infected does	and heat-treated		early in life
(CAE)	breathing	•. Also spread by	goat or cows		• lower milk
KAY-PRINE AR-	difficulty, hard	close contact from	colostrum		production
THR- EYE-TIS	udders	Doe to Doe, Doe to			
EN-SEF-A-	• Does may carry	Kid, or Kid to Kid			
LIGHT-TIS)	CAE but not				
	show it (however				
	chronic lameness				
	and arthritis are				
	signs)				
Coccidiosis	<ul> <li>kids can look</li> </ul>	<ul> <li>ingestion of</li> </ul>	prevent fecal	•sulfa drugs or	<ul> <li>stunted</li> </ul>
(COCK-SID- EE-	and feel fine while	infected feces	contamination of	Amprolium	growth
OH-SIS)	the	containing the	feed and water.		• some kids die
	damage is being	protozoan parasites	• sanitary, clean,		
	done		dry conditions		
	• stunted growth,		• wean gradually		
	usually in kids		over a week.		
	< 7 months old		• avoid		
	occasionally		overfeeding of		
	diarrhea		milk		
	<ul> <li>adult goats are</li> </ul>		<ul> <li>special feed</li> </ul>		
	carriers		additives and		
			coccidiostats		
			• coccidiosis can		
			weaken kids and		
			make them very		
			susceptible to		
			pneumonia		
Pneumonia	depression	usually caused by	• good	antibiotics	<ul> <li>reduced milk</li> </ul>
(NEW- MOAN-	• fever, loss of	bacteria	ventilation	• keep separate	production
ҮАН	appetite, drooping	<ul> <li>stress from</li> </ul>	without drafts	from the head	<ul> <li>lower weight</li> </ul>
	ears	poor ventilation,	• reduce dust	encourage	gains
	• rapid, di8icult	overcrowding	adequate space	eating and	
	breathing			drinking	

Disease	Signs	Causes and	Prevention	Treatment	Economic
		Spread			Loss
Scours (SCOW-ERS)	• off feed • diarrhea	<ul> <li>not fed colostrum soon enough after birth</li> <li>dirty environment</li> <li>may be caused by bacteria, viruses or protozoa</li> </ul>	<ul> <li>feeding colostrum within an hour after birth</li> <li>sanitary kid and kidding pens</li> <li>disinfect navel keep hands out of kids' mouths at birth</li> </ul>	<ul> <li>electrolytes to replace lost body fluids</li> <li>oral antibiotics may be necessary</li> <li>isolate infected kids</li> </ul>	• death • weight loss
(Orf) Sore Mouth	• small pimples which turn to scabs or blisters at the corner of the mouth, lips or on the gums	• contact with virus or scabs	<ul> <li>difficult to prevent unless you keep a closed herd</li> </ul>	<ul> <li>none</li> <li>sanitary</li> <li>precautions to</li> <li>prevent further</li> <li>infection</li> </ul>	<ul><li>weight loss</li><li>mastitis</li></ul>
Parasites	<ul> <li>EXTERNAL:</li> <li>flaky skin and/or</li> <li>hair loss</li> <li>scratching - not</li> <li>always visible</li> <li>signs</li> <li>INTERNAL:</li> <li>lower feed</li> <li>efficiency</li> <li>anemia (often no</li> <li>apparent signs)</li> </ul>	<ul> <li>contact with lice or mites</li> <li>ingesting worm</li> <li>egg or larva</li> </ul>	<ul> <li>insecticides</li> <li>avoid contact with infected goats</li> <li>dewormers</li> </ul>	insecticides     dewormers	<ul> <li>lower weight gains</li> <li>reduced gain and feed efficiency</li> </ul>
Pinkeye	<ul> <li>tears, water streaks below eyes, squinting</li> <li>Some can be carriers but not show signs</li> </ul>	<ul> <li>dust, high winds,</li> <li>bright sunlight</li> <li>infective</li> <li>organism is</li> <li>mycoplasma</li> </ul>	<ul> <li>don't expose goats to eye irritating things</li> <li>keep away from infected goats</li> </ul>	<ul> <li>antibiotics</li> <li>(avoid penicillin)</li> <li>keep in the shade and away from dust</li> </ul>	<ul> <li>decreased</li> <li>feed intake</li> <li>possible</li> <li>blindness</li> </ul>

Disease	Signs	Causes and	Prevention	Treatment	Economic Loss
		Spread			
Abscesses	• swelling of	• hacteria	• cleanliness	• isolate infected	• mainly a cosmetic
100000000	lymph nodes.	•	reduce stress	goats drainage of	problem
	especially	contaminated	• vaccines to prevent	abscess and use	• very little economic
	under the ear	housing	some abscesses	antibiotics	loss but may
	and on the	• stresses can	• do not buy or keep		predispose infected
	shoulder	increase the	carrier animals		goats to other
	shoulder	incidence of			diseases
		abscesses			
Abortion	• termination	• infectious	for infectious	antibiotics	reduced number of
(A-BOR- SHUN)	of pregnancy	• stress	causes: remove	vaccines in some	animals within the
	before the	nutritional	nlacenta fetus and		herd
	fetus can live	- nutritional	discharges so other		decrease in overall
	on its own		goats cannot contract		milk production
	on its own		the disease		decreased stock
					sales (especially if a
					meat goat producer)
Babies	• abnormal	• infectious	• keen goats indoors	None if infected	hitten goats may
	and aggressive	disease spread	at times when a	(*although	have to be destroyed
	behaviour OR	by hite or	rahies outbreak is	humans may be	• head will be
	doney sleeny	scratch of	occurring in your area	given injections	quarantined for some
	behaviour	an infected	• vaccinate for rahies	to ston disease if	time (see provincial
	• goat acts as	animal	if recommended by	they have been	reporting)
	though it is		vour veterinarian	hitten)	
	choking and			bitterij	
	having difficulty				
	breathing				
	salivation				
Mastitis	Udder is	infection in	• use good sanitation	antibiotic udder	decrease in milk
	swollen. milk is	the mammary	practices at milking	infusions	production
	clotty	, system	keep the goat	• sometimes	• cost of treatment
	,	,	in a clean, dry	injections to	discarded milk
			environment	severely affected	
			• treat dry goats at	goats (milk	
			the end of lactation	withdrawal will be	
			with a dry-cow	necessarv)	
			mastitis treatment if		
			needed and teat		
			sealant		

### **Topic Information**

# Becoming a Canadian goat producer creates a duty of care to their animals and a legal requirement to report all suspected cases of certain diseases.

The reporting requirements are laid out in federal (the Health of Animals Act) and provincial (the Animal Health Act) statutes. The diseases identified in these statutes represent diseases that can spread rapidly and may not be in Canada currently. As you will read, the best defence against all of these diseases is to stop the spread, and control the affected area. Although the diseases listed

## Discuss It!

What is encompassed by the term duty of care?

have awful human and animal health implications, they can be prevented and controlled.

The Canadian Food Inspection Agency (CFIA) enforces the reportability guidelines. To ensure compliance, the CFIA will often cover the cost of disposal of the infected animals. For example, for an outbreak of Scrapie, all the animals exposed to the same birthing environment are deemed at risk of developing the disease and are ordered destroyed. Producers are compensated for the loss of their animals. The maximum amount of compensation paid for goats ordered destroyed under the Health of Animals Act is \$600 for non-registered animals and \$1000 for registered animals. Sheep or goats known to be infected with Scrapie are humanely destroyed. Their carcasses are burned or buried under CFIA supervision (Scrapie Canada).

These diseases are serious, so the federally reportable diseases are explained below:

### **Federally Reportable Diseases**

1. Anaplasmosis: This disease is also called gall sickness and is primarily caused by ticks that carry the bacterium Anaplasma phagocytophilum. This bacterium invades the blood cells leading to anemia (due to a breakdown of the blood cells). Anemia refers to any condition in which there is a lack of healthy red blood cells that carry oxygen to the body's tissues. The symptoms are hard to spot upon the first infection but lead to fevers, muscle weakness and irregular heartbeats. In general, an infected goat will appear like it does not have energy. This goat should be separated from the rest of the herd, and the incident should be reported to the authorities. This is an economically significant disease, especially if there are biting flies present, which can further spread the disease. With the increase in global temperature, tick populations are moving further north with the many diseases that would not be experienced normally by the goat industry.

2. Anthrax: This disease results from infection by the bacterium Bacillus anthracis. This disease is a concern for producers as it can survive in two forms. Its first form is vegetative (easy to kill). The other is a sporulated/spore form, which is highly resistant to temperatures, drying or disinfectants. Anthrax is usually contracted by livestock when they eat the bacillus spores on plants in pastures. Sudden death is the typical sign; however, fever, staggering, excitement, depression, incoordination, trembling and difficulty breathing can also be symptoms. If an infection is suspected, contact a veterinarian immediately, and they will advise on next steps. Due to the way that the bacterium incubates, this can only spread the spores more. Additionally, spores can remain dormant in the soil or animal by-products meaning that they can spread up to 10 years later. This is why this is a nasty and reportable disease.

3. Besnoitiosis: This refers to Caprine besnoitiosis caused by the cyst-forming protozoal apicomplexan Besnoitia caprae. The disease is endemic (regularly found in a certain area) of Kenya, Nigerian and Iran. Still, it has also been identified in other parts of the world as well. The disease has a generally high infection rate but low mortality. The parasites cause lesions on the skin, nasal cavity and larynx. This disease is reportable as it is economically important in other ruminant and equine species. Not a lot is known regarding its transmission or pathogenesis.

4. Bluetongue: A severe viral disease that is caused by orbivirus transmitted by the genus Culicoides (biting gnats). The disease is isolated based on the range of these gnats, but as temperatures have warmed, the disease has spread North in Europe. Disease spread occurs mainly in the late summer and early fall, and is self-limiting primarily (resolves without treatment) in goats, but is economically significant for other ruminants (particularly sheep) and wild species.

#### Fun Fact!

Although the disease is referred to as bluetongue, it rarely leads to cyanotic (blue= lack of oxygen) tongue. It instead mainly manifests in sheep as fever, swelling of the face, and nasal discharge. Again, the disease often does not show symptoms in goats.

5. Brucellosis- This disease is caused by infection from a species of Brucella. Brucella melitensis is the most important species in sheep and goats. The disease can lead to abortion, retained placenta, and swelling of the testicles (leading to infertility). Additionally, this disease can be spread to humans and goats through any of the goat's bodily fluids. The ability for this disease to spread makes it a reportable disease.

6. Cysticercosis- This disease is caused by the larval stage of Taenia ovis (also known as tapeworms). The parasite leads to cysts occurring in the muscles, brain, liver or peritoneal cavity leading to death. The parasite is on the list due to the risk for dogs and other sheep and goats.

7. Foot-and-Mouth Disease (FMD)- This viral disease is considered one of the most economically significant diseases for livestock caused by Aphthovirus. The virus infects many species of agricultural importance. It leads to vesicular lesions (blisters) on the infected individual's feet and mouth, leading to reluctant gait and eating. The only way to control this disease is to cull, as infected individuals can quickly spread the illness.

8. Peste Des Petits Ruminants- This disease carries a French name due to its discovery in Cote d'Ivoire (The Ivory Coast, a country in Africa) in 1942. The disease is characterized by fever, necrotic stomatitis (gut pain making eating or drinking difficult), gastroenteritis (diarrhea, vomiting and abdominal pain), pneumonia (respiratory infection), and sometimes death. Transmission occurs by close contact. Although it does not affect humans, it can spread very quickly to other goats or ruminants.

9. Rift Valley Fever (RVF)- This zoonotic viral disease (it can also infect humans) originated in Kenya's Rift Valley. It is commonly caused by close contact with the blood or organs of infected animals. Still, the disease can also be caused by bites from infected mosquitoes. The disease is normally confined to Africa, but a preventative vaccine makes this a preventable and reportable disease in Canada.

10. Scrapie- a fatal, degenerative disease caused by a prion (a type of protein that can trigger normal proteins in the brain to fold abnormally). These known prions make up the transmissible spongiform encephalitis (TSEs) that occur in cattle (BSE or mad cow disease; bovine spongiform encephalopathy) and humans (Creutzfelt-Jakob disease). Although there are no current associations supporting scrapie transfer into humans, BSE is a true problem for transmission, and it needs to be kept out of the food chain. The disease can transfer from dam to kid and to other kids in that same environment. There is no treatment for this disease, and it is to be kept out of the country through strict control.

### **Provincially Immediately Notifiable Diseases**

The following list of diseases from the regulations relating to goats is being reported:

- 1. Aino Virus Infection
- 2. Akabane Disease
- 3. Besnoitiosis
- 4. Borna Disease
- 5. Botulism
- 6. Contagious Agalactia
- 7. Contagious Caprine Pleuropneumonia
- 8. Coxiellosis (Q Fever)
- 9. Heartwater
- 10. Influenza
- 11. Japanese Encephalitis
- 12. Listeriosis
- 13. Louping III
- 14. Nipah Virus
- 15. Peste Des Petits Ruminants
- 16. Salmonellosis
- 17. Screwworm
- 18. Sheep and Goat Pox
- 19. Tick-Born Fever
- 20. Rabies
- 21. Toxic Substances that may cause a threat to animal or human health

### Research It!

Look up one of the diseases not previously identified in the national reporting guidelines and give its mode of action, treatment, infection risks and reasons for showing up on the list.

## **Quarantine and Emergency Response Procedures**

Now that we have identified those reportable diseases, it is essential to determine what happens when diseases are caught with enough time. Ontario goat has a great resource on this topic (Ontario Goat- Producer Handbook; Preparing the Ontario Goat Sector for Disease-Related

Sector-Wide Emergencies), which this manual will use to help explain the process by which Emergency Response Personnel follow when a report of a disease outlined above is made.



Each of these 6 phases of the response plan (Alert, Suspicion, Confirmation, Response, Recovery, and Prevention) requires cooperation from the producer, producer organizations, the provincial government and the federal government (and their associated ministries).

### **Biosecurity and Zoning**

There are three components or pillars to a good biosecurity program:

- 1. Bio-Exclusion: stop those infected individuals from entering the herd.
- 2. Bio-Management: Stopping infection from spreading within the herd or farm.
- 3. Bio-Containment: To prevent infected animals from leaving the herd.

Each of these components is key to a good biosecurity process. However, in the past ruminant industries have seen variable adherence to these strategies that would not be possible to avoid for pork or poultry producers. This is because of the ever-present potential for animal health and economic disaster that has occurred in these industries in the past. However, any of the diseases outlined already could impact the industry at any time.

A biosecurity protocol has been implemented outlining colour levels based on risk (Source: Ontario Goat):



#### Figure 2. Escalating Biosecurity Levels



These protocols can also be applied regionally through the use of zones that are regulated at a federal level (Source: Ontario Goat)

## ACTIVITY# 2

## CAN YOU CONTAIN THE OUTBREAK

	Time: 30 minutes	This activity introduces a game that can be applied
	Materials needed:	to many different levels of outbreak control.
	dice, game board	components of outbreak response and ensure good practices for each step of the process. This activity can also be done in a big field with pylons serving as the farms.
		To start, split the group into two equal groups: one group will serve as the viral group. In contrast, the other will perform as the government emergency response personnel. The virus strikes first, so it automatically goes first.
DO		On the board, there are 10 farms. The viral group will choose which farm they would like to start at and can move one to three spaces each turn depending on the roll of a dice:
		1. A roll of 1-2 means you can move 1 space on the board.
		2. A roll of 3-4 means you can move 2 spaces on the board.
		3. A roll of 5-6 means you can move 3 spaces on the board.
		Your goal as the viral team is to reach the next farm and make it to each farm on the board (to infect all of the farms).
		To start the response, the response personnel must roll a 5 or 6. If they do not, they will have to give up their turn and let the other team go again (giving the virus more time to move to infect more farms).

# ACTIVITY# 1

## **THREE TYPES OF DISEASES**

	lf ca vi	f the response personnel do roll a 5 or 6, then they an roll again to see if they do anything to stop the iral progression:
DO	1 vi 2 R rc h g a b c. d 3 t	<ul> <li>A roll of 1 means you cannot do anything, and the iral team also gets to move one step.</li> <li>A roll of 2-4 means you get to set up a roadblock.</li> <li>Boll again to determine the number of lines your oadblock can span (the line can go vertical and norizontal to try and block in the viral team from getting to other farms: <ul> <li>1-2 means you get 2 lines</li> <li>3-4 means you get 3 lines</li> <li>4-5 means you get 5 lines</li> <li>A roll of 5-6 means that nothing happens for that urn.</li> </ul> </li> </ul>
	T rc (t p st	The game ends when the virus is surrounded by oadblocks or when the virus infects all 10 farms this game is heavily skewed to the response personnel, but it is possible to get stuck at the first tep of the game for a while).
	T tł te	his activity can be done in paint or PowerPoint if his is a virtual club. If the activity ends early, switch eams (the strategy used should be very different).
REFLECT	T re CC	his activity aims to identify how emergency esponse works in terms of reporting and ontainment procedures.
	Discuss the following prompts as a group (10 minutes)	How difficult was it for the personnel to start? How does that relate to how diseases can spread quickly if not reported?
-------	---	---
APPLY		How many farms did the virus infect before they were cordoned off? If each farm represented 100 animals, how many animals were affected? Could that have been less if your dice rolls were different? How did the starting position of the viral infection affect the game? Did the second group change their strategy? How can you apply this game to your life? (think COVID pandemic).

					F	
	F					
			F			F
		F				
F						
				F		
		F				
						F

# ACTIVITY# 3 CONTAINMENT AND BIOSECURITY CASE STUDY

(CASE SOURCE: ONTARIO GOAT)

	Time: 15 minutes	Get a different member to read each part of the case
	Materials needed:	and discuss any of the highlighted terms.
DO	Case Study and definition sheet	Clear up any confusion about the case.
		This activity aims for youth to understand the
REFLECT		emergency procedures that are in place and how these might be used to stop a disease outbreak
		Do the steps in the emergency preparedness and
		outbreak protocol make sense?
	Discuss the following	
	prompts as a group	Were there any parts of the procedures that
APPLY		surprised you?
		Why are these procedures essential?

### **Case Definitions**

**Unusual Animal Health Event**- Whether it is a behavioural change or physical symptoms, these are the cues that producers should constantly be looking at. Producers must report any problems to the proper authorities, including your farm veterinarian or provincial or federal veterinarians.

**Notice of Suspicion**- The first of two precursors for a sector-wide emergency declaration with this one declared by the CFIA's Chief Veterinary Office or the Provincial Chief veterinarian. This first step can also be referred to as the gray period where an outbreak is suspected but not confirmed.

Notice of Confirmation- This is the second precursor and declares a severe animal disease.

**Disease Control Plan**- The overall plan by which containment and biosecurity practices are rolled out based on the zone.

**Primary Control Zone**- Made up of the Infected zone, restricted zone, and the security zone. It is usually as large as reasonably suspected, with the area likely to only reduce in size as control measures are implemented.

**Infected Zones**- These are the main focus for control efforts that encompass all of the infected places.

Joint Emergency Operations Centre- This is the central base of operations for the response effort.

**Restricted Zone**- Surrounds the infected zone.

**Security Zone**- Falls in between the outer perimeter of the restricted zone and the edge of the primary control zone. There is no restriction on size.

**Movement Controls-** Set up to control the movement of infected animals and their products. Biosecurity Protocols- The three-coloured framework is made up of bio-exclusion, biomanagement and bio-containment procedures. This definition can be further broken down into procedures for:

- Farm Access
- Sick Animals
- Incoming and Outgoing Traffic
- Staff
- Deadstock
- Production Area

**Mass Vaccination-** Mass vaccination is an essential aspect of the outbreak response. By vaccinating animals, producers can control the spread of the disease and create buffer zones. These can be ordered by the chief provincial or federal veterinarians.

**Destruction Order**- When an outbreak can only be controlled by mass depopulation and disposal of carcasses, it will be ordered by the chief federal or provincial veterinarians.

**Depopulation-** Made up of the destruction orders and the method of disposal. This can be made up of:

- Burial at a central location and/or approved secondary landfill sites
- Incineration
- Rendering
- Processing for food (depending on the disease)

**Valuation-** This is meant to set a fair compensation structure for those farms ordered to destroy animals.

**Compensation**- Money is given for those animals that need to be depopulated. Cleaned and Disinfected- CFIA sets out protocols for cleaning and disinfection post-outbreak.

**Lift Restrictions**- The last part of the response framework where the biosecurity and other protocols are lifted.

### **Case Study- Typical Disease Response**

After noticing that several animals are limping and have backed off feed on Friday, ABC farm staff proceed with an Unusual Animal Health Event protocol. They contact their local veterinarian to come and look at the animals.

The veterinarian suspects FMD, a federally reportable disease, and notifies the regulatory authority (CFIA). A senior veterinary officer with the CFIA visits the farm shortly afterward, clinically diagnoses FMD and declares that ABC Goats is an 'Infected Place.' Canada's Chief Veterinary Officer issues a formal **Notice of Suspicion** setting out very limited and general information related to the incident.

Within days, the National Centre for Foreign Animal Disease in Winnipeg confirms the disease, and Canada's Chief Veterinary Officer issues a formal **Notice of Confirmation**. Again, the information provided is quite limited and general.

As part of the **Disease Control Plan**, the Minister of Agriculture and Agri-Food establishes a **Primary Control Zone**. This zone includes Ontario and Quebec.

Several Infected Zones have been declared around the Infected Place located near Hanover and Minto. The Ontario Provincial Police (OPP) is enforcing a ban on all movements of livestock and livestockrelated products such as feed and bedding within/ to/ from/through these Zones. Licenses are required for these movements and may be obtained from the Joint Emergency Operations Centre, which has been established in Guelph.



A larger **Restricted Zone** extends around all of the Infected Zones, essentially from Highway 11 south to the US border and east to the Quebec/Ontario border. Specific permits are required for all livestock and livestock-related movements within/to/from/through this Restricted Zone. These are also being enforced by OPP.

The **Security Zone** extends outwards from the Restricted Zone and covers the remainder of the Primary Control Zone. General Permits are required for all livestock and livestock-related movements into or within the Security Zone, which police enforce.

With the CFIA's operational restrictions now in place, goats are not moving anywhere in Western or Eastern Canada without a permit. Movements into or through the Restricted Zones are even more limited and require specific permits. There are almost no movements into, from or through the Infected Zones. The same is true for movements of other susceptible livestock, including swine, sheep, beef and dairy cattle. Permits are also required for horse movements. The disease may be carried on their body or the trailer even though they don't contract the disease itself.

DEF Goats is a 325-head goat operation located within the **Restricted Zone**, near Chatsworth in southwestern Ontario. DEF Goats's herd is all raised on DEF's premises and adjacent pastures.

To protect the goats, **Movement Controls** and **Biosecurity Protocols** requested by Ontario Goat, OMAFRA, and the CFIA are being strictly followed. All activity is being monitored closely. Vehicles entering the premises are washed and disinfected before entry and when leaving. A temporary washing station has been installed at the main entrance and a structure to shelter a 24/7 security guard responsible for enforcement of the perimeter security, logging of all movements, and overseeing vehicle washing.

Other than the main entry, all access points have been gated and locked. **Red Biosecurity Protocols** have been implemented and posted clearly to advise visitors of the risk. Where possible, drivers have been instructed to remain in their cabs.

Milk movement will be in accordance with CFIA requirements at the time. No milk movement will be permitted from herds that have been confirmed FMD positive. FMD suspect flocks or herds in the Primary Control Zone may move milk to a processor for pasteurization but require EOC's Movement Control Unit permits.

**Mass Vaccination** has also been ordered for operations located near the Infected Place. According to a strict protocol, a CFIA designated site supervisor has arrived at DEF Goats and oversees farm staff who are vaccinating animals. Milk usage and marketability may be affected after goats have been vaccinated (depending on CFIA or Ontario Goat policies at that time).

While DEF Goats staff continue to vaccinate and monitor their herd, a **Destruction Order** has been issued, and depopulation of goats on ABC Goats and other Infected Places has commenced. All goats on the Infected Places are being slaughtered with the assistance of farm staff and under the oversight of a CFIA representative. As part of the disposal requirements, producers have opted to render some carcasses and move others to government-designated burial sites.

Valuation teams sent to the Infected Places establish a fair market value on a per goat basis based on pre-outbreak prices for the different classes of goats present. **Compensation** is being provided for all livestock ordered depopulated.

Before restocking, all of the Infected Places must be thoroughly **Cleaned and Disinfected** per a CFIA protocol. Infected community pastures also require a fallow period, and the fence posts need to be disinfected before animals can return. Landowners are responsible for these expenses.

Once there is no longer a chance of contracting the disease and all identified requirements have been met, CFIA will officially **Lift Restrictions** and give the approval to restock the premises with animals.







A federal-provincial-territorial initiative

# MEETING 4 – NO KIDDING: KID HEALTH IS IMPORTANT

# **Setting Objectives**

To create an understanding of what practices contribute to good kid health.

Suggested Lesson Outcomes

- $\Box$  To learn about the different health stages of goats
- $\Box$  To assess colostrum quality and identify why it is important
- $\Box$  To learn about two normal procedures conducted on farm

### **Suggested Roll Call Questions:**

- What is most important for goats early in life?
- How can you ensure goats remain healthy throughout life?

### Sample Meeting Agenda Time: 2 hours 10 minutes

Welcome, call to order, pledge		10 minutes
		10 minutos
	1	
Parliamentary procedure	Minutes and Business	10-15 minutes
Topic Information Discussion	Overview of Goat Life	15 minutes
Topic Information Discussion	Passive Immunity	10 minutes
Activities Related to Topic	Activity #1- Ensuring Colostrum	20 minutes
	Quality	
Activities Related to Topic	Activity #2- Assessing Gain	15 minutes
Topic Information Discussion	The Challenges of Horns	5 minutes
Activities Related to Topic	Activity #3- Disbudding	10 minutes
	Procedure	
Career Focus	Veterinarians and Veterinary	10 minutes
	Technicians	
At-Home Activity	Review what activities/projects	5 minutes
	members are to complete at	
	home	
Wrap up, Social time and		10 minutes
adjournment		

### **Overview of Goat Life**

The life of a goat can be split into stages based on gender and age. These stages drive the health, nutrition and management decisions that are made by producers. Breaking those distinctions down further:

• Buck- A non-castrated male goat.

• Wether- A castrated male goat (meaning that they cannot reproduce) is typical for meat and non-breeding goats.

- Doe- A female goat that has delivered kids. The process of giving birth is known as kidding.
- Doeling- A doe from the time that it has been weaned until she has delivered a kid.
- Kid- A goat that is less than 1 year old.

As a part of the life of a goat, many aspects need to be monitored to ensure good goat health. The chart on the next page breaks down the stages of life and some key aspects that need to be considered at each stage.



### **Passive Immunity**

Goat kids need their first drink of colostrum as soon as possible after birth. Newborn goat kids can be exposed to unknown bacteria and pathogens as very little immunity crosses the placenta. Goat kids are born without any antibodies and therefore, they rely totally on colostrum. Colostrum contains antibodies and other compounds that help prevent digestive and respiratory diseases and is produced by the doe in late pregnancy.

Once colostrum is consumed the antibodies are absorbed through the small intestine and into the blood stream. Failure of passive transfer of immunity (FPT) is the term given to a newborn

### What is Colostrum?

Defined as the first milk produced by the goat after the birth of the kid. Contains many beneficial nutrients as described below!

animal that has not received adequate immunity from the colostrum consumed. Ability to absorb antibodies begins to decline 30 minutes after birth. FPT can also be caused by poor quality colostrum.

When collecting colostrum, use standard clean milking practices: wear gloves, clean the udder and ensure all milking equipment is sanitized before collecting colostrum. Collect colostrum within 15 minutes of kidding. Bottles, buckets and nipples should be washed using soap and hot water (80°C). They should then be rinsed with a 10 per cent bleach solution. Let dry before using.

Additionally, colostrum should be heat-treated to help prevent the transfer of bacteria or viruses that might lead to transmissible diseases (CAE). Some producers prepare colostrum ahead of time and freeze it in ice-cube trays to be thawed in small quantities.

Colostrum quality is also crucial as colostrum production can be highly variable. In general, older does produce higher volumes compared to younger animals. As a result, there is a need to test colostrum for quality and store any excess colostrum for twins or sub-quality colostrum.

An average kid weighs approximately three kilograms (kg) at birth. The general rule for feeding colostrum is 50 mL per kg of bodyweight four times within the first 24 hours of life. If the kid is too weak to drink, use an esophageal tube.

Suppose you have samples of regular goat's milk and colostrum. In that case, you can ask members to compare them for colour and consistency.

# ACTIVITY# 1 ENSURING COLOSTRUM QUALITY

	Time: 20 minutes	IgG is seen as the most reliable indicator of
		successful immunity transfer from Doe to Kid.
	Materials needed:	
	Colostrum, Brix	To test colostrum for IgG colostrum, we can use
	refractometer,	a Brix refractometer to examine the total protein
		level in the colostrum. This total protein level can be
		related to the total colostrum in the sample.
		To use the Brix refractometer, you can first pre-
		calibrate the Brix with distilled water. You can then
		dump that water out and place a small drop of
		colostrum on the prism and lower the sample cover.
		Make sure there are no bubbles in the refractometer.
		You can then read the IgG content by holding it up
		to a light source and reading the scale through the
		eyepiece. Good quality colostrum will bend the light
		more, so it rises higher on the scale (white line and
		blue line meet). If it is above 22% on the Brix scale,
		then it is good quality and depending on the total
		volume, you may be able to freeze it for future kids!
		You can get a veterinarian or knowledgeable
		producer to help you to read colostrum IgG values.
		This activity aims to quantify colostrum quality to
REFLECT		give goats the best chance of a good start in life.
		How might an animal's conditions affect colostrum
		quality? Poor health, poor diet?
	Discuss the following	
APPLY	prompts as a group	How can we promote good health for our goat kids?
		How can tools like these be used to improve on-farm
		operations?

# ACTIVITY# 2 ASSESSING GAIN

	Time: 15 minutes	When a goat is growing, it is essential to quantify the gain over
		time to compute an average daily gain (ADG).
	Materials	
	needed:	ADG=(Weight at day m-weight at n)
	Measuring tape	(m-n)
	(foldable, not	
	stiff) or string	From this average daily gain, you can identify how well your goats
	and ruler	are doing and if they may not be getting the things they need to
		grow in me.
		In general, there are two ways that weight can be quantified:
		1. Inrough a scale (either portable or in the barn)
		2. Or through taping the goat (which will provide an approximate
		weight)
		The first is relatively self-explanatory, but the second involves
using an equation to work out		using an equation to work out the math.
		Woight (lbc) - (heart girth (inches) <sup>2</sup> *Shoulder to pin distance (inches)
		$\frac{1}{300}$
		To convert lbs to kg, multiply by 2.2. You can also use the chart on
		the next page to get another estimate.
		Overall, since goat breeds have quite a bit of variation from breed
		to breed, these numbers can be subjective (also based on the final
		purpose of the goat).
		However as part of this project, you should take your goat once
		per month and monitor weight gain.

REFLECT		This activity aims to learn how to weigh your
		goats to use this information to inform health,
		management, and nutrition decisions.
		How often might you weigh your goat?
APPLY	Discuss the following	Are more frequent weights better?
	prompts as a group	
		What did you learn from weighing your goat? Can
		you find information online about how much weight
		your breed and purpose of goat should be and what
		the ADG should be?

in	cm	kg	in	cm	lb.	kg
10.75	27.3	2.27	26.75	67.9	65.85	29.93
11.25	28.6	2.49	27.25	69.2	68.84	31.29
11.75	29.9	2.73	27.75	70.6	71.83	32.65
12.25	31.1	2.96	28.25	71.7	184.82	84.01
12.75	32.4	3.17	28.75	73	77.81	35.37
13.25	33.7	3.63	29.25	74.3	80.81	36.73
13.75	34.9	4.08	30.25	76.6	83.82	38.1
14.25	36.2	4.54	30.25	76.8	86.81	39.46
14.75	37.5	4.99	30.75	78	89.80	40.82
15.25	38.7	5.44	31.25	79.4	92.80	42.18
15.75	40	5.9	31.75	80.7	96.80	44
16.25	41.3	6.8	32.25	81.9	100.76	45.8
16.75	42.7	7.71	32.75	83.2	104.76	47.62
17.25	43.8	8.62	33.25	84.5	109.76	49.89
17.75	45.1	9.52	33.75	85.7	114.73	52.15
18.25	46.4	10.43	34.25	87	141.72	64.42
18.75	47.6	11.34	34.75	88.3	124.72	56.69
19.25	48.9	12.24	35.25	89.5	151.71	68.96
19.75	50.2	13.15	35.75	90.8	134.68	61.22
20.25	51.4	14.06	36.25	92.1	139.68	63.49
20.75	52.7	14.97	36.75	93.4	144.67	65.76
25.25	63.9	15.87	37.25	94.6	149.78	68.08
21.75	55.3	16.78	37.75	95.9	154.64	70.29
22.25	56.5	17.69	38.25	97.2	159.85	72.66
22.75	57.8	19.05	38.75	98.4	164.63	74.83
23.25	59.1	20.41	39.25	99.7	169.62	77.1
23.75	60.3	21.77	39.75	101	174.61	79.37
24.25	61.6	23.13	40.25	102.2	179.59	81.63
24.75	62.9	24.49	40.75	103.5	184.58	83.9
25.25	64.1	25.85	41.25	104.8	189.57	86.17
25.75	65.4	27.21	41.75	106.1	194.57	88.44
26.25	66.7	28.57				

Goat Weight Chart (heart girth measurements)

### The Challenges of Horns

Almost all cloven-hooved animals have either horns or antlers except for polled animals that do not grow horns. Disbudding is not usually practiced for meat goat kids (it's not allowed for purebred Boers) or dairy bucklings intended for meat. Additionally, polled goats (those goats that are born without horns) can be infertile and therefore, selecting for polled is not currently recommended.

The process of disbudding normally involves the use of caustic paste or hot iron. In general, this procedure should be performed using pain mitigation techniques and should be done early on in life.

Some producers may have reasons for keeping the horns, which might include:

- To assess the quality of goat genetics and the pigmentation of the goat (Mohair)
- Horns can protect against predators.

However, the presence of horns can also lead to challenges as the goat is a playful and curious creature:

- Goats regularly establish hierarchy, and these horns can injure other goats.
- The horns can injure those working with the goats.
- The goats can get caught in fencing or mangers.

Either way, it is important to consider the negative aspects of horns and to consider disbudding animals early in life. Additionally, the decision should be based on type of production system.

#### Do it!

Get members to build disbudding boxes for their goats. The instructions for these may be found online.



# ACTIVITY# 2 DISBUDDING PROCEDURE

	Time: 10 minutes	Get a veterinarian to come in and disbud a few
	Materials needed:	questions that the youth might have.
	Veterinarian	
DO		
		The objective of this activity is for members to
KEFLECT		observe the process and ask any relevant questions.
		What is done to sedate the goats?
	Discuss the following	How was the disbudding performed?
APPLY	prompts as a group	
		What additional procedures were performed?

# MEETING 5 – MAKING THE TRANSITION TO KIDDING

# **Setting Objectives**

To create an understanding of what is involved with the kidding process and factors that affect milking and dry off of Does.

#### Suggested Lesson Outcomes

- □ To learn the different types of dystocia for goats and the normal kidding procedure
- □ To perform a CMT (California Mastitis Test) and learn more amount mastitis
- □ To learn about the importance of dry off and the importance of the dry off period

## Suggested Roll Call Questions:

- What impacts kidding success?
- What does milk quality mean?
- What is your herd's (or the herd where your project animal is held) dry-off period?

# Sample Meeting Agenda Time: 2 hours 10 Minutes

Welcome, call to order, pledge		10 minutes
Roll call		10 minutes
Parliamentary procedure	Minutes and Business	10-15 minutes
Topic Information Discussion	Goat to be Kidding Me!	15 minutes
Activities Related to Topic	Activity #1- Witness a birth	15 minutes
Topic Information Discussion	Mastitis	20 minutes
Activities Related to Topic	Activity #2- California Mastitis	20 minutes
	Test	
Topic Information Discussion	Dry Off	5 minutes
Activities Related to Topic	Activity #3- Dry off Time	10 minutes
At-Home Activity	Review what activities/projects	5 minutes
	members are to complete at	
	home	
Wrap up, Social time and		10 minutes
adjournment		

### Goat to be Kidding Me!

A few days before kidding, a doe may show one or more of the following.

- The udder will begin to fill up with milk.
- The doe's backbone ahead of the tail will become raised and lose feeling.
- The doe's vulva will become swollen and pink.

• The doe may lie around and breathe loudly or even make small grunting or groaning sounds between chewing mouthfuls of cud.

Close to kidding, the doe may:

- Become restless and begin pawing at the bedding;
- Look as though she is listening for noise, make tiny cries, answer any goat kids that she hears crying in another part of the barn;
- Lie down and then get up again, repeatedly.

At kidding, the doe may:

- Paw very hard at the bedding and lie down in the depression made;
- Lie against a wall with one hind leg stretched out while she attempts to push out the kids.

The following is a three-image breakdown of the process of kidding:





The doe has been in heavy labour for several minutes and will push out a water filled birth sac. If the delivery is normal, the kid's front feet should appear within the sac as the doe pushes.

After some more hard pushing, the kid will continue to be pushed from the doe who may be lying down or standing up as this is happening.



Finally the kid is pushed completely out. The umbilical cord may still be unbroken. It should be broken off 10-15 cm from the kid. Be sure that you don't pull on the kid's navel as you can tear the cord. Hold the cord on either side of where you want it to break, then slowly pull that section until it stretches and breaks. Dip the navel in iodine immediately after breaking.This will help to prevent bacteria from entering the kid's body through its navel. There can also be complications that can occur in the kidding process. A complication during the birthing is known as dystocia. However, most goat births occur without incident (<5% experience some form of dystocia, which is mainly caused when twins come out simultaneously). The following images present the types of dystocia seen in goats (images obtained from the Extension Foundation):



You should suspect problems if:

- The goat does not produce a kid within about 20 minutes of reasonably hard pushing;
- A water sac breaks, but no kid appears, even after several minutes of pushing;
- Doe is in an abnormal amount of physical distress crying out or lying flat on her side

(although some goats will cry out loudly when they are kidding).

If there are problems: Contact your veterinarian or an experienced goat owner to ask for advice. Don't take chances. If a goat pushes for too long, kids can be injured or may die. Also, the doe may be injured during a difficult delivery.

# ACTIVITY# 1 WITNESS A BIRTH

	Time: 15 minutes	Several videos are available online of goat births.
	Materials needed: None	Teddy bears with long legs can be used to demonstrate dystocia positions, how they could be delivered, etc.
DO		You can also do preg checks by ultrasound, and show kids how to identify scans, and show parts of the fetus
		Get producers to discuss how they handle births and any other things they do for their does or kids after birth.
REFLECT		This activity aims to better appreciate births and meet with goat producers to discuss their post-kidding practices.
APPLY	Discuss the following prompts as a group	How does the producer deal with complicated births? What are the other items given after birth? Was there anything that surprised you?

### Mastitis

In its obvious form, udders are swollen, and milk is clotty. Money is lost because of the cost of antibiotics, discarded milk and reduced milk production.

### Define it!

Mastitis is inflammation of the mammary tissues that is sometimes caused by infection.

When mastitis is in its hidden form, milk and udder texture look normal. This form of mastitis is still costing you money. There can be bacteria and other mastitis-causing organisms inside the udder. These bacteria block off some of the milk ducts or tubes so that not all the milk the doe produces can be harvested.

How do you know if you have "hidden" mastitis? There is a test that can be done on a sample of each goat's milk. This is called a milk culture. This sample must be taken properly for accurate results. Knowing the type of bacteria causing the problem helps prescribe the correct antibiotic and treat mastitis. Traces of hidden mastitis can also be found by using the California Mastitis Test (MMT). A CMT kit is available from some vets, at many feed stores, and mail-order livestock equipment companies.

## **Causes of Mastitis**



#### Environment

Like other diseases, the amount of obvious or hidden mastitis is influenced by the number of mastitis-causing organisms in the environment.

Skin, mud and manure provide ideal breeding sites. Environmental stresses such as overcrowding and inclement weather can also increase mastitis. If the teat is cracked or chapped, bacteria can grow here as well.

#### **Milking Procedures**

Here are the recommended steps:

- Wash hands before handling goat's udders.
- Wash base of udder and teat with an udder wash solution
- Massage udder for 20 seconds to stimulate milk let-down

#### Machine milking

- Apply milker 30 to 60 seconds after stimulation begins
- Use minimum machine stripping or strip by hand
- Use a vacuum shut-off valve before removing the milker

#### OR

#### Hand milking

• When hand milking, it is a good idea to wash hands between goats. This will help to prevent the spread of mastitis and some common forms of dermatitis (skin irritations and infections) found on goat's udders

#### Following Milking for both types

- Dip teats of all does after milking
- Milk all CAE goats or those with mastitis last

#### **Milking Equipment**

The goal in milking goats is to milk them quickly and expose them to as little stress from the milking machine as possible. How well the milking equipment is working is very important in helping to prevent stress on goats.

Milking equipment should be tested regularly (once a year) to ensure that it is working properly. Some milking equipment problems can only be determined by using proper testing equipment. For fast milk-out, the vacuum should be set at 12" mercury, and the milking equipment components (vacuum pump and milk lines) sized according to the number of milking units being used. If there is not enough vacuum, teats will not be massaged enough, and irritation can occur.

A pulsation rate of 60:40 (liner open 60% of the time and closed 40% of the time) is recommended. If a more comprehensive ratio such as 70:30 is used, there may not be enough time spent on teat massage.

You can speak with your equipment dealer to find out the right options for your herd.

### **Dry Doe Treatment**

It is advisable to treat all does when they dry off to (stop producing milk) with a long-lasting intramammary antibiotic. The antibiotic to use would depend on the organisms identified from milk samples taken earlier in lactation.

Cleanliness when giving the antibiotic is essential:

- swab teats with alcohol
- shake the antibiotic tube well
- insert the tip of the tube against or slightly inside the teat opening as you inject the antibiotic (do not insert the tip far into the teat)
- massage teat and udder to work antibiotic throughout udder
- use only individual tubes of antibiotic

# ACTIVITY# 2 CALIFORNIA MASTITIS TEST

	Time: 20 minutes	The California Mastitis Test (CMT) is a tool used
		to diagnose the presence of mastitis. It does
	Materials needed:	not confirm the type of mastitis (which must be
	Materials needed.	cultured) Here is a sten-by-sten process:
		cultured). Here is a step-by-step process.
		- To start, you must wear gloves for this procedure
		and prepare the goat for milking.
		- Hold the paddle (which can have two sections,
		with one for each teat) under the goat. If you have a
		paddle with four sections, then only use two (as the
		others are meant for a dairy cow).
		- The ideal amount of milk in each of the two cups
DO		is enough so that it remains in the cup but does not
		flow over the sides
		- Add an equal amount of the reacting solution to
		each cup; proportion should be one to one (an equal
		amount compared to the milk).
		- Mix the reagent (reacting solution) and the milk,
		swirling for 10-30 seconds.
		- Read the results
		Results
		For a table with results and their meaning, see the
		following page for a resource from McGill University.
		This activity aims to identify methods to determine
		mastitis within a milk sample, which can be a
NEFLECT		powerful tool in maintaining good milk quality and
		udder health.
		How interesting did you find the test?
	Discuss the following	How was the quality of the milk sample?
	prompts as a group	
APPLY		A single goat's milk can be diluted in whole herd
		milk, how might a larger milk volume of high SCC
		(somatic cell count) affect the overall milk bulk tank?
		(hint: it will increase the SCC of the bulk tank as it is
		a higher proportion of the total milk).

# Reading the CMT Results

	Score	Meaning	Description of reaction	Individual Quarter Sample	Bucket Milk Sample
V	N	Negative	Mixture remains liquid. No slime or gel form. It can drip out of the paddle well.	No Mastitis	No Mastitis
	T	Trace	Mixture becomes slimy or gel like. It's seen to best advantage by tipping paddle back and forth, observing mixture as it flows over the bottom of cups.	Trace of mastitis	Mastitis in one or more quarters
NOT	1	Weak Positive	Mixture distinctly forms a gel.	Mastitis	Define mastitis - Check quarters
Y	2	Distinct Positive	Mixture thickens immediately, tends to form jelly. Swirling cup moves mixture in toward center exposing outer edges of the cup.	Mastitis	Serious Mastitis – Check quarters

(Used with permission from McGill University and the Mastitis Network)

### Importance of the Dry Period

Drying off, or ceasing the production of milk, is a common practice for all dairy breeds. This practice, as mentioned previously, is meant to minimize the risk of infections such as mastitis. It has also been shown to increase milk production in other dairy animals (specifically cows).

Dry periods for dairy animals should be between 50 to 60 days, but variability can occur with producers primarily drying off does based on the days to kidding. However, it is important to maintain both a steady voluntary waiting period and an appropriate body condition for your goats (both of these will be discussed in further meetings or sections).

Voluntary Waiting Period- The number of days from birth that a producer will wait before breeding their animals. This can be varied but based on 305-day milk production is typically between 55-70 days.

Body Condition- Measure of the amount of fat stores the animal has with condition highest before kidding and lowest 60 days after kidding.

In addition to maintaining the appropriate length of the dry period, it is also important to minimize the stress of udder pressure by decreasing the amount of milk a goat is producing late in lactation. This is typically done by reducing the frequency of milkings and partially restricting the amount of feed offered to lactating does. It is not a good practice to restrict water before drying does off as that can lead to dehydration and potentially death.

### **Dry Doe Treatment**

On the day of dry off, it is important to identify those does that need treatment through a CMT or other test. These does should be treated for this infection to minimize the effect on milk production in the following lactation. Blanket (or all does treated) can often be more expensive and lead to antibiotic resistance (which can further impact a herd).

Teat sealant can also be used to limit the entry of bacteria into the teat during the dry period. These options can be considered with the help of your herd veterinarian.

# ACTIVITY# 3 DRY OFF TIME

DO	Time: 15 minutes Materials needed: None	Ideally, go on farm and see a dry-off procedure. This should include milking the goat out and then seeing the procedure used to limit the impact of mastitis.
REFLECT		The objective of this activity is to see how does are dried off and associated procedures used on farm.
APPLY		How does the producer dry does off?
	Discuss the following prompts as a group	What is the producer's voluntary waiting period?
		How long is the producer's dry period? Is that variable with their different does? Why?

# MEETING 6 – WHAT IS THE SCORE? AND DO YOU HAVE THE RECORDS?

## **Setting Objectives**

To create an understanding of the different scoring systems used to quantify condition, lameness and other scores on farm. Also, to learn more about good recording keeping.

Suggested Lesson Outcomes

- □ To learn what is normal for healthy goats
- $\Box$  To learn how to score for different health aspects
- $\Box$  To learn how to keep good health records

## Suggested Roll Call Questions:

- What does lameness mean? How can we quantify it?
- How fat is too fat? How about skinny?
- What goes into a health record?
#### Sample Meeting Agenda Time: 2 hour 20 minutes

Welcome, call to order, pledge		10 minutes
Roll call		10 minutes
Parliamentary procedure	Minutes and Business	10-15 minutes
Topic Information Discussion	Importance of Monitoring Body	15 minutes
	Condition	
Activities Related to Topic	Activity #1- Identify that	20 minutes
	condition!	
Topic Information Discussion	The impact of lameness	15 minutes
Activities Related to Topic	Activity #2- Lameness Scoring	20 minutes
Topic Information Discussion	Record Keeping	10 minutes
Senior Member Project	Drugs, Vaccines, other emerging	20 minutes
	treatments	
Wrap up, Social time and		10 minutes
adjournment		

#### **Topic Information**

#### **Importance of Monitoring Body Condition**

#### **Monitoring Body Condition**

By keeping track of animals that are too fat, too skinny, or at the ideal body condition, we can tailor feeding, management and housing strategies to the animals in our care and improve production efficiency.

However, ideal body condition can also be dependent on:

- Breed
- Animal Purpose (Meat, Milk or Mohair)
- Frame size
- Nutritional requirements based on growth and stage of life
- Stage of lactation
- If the animal is pregnant

#### **Body Condition Scoring**

To quantify body condition, a subjective system called body condition scoring (BCS) can be used. This scoring system assigns a score from 1.0 to 5.0, with 0.5 increments. Below is a table summarizing the BCS distinctions (with 0.5 increments being used to note body conditions that are between two levels as adapted from resources from Michigan State University and the American Institute for Goat Research):

#### What is it?

Body condition, or an animal's composition of both fat and muscle, is very important to monitor to ensure good health of the animals in your care.

BCS	Key Items
1.0	<ul> <li>The goat is visually weak or emaciated.</li> </ul>
	• The backbone is obvious, forming a ridge along the top of the goat (this ridge
	is referred to as the spinous process).
	<ul> <li>The ribs are clearly visible, and the flank is hollow.</li> </ul>
	• There is no fat cover, and the intercostal spaces can be penetrated.
2.0	<ul> <li>The goat's backbone is still visible with a continuous ridge.</li> </ul>
	<ul> <li>Some ribs can be seen, and there is a small amount of fat cover.</li> </ul>
	• Ribs can still be felt, and intercostal spaces are smooth, but they can still be
	penetrated.
3.0	• The backbone is not prominent, and the ribs are barely discernable, with a
	layer of fat covering the ribs.
	<ul> <li>The intercostal spaces are felt only with pressure.</li> </ul>
4.0	<ul> <li>The backbone and ribs cannot be seen.</li> </ul>
	• The animal is "sleek" in appearance
5.0	• The backbone is buried in fat, and the ribs are not visible.
	• The ribcage is covered with excessive fat.



*Figure 1. Ideal Body Condition Score throughout lactation for a Dairy Doe (Used with permission from Dr. Paula Menzies (University of Guelph, ON, Canada).* 

BCS change is due to the need for fresh does to mobilize their fat stores to support their initial milk production (which peaks around the 40-day mark). For the rest of the lactation, the doe will start to convert more of her nutrition into her milk production while putting on that lost condition to get ready for her subsequent pregnancy. The change in body condition is important to examine as unmonitored body condition can result in several health outcomes mentioned later in this section.

# ACTIVITY# 1 IDENTIFY THAT CONDITION!

	Time: 20 minutes	Split into groups with around equal amounts of both
		older and younger members.
	Materials needed:	
	Goats, record-	Assign each group a different and varying goat and
	keeping sheet, Goat	get the groups to assign a body condition score to
	BCS fact sheets	their goat. Remember to also physically assess the
	(appropriate one for	body condition as visual alone can sometimes be
	goat being scored)	misleading. Please get each of them to do this before
		giving them the fact sheet with the knowledge that
DO		the score is from 1 (skinny) to 5 (over-conditioned). Once the youth have recorded their initial
		prediction, hand out the appropriate body condition
		scoring fact sheet (meat vs. dairy). Get the youth to
		read over the fact sheet and discuss why they are
		giving the goat that score.
		Then when all of the youth have decided to get
		them to write down their final condition and bring
		everyone back into discuss.
		The objective is to learn how to body condition
REFLECT		score goats and identify ideal conditions for different
		stages and kinds of goats.
		What is the appropriate body condition score for
		your goat? why?
		What factors need to be considered when scoring
		goats?
	Discuss the following	When you first scored the goats, did your group
	prompts as a group	come up with a range of answers? Did that line up with other groups?
APPLY		Did the fact chects help you some up with a final
		decision about a score?
		Ultimately the important part of this activity is to
		identify that body condition scoring is a subjective
		measure; however, by following standards set up
		by professionals, we can use these scores to be
		proactive in terms of the animal's health.

# Body Condition Score Record-Keeping Sheet

Group Member	Goat	First BCS (1-5)	Second BCS (1-5)



#### How to body condition score (BCS):

The hair coat can often prevent you from seeing the true shape of a goat and therefore, it is important that the handson assessment is done. A visual assessment alone is not adequate to assess poor body condition.

If you cannot score all your goats, choose a subset of goats in your herd. Alternatively, combine body condition scoring with other routine husbandry procedures such as hoof trimming or vaccination. Recording BCS is important as it may help you identify changes in an individual animal that may indicate disease or inform breeding and culling decisions. With practice, body condition scoring should take only 10-15 seconds per animal.

The three main locations to assess when performing body condition scoring are the lumbar spine, ribs, and sternum/ breast bone (see figure 1). You are feeling for the bones in the goat. The amount of fat and muscle the goat has will change vour ability to feel the bones underneath. If it is easy to feel the bones, the goat doesn't have enough fat and muscle. If you have trouble feeling the bones, the goat may have too much fat.

Giving each goat a specific body Tīp: condition score is not as important as being able to determine if your goat is under-conditioned (too thin), over-conditioned (too fat), or properly conditioned (healthy weight).

Lumbar Spine: This is the part of goat behind the ribcage and in front of the tail, also known as the loin. The spine is made up of many connected vertebrae. Vertebrae have three processes that stick out - one on each side (short ribs) and one straight up (top of spine). Move your fingers from one vertebrae to the next, noting the shape of the space the between processes on the sides and top. See if you can slip your fingers under the short ribs or pinch the top of the spine. Feel the amount of fat or muscle in the space between the top of the spine and the short ribs (transition) (see figure 1).

**Ribs:** Assess the amount of muscle and fat cover over the ribs, behind the front leg. Try to push your fingers into the space between two ribs and note how much pressure it takes to feel for this space.

Having an independent person TID: perform body condition scoring on your goats may be beneficial. If the majority of your goats are a little over- or under-conditioned, you may think that is normal. You can always ask your veterinarian or nutritionist to perform body condition scoring on your goats and compare your assessments.

Sternum: Assess the amount of muscle and fat over the sternum or breastbone, between the goat's front legs. This area has cartilage (slightly softer than bone) that connects the ribs to the breast bone. Note how easily the cartilage is felt. Grasp the fat pad on the sternum/breast bone to judge how large it is and whether you can move it.

TID:

Body condition scoring is not about ranking your goats, but comparing them to the scale. Do not pick a doe that you think has an ideal BCS and compare everyone to her. Each goat should be compared to the BCS chart

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At kidding or before winter: (3.5) (3.0-3.5)

Does at breeding: (3.0) (2.5-3.5)

Bucks at breeding: (3.0) (3.0-3.5)

Does may lose up to one point during peak lactation, but should be allowed to regain this before kidding.



	<b>Body Condition S</b>	core 1			
	90	Lumbar spine	Ribs	Sternum	
Emaciated		Top of spine: clearly visible, can easily be pinched. Deep depression between each vertebra. Short ribs: form a continuous shelf that fingers can grasp. Deep depression between each. Transition: no fat and little muscle is felt between the top of the spine and short ribs.	<b>Ribs:</b> Clearly visible. Fingers easily penetrate space between ribs.	<b>Cartilage:</b> easily felt <b>Fat pad:</b> can easily be grasped between thumb and forefinger and moved side to side.	
	<b>Body Condition S</b>	core 2			
Thin		Lumbar spine Top of spine: visible, some muscle can be felt between skin and bone. Short ribs: form a shelf that fingers can grasp. Transition: deep depression from the top of the spine to the short ribs.	Ribs Ribs: some can be seen. Fingers easily penetrate space between ribs.	Sternum Cartilage: not easily felt. Fat pad: can be grasped and moved slightly from side to side.	
	Body Condition S	core 3		11	
	60	Lumbar spine	Ribs	Sternum	
Ideal		Top of spine: not prominent, slight hollow between each vertebrae. Cannot easily be grasped. Short ribs: shelf is slightly noticeable, cannot be grasped. Transition: smooth slope from top of the spine to short ribs	<b>Ribs:</b> difficult to see. Space between ribs felt with pressure.	<b>Cartilage:</b> barely felt. <b>Fat pad:</b> wide and thick. It can be grasped, but has very little movement.	
	<b>Body Condition S</b>	core 4		11	
	50	Lumbar spine	Ribs	Sternum	
Overweight	A CANANA AND AND AND AND AND AND AND AND AN	Top of spine: cannot be seen. No indent between vertebrae. Top of spine is flat and cannot be grasped. Short ribs: no ridge or shelf present. Transition: rounded from the top of the spine to the short ribs.	<b>Ribs:</b> cannot be seen. Side of the animal is flat in appearance. Space between ribs only felt with strong pressure.	Cartilage: cannot be felt. Fat pad: difficult to grasp, cannot be moved side to side.	
	Body Condition S	core 5			
	88	Lumbar spine	Ribs	Sternum	-
Obese		Top of spine: buried in fat, slight indent surrounded by bulging fat. Rump looks like the top of a heart. Individual vertebrae cannot be felt. Short ribs: individual vertebrae cannot be felt. Transition: fat bulges out from the top of the spine to the short ribs.	<b>Ribs:</b> not visible. Space between ribs cannot be felt.	Cartilage: cannot be felt Fat pad: cannot be grasped or moved.	
	Growing Forw A teleral-provincial-territoria	ard 2			Canada

#### **Topic Information**

#### **Emerging Diagnostic Scoring Techniques**

#### Lameness Scoring

The revision to the Goat Code of Practice has included the addition of lameness by stating, "Lameness in goats is a serious condition affecting welfare that should not be ignored. Lame animals experience pain and have difficulty moving to find food and water."

Lameness is defined by examining the gait of an animal with a moderate limp or the ability for affected limps to be identified noted as moderate lameness. Conversely, severe lameness is defined as a severe limp, unable to bear weight on all four legs and those goats that may walk on knees or walking with limbs that are not stretched and not bent at the joint (this is also called goose-stepping).

The presence of lameness, in general, is to be minimized as much as possible to increase animal welfare and help strengthen the goat industry's position with the public.

The cause of lameness is also important when considering prevention. The following table has been pulled directly from the Draft Revised Draft of the Goat Code of Practice and is included for educational purposes. Many of these conditions will be covered in additional sections of the goat project if they have not already been covered:

Lameness from disease	Caused by
Laminitis (abnormal, poor quality hoof,	Complication of infection, e.g. metritis (uterine
inflammation, deformed bone)	infection), pneumonia
Inflammation of joints and bursae	CAE (Caprine Arthritis Encephalitis)
Footrot, digital dermatitis	Contagious bacteria
Poor foot and leg conformation (fallen pasterns,	Age / genetics
posty legs, misshapen toes)	
Lameness from housing/husbandry	Caused by
Hoof overgrowth	Infrequent or incorrect trimming
Foot scald or abscesses, hoof infections	Wet or dirty environment
	Trapped materials in hoof
Fractures, sprains, spinal injuries	Unsafe handling or housing facilities, bullying
	behaviours
Joint ill (swollen or infected knees and hips)	Bacteria from environment
	Poor colostrum management
Lameness from nutritional imbalances	Caused by
Laminitis	RA and SARA (sub-acute rumen acidosis)
Rickets (deformed joints, bow-legged)	Calcium or phosphorus imbalance
White Muscle Disease	Vitamin E – selenium deficiency

#### **Requirements from the Goat Code of Practice state the following:**

1. Goats must be able to stand and walk correctly (square, straight, strong) on flat, level hooves.

- 2. Stock people must be able to recognize lameness.
- 3. Lame goats must be assessed and action taken without delay.
- 4. The cause must be investigated when moderate to severe lameness in the herd exceeds 5%.

Additionally, the code highlights the following recommended practices:

1. Develop and implement a farm-specific protocol for hoof care and treatment of common diseases that cause lameness.

2. Records of the date of hoof trimming should be kept for each animal and include any abnormal findings.

- 3. Use hoof trimming as a tool to diagnose lameness.
- 4. Animals with foot diseases or lameness should be examined more frequently.
- 5. Lameness levels in the herd should be scored for benchmarking purposes.

6. If the prevalence of moderate to severe lameness exceeds 5% for a management group, the herd veterinarian should be consulted to investigate the cause(s) and recommend/perform treatments or preventive measures.

By taking these practices into account, your farm can help minimize the chances of lameness.

#### Animal Welfare Break

How can you use the requirements and recommended practices outlined above to improve welfare for goats in your care?

## ACTIVITY# 2 LAMENESS SCORING

	Time: 20 minutes	Split into groups with around equal number of both
		older and younger members.
	Materials needed:	
	Goats, record-	Assign each group a different and varying goat and
	keeping sheet, Goat	get the groups to assign a lameness (gait) score to
	lameness fact sheets	their goat. Please get each of them to do this before
	(appropriate one for	giving them the fact sheet with the knowledge that
	goat being scored)	the score is from 1 (good locomotion) to 5 (poor
		locomotion = severe lameness).
DO		Once the youth have recorded their initial
		prediction, hand out the appropriate lameness
		scoring fact sheet (meat vs. dairy). Get the youth to
		read over the fact sheet and discuss the reasons why
		they are giving the goat that score.
		Then when all of the youth have decided, get
		them to write down their final condition and bring
		everyone back into the group to have a debrief.
		The chiestive is to leave how to leave accessor
		The objective is to learn now to lameness score
REFLECT		goats and to examine lameness scores across the
		herd.
	Discuss the following	Go around the groups and find out the lameness
	prompts as a group	score of the different goats. Were there any trends?
APPLY		Is there a possible explanation for the lameness?

Category	Willing to move forward	Weight-bearing	Head nodding	Description
1. Normal gait	Yes	Yes	No	Even gait, walking unhalted.
2. Uneven gait	Yes	Yes	No	Short stride, stiff gait, or swinging of hoof.
3. Mild lameness	Yes	Yes	Maybe	Mild limp. Affected limb not readily identifiable.
4. Moderate lameness	Reluctant	Reluctant	Yes	Moderate limp. Affected limb(s) identifiable.
5. Severe lameness	Unwilling	Unable	Yes (severe)	Severe limp, unable to bear weight on all 4 legs. May walk on knees or walking with limbs stretched and not bending joints (i.e., goose-stepping).

#### **Topic Information**

#### **Record Keeping**

Keeping accurate treatment records is very important for your farm operation. Depending on the type of operation (milk, meat or mohair), there may be different withhold periods for different drugs.

Withhold period refers to the amount of time that the drug, antibiotic, or treatment requires to no longer be a concern for the end-user. Usually, each drug will have different meat and milk withdrawal times.

For milking does the following are important aspects to collect (Source: Ontario Goat):

- Treatment dates
- Animal ID
- Condition Treated
- Product Name
- Prescription (P) or Non-prescription (NP)
- Dose given
- Estimated animal weight
- Route (which will be covered in the senior member project)
- Safe to ship/slaughter date (withhold period)
- Treated by (individual initials)

Example of the way that records can be formatted:

# Goat

#### Animal Health Product Treatment for Dairy Operations

Treatment date (D/M/Y)	Animal or pen ID	Condition I treated (see Mastitis Treatments	Product name	ct Prescription e (P) or non- prescription (NP)	Prescription Dose (P) or non- prescription (NP)	Estimated animal weight/ # of animals treated	Route (See route codes below)	Safe to Slaughter Date (D/M/Y)		Treated by (Initials)
		below)						Milk	Meat	
	-				5		-		-	-

For meat goats, the same checklist can be used with omitted information for milk withdrawal dates.

Some goat farmers do not collect a lot of information but may build upon the information they currently collect. Meat goat producers may keep a record of the weight gained each week by their kids and the number of kids raised per doe. Milk goat producers may weigh the milk produced by their goats regularly. Angora goat producers weigh the fleece that is sheared from their goats. All of these relate to the farmer's bottom line.

However, it is important to remember that the quality and depth of information you collect will help all farm advisors examine where improvements might be possible. Therefore, it is important to keep these treatment records up to date.

# SENIOR MEMBER PROJECT Vaccinations

This section outlines a senior member project that can be introduced during the first meeting. Overall, the goal of this activity is to keep senior members engaged with the material while also allowing them to share knowledge with younger members in the group.

The following material will provide some overview for senior youth to develop a teaching plan to teach the club:

#### How to Give an Injection

It is sometimes necessary to give injections to goats. Giving an injection means using a needle to directly place a vaccine or other medication into the goat's body. There are several types of injections used when treating animals. Never attempt to give an injection unless you know exactly how to do it.

#### Do it!

For older and well supervised youth, get kids to practice injecting on oranges or teddy bears with a water filled syringe.





Subcutaneous and intramuscular injections are the most useful to the goat owner. Here are some tips on how these injections are given.

#### Before Giving an Injection

Examine the bottle of medication that you wish to use.

Check the withdrawal period (the length of time between the drug administration and the date when the milk and/or meat can be used for human consumption from the treated animal). Follow these instructions closely.

#### **Giving the Injection**

To give an injection, you must have a Sterile needle and a syringe. These should be an appropriate size for the job. Use a small syringe for small amounts and a large syringe for large quantities. Often, with large dosages, it is recommended to split the injection and inject 2 of the dosage in two locations on the animal.

A small needle, such as a 20 gauge, is small enough to cause minimal discomfort for the goat but large enough to inject most medications no matter how thick they are. The length of the needle is important too. Most goat farmers find that a l" needle is long enough for most injections. (Needles are not measured in metric.) All needles and syringes should be disposable. Disposable needles are sterile, they have a tight seal so they will not leak air, and they are very sharp. The older style reusable needles can carry bacteria, and they become dull after a few uses.

BE SURE TO DISPOSE OF ALL USED NEEDLES AND SYRINGES VERY CAREFULLY!

#### Filling the Syringe

The top of a new medication bottle has a thin metal tab that must be peeled off to reveal the rubber area where medication is extracted using a needle. Clean the rubber area with an alcohol swab before extracting medication.

Leaving the needle inside its protective cap, attach the needle to the syringe. Do not touch the tip of the syringe or the plastic base of the needle while you are putting them together. Most needles twist into place.

PLASTIC ٥F NEEDLE SCREWS COLLAR . INTO PLASTIC CAP NEEDLE WHILE YOU ATTACH

NEEDLE TO SYRINGE. REMOVE CAP TO FILL SYRINGE. REPLACE CAP UNTIL JUST BEFORE YOU GIVE INJECTION!

Invert bottle of medication gently to mix it. Do not shake because this causes air bubbles in the medication.

Following the diagram, withdraw a bit of extra medication into the syringe and then inject this back into the bottle while you adjust the dosage until it is correct. Do not remove the needle from the bottle and then push it back in. This may introduce bacteria into the bottle.



To make it easier to withdraw medication from a bottle, pull back the syringe to fill with air before pushing the needle into the bottle. Allow the air to enter the bottle and then pull out on the syringe to fill it with medication. This is necessary because the withdrawal of medication causes a vacuum in the bottle, which may prevent the medication from being withdrawn unless air is allowed to enter the bottle.

Look for air bubbles. Hold the syringe with the needle pointed straight up. If there are large bubbles or many tiny bubbles in the medication, use your finger and gently tap the side of the syringe. The bubbles will float up to the top of the syringe to the place where the needle is attached. Gently push in the syringe to release the bubbles along with a drop or two of the medication. When the medication is bubble-free, give the injection.

#### Focus on Technique

Be sure the goat is adequately restrained. If the goat moves around, it may cause you to puncture yourself or the goat - or cause the needle to break off or bend.

#### **Subcutaneous Injections**

Find an area of the goat where the skin is loose enough to pull away from the flesh or muscle. Pull a good pinch of skin out from the goat's body and insert the needle into the side of a pinch of skin. Gently swivel the tip of the needle from side to side once or twice to be sure that it isn't actually into the muscle or the skin. When you are sure that the needle is in an empty pocket between the skin and the flesh, inject the medication smoothly and slowly. Withdraw the needle and gently massage the injection site with the palm of your hand to help distribute the medication over a wider area.



#### **Intramuscular Injections**

Find one of the larger muscle masses in the neck area (see diagram below) on the goat away from any bones, nerves or arteries.

Insert the needle into the muscle and then draw back a little on the syringe plunger. If blood begins to fill the syringe, the injection site is incorrect. Withdraw the needle and try in a different spot.

Watch animals for a few minutes after giving the injection. Many farmers keep a bottle of epinephrine with them when they are giving injections. An antidote injection must be given as soon as possible if an allergic reaction is noted. Symptoms of allergic reaction are: sudden weakness, staggering, or falling down; swelling of the eyelids so that they droop shut; any type of nervous reaction such as strong muscle tremors or difficult respiration.

Many medications cause some stinging at the injection site, so the goat may scratch at the spot, rub itself against the wall, lie down and get up again a few times, or fuss in some other way. This may be quite normal.



# **SECTION 2: NUTRITION**



# MEETING 1 – ALL ABOUT RUMINANTS!

### **Setting Objectives**

To explore how goats eat and how that relates to their natural environment.

#### Suggested Lesson Outcomes

- $\Box$  To learn the parts of the ruminant digestive system
- □ To understand how the ruminant digestive system works and how a ruminant digest its food
- □ To learn about the difference between grazers and browsers

#### **Suggested Roll Call Questions:**

- Name a part of the goat digestive system.
- What is the role of the ruminant stomach?
- What does the word browser mean?
- What are some differences between the food that humans and goats eat?

#### Sample Meeting Agenda Time: 2 Hours

Welcome, Call to Order & Pledge		10 min
Roll Call		10 min
Parliamentary Procedure	Minutes, Elections and Business	20 min
	New Executive:	
	President	
	Vice President	
	Secretary	
	Press Reporter	
Activities Related to Topic	Activity #1- Just Ruminating!	15 minutes
Topic Information Discussion	Overview of Ruminants	15 minutes
Activities Related to Topic	Activity #2- How the Factory Works	20 minutes
Topic Information Discussion	Browser vs Grazer	10 minutes
Activities Related to Topic	Activity #3- Match the Description Browser	10 minutes
	vs Grazer	
Wrap up, Social time and		10 minutes
adjournment		

# ACTIVITY #1 THE RUMEN IS LIKE A FACTORY

	Time: 15 minutes	The following is an experiment to show how we are
		able to see the results of microscopic activity that is
	Materials needed:	similar to rumination in some ways.
	-Four small bowls,	
	a small amount of	You need:
	sugar, warm water,	<ul> <li>Two bowls full of cold water</li> </ul>
	cold water, saran	• 30 mL sugar
	wrap and two	<ul> <li>Two bowls full of warm water</li> </ul>
	packages of dry yeast	• Two pkg. yeast
	for baking.	Have the members prepare four small bowls of water.
		Get members to fill two bowls half full with warm
		water and put one tablespoon of sugar in one of the
		bowls. Next get members to fill two bowls half full
		with cold water and put one tablespoon of sugar in
		one of the bowls. Overall there should be four bowls:
		1. Warm Water & Sugar
		2. Warm Water
DO		3. Cold Water & Sugar
		4. Cold Water
		After this is done, sprinkle half a packet of yeast on
		top of the two bowls of cold water and the other
		package on the two bowls of warm water. Set these
		aside for a few minutes and proceed with the rest of
		the material in this section of the meeting. Cover all
		bowls loosely with saran wrap. Leave the experiment
		until later in the meeting.
		Have members examine the yeast experiment to
		see what is happening. There should be a noticeable
		difference between the yeast action in the cold water
		without sugar and the warm water with sugar. Explain
		that the yeast in the bowl of cold water with no sugar
		is in an unfavourable environment. There is no food
		(sugar), and it is too cold so that nothing much will
		happen.

DO		On the other hand, in the bowl of warm water and sugar, the yeast has found a good home. The warm water is the temperature which yeast like best. The sugar supplies a carbohydrate food which the yeast will then transform into carbonic-acid gas (which helps bread to rise). In a similar manner, the microbes in the goat's rumen are living in a comfortable, warm environment. The goat eats cellulose foods (hay, grain, etc.) which become mixed with water in the rumen where the microbes are. They begin to break down this food and they, in turn, supply the goat with usable nutrients.
REFLECT		The objective is to learn about how the ruminant animal works by stimulating how the right conditions can stimulate activity.
APPLY	Discuss the following prompts as a group	Did the cold bowl of water have anything observable? How about the warm water? What are the ideal conditions for the yeast? How might this relate to a microbial environment? What happened with the saran wrap covered bowls? Did the warm one inflate relative to the cold? Why did this happen and why might it explain the size of ruminant animals?

### **Topic Information**

#### Just Ruminating!

The topic information contains information and illustrations about different types of digestive systems. After reviewing this section, you might wish to discuss why each type of animal has the type of digestive system that it does. You may also want to discuss:

- Cud chewing and why goats do it
- Encourage members to think of some reasons why goats chew cud

   Ruminant animals chew cud because they must consume a large volume of plant
   material to get enough nutrients. This material is usually tough and fibrous and needs a
   great deal of chewing.

#### **Overview of Ruminants**

There are several different types of digestive systems in animals. Each type is suited to the foods and behaviour of the animal it is a part of. All animals need the same kinds of nutrients to live, but different animals need different amounts of these nutrients. The type of food that an animal eats plays a big role in its ability to achieve nutrient balance.

The goat is a ruminant animal. This is why goats are able to eat grass, hay, leaves and branches, which animals with simpler digestive systems are not able to eat. In fact, goats can eat very tough, fibrous plants that may even be tougher than those that other ruminants can digest. This is why goats can survive in areas that are not suitable for other livestock.

The goat is only one of many types of ruminant animals. Others include other farm animals (sheep and cows) and wild animals (buffalo, deer, moose and antelope).

What do these animals have in common?

- All of them eat vegetation (plants).
- Most of them are quite large and must eat a lot to survive.
- Many of them would be prey for meat-eating animals (carnivores).

All these clues might help you to understand why these animals are ruminants. Ruminants must eat quickly as they move about in search of food. They cannot spend a great deal of time chewing their food as they eat it. They wait until later to chew their food by regurgitating it from the rumen back into their mouths. These regurgitations are collectively referred to as rumination.

#### What does the Ruminant Do?

Ruminant animals digest the cellulose in roughage using microbes contained in the rumen (stomach). Microbes are types of bacteria and other single-celled organisms that break down plant material that has been eaten by the animal. They are very good at processing tough feeds like hay and whole grains.

The microbes turn the feeds into vitamins, proteins, minerals, and carbohydrates for the goat. These nutrients can then be digested by the animal, similarly as you and I do.

The digestive process is a little like a factory in which raw materials are refined into finished products. A good example is a pulp and paper mill in which logs are chopped up, boiled, fermented in chemicals and then compressed into paper.

The goat's digestive system is a complex "factory" that can process foods we cannot eat, like grass and hay, into milk or meat that we can eat.

We have to remember that the basic nutrients must be in the food the goat eats so that it can turn these into energy and other products. Additionally, these nutrients must be balanced to avoid any unintended consequences.

#### How Ruminants Compare to Other Animals

As mentioned previously, goats are ruminants, but there are other digestive systems employed by vertebrates (animals that have a backbone). Monogastrics (such as swine and humans) have one-true stomach that breaks down food. For many of these species, fibre may be important for digestion. However, the fibre cannot be broken down any further. That rule goes for all animals except for a few exceptions, such as rabbits and horses. These animals have enlarged intestines and cecum to allow for more digestion of plant material to take place.



Overview of the differences between digestive systems. (image modified and used with permission from: https://opentextbc.ca/biology/chapter/15-1-digestive-systems/)

Avian Species (chicken, turkey, etc.) also appear a little differently than typical monogastrics (swine or human). This is due to the pouch, known as a crop, which stores food and aids in digestion as birds do not have teeth. These bird species also use a gizzard that stores food soaked and mechanically ground.

Outside of the monogastric and ruminant realms, there is another type of digestive system that is commonly termed as camelids. These include llamas, alpacas and camels. Ultimately, these species are very similar to ruminants but should be mentioned here as they are distinct in their number of stomach chambers (3 chambers in camelids vs 4 in ruminants).

#### The parts of the machine

The **mouth** ingests food and chews it into smaller particles. Saliva mixes with the food and begins the digestive process. More specificically, the lips are goat's organ of prehension (how they gather food).

The **esophagus** moves the food from the mouth to the stomach by muscle contractions.

The **rumen** is the largest part of the stomach. It is also known as the first stomach or the paunch. Food enters and is agitated and partially digested by microbes.

The **reticulum** forms a cud (ball of food) and regurgitates it to the mouth for chewing. It is also known as the second stomach or the honeycomb because of its honeycomb appearance.

The **omasum** (oh-may-sum) extracts (removes) and absorbs fluids out of the food. This fluid contains nutrients. This is also known as the third stomach or the bible because its surface looks like the edges of pages of a large open book.

The **abomasum** (ah-bow-may-sum) contains digestive juices to digest food further. It is similar to our human stomach. In young goats, this is the stomach that does most of the work when kids are drinking large quantities of milk. A special passage called the esophageal groove closes off the other stomachs when the kid is drinking so that milk passes by them and comes right to the omasum and into the abomasum for digestion. The abomasum is also known as the fourth stomach.

The **small intestine** is like a long pipe where more digestion takes place. Most fluids and nutrients are absorbed through the walls of the small intestine. Most nutrient extraction takes place here.

The **cecum** (see-cum) is between the small and large intestine. It contains more microorganisms to digest food further.

The **large intestine** absorbs water and adds mucous to the remaining material to help it continue through the digestive system.

The **anus** is the opening through which undigested food is eliminated from the body.

# ACTIVITY #2 HOW THE FACTORY WORKS

DO	Time: 20 minutes Materials needed: photocopy the large drawing of the goat's digestive system, an equal number of sets of cards listing	<ul> <li>Split the group into two equal teams. The task is to label the parts of the goat's digestive system. They can do this in one of two ways:</li> <li>Cut out the descriptions and point to them on the goat or</li> <li>Draw lines on the goat.</li> </ul>	
	the narts and their	both groups to come back together and then go	
	function	through the anatomy of the goat.	
		The objective is to gain an appreciation for the	
		complexity of the ruminant goat.	
		How do the parts of the ruminant stomach work	
		together to accomplish digestion?	
	Discuss the following	Will at any the four parts of the stores of 2	
	prompts as a group	what are the four parts of the stomach?	
APPLY		If possible, get a sample ruminant goat's stomach	
		and get a veterinarian to go over the parts of the	
		ruminant stomach and to go over the different	
		parts. This can be a very fun activity that can make	
		a big impact on members!	





МОИТН	ESOPHAGUS	RUMEN
Bites off food and chews it up—Chews cud.	Moves food along to the stomach by muscle contractions.	Agitates food. Microbes in rumen break up food and begin digesting.
RETICULUM	OMASUM	ABOMASUM
Forms cud and regurgitates it to the mouth for further chewing.	Extracts and absorbs fluids out of food - fluids that contain nutrients.	It contains digestive juices (acids) to digest foods further. It works similarly to the human stomach.
SMALL INTESTINE	CECUM	LARGE INTESTINE
The long tube-like organ where more digestion takes place. Most fluids and nutrients are absorbed through the walls of this organ.	Small organ between the small and large intestine. Contains more micro- organisms for digestion.	Absorbs more water. Adds mucous to remaining food materials to help keep them moving through the digestive system.
ANUS		
The opening through which undigested food (waste) is eliminated from the body.		

#### **Topic Information – Browser vs Grazer**

As we know, goats can make use of many types of plants for food. Goats enjoy browsing. This means that they like to walk around, nibbling off leaves and branches, flowers, tree bark and other plants. For this reason, marginal land can be used for feeding goats. Marginal land is land that is too hard to cultivate and seed with crops. This may be because it is too wet to plant, too rocky to cultivate, or the land may be very hilly and impossible to work with tractors. This type of land grows many plants that goats like to eat.

However, unlike other ruminants, goats are considered browsers and not grazers. So...

#### What is a Browser?

Browser is a term that defines ruminants that can utilize leaves, bark and green stems from plants that may be higher off the ground. These animals differ from grazers that mainly eat vegetation at or near ground level. This makes goats more like deer in browsing and digestion.

The ability for some ruminants to browse gives them a distinct advantage vs other ruminants as these animals can survive in times when some forages might be unavailable (such as in times of droughts).





The differences extend far beyond these, though with browsers having clear anatomy and physiology differences when compared with grazers. The following summary table breaks down the differences between these species (originally published by Lisa Shipley (University of California, Berkeley) with information data from Hofmann (1989), Hoeck (1975) and Robbins et al. (1995):

Characteristic	Grazer	Browser
Foregut	Large	Small
	Subdivided	Simple
	Smaller opening between the reticulum and the omasum (2nd and 3rd chambers of the stomach).	Larger opening
	Sparser, more uneven pipilae (which are the aspects on the rumen that increase surface area)	Denser, more even
True stomach (abomasum)	Smaller	Larger
Hindgut	Smaller cecum and intestines	Larger cecum and intestines
Salivary gland	Smaller parotid salivary gland	Larger parotid salivary gland
Liver	Smaller	Larger
Mouth	Wider muzzle and incisor row (teeth)	Narrower
	Lower incisors of similar size	Central incisors that are
	Incisors project forward	broader than outside ones
	Smaller mouth opening and stiffer lips	Incisors are more upright
		Wider mouth opening with longer tongue
Teeth	Higher crowns in some species	Lower crowns in some species

From this summary table if there are any words that you are not familiar with, try and use the internet to find out how these differences influence goat nutrition and their ability to digest certain types of fiber.

# ACTIVITY #3 MATCH THE DESCRIPTION BROWSER VS GRAZER

	Time: 10 minutes	Get everyone to separate into two groups.
DO	Materials needed: Browser vs grazer activity	Read out the question and get members to call out Browser vs Grazer in a buzz in Go for the Gold format. Go for the Gold is a competition where members Increase their knowledge of 4-H project materials, agriculture, food, community events and more in a challenging and fun team atmosphere! The format can be found online at 4-hontario.ca under youth, 4-H-events and competitions. The format in this game is like the snapper questions in the game (True or False), however the rest of the game often has multiple choice or long answer questions which are meant to test knowledge of 4-H members. There are also other quizzes and questions that can be used online from: http://www.geauga4h.org/goats/goat-questions-2011.pdf https://www.sheepandgoat.com/feedforageid https://www.sheepandgoat.com/feedforageid
REFLECT		The objective is to identify the differences between browsers and grazers
APPLY	Discuss the following prompts as a group	Grasses tend to be thicker (in terms of plant density) than browses (woody plants), with new growth added at the base. At the same time, browses are often thin and have new growth added to the tips. How might this affect the ability for a goat to gain nutrients? How are they specialized to browse? Since goats have different anatomy than cows, how might this affect the goat's ability to gain nutrients in an agricultural setting? How might we adapt our nutritional approach to goats?
# Matching Activity- Browsers vs grazers (Answers)

- (1) I include deer and goats in my category. B
- (2) I include sheep, and cattle in my category. G
- (3) I have a large foregut. G
- (4) The opening between my reticulum and the omasum is generally smaller. B
- (5) My teeth are bigger in many of my species and I have a longer tongue B
- (6) My incisor teeth project forward G
- (7) My muzzle is wider allowing me to eat a lot of food very quickly G
- (8) My digestive system is designed to be handle woody materials **B**
- (9) I am said to be more adaptable to stress from drought than my counterparts B
- (10) My true stomach is relatively larger to allow for further digestion. B

# MEETING 2 – FORAGE FUNDAMENTALS!

# **Setting Objectives**

To identify the importance of quality forages for goats and to identify types of plants that are commonly harvested for forage.

#### Suggested Lesson Outcomes

- $\Box$  To quantify forage quality and to identify its importance
- $\Box$  To identify forage types and common storage methods
- □ To identify forage plants and poisonous plants

## Suggested Roll Call Questions:

- How do you store forage for your project animal?
- Why is forage quality important?

#### Sample Meeting Agenda Time: 1 hour 55 minutes

Welcome, call to order, pledge		10 minutes
Roll call		10 minutes
Parliamentary procedure	Minutes and Business	10-15 minutes
Topic Information Discussion	The Importance of Forage and processing.	15 minutes
Activities Related to Topic	Activity #1- Emphasis on Quality	20 minutes
Activities Related to Topic	Activity #2- Match the Forage	10 minutes
Topic Information Discussion	Pastures and Plant Type	10 minutes
Activities Related to Topic	Activity #3- Reading the Analysis	10 minutes
Topic Information Discussion	Poison or Not?	10 minutes
Wrap up, Social time and		10 minutes
adjournment		

# **Topic Information**

# The Importance of Forage and processing

#### The Importance of Forage to the Goat

As we know, the ruminant animal can make very good use of roughage. The goat's digestive system works best on high fibre feeds. For this reason, farmers feed forage crops to their ruminant animals. The most common among these crops is hay and pasture.

Can you think of some reasons that might explain why farmers like to feed hay to animals?

- Hay crops are easy to grow in most parts of Canada. Hay is quite easy to store.
- Most farmers have the type of equipment required for hay.
- Good quality hay is a very economical way of supplying nutrients.
- Very good quality hay can replace much of the need for expensive grains. Some people do not have pasture and rely on hay that they purchase.
- Hay can replace pasture when the weather is too bad for grazing. Pasture is not available in the winter.

### **Recognizing Quality Hay**

The key to choosing good hay is "quality". Good quality hay is:

• Palatable (meaning that goats want to eat it)

#### And

• High in Nutrients for that specific life stage

Additional questions to ask:

#### Appearance

There are many things that we can find out about hay just by looking at it.

- Is the hay nice and green or is it bleached out or even brown or black?
- Was it cut when it was young or just maturing or is it over ripe the leaves, buds and flowers are gone with just the stalks left?
- Does the hay have the right combination of grasses or legumes we want?
- Is there mould in the bales?

#### Odour

• Does the hay smell as if it would be good to eat? Does it smell like a freshly mown field (or your lawn when you cut the grass)?

• Is it mouldy or bad-smelling, musty or dusty like an old barn?

#### Feel

- Does it feel soft and tender?
- Is it sharp and tough feeling?

#### Wet vs Dry Forage

The previous material covered in this section has covered forages that are dried down before being fed to goats. However, developments in forage preservation have led to techniques that do not require forages to be dried down fully before storage:

(1) Haylage or Silage- Fermented whole plants that are stored under anaerobic conditions (popular due to ease of harvest)



(2) Baleage- slightly wetter hay that is kept in individual plastic or together in a row (popular as it maintains an optimal leaf to stem ratio)



Although these practices have become more popular, there is also a need to pay close attention to harvesting and storing of forages when forages are harvested in this manner.

If a forage is too wet or too dry when it is stored, it can lead to mould or spoilage. Additionally, attention must be paid to storage conditions as an opening in the bunk, or the bale can lead to spoilage and bad bacterial development.

# Forage Analysis

When discussing forage quality, it is important to not forget about the nutrients that make up that forage. For this section, you might borrow the forage testing auger from a feed company and demonstrate how a sample is taken. After the hay judging, a member might like to take a sample to send in for analysis. Results could then be discussed at a later meeting. Information about reading an analysis will be supplied with the next meeting's information.

Several laboratories are certified across the province to do forage testing for farmers. With forage testing equipment, a sample is taken and then sent to one of these certified laboratories for analysis. The farmer is charged a fee for the nutrient analysis of his/her forage. Grain rations may be analyzed in the same way. Knowing the exact nutrient content of your hay (through forage analysis) helps to determine how much grain and mineral is required to meet the goats nutritional needs.

#### Taking and Submitting a Forage Sample (Source: OMAFRA)

#### Step 1. Choose the Feeds to be Tested

The feedstuffs chosen for analysis should form the basis of the ration. This will usually include samples of each different type or cutting of hay, haylage, corn silage and any other roughages. The nutrient composition of roughages varies greatly from year to year and from farm to farm, making yearly analysis a necessity.

Homegrown grains should be tested every two years to check nutrient quality compared to expected values. Nutrient composition of feeds such as corn and soybean meal vary significantly, depending upon variety, weather and processing conditions. Frequent testing of the energy and protein ingredients in mixed feeds, such as sheep grower or lactating rations, is necessary to optimize formulation.

#### Step 2. Collect the Feed Sample

Accurate feed analysis begins on-farm with proper feed sampling techniques. Collection of a representative feed sample, one truly indicative of the entire hay mow, grain bin or silo, is the most important step in feed analysis. Use these guidelines when collecting feed samples:

#### Hay Samples

To sample hay properly, a hay Core Sampler is a necessity. Many feed company representatives and veterinarians have core samplers. Place the hay corer into the middle of the narrow end of square bales, or the rounded side of large round bales, and drill to the centre of the bale. When sampling from large round bales, an extender is added to the core sampler so that the bale centre can be reached. Proper sampling practices ensure that the sample obtained will include the same proportion of leaves and stems as is present in the entire bale. Sample a minimum of 10-12 bales from different locations in the mow or storage area. Better yet, set aside bales that are to be sampled as you are storing the hay. This will avoid hay being buried under or behind other hay in the storage area, and allow a more representative sample to be collected. Mix the samples together in a clean, dry plastic pail. A two-handful subsample, sealed in a plastic bag and well labelled is sufficient for laboratory analysis. Flakes of hay or samples grabbed by hand are not representative samples and analytical results will be inaccurate. Many labs will refuse to accept inappropriate samples.

#### Silage and High Moisture Grains

Silage and high moisture grain samples are best collected during harvesting. Collect a handful of silage from every third or fourth wagonload and place in a clean plastic bag. At the end of each day, mix the contents of the plastic bag, take a two-handful subsample and freeze it in a sealed freezer bag. Continue this practice each day of harvesting.

When the silo is filled, thaw all the subsamples, and mix them together in a clean, dry plastic pail or bag. Take a two-handful sample and place it in a clearly labelled plastic bag. Remove any air present by squeezing the bag, and then seal it securely. This will help to preserve the moisture content of the sample. A sample collected this way will represent the nutrient composition of the entire silo. Any feed variations that may exist, due to field differences, varying stages of maturity, or weather conditions, will be reflected in the sample.

If more than one type of haylage or silage is stored in the same silo, use a marker to indicate when the change occurs. There is no value in sampling and testing a silage if you do not know when you are feeding it. Egg cartons, or polystyrene cups are examples of markers which have been used successfully. Put these materials through the blower in liberal quantities whenever you start filling with a new type of silage. Then watch for these markers later when you are feeding the silage from the silo.

Ensiling affects some nutrient levels, particularly the Acid Detergent Fibre (ADF) content, from those measured in the fresh plant material. The ADF analysis is important as it is used to estimate energy content of roughages. An ADF estimate of fermented forage can be predicted using specialized equations, based on the ADF analysis of the fresh feed prior to ensiling. Labelling the sample as "fresh silage - sampled during ensiling" is therefore necessary to accurately predict the energy content of silage that will be fed.

If it is impossible to collect a silage or high moisture grain sample during harvesting, the next best practice is to sample from the silo itself. Samples should be taken over a two day period. Allow the silo unloader to run for several minutes, then grab several handfuls of freshly unloaded material and place them in a clean dry plastic bag. Mix all the subsamples at the end of the two day period and submit a two handful subsample for analysis. It is very important to be safe if you are working with pit or bunk silos. Use a front-loader or silage defacer to bring down a pile of silage, moving the silage a safe distance away from the silo face for your safety. Mix 5-8 handfuls of feed from this pile and add a subsample of two handfuls (about half a pound) to a labelled plastic bag for analysis. Silage or high moisture grain samples collected from storage will only represent a small portion of the silo or bunk. Analysis of these samples, however, will provide a better estimate of the feed quality than would average Ontario or book values.

# **Dry Grains**

Sample dry grains by hand or with a grain probe. Sample from various areas in the storage bin, mix in a clean dry pail and grab a two handful sample. Place the sample in a clearly labelled plastic bag.

Now that all the samples are properly collected, you are ready to send them to the feed laboratory.

# Step 3. Submit the Feed Samples

Once the representative sample is properly collected, the process is not yet complete. Samples must be accurately labelled. Feed analysis laboratories require a completed "sample input" form to accompany the samples. The input form information and proper sample identification are extremely important to enable the lab to perform the correct analytical procedures. When submitting hay and/or haylage samples, indicate the type (grass, mixed or legume) and appropriate cutting (i.e. first, second, etc.) Follow these general guidelines to determine the type of hay or haylage being submitted for analysis:

Grass = < 25% legume (alfalfa, red clover, etc.) in the sample Mixed = 25-75% legume in the sample Legume = > 75% legume in the sample

Equations, specific for the type of forage, use the Acid Detergent Fibre (ADF) analysis to predict the energy content. Most laboratories use these equations and can provide an estimated energy value, expressed as Total Digestible Nutrients (TDN) and/or Net Energy (NE), for hay, haylage and corn silage samples. Correctly labelling forage samples ensures the appropriate energy estimating equation is used. Use of the wrong equation will under or overestimate the energy content of the forage and, ultimately, lead to deficiencies or excesses in the formulated ration.

Clearly label samples treated with a non-protein nitrogen (NPN) additive, such as urea or anhydrous ammonia. These feed samples must be dried differently to preserve the added NPN. If the sample is dried normally (oven dried), the NPN is lost and the resulting crude protein analysis will be inaccurate. A good policy to follow when submitting samples is to include any and all information that you feel will help the laboratory do the best job possible.

Feeds can be analyzed by a feed laboratory. A list can be obtained from the OMAFRA Agricultural Information Centre.

## Step 4. Choose the Nutrients to be Analyzed

Choosing the proper nutrients to be analyzed is essential to accurately assess feed quality and provide the information necessary for ration formulation. The major nutrients commonly analyzed in feed samples are described below.

## Dry Matter

The dry matter (DM) of a feed contains all the nutrients (except water) of importance in livestock nutrition. Once the feed dry matter content is known, the amount of feed (as fed) to be offered to the animals can be calculated.

## Crude Protein

Crude Protein (CP) is based on a laboratory nitrogen analysis, from which the total protein content in a feedstuff can be calculated. Requirements for CP must be met in a ration designed to optimize production.

## Energy

Energy is a major nutrient required for maintenance, growth, production and reproduction. Feed energy content is expressed as either Total Digestible Nutrients (TDN) or Net Energy (NE). Energy itself cannot be directly measured in a laboratory, but can be predicted for hay, haylage and corn silage from the Acid Detergent Fibre (ADF) a Calcium and Phosphorus

Calcium (Ca) and Phosphorus (P) are two macro or major minerals required in a ration in relatively large amounts. Maximum productivity and good health depend on both the actual amounts of Ca and P supplied and the ratio of Ca:P. Hay and haylage are good sources of Ca but relatively poor in P. Grains are rich in P but contain little Ca.

nalysis. Energy values for other feedstuffs are usually obtained from reference books.

Calcium and Phosphorus

Calcium (Ca) and Phosphorus (P) are two macro or major minerals required in a ration in relatively large amounts. Maximum productivity and good health depend on both the actual amounts of Ca and P supplied and the ratio of Ca:P. Hay and haylage are good sources of Ca but relatively poor in P. Grains are rich in P but contain little Ca.

## Magnesium and Potassium

Magnesium (Mg) and Potassium (K) are also macro minerals present in feeds in variable amounts. Many roughages grown on Mg deficient soil are low in Mg. In general, hay and haylage provide an abundant source of Mg and K, whereas grains contain lower levels. Mg and K should be analyzed in feeds fed to ruminant animals.

#### Manganese, Copper and Zinc

Manganese (Mn), Copper (Cu) and Zinc (Zn) are three micro or trace minerals. The levels of these three minerals vary considerably in feed. Copper should be routinely analyzed in feeds offered to sheep. Trace mineral analysis for Cu, Mn and Zn and other micro minerals is recommended when a related health and/or production problem exists or when a custom mineral formulation is desired. Consult a veterinarian for advice if a trace mineral deficiency or excess is suspected.

#### Fibre

Acid Detergent Fibre (ADF) measures the least digestible portion of the fibre in feeds and is used in predicting the energy content of hay, haylage and corn silage. An increase in feed ADF content reflects a decrease in energy value.

Neutral Detergent Fibre (NDF) measures the total fibre or bulk component of a feedstuff. NDF is also used to predict feed intake; an increase in feed NDF results in decreased feed intake. Check with your nutritionist to see if NDF is being used in ration formulation.

#### Digestible Protein and Acid Detergent Fibre-Nitrogen

Request a Digestible Protein (DP) or Acid Detergent Fibre-Nitrogen (ADF-N) test for any hay or ensiled haylage samples you suspect may have suffered heat damage. This test will estimate the adjusted crude protein value of a heat damaged hay or haylage. Only stored samples can be tested for DP or ADF-N as heat damage occurs during storage.

# ACTIVITY #1 EMPHASIS ON QUALITY

	Time: 20 minutes	At Home (Virtual) or No Access to Goats:
DO	Materials needed: Four different hay samples	Gather four different types of hay samples of various quality. These can also be found online or by contacting a forage specialist. Arrange these samples and number them 1 to 4 (left to right). You can add extra information to each Sample about non-visual aspects like smell. Get members to judge the samples and get members to give reasons. You can also include the score card. <b>On-Farm or in-person:</b> Same thing as virtual, but arrange the samples so that members have a hands-on activity. You can add criteria for your hay class as well (type of animals fed to).
REFLECT		The objective is to identify good quality forages and to judge forage.
APPLY	Discuss the following prompts as a group	Why is it essential to identify forages that will be fed to certain life stages? How can forage quality improve nutrition and performance? What about mouldy hay or baleage? Should this be disposed of?

# Hay Judging Card

<ul> <li>MATURITY</li> <li>hay should be cut when legumes are in first flower and grasses are in boot stage (heads just emerging)</li> <li>late cut hay is low in field value</li> <li>early cut hay will produce low yields but be tasty</li> </ul>	HAY 40
<ul> <li>COLOUR, ODOUR AND DISEASE <ul> <li>should retain a green colour</li> <li>hay should have a fresh smell</li> <li>haylage should have a sharp, sweet smell</li> <li>musty, burnt or rotten smells indicate poor quality hay or haylage</li> <li>discolouration is undesirable</li> </ul> </li> </ul>	20
<ul> <li>LEAF TO STEM RATIO</li> <li>much of the feed value is in the leaves</li> <li>good quality hay will retain most of its leaves</li> </ul>	20
<ul> <li>MOISTURE AND CONDITION</li> <li>moisture content should be 55-65%</li> <li>you should not be able to squeeze out water</li> <li>very wet samples may rot in silo</li> <li>should be free from mold or slime</li> <li>if too dry, haylage will lose nutrients and taste</li> </ul>	0
<ul> <li>LEGUME-GRASS BALANCE</li> <li>legumes are higher in protein than grasses of similar maturity</li> <li>for hay: over 75% legumes is excellent</li> <li>for haylage: over 50% legumes is best</li> </ul>	15
<ul> <li>PURITY</li> <li>foreign materials such as weeds or straw indicate a low feed value</li> </ul>	5

# 4-H STANDARD JUDGING CARD

Name/Number	Age
Class	Club
Placing: First Second Third Fourth	
REASONS (list only main points):	
I place at the top because:	
I place over because	9:
I place over because	:
I place over because:	
FOR THESE REASONS I PLACE THIS C	CLASS OF

# ACTIVITY #2 MATCH THE FORAGE

	Time: 10 minutes	Provide the next few pages to members and go to a field that
DO		has mixed forages. Get members to identify the different
	Materials	species of forages found in the field.
	needed: Forage	
	Type Fact Sheet	Get members to read over the different forage types and get
		members to predict the general proportion of each species
		within the field.
		The objective is to gain knowledge about different types of
KEFLECI		forages and to learn about ways to identify them.
		Did you identify any species of plants that were not included
		in the fact sheet? Were those weeds or different species of
		forages?
	Discuss the	What is the forage being used for? How does that relate to
	following	the type of lorage being grown.
APPLY	prompts as a	Is the field in flower? What does flowering do to a plant
	group	(decreases nutrient content)?
		How much of the field is made up of grasses vs legumes?
		How might this affect the composition of the harvested
		forage?

	Trefoil	Clover	Alfalfa
Images	A A A A A A A A A A A A A A A A A A A		No contraction of the second s
Leaves	Legume with small pointed leaves.	Oval shaped leaves.	Long oval shaped leaves with tooth shaped edges
Flowers	Has yellow flowers that resemble snapdragons.	Flowers are predominantly purple and red.	Flowers are blueish coloured

# Forage Type Fact Sheet

		Grasses		
	Fescue	Timothy	Brome Grass	Orchard Grass
Cartoon Image		Å		
Live Image				
Overview	Light, feathery grass	Characteristic seed head	Tall Sturdy Grass	Tall Sturdy Grass

# **Topic Information**

#### How do we identifu a well managed pasture?

- The forage plants are tasty and interesting to the animal;
- The field is the right size for the number of goats;
  - o A field that is too small will become over-grazed and the plants will be killed as they are chewed off too close to the ground or stepped on by the animals.
  - o A field that is too big will not be grazed enough. The plants will grow too tall and be tough and tasteless.
- The type of plants grown provides good nutrition for the animals.

#### How to Manage a Pasture Well

• Divide pastureland into properly sized fields for the herd. This is often done with electric fences. For optimum pasture growth, it is best if animals are only allowed 3 to 4 days grazing in a paddock and then moved to the next. Each paddock should be rested for approximately 30 days before animals return to graze it.

NOTE: It is important to know when animals are beginning to over-graze a field. The farmer must watch to see how much grazing the animals are doing. Grasses should never be grazed until all leaves are gone. Make sure that enough leaves remain for the plant to continue growing well (usually no shorter than 6 cm). Do not turn goats out onto a pasture until it is about 15 cm tall.



Source: Government of Manitoba

• Grow different types of forage. Different varieties of forage crops mature at different times (flower and go to seed). When the farmer plants a field, he/she can choose varieties of forage grasses and legumes that have different maturity dates. In this way, all fields will not mature at the same time.

• Take goats off a pasture that is growing faster than it can be eaten. The field can be cut for hay while it is still tender and nutritious enough to make good hay. Later, goats can be turned back into the field to eat the remaining grass.

• Make sure that pastures are fertilized well so that they will grow back well each year.

• You may also graze on cover crops (such as planting oats or rye after wheat is harvested) and using temporary fencing. Make sure the temporary fencing is enough to contain the goats otherwise you may have other problems.

# ACTIVITY #3 MANAGING PASTURES

	Time: 10 minutes	Using the bread samples, ask each member to taste each		
		of the three types of bread and decide which type they like		
	Materials	most. Then, explain that pasture is a lot like bread.		
	needed: 3			
	different bread	If this meeting is being done remotely, get each member to		
	samples (ideally	show their favourite kind of bread.		
	one that is older			
	but not expired)	Goats like fresh pasture, which is full of tender grasses. They		
DO		will eat large quantities of good pasture. The slightly stale		
		bread is like pasture that is still edible but not particularly		
		enjoyed by the goats. They may not eat as much, and it		
		doesn't take long before the whole pasture becomes over-		
		ripe (like the stale bread) and goats don't bother eating very		
		much at all. As a result, the goats may lose weight, does will		
		not produce much milk and kids will have lower growth rates		
		when kept on old overgrown pasture		
		The objective is to identify how forage age can impact intake		
REFLECT		and how pastures can be managed efficiently.		
	Discuss the	What was the difference between the slices of bread?		
	following			
	prompts as a	How might the differences in preference also be seen on		
AFFLI	group	farm?		

# **Topic Information**

#### **Poisonous Wild Plants**

It can be very economical to pasture goats on land that cannot grow any type of cultivated crop. But, before we turn goats onto uncultivated land, we must know that the plants are safe to eat. In Ontario, we have several plants that are very poisonous to livestock. It is important that we learn to recognize these plants and keep them out of our fields.

#### **Breaking Down Toxins**

#### Define it!

What is a toxin? A toxin is something that is made by plants or a living thing that is harmful to another living thing (such as a goat).

Poisonous plants can be separated based on the toxin that they contain. The toxin may be located in the fruit, plant or roots. The following is a list of the plants that are toxic to goats arranged by toxin type. Some of these human food species have been bred to contain less toxin but may still be toxic in large quantities. Additionally, some plants may only be toxic when their intake is high. Overall is is the dose (amount) that makes the poison!

#### Cyanides

(are also toxic to humans- Mainly due to the cyanide content in the seed- not the fruit) Wild Cherry Black Cherry Chokecherry Apricot Peach Plum Cherry Laurel Plants with Pitted Fruits Arrowgrass Elderberry Clovers – when fresh

#### **Glycosides**

Oleander – extremely toxic Hemp Dogbane Locoweed Milkvetch Buttercup Foxglove Milkweeds

# Alkaloids Japanese Yew – extremely toxic Deathcamus Greasewood Lupine Locoweed Milkvetch Kochia Crotolaria Tansy Ragwort Nightshades Horsenettle Larkspur Jimsonweed Houndstongue Boxwood Sweetshrub Yellow Jessamine Stagger Grass (Fly Poison) Yarrow (Mild Gastrointestinal Irritant) Potatoes Tomatoes Kale Cabbage Turnips Mustard family

#### Nitrates

Pigweed Lambsquarter Kochia Clovers – when fresh, dry is neutral Milk Thistle

#### Oxilates

Lambsquarter Kochia Halogeton Dock Sorrel

#### **Other Toxins**

Sneezeweeds Bracken Fern Horsetail Water Hemlock Poison Hemlock Black Locust Hypericin St. Johnswort Oak Trees/Acorns/Leaves **Resin Toxins** Marijuana Rhododendron Laurels Azalea Chinaberry Fetterbush Maleberry Horsebrushes Tall Fescue Black Walnut Ponderosa Pine (mostly for cattle) False Hellebore Fiddleneck Tarweed Prickly lettuce **Russian Knapweed** Yellowstar Thistle Spurge Laurel Sicklepod

From this list it is important to note the domestic plants that can be toxic to goats. These include yew, and rhubarb. A kid goat can drop dead a couple hours after it eats yew shrub clippings – and yew is a pretty common foundation shrub in Ontario. Goats sometimes have a greater chance of getting poisoned when they break out of their pasture and investigate the flowerbeds than if they were to find another plant in their pasture.

### **Prevention of Poisonings**

• Don't let fields become over-grazed. Goats may not bother with a poisonous weed at all but if there is nothing left to eat in the field, they will try eating these plants.

• Be careful not to harvest poisonous plants with hay.

• Keep goats out of fields until grasses are well advanced, as many of the poisonous weeds are early growers.

• Destroy poisonous plants or fence off areas where they are found.

**NOTE:** Some of these plants cannot be killed by pulling. Most notable is the sheep laurel which grows from extensive root systems. Pulling it up only makes it grow more shoots from the root areas.

To ensure that goats do not become poisoned, it is important for you to be able to identify these poisonous plants to prevent any consequences for your goats from the consumption of harmful plants.

# MEETING 3 – WHAT A GOAT NEEDS

# **Setting Objectives**

To identify a nutrient and to recognize the importance of a balanced diet for a goat.

Suggested Lesson Outcomes

- $\hfill\square$  To identify the necessary nutrients for goats.
- $\Box$  To read a feed analysis.
- $\Box$  To make simple protein blends.

### **Suggested Roll Call Questions:**

- What do goats need to thrive?
- What is a source of nutrients for goats?

#### Sample Meeting Agenda Time: 2 hours 10 minutes

Welcome, call to order, pledge		10 minutes
Roll call		10 minutes
Parliamentary procedure	Minutes and Business	10-15 minutes
Activities Related to Topic	Activity #1- Is it True or False?	10 minutes
Topic Information Discussion	Importance of Water	10 minutes
Activities Related to Topic	Activity #2- How Important is Water?	10 minutes
Topic Information Discussion	Nutrition and Nutrient Requirements	5 minutes
Topic Information Discussion	Feeding Guidelines for Goats	10 minutes
Activities Related to Topic	Activity #3- Reading an Analysis	10 minutes
Topic Information Discussion	Concentrate for Goats and Tagging	10 minutes
Activities Related to Topic	Activity #4- Alternative Goat Feeds	15 minutes
At Home Activity		5 minutes
Wrap up, Social time and		10 minutes
adjournment		

# ACTIVITY #1 IS IT TRUE OR FALSE?

DO	Time: 10 minutes Materials needed: The Attached True or False Prompts	Split the group into two even groups and read out the prompts. You can give one question to group 1 and then alternate. If the first group gets the question incorrect, the second group can answer why the answer is true or false. If the first group gets it right they can potentially get two points if they can also get the reason right. Otherwise the other team gets a chance.
REFLECT		The objective is to review aspects already covered and topics that will be covered in this meeting.
APPLY	Discuss the following prompts as a group	Were there any prompts that you did not know the answer to? Are you still unclear about any of the questions?

### True/False Prompts

- 1. All living things need energy to live.
- 2. Good nutrition is not important for young growing goats.
- 3. Poor nutrition can cause poor growth, milk production and illness.
- 4. Goats only need water once a day.
- 5. A buck is a male goat.
- 6. Wilted cherry or plum leaves are very poisonous to goats.
- 7. Cedar branches are safe to feed to goats but may change the flavour of their milk.
- 8. Rhubarb leaves are poisonous to goats.
- 9. Spinach is good for goats.
- 10. Goats like old, long grass, the longer the better.
- 11. Goats know the difference between safe and poisonous plants.
- 12. Fields should be grazed until the grass is less than an inch tall.

### The answers are:

- 1. TRUE- All living things need energy to live.
- 2. FALSE- Good nutrition is important for young growing goats.
- 3. TRUE- Poor nutrition can cause poor growth, milk production and illness.
- 4. FALSE- Goats need clean water at all times.
- 5. TRUE- A buck is a male goat.

6. TRUE - Wilted cherry or plum leaves are very poisonous to goats. In fact, these types of leaves should not be fed at any time of the year.

7. TRUE - Cedar branches are safe to feed to goats but they may change the flavour of the goat's milk.

8. TRUE - Rhubarb leaves are poisonous to goats. (Humans shouldn't eat them either.)

9. TRUE - Spinach is good for goats.

10. FALSE - Goats do not like old, long grass. It tastes about the same as stale bread tastes to us. 11. FALSE - Goats do not know the difference between safe and poisonous plants. Some bad plants taste bad and goats learn not to eat them, but some plants are so poisonous that even a few bites make the goat sick. Also, some poisonous plants taste good even though they are bad for the animal.

12. FALSE - Fields should never be grazed until they are only an inch tall. The grass will not grow back if it gets too short and the animals will trample the grass and kill the root systems of the plants.

# **Topic Information**

#### **Importance of Water**

It can be very economical to pasture goats on land that cannot grow any type of cultivated crop. But, before we turn goats onto uncultivated land, we must know that the plants are safe to eat. In Ontario, we have several plants that are very poisonous to livestock. It is important that we learn to recognize these plants and keep them out of our fields.

#### **Q:** How often should you water goats?

A: Goats must have water at all times, particularly in hot weather. It is best to replace water two or three times a day so that it is as fresh as possible, but once a day would be adequate as long as the water remains clean and there is enough so that the goats will always have something to drink.

#### Q: What temperature should the water be?

A: The water can be as cold as it comes from the tap. During the winter, water that has frozen on top should be emptied and refilled with fresh water. Warm water is better than cold water. Goats will drink more water if it is warm, and they will waste less body energy warming the water up once they have swallowed it. Warm water is not very convenient for most people, so cold water is quite acceptable.

Water is very important to the goat, as it is to all living beings!



#### **Remember!**

Insufficient water intake will depress a goat's performance earlier and more severely than any other dietary insufficiency. Maintaining enough water is the most important management consideration. Goats should be consuming more water with high protein ration feedings. Decent water quality, not just quantity, is a must (Source: Manitoba Goat Association).

# ACTIVITY #2 HOW IMPORTANT IS WATER?

	Time: 10 minutes	Try to help members to envision how much water is in
		a rumen. Have a 10-litre pail or a large barrel on hand if
	Materials	possible. Examples such as a cow having about 105 L of
	needed:	water capacity and a goat having a capacity about 46 L, etc.
		can help members understand just how much water and
	Four different	food materials are being processed in a goat or cow at a
	hay samples	time.
DO		
		As reinforcement of the idea of milk being mostly water by
		weight, mix up a glass of powdered milk to show how the
		solid part of milk can be dehydrated down to such a small
		amount. This is why it is so important for milking animals to
		have a really good supply of water in order to produce milk.
		The objective is to identify the importance of water for daily
REFLECT		life.
		What might happen to a goat that does not have enough
	Discuss the	water for life? Why would it be considered an animal welfare
APPLY	following	concern if a goat does not have access to clean water?
	prompts as a	
	group	What is the water capacity of a goat?

# **Topic Information**

#### **Nutrition and Nutrient Requirements**

Nutrition is the process through which animals and plants turn food materials into energy.

We need energy to live, to grow, to work, and to play. Many things need energy in order to keep moving.

Cars need energy (fuel) to move the same way that living beings require energy to function.

Here are some examples of types of energy and the objects or animals that would use them to function:

Diesel Fuel	Tractor
Grain and Hay	Goats
Fertilizer	Vegetables

Plankton	Whale
Electricity	Lights

#### What is a nutrient?

A substance that provides nourishment essential for growth and the maintenance of life.

Proper nutrition is very important to all goats, but particularly to young growing goats. While goats eat feed, it is the nutrients that make up these feeds that are most important!

Goat owners must care for their animals and feed them properly to give them a chance to grow well and to produce milk, meat, offspring or fibre (wool, hair, etc.) to their full potential.

It is important to know the nutritional requirements for the kind of animal being raised and for the stage of life the goat is in. This means that we must know what nutrients a specific animals needs to be able to live and grow. We must also know how much of each nutrient is needed to meet the animal's needs.

A nutrient is like an ingredient in a recipe. If we leave some nutrients out of an animal's diet, it will cause some type of deficiency (a shortage). This will result in problems such as low milk production, slow growth or disease.

Think of this as a bread recipe; if you forget an ingredient, the others may not work the way you intended them to.

# Topic Information Feeding Guidelines for Goats

#### **Defining some Terms**

**Energy** - Defined as the potential to do work. Based on fundamental principles, energy cannot be created or destroyed and can only change forms (food transforms into heat, kinetic and chemical energy). Energy requirements can vary across breeds and age groups. Energy content varies across feed types and is typically measured in terms of calories (cal) or joules (J). However, it is usually defined in terms of TDN which stands for total digestible energy.

**Carbohydrates** - The main source of dietary energy and primarily made up of sugars. Corn, and grains are good examples of carbohydrate rich ingredients.

**Fatty Acids and Fats** - Part of a larger category called lipids which includes steroids and other compounds that do not react well with water. On an analysis the measure for fat content may be defined as EE (ether extract) due to the way the analysis was traditionally conducted. Lipids are also generally a great source of energy. Fat can come from soybean meal, canola meal but is much denser in fat sources such as palm fat.

**Protein** - Protein is one of the main structural building blocks for life but in ruminants, protein can be separated into two categories:

Microbial Protein- The protein that is available to microbes in the rumen to break down into the building blocks that the animal can use. Examples include soybean meal and canola meal.
Bypass Protein- The protein that cannot be broken down in the rumen (either due to protection or inaccessibility) which can be broken down by the animal. Sources of this include corn glutten meal and bypass soybean meal).

Since protein can also be formed by microbes, nitrogen containing compounds can also be used to stimulate additional protein production (although this is not always as easy to regulate).

#### What is it?

Urea is nitrogen that is not a protein. Ruminants, including the goat, can turn non-protein nitrogen into protein through the microbe activity of their rumens. Urea cannot be fed alone as the microbes must also have carbohydrates from other feed sources in order to use urea to make protein. Urea is toxic if not properly fed to goats. Feeds containing urea should not be fed to very young goats as the rumen is still developing. Most farmers do not give urea feeds to their goats. If they do, these feeds should be closely monitored.

**Fiber** - One of the most important parts of the rations for ruminant animals. It buffers the rumen, feeds good microbes and allows ruminants to be healthy. The level of digestibility is also a good measure of forage quality as will be discussed later.

Minerals and Vitamins: Outlines on next couple of pages:

#### VITAMINS

Goats do not synthesize Vitamin A, D and E but still require it in their diet, so these vitamins must be added to feed ration. Vitamin and mineral interactions are complex.

Being aware of deficiency symptoms can help a goat producer know when to seek advice from a qualified nutritionist.

Vitamin A	Vitamin D	
Important for outer defences of the skin and	Important for <u>bone formation</u> . Vit D is called the	
mucous membranes against disease. Vitamin A	sunshine vitamin, and stimulates both calcium and	
aids disease resistance and is required for good	phosphorous release.	
vision, lactation and reproduction.	Signs of deficiency: RICKETS can occur in goats	
Signs of deficiency: poor appetite, weight loss,	deprived of natural sun and Vit D supplements –	
unthrifty appearance with poor hair, tearing eyes,	signs include bowed legs, enlarged joints, lameness,	
night blindness, and thick nasal discharge. Kids are	stiffness and poor growth and body condition.	
prone to scours, respiratory disease and parasites.	Adults can develop osteoporosis.	
Kids with coccidiosis have an increased Vitamin A requirement because absorption is impaired by damage to intestine.	Goats on pasture absorb Vit D through their skin from the sun. Goats housed indoors, fed higher quantities of grain and high milk producers may need to be supplemented with Vit D.	

#### Vitamin E

The main action is as an <u>antioxidant</u> – it stabilizes fatty acids, Vit A and various hormones and enzymes. Vit E is also important for <u>immune</u> <u>response</u>. Vit E and selenium work together.

<u>Signs of deficiency</u>: In severe cases, kids may have nutritional MUSCULAR DYSTROPHY (white muscle disease) at birth and be too weak to suckle. Affected kids might cough or let milk run out of the nose after drinking. Kids may develop muscle stiffness, pneumonia or sudden death from deteriorating muscles in pharynx, heart and diaphragm.

A shortage of Vitamin E may cause adult does to have retained placenta after kidding or off-flavour milk.

#### Vitamin B

B1 (thiamine) is necessary for <u>carbohydrate</u> <u>metabolism and brain function</u>. When metabolism slows down as a result of inadequate thiamine, cells die and brain swelling occurs.

<u>Signs of deficiency:</u> In some cases the rumen microbes do not produce enough B vitamins, and the goat shows a thiamine deficiency.

POLIOENCEPHALOMALACIA is a nervous disorder in which the animal becomes blind, depressed and presses with its head; the pupil slit in the eyes becomes vertical rather than horizontal, which is the norm.

Thiamine can be injected by needle or fed.

#### MACRONUTRIENTS

These major minerals naturally occur in hay and grass in larger quantities, so it is important to analyse a forage sample to balance the ration. Premixes and supplements contain macronutrients and trace minerals and can be formulated to balance and/or improve a ration when the forage/hay has lower protein, energy or digestibility.



#### MICRONUTRIENTS

Micronutrients or trace minerals are needed in very small amounts, and sometimes to perform a very specific job that is critical to overall health and productivity.

Trace mineral nutrition is tricky because the availability of trace minerals in hay, forage and grain is affected by the soil type, soil pH, species and maturity of plants, plus, goats are selective eaters, and may eat a variable amount of feed.

COBALT	COPPER		IODINE
Goats need cobalt to make Vitamin B.	Required to make the enzyme to form hemoglobin in blood. Goats need more copper than		Goats need iodine to make a hormone for thyroid function. Deficiency causes
mineral block.	sheep.		hairless fetuses, abortion.
IRON	MANGA	NESE	MOLYBDENUM
Stored in liver, spleen and bone marrow. Iron is a component of hemoglobin in blood, which carries oxygen from lungs to all tissues in body.	The "Motherhood needed for bone and reproduction	d" mineral is production	Needed to produce an enzyme, xanthine oxidase. Must be balanced with copper.
SELEN	IUM		ZINC
Important for membra reproduction. Interacts with Vit E for response.	ane integrity and r immune	Needed for integrity. Zinc is ofter	skin and hoof n used to treat skin
Selenium is deficient in Ontario soils, so is also low in feed, and needs to be added.		problems a	nd hair loss.

#### Feed and Nutrients all Goats Need:

- 1. Clean water at all times.
- 2. Free choice good quality mixed hay, forage or have access to pasture.

3. A loose mineral box and/or a trace mineral salt lick. Trace mineral salt licks are salt blocks with the trace minerals (copper, manganese and zinc) added to them. They do not include any of the other essential minerals needed by the goat. They are placed in an area of the barn or pasture where the animals can lick them when they want to.

4. A ration can vary from farm to farm. Some rations may contain different mixes of grains, forages and different amounts of minerals. Goats need different amounts of their ration, depending on their age, breed, animal type and sex. The table below gives examples of amounts needed.

#### **Maximizing Intakes and Requirements**

Although this section is meant to be a guide, there are other resources that break down more specific requirements for goats. These include peer review documents such as NRC (2007) which breaks down the requirements for sheep, goats, cervids and new world camelids:

Production Stage	DMI, % of BW	% СР	% TDN
Mature Does			
Maintenance	1.8-2.4	7	53
Early gestation	2.4-3.0	9-10	53
Late gestation	2.4-3.0	13-14	53
Lactation	2.8-4.6	12-17	53-66
Other Goats			
Dairy doelings	3.3-3.8	12	67
Boer doelings	3-3.4	15-17	67
Dairy males	3.2-3.7	10-15	67-88
(weight gain dependen	t)		
Boer males	3.3-3.7	15	67

#### Define it!

What is DMI, % of BW? That refers to the dry matter intake (how much a goat eats in dry weight) as a percentage of their total weight. In nutrition, we usually discuss these measures in dry weight as wet weight can vary across the different types of forage.

The DMI refers to dry matter intake which is a key aspect to discuss when examining goats. A goat can only eat so much in a day and that is based on the dry matter of the feed stuff and the level of fiber in the feed. Therefore, if you know the purpose of your goat and the body weight (BW) you can approximate the intake of your goat.

That intake amount can help you balance the ration for the goat, but software can also examine parameters closer to ensure optimal nutrients.

This software can be quite useful when examining the level of macro and microminerals within the ration.

### The role of processing

When talking about nutrients, it is also important to examine processing. By mechanically or chemically changing a product, we can modify the availability of nutrients for growth or milk production of goats.

To examine the effect of processing, have members look at popcorn or dried beans. You should have a handful of dried beans and the same amount again, which have been soaked overnight, or a handful of popping corn and the same amount again that has been popped.

#### Demonstrate it!

Ask a ruminant n utritionist to come out and demonstrate how they balance rations and the key aspects they look for when recommending feeding practices. They can also help with the next activity of reviewing the analysis.

Explain that although the actual volume of the beans or corn has changed, the nutrients contained in either of them are the same in its original state as it is in the soaked or popped form. The change in nature of these products make the nutrients more available. Think about this in terms of hay that may be chopped to different lengths to allow for cud chewing or digestion.
# ACTIVITY #3 READING AN ANALYSIS

	Time: 10 minutes	After the last meeting, a hay sample should have been sent
	Materials	away for analysis. Alternatively, a nutritionist can bring in an
	needed:	analysis of a number of uncrent analyses.
		Ask members to go over the analysis and see if you can
	Forage Analysis	identify the terms identified in the previous topic information on the analysis.
		Feed sampling companies also typically have reference material that can be provided to denote the type of tests used to determine the analysis.
DO		A typical analysis results for various feed ingredients
		are provided on the page following this activity (source: OMAFRA).
		Alternatively, you can also use the attached page to find the
		following:
		<ul> <li>Find a good source of fibre to feed goats</li> </ul>
		• Find a good source of energy (carb) to feed in late stage of
		<ul> <li>What kind of hay should dry goats be fed?</li> </ul>
		The objective is to identify the methods used to analyze
REFLECT		forages and how those can be used to better animal health
		How might the analysis inform our production potential?
	Discuss the	
	following	What might this forage be deficient in? Can we make up for
APPLY	prompts as a	this deficiency with grain or other feeds?
	group	Are there any risks with this feed?

AVER	AGE ANA	LYSIS	ON A D	RY MA	TTER	BASIS	(Sourc	e: OM	AFRA	.)	
Type of Feed	No. of Sample s	D.M. %	CP %	Ca %	P %	Mg %	K %	Mn ppm	Cu ppm	Zn ppm	Est. TDN%
			Hay	y and Ha	ylage			1		-	1
1st Cut Legume Hay	452	86.68	15.84	1.30	0.24	0.25	1.98	28	7	22	58
1st Cut Grass Hay	264	87.73	9.69	0.60	0.20	0.17	1.87	39	5	23	55
1st Cut Mixed Hay	7381	87.73	12.16	0.90	0.22	0.20	1.87	31	6	21	56
2nd Cut Hay	1390	86.78	17.70	1.39	0.28	0.26	2.01	31	7	22	59
Legume Hay	439	46.90	17.60	1.44	0.28	0.27	2.36	32	7	24	59
				Silage							
Grass Hay Silage	110	38.78	12.97	0.73	0.25	0.23	2.26	48	6	28	57
Mixed Hay Silage	5369	49.41	15.80	1.21	0.27	0.24	2.28	34	7	29	58
Oat Silage	81	44.37	11.47	0.59	0.28	0.20	2.38	33	8	22	57
Barley Silage	76	42.52	10.19	0.54	0.29	0.19	2.04	26	4	23	58
Corn Silage	5116	35.87	7.97	0.26	0.22	0.20	0.88	21	4	24	66
Corn Silage & N	520	36.47	12.04	0.32	0.28	0.20	0.89	22	5	28	66
and the second			-	Grains							100
Oats	166	88.49	12.12	0.09	0.39	0.14	0.51	35	2	32	74
Barley	286	88.64	12.26	008.	0.41	0.13	0.50	15	5	33	82
Wheat	61	89.90	13.20	0.07	0.41	0.15	0.45	29	4	35	88
Mixed Grain	533	88.41	12.29	0.09	0.41	0.13	0.50	22	3	32	77
Grain Corn	425	86.61	9.64	0.02	0.30	0.11	0.35	5	1	19	90
Corn and Cob Meal	87	81.16	9.67	0.05	0.29	0.11	0.41	7	2	23	84
H.M.GrainCorn	593	72.39	9.56	0.03	0.31	0.11	0.38	6	2	21	90
H.M.Corn&Cob Meal	921	65.70	9.36	0.05	0.29	0.11	0.45	7	3	21	84
	-		Othe	r Conce	ntrates						
Canola Meal	1	90.00	40.50	0.65	1.08	0.41	1.62	60	9	67	76
Beet Pulp	20	89.02	9.39	0.61	0.09	0.27	0.82	35	6	16	72
Linseed Meal	22	90.00	35.25	0.41	0.82	0.59	1.30	58	17	73	75
Dry Molasses	20	97.00	7.25	0.57	0.08	0.29	2.44	43	11	17	57
Wet Molasses	20	74.64	5.03	1.21	0.09	0.46	3.66	50	25	29	80
Soybean Meal 44%	27	89.00	47.80	0.34	0.58	0.31	2.42	24	13	56	81
Wheat Bran	23	88.00	16.72	0.15	1.28	0.65	1.58	12	10	10	70
Wheat Shorts	20	89.00	18.10	0.16	0.97	0.44	1.18	10	9	10	86

H.M. = High moisture

# **Topic Information**

# **Concentrate for Goats**

We have previously discussed the importance of forage, but grains make up the other portion of the nutrients that goats eat. The grain portion of a goat's ration can make up for forage quality and give goats the nutrients necessary for their purpose, life stage and reproductive status.

In practice, these grains are commonly mixed to form blends known as concentrates. This combination of grains is typically referred to as a concentrate as the nutrients tend to be concentrated in these mixes. These concentrates can then be split based on the stage of life that they feed, their composition and their feeding rate.

Examples of different concentrates are given on the previous activity. Can you think of any concentrates used on farms that are not listed in the table?

Regardless of the type of concentrate blend that is put together, if they are put together by commercial feed mills or consulting groups, a tag must be provided with a minimum analysis. The type of feed dictates what kind of information goes on this tag but the following gives a general overview of the information needed on a tag:

# Breaking Down a Feed Tag:

When we purchase mixed grain rations, the bag will have a label attached to it.

As mentioned, different types of feed have different rules and if feed is medicated it must display language from the CMIB (Compendium of Medicating Ingredient Brochures). If you want to find out more about medications that are approved in Canada you can access that information through: https://inspection.canada.ca/animal-health/livestock-feeds/medicating-ingredients/eng/1300212600464/1320602461227

The label will look something like this (descriptions of the components of the tag are also given):

The name of the company which sold the feed.

The name of the type of ration (what it is made for - the type of animal it is fed to) and potentially an identifier.

If selenium is added, it will be marked along with the rate it is added at. If antibiotics are added to the feed, this will also be marked on the feed tag along with feeding details.

The "Guaranteed Analysis" tells us what the nutrient content of this feed is. It is guaranteed to include the nutrients stated on this label (the number of ingredients that must be given on the tag depends on the type of feed)

ECP (or ECP) from NPS means, / "Equivalent crude protein from nonprotein nitrogen sources." This feed has 0.0% (none). NPS is usually a feed additive known as urea. Goats must adapt slowly to a urea ration over a period of at least three weeks, if it is to be introduced to their diet.

The Caution and Directions for use must be listed.

Company, Town and Address of Company

**Revision Date** 

# GENERIC FEED COMPANY 16% DAIRY GOAT RATION G1914

This feed contains selenium added at a level of 0.2 mg/kg.

# GUARANTEED ANALYSIS

Crude protein (min)	
ECP from NPS	0.0%
Crude Fat (min)	3.0%
Crude Fibre (max)	6.0%
Sodium (actual)	0.20%
Calcium (actual)	0.8%
Phosphorus (actual)	0.6%
Vitamin A (min)	
Vitamin D (min)	2,200 IU/kg
Vitamin E (min)	8.8 IU/kg

# Directions for use

Feed with good quality roughage to goats according to production, body condition and stage of lactation.

If fed accompanied by veterinary prescription, following the feeding recommendations prescribed by veterinarian.

# Caution

1. Directions must be carefully followed.

2. Do not use in association with other feed containing supplemental selenium.

A list of ingredients used in this product may be obtained from the manufacturer or registrant.

Manufactured by: Generic Feed Company, Rockwood, ON, N0B 2K0

Revised 01/01/2021

# ACTIVITY #4 MAKING A BLEND (PEARSON SQUARE)

	Time: 15 minutes	A useful tool for balancing simple rations is the Pearson
		Square. In order to learn to use the square the following is a
		step by step case.
	Materials	(1) Find the nutrient breakdown of the two components you
	needed:	are looking at sSoybean meal = 45% CP and corn = 10% CP).
	None	Both of these should be in the same form (either both Dry
		matter or both as fed).
		(2) Construct a square as is seen in the following (source:
		Colorado State University Extension):
		Soybean 45% meal. CP 14% Corn 10% CP Corn 10% CP Corn 10% CP
		(3) The middle is the goal of the blend in terms of crude
		protein. One aspect of this method is that the number that is
		the goal must fall between the two ingredient values (in this
DO		example 14% falls between 45% and 10%).
		(4) Start from the bottom of the square. Take the goal and
		subtract the makeup of the bottom number. Always place the
		lower number at the bottom of the square for simplicity. In
		(F) Next take the ten number and subtract the goal. That will
		give you the other parts that you need
		(6) You will notice that you will then he able to add up the
		total parts and using a calculator and dividing the parts of
		the top by the total parts. By doing this you will be able to
		get the percentage of each within the blend. Notice the top
		and bottom numbers correspond to the ingredients from the
		same top/bottom of the square:
		4/35 = 11.4% of the blend will be sovbean Meal
		31/35 = 88.6% of the plant will be corn.
		4/35 = 11.4% of the blend will be soybean Meal
		31/35 = 88.6% of the plant will be corn.

		This activity might be difficult for younger members so get
		those older members to pair up with them.
		The objective is for members to learn about methods that
REFLECT		they can use to formulate grain blends.
		You can do this for any nutrient. How might you use this?
	Discuss the	
	following	Ration balancing software use these kinds of calculations to
APPLY	prompts as a	calculate the amount of nutrients that are in blends. How
	group	long might these calculations take if done by hand?

# MEETING 4 – GETTING A GOOD START

# **Setting Objectives**

To identify nutrition practices that are optimal for kids and doelings.

Suggested Lesson Outcomes

- $\Box$  To identify the necessary elements for kids early on in life.
- □ To identify those practices that contribute to good early life goat health outcomes.
- $\Box$  To identify challenges with doelings.

# Suggested Roll Call Questions:

- What are some of the biggest challenges for young goats?
- How can we best manage goats early in life with nutrition?
- What do you feed your young goats?

## Sample Meeting Agenda Time: 2 hours 5 minutes

Welcome, call to order, pledge		10 minutes
Roll call		10 minutes
Parliamentary procedure	Minutes and Business	10-15 minutes
Topic Information	Feeding Young Goats: Kid to Doeling	30 minutes
Activities Related to Topic	Activity #1- Preventing CAE	30 minutes
Activities Related to Topic	Activity #2- Tube Feeding A Kid!	15 minutes
At Home Activity	Review an illness from the list provided in	10 minutes
	the topic information and be prepared to	
	discuss at the next meeting	
Wrap up, Social time and		10 minutes
adjournment		

# **Topic Information**

# Feeding Young Goats: Start to Finish

The best way to go over this topic information is to tour the kid rearing facility of a farm. At each stage, you can go over the different parts of the operation. In general the early life for a goat can be divided into three periods:

(1) Milk Feeding Period- from birth to weaning (weaning refers to the time where milk is removed which can be 3-6 months (for meat goats), 8-9 months (if on pasture) or for some farms, 6-8 weeks (milk replacer fed). This time frame is highly variable and dependant on management factors.

(2) Weaning Period- characterized by slowing of growth as kids experience weaning shock and make the transition onto solid food.

(3) Growth Period- when goats are able to make substantial gains after weaning.

These three periods will be explored with the rest of the topic information and with the activities provided after.

# **Beginning on Day One**

(1) The goat kid is born! Like all newborns, baby goats are born without resistance to many diseases and bacteria that are in its environment.

(2) The first milk a goat produces is different from regular milk. It is called colostrum. Colostrum is very thick and very high in nutrients. It also contains a special substance that is high in immunoglobins (antibodies), which give the goat kid protection from disease and bacteria during its early life. As the young kid grows older, it eventually develops its own antibodies to disease.

(3) Older goats have antibodies in their blood that recognize bad bacteria when they see them, due to previous exposure. The anitbodies get together and attack them at the first sign of trouble. The mother passes along some of these antibodies in the colostrum milk so that the newborn will have a way to fight bad bacteria until he or she is strong enough to make his or her own antibodies.

(4) In order for the newborn goat kid to get protection from the colostrum, it is very important for the kid to nurse as soon after birth as possible. If it waits too long, its stomach cannot absorb the antibodies properly. For the first several days it should drink every 3 to 4 hours (about 100-150 mL per feeding).

# CAE

No information on feeding and rearing young goats is complete without mentioning Caprine Arthritis Encephalitis (commonly known as CAE). CAE is a disease that is prevalent in goats all over the world. It causes a form of crippling arthritis in goats. It also causes a type of encephalitis (brain and spinal cord) infection that cripples and kills young goats. Many goat owners in Canada are working to control this disease and it is similar to Johne's Disease in dairy cattle and Maedi-Visna in sheep.

CAE is spread through contact, but can also be passed from the milk of infected goats to other goats. For this reason, most goat owners remove the kids from their dam right at birth without letting them nurse or be licked off by their mother. From this point on, the kid is fed only "heat treated colostrum", "colostrum replacer" or "bovine colostrum". After the initial period of life kids can then be fed "pasteurized milk" or "milk replacer". The kid must be kept in an area separate from goats that have not been raised under a CAE control program.

In meat and angora goat herds, kids are usually raised on their dams. Goats with swollen joints (knees, hocks, etc.) should be culled. If this is done, there is much less chance of having kids develop CAE. The worst CAE problems are in herds where all of the kids are raised on milk that has been taken from many goats and pooled together before bottle or pan feeding to kids.

CAE control is largely up to the owner. It takes more time to raise kids on pasteurized milk, but it may be worth it in the long run if CAE is a problem in your herd or if you want to be sure it doesn't become one in the future.

# **Heat Treatment**

Colostrum milk is much more difficult to heat- treat when compared to pasteurizing regular goat's milk. If it is heated too much, the antibodies are destroyed, and it looks just like an omelette! This is because of the extra fat and other ingredients in the colostrum. We must take care in heating it properly.

Put colostrum in a heatproof container and place in water in the top part of a double boiler. Heat this gradually until the temperature of the milk is raised to 58°C.



Have a thermos ready. Just before the colostrum is warm enough, rinse the thermos out with very hot tap water. When the colostrum is up to temperature, pour it into the thermos and put the cap on tightly right away.

Wrap the thermos in a towel and keep it in a warm place for one hour (you could wrap the thermos in a heating pad instead). After one hour open the thermos and check the temperature of the milk. If you have heat- treated correctly, the temperature should still be at 58 degrees Celsius.

Pour the colostrum into ice cube trays and freeze. Pop the "milk" cubes out into a plastic bag and store in the freezer until needed. You might need extra colostrum if a doe is unable to produce any or enough colostrum. When needed, use 2 cubes (about 70-75 mL) and put these in a heatproof container sitting in hot water from the tap. Let sit until colostrum reaches 38 degrees Celsius. Feed to kids as soon as they are born. Kids should have heat- treated colostrum for their first three or four feedings (in first 24 hrs.) if possible. Use 3 cubes (about 100-150 mL depending on appetite) for the second and remaining feedings of colostrum.

# Pasteurized Milk

Once the goat's colostrum milk is gone (about 2 days after kidding), her regular milk may be pasteurized. To pasteurize:

- Strain milk to remove any dirt particles.
- Put milk in a heavy pot or top part of a double boiler.
- Heat slowly to 72 degrees Celsius.
- Hold at this temperature for 30 seconds.
- Place the pot of hot milk into a sink filled with cold water to cool it down as quickly as possible.
- Refrigerate and use as needed.

You may just cool the milk down to 38 degrees Celsius and feed it to the goat kids right after heating.

# **Alternative Milk Sources**

# Cows Colostrum

Because colostrum is so difficult to pasteurize properly, many goat breeders have chosen to use cow colostrum to start their goat kids. Most dairy cow owners have much more colostrum than is needed to feed their calves. A dairy cow farmer may be willing to give you the small quantity of cow colostrum for your goat kids for their first 2 or 3 feedings. If you wish to use cow colostrum, remember the following points:

• Be sure that the colostrum is stirred up well before feeding. The cream in cow colostrum will rise to the top (unlike goat milk). If you take colostrum from the top of the bucket, it may be far too rich for the goat kids. This will result in serious digestive problems. If freezing colostrum, ensure that is labelled.

• Cow colostrum often seems a little too rich and thick for goat kids. Mix in a little warm water or some pasteurized non-colostrum goat or cow milk before feeding to kids.

• Powdered colostrum can also be an alternative.

# Milk Replacers

After kids receive colostrum milk (or powedered colostrum), they may be fed milk replacers if pasteurized goat milk is not practical. There are several different kinds of replacers available. One made for kids is usually better than the kind made for calves or lambs. Ask your feed supplier for more details.

Be sure that the milk replacer is always mixed properly. Most goat owners mix the powder with a small amount of water first and then add the rest of the water to this mixture. The ratio of milk replacer to water may have to be adjusted slightly to prevent digestive upset in kids. This should be weighed out as volume can vary.

# Tube Feeding a Kid

Once in a while, an emergency situation may make it necessary for the goat farmer to tube-feed milk to a kid in order to save its life. This is only done when kids have become too weak to drink milk from a bottle or from their mother.

There is some danger of causing a kid to drown with tube feeding if it is not done properly. However, some people mistakenly believe that it is less dangerous to drip small quantities of milk into a weak kid's mouth with a syringe. This may be even more dangerous because the kid may be too weak to swallow properly. This milk ends up going into the kid's lungs where it can cause drowning.

If tube-feeding is done correctly, it is not dangerous and it may save a kid's life.

# Leaving Early Life

After 2 or 3 days of age, kids should be fed about 250 mL 4 times a day if possible. After a week, they can be fed 3 times per day, up to 500 mL per feeding as they grow. At 3 to 4 weeks old, they may be fed 2 times per day and the milk can be increased to 750 mL (or more) per feeding. However, it is important to follow the mixing instructions and feeding schedule on the product label. Additionally, many labels may have body weights that should be considered.

Kids should also have access to a creep feed ration from one to two weeks of age on. Most creep rations are 18% crude protein. Very soft, tender, palatable hay should also be offered. Salt licks and water should also be made available. Be careful to remove soiled or uneaten food from the creep feeder at each feeding.

# What is a Creep Feeder?

A creep feeder is a feeder which is set up so that only small goats can have access to the feed-in it. This is usually done by dividing the stall with a wall or gate that has an opening which young goats can go through but which is too small for adult goats to get through. This can be useful for limiting medicated feed only to the kids if older goats are kept in the same area. Creep feeding may not always be economical, especially on farms with high-quality forage. Creep feeding is more likely to be cost-effective with lambs than goats. More specifically, creep-feed has been demonstrated to increase weaning weight and pre-weaning ADG. But the gains were not high enough when accounting for the cost of the creep to see any economic advantages.

# Weaning Methods

Most kids are weaned (taken off a milk diet) by three months of age. The process that this occurs can either be gradual (otherwise referred to as stepdown) or abrupt. In general, step down is seen as having several advantages over abrupt with kids able to adapt to relying on solid feeds to supply more of their nutrients. Kids should be eating hay and grain very well by this time. Hay should be mixed grass/legume hay and should be always available. Kids should receive approximately 2 kilograms of feed per day (including both grain and hay).

# When to Wean?

When kids have reached 2.5 times their birth weight and are consuming at least 30 grams of solid feeds, daily (Source: OMAFRA)

### Doelings

Gradually increase grain ration to one kilogram per day during the last four weeks of gestation. If you think a young goat is carrying twins or triplets, the grain could be increased even more. Be sure that hay is a grass/legume first cut hay to ensure that digestibility, protein and fiber levels are appropriate for the age group. However, forage availability can vary by farm so you can always formulate diets to contain other combinations of forage, grain and mineral.

# Goat Diseases Related to Nutrition for Kids to Doelings

These diseases are primarily related to kid and doeling health with transition diseases covered in the next meeting:

Disease	Symptoms	Prevention
White Muscle Disease	<ul> <li>Kids are born weak or dead or healthy kids suddenly become weak and listless and die.</li> <li>Digestive problems in young kids.</li> <li>Respiratory problems in young kids.</li> <li>Caused by a shortage of Vitamin E and selenium.</li> </ul>	<ul> <li>Give vitamin E - selenium injections to mother goats at 3 to 4 weeks before kidding due date.</li> <li>Newborn kids should also receive an injection of vitamin E - selenium when they are 1 or 2 days old.</li> <li>See package directions for dosage or consult your veterinarian.</li> </ul>
Rickets	<ul> <li>Affects young, quickly growing kids.</li> <li>Leg bones and joints become bent out of shape.</li> <li>Ends of the ribs will feel knobby.</li> </ul>	- Adequate levels of Calcium, Vitamins A and D in the ration will prevent this problem.
Laminitis (Founder)	<ul> <li>Feet and lower legs of older kids or pregnant yearlings become very hot and swollen.</li> <li>Front pasterns may bend inwards and the rear pasterns bend outwards.</li> <li>Onset is very rapid.</li> <li>The goat may seem normal at evening feeding and have trouble walking by morning.</li> <li>Caused by overfeeding grain or energy rich feeds.</li> </ul>	<ul> <li>Feed grass-legume mixed hays (first cut).</li> <li>Increases in amount of grain fed should be done gradually over time.</li> <li>Keep grain storage area secure from goat access.</li> </ul>

		-
Urinary Calculi (Stones)	- A problem sometimes found	- Feed a good mixed or grass
	in male goats and kids.	hay.
	- Goat cannot urinate, may	- Provide clean water at all
	have a fever and has no	times.
	appetite.	- A grain ration with too high
	- Many possible causes, but	a percentage of protein is
	mineral imbalances are most	not good for bucks either;
	commonly the reason.	14 to 16% protein is usually
		adequate. Additionally,
		grains are typically higher in
		phosphorus which can result
		in an imbalance.
		- Provide free-choice salt.
		- The ratio of calcium to
		phosphorus should be at least
		2:1 to prevent urinary calculi
		in kids. Ammonium Chloride
		can be added to dissolve
		stones (typically 7 g per head
		per day)
Runny Eyes	- Eyes will appear irritated	- Mucous membranes
	and there will be tear streaks	are affected by vitamin A
	on the hair below the eyes.	shortages.
	- Can appear to be a chronic	- Runny eyes are often a
	(long term, continuing)	symptom of this shortage.
	condition.	

Enterotoxemia	- A disease caused by the	- Avoid sudden changes of
	sudden growth	feeds.
	of a type of bacteria usually	- Do not allow goats onto
	existing in small numbers in	pasture without first letting
	the rumen.	them out for a few minutes
	- Bacteria can suddenly	a day to get used to the diet
	multiply and produce a toxin	change.
	(poison) fatal to goats.	- A "clostridial vaccine" may
	- Bacterial growth is a result	be used to help prevent the
	of certain conditions in the	growth of the bacteria, which
	iumen - a goat that has eaten	is considered responsible
	a large amount of a rich	for this disease (Clostridium
	feed such as grain, rich lush	perfringens type D).
	pasture, rich legume hay.	
	- Sudden changes in feeds and	
	hay can bring on this illness.	
Posthitis (Pizzle Rot)	- Urine is very high in urea	- diet change to lower protein
	(alkaline) caused by high	diets.
	protein diets	-Cleaning the genital area
	-Problem in bucks and	
	wethers	

# ACTIVITY #1 PREVENTING CAE

	Times 20 minutes	After going over proventative measures for CAE you can
	nme: 30 minutes	After going over preventative measures for CAE you can
		demonstrate the process to heat-treat colostrum and
		pasteurize it.
	Materials	
	needed:	Heat Treat
	colostrum	(1) Put colostrum in a heatproof container and place in water
	samples, goat	in the top part of a double boiler. Heat this gradually until the
	or cow milk,	temperature of the milk is raised to 58°C.
	the double	
	boiler and	
	thermometer,	
	as well as cool	BALLING
	water for cooling	WATER
	the milk	( · · · · · · · · · · · · · · · · · · ·
		(2) Double boilers are commonly used for melting chocolate
		or cheese and safety should always be taken to prevent
		burns. If you do not know how to use one, ask!
		(3) Have a thermos ready. Just before the colostrum is warm
00		enough, rinse the thermos out with very hot tap water.
		When the colostrum is up to temperature, pour it into the
		thermos and put the cap on tightly right away.
		(4) Wran the thermos in a towel and keen it in a warm place
		for one hour (you could wran the thermos in a heating had
		instead) After one hour onen the thermos and check the
		tomporature of the milk. If you have beat, treated correctly
		the temperature should still be at E8 degrees Colsius
		(5) Down the collectrum into ice sube trave and fracts.
		(5) Pour the colosit unit into ice cube trays and neeze. Pop the
		milk cubes out into a plastic bag and store in the freezer
		until needed. You might need extra colostrum if a doe is
		unable to produce any or enough colostrum. When needed,
		use 2 cubes (about 70-75 mL) and put these in a heatproof
		container sitting in hot water from the tap. Let sit until
		colostrum reaches 38 degrees Celsius. Feed to kids as soon as
		they are born. Kids should have heat- treated colostrum for
		their first three or four feedings (in first 24 hrs.) if possible.

		Use 3 cubes (about 100-150 mL depending on appetite) for the second and remaining feedings of colostrum
		Pasteurization
		<ul> <li>(1) Once the goat's colostrum milk is gone (about 2 days after kidding), her regular milk may be pasteurized. To pasteurize: <ul> <li>a. Strain milk to remove any dirt particles.</li> <li>b. Put milk in a heavy pot or top part of a double boiler.</li> <li>c. Heat slowly to 72 degrees Celsius.</li> <li>d. Hold at this temperature for 30 seconds.</li> <li>e. Place the pot of hot milk into a sink filled with cold water to cool it down as quickly as possible.</li> <li>f. Refrigerate and use as needed.</li> <li>(2) You may just cool the milk down to 38 degrees Celsius and feed it to the kids right after heating</li> </ul> </li> </ul>
		The objective is to review aspects already covered and tenics
REFLECT		that will be covered in this meeting.
APPLY	Discuss the following prompts as a group	Why was the procedure for heat treating different than pasteurization? Why do we not pasteurize all milk? Are you still unclear about any of the questions?

# ACTIVITY #2 TUBE FEEDING A KID

	Time: 10 minutes	This activity can be explained to youth so that they can
		understand and potentially use the procedure if ever needed
		(ideally if a life is ever at risk a veterinarian can be called to
	Materials	assist):
	needed: A piece	
	of soft plastic	(1) Assemble the following: A piece of soft plastic tube
	tube about 2/3	about 2/3 of a meter long (60 to 70 cm). A small amount
	of a meter long	of adhesive tape of any kind. A large syringe to hold milk. A
	(60 to 70 cm). A	small supply of milk (nice and warm). A rolled up towel or a
	small amount of	pillow to support the kid's head.
	adhesive tape of	(2) Warm the tube in warm water to be sure that it is soft
	any kind. A large	and pliable. Remove the tube from water and shake it out to
	syringe to hold	remove any large drops of water.
	milk. A small	(3) Take the tube and lie it over the kid following the shape of
	supply of milk	its body down to the stomach area. With this in place, wrap
	(nice and warm).	a small piece of tape around the tube at a spot even with
	A rolled up towel	the kid's mouth. (This will help you to know when the tube
DO	or a pillow to	is in the right place after you feed it into the kid's mouth and
	support the kid's	down into the stomach).
	head.	(4) (This step should only be done when actually necessary
		to tube-feed a kid and not just for demonstration
		purposes!). Place the end of the tube over the kid's tongue
		and gently push it down its throat. (Be sure you are using the
		end of the tube intended to end up at the stomach - not the
		end you have marked with tape). Gently and slowly feed the
		tube down the kid's throat.
		(5) You will find that the tube will probably slide down easily.
		When the tube doesn't seem to be going in any further,
		check it to see where the tape marker is. It should be quite
		close to the kid's mouth. You may wish to prop the kid's head
		up on a rolled up towel to make it easier to feed the kid.
		RO
		2
		And
		W/ B

(6) WARNING! If the tape is much further up the tube, the tube may be caught somewhere in the kid's windpipe or lung. To check tube's position, you can hold a piece of tissue paper or a tuft of cotton batting near the end. If air is coming through the tube, enough to make the tissue or cotton rustle, you are in the lungs! Gently remove the tube and try again.



(7) When the tube is correctly positioned in the stomach, it is not unusual for some fluid from the stomach to come part of the way up the

(8) Once the tube is in place, a syringe filled with warm milk may be attached to the end of the tube sticking out of the kid's mouth. Gently and slowly push the plunger of the syringe in to feed the kid. Do not push the plunger quickly because you may injure the kid by injecting milk too quickly into the stomach. Do not overfeed! Feed only a small amount of milk at a time (usually no more than 50 ml). If you are using a small syringe, you may leave the tube in place and refill the syringe and replace it to continue feeding. Some farmers leave the plunger out of the syringe and carefully pour a small amount of milk into the empty syringe.

DO

DO		<ul> <li>(9) When you are finished feeding the kid, leave the syringe attached to the tube with the plunger pushed all of the way in. This will prevent any milk from flowing out of the tube as you remove it from the kid's throat. You do not want drops of milk to drip out of the tube near the kid's lungs as you remove the tube.</li> <li>(10) After the tube is removed, wash the tube well in soapy water and let it dry well before storing it away in your medical kit.</li> </ul>
REFLECT		The objective is to review aspects already covered and topics that will be covered in this meeting.
APPLY	Discuss the following prompts as a group	Were there any prompts that you did not know the answer to? Are you still unclear about any of the questions?

# MEETING 5 – A SEAMLESS TRANSITION

# **Setting Objectives**

To identify the importance of the transition period for goats and the nutrition practices that minimize risk at transition.

Suggested Lesson Outcomes

- □ To learn about diseases that affect goats at the transition period.
- $\Box$  To examine dietary options for transition goats.

# **Suggested Roll Call Questions:**

- What challenges does your farm have with transition goats?
- How important is a seamless transition?

## Sample Meeting Agenda Time: 2 hours 15 minutes

Welcome, call to order, pledge		10 minutes
Roll call		10 minutes
Parliamentary procedure	Minutes and Business	10-15 minutes
Topic Information	The Transition Doe and Complications	10 minutes
Activities Related to Topic	Activity #1- Draw out the Life cycle of your	20 minutes
	goat!	
Topic Information	Transition Doe Diets	5 minutes
Activities Related to Topic	Activity #2- Tour the Transition Goat Facility	15 minutes
Topic Information	Importance of Monitoring Body Condition	15 minutes
Activities Related to Topic	Activity #3- Identify that condition!	20 minutes
At Home Activity		10 minutes
Wrap up, Social time and		10 minutes
adjournment		

# **Topic Information**

# The Transition Doe and Complications with Milking

The following chart breaks down some diseases associated with the transition period for bred and pregnant does:

Disease	Symptoms	Prevention
Pregnancy Toxemia (Ketosis	- Goats in the last weeks of	- Ensure that goats do not
	gestation (pregnancy) become	get overweight during early
	weak, lose their appetite,	pregnancy.
	stagger, can't get up.	- Provide propylene glycol (for
	- Caused by incorrect feeding	energy) and rumen protected
	or energy imbalance.	choline during the transition
	- Usually occurs when a goat	period.
	is overfed and overweight and	- Feed a high-fibre diet
	cannot consume enough food	during the first few months
	to meet its nutritional needs.	of gestation and gradually
	- Also occurs when a goat	increase grain ration during
	is carrying multiple kids	the last few weeks.
	(triplets, quadruplets, etc.)	
	and as a result cannot	
	consume enough to support	
	the additional requirements.	
	Does should be fed a higher	
	energy (denser ration).	
Periparturient Hypocalcemia	- Goats become very weak	- Caused by a shortage of readily
(Milk Fever)	shortly after	available calcium.
	freshening.	- Feeding calcium-rich feeds
	- Usually lose strength in the	during late pregnancy can upset
	hindquarters and fall down with	the metabolism of the goat so
	hind legs stretched out behind	that it cannot draw enough
	them.	calcium from its body when
	- There is no fever (even though	required to start milking after
	the illness is called milk fever).	freshening.
		- A good mixed hay should be
		fed during pregnancy and a
		higher calcium hay (like alfalfa)
		added to the diet gradually after
		freshening.

Lactic Acidosis (Grain	- Indigestion or when a goat	- Slow transition to higher
Overload)	does not have an appetite	grain rations in late
	may be the first sign.	pregnancy.
	- Toes grow abnormally with	- Very difficult to correct
	rings.	(involves changing out the
	- Milk fat can become	rumen environment) and is
	depressed	often fatal.
lodine Deficiency Abortion	- Abortion or birth of stillborn,	- Since iodine is deficient in this
	and weak kids with enlarged,	area it should be supplemented
	goitered thyroid glands	to correct this problem
	- The thyroid gland may be	- If iodized salt is already fed,
	several times normal size	the needs may have increased if
		the does are grazed on brassica
		plants (turnips, cabbage, forage
		rape) while pregnant.

# FACT:

The gestation period means the time between the date that a female animal conceives (becomes pregnant) and the date that the offspring are born. In goats, this is usually about 150 days (5 months)

# ACTIVITY #1 DRAW OUT THE LIFE CYCLE OF YOUR GOAT!

	Time: 20 minutes Materials needed: Supplementary Outline	This activity asks members to draw out the lifecycle for their specific breed of goat for both genders. Start by separating the youth into even groups and get groups to select their specific type of goat.
DO		The lifecycle should include the start of life, weaning, growth period, kidding, lactation start, dry period (and sections) and then what happens to the kids depending on gender. Compare the initial drawings to the overall lifecycle given on the next page.
REFLECT		The objective is to characterize the different life stages of the goat.
APPLY	Discuss the following prompts as a group	What different sections did you identify that were different from the supplementary outline given?

# **Goat Life Cycle**

# Birth

- Colostrum
- · Milk Feeding
- · Small Amount of
  - Solid Feed
- Seperate bucks
   from does

# Weaning •When reached the growth numbers and eating solid feed (between 5 weeks to several months)

# Doeling • Breeding (female and select

males)- 7-10 months or 65% of their adult weight (seasonal) Most does are mated during autumn so that kidding will occur in spring

# Milking

- Starts at birth- colostrum is harvested
- Does normally produce between
   one and three kids per year
   Does giving birth to twins produce
- more milk and have greater total kid weight per maintenance doe unit



# Pregnancy

- After breeding there is three stages:
   1st Trimester Up to 50 days
  - · 2 nd Trimoctor from E1 to 100 d
- · 2nd Trimester- from 51 to 100 days
- · 3rd Trimester- from 101 to 150 days (+/- 5 days)
- · Encourage freshening of the does over as wide a time
- span as possible. This provides the customers with a yearround source of milk

# **Topic Information**

# **Transition Doe Diets**

Based on the illnesses covered in the previous section, numerous strategies can be used to prevent transition diseases in goats. As mentioned, previous a goat's gestation is 150 days in length but much of the growth of the fetus (unborn goat) occurs in the last 50 days. During this period, goats are normally dried off from their previous lactation but these goats must also receive 28% higher energy and 42% higher protein requirements than previously offered.

If these changes occur too rapidly, they can lead to problems so there is an increased need to gradually step up these goats over a 7–10-day period around 50 days before kidding. This amount of concentrate can then be increased to lactation levels gradually over the next 30 days to seamlessly transition onto the lactating diet.

Additionally, monitoring mineral levels in forage is also very important. Forages that are lower in protein, phosphorus and calcium, like grass hay can help limit milk fever by restricting dietary calcium. When this occurs, it turns on the goats natural calcium mobilization machinery leading to less risk of milk fever. The use of alfalfa or legume forages can further limit the effect of milk fever if offered after kidding.

# ACTIVITY #2 TOUR THE TRANSITION GOAT FACILITY

	Time: 15 minutes	Walk through the transition goat facility.	
DO	Materials needed: None	BIOSECURITY CHECK, are you following all on farm biosecurity practices?         Ask questions about the way the goats are fed, if there are any areas where goats are moved to at certain stages.         Pay special attention to the forages, concentrates and strategies used.         You can also have a feed representative come out and guide you through the farm.	
REFLECT		The objective is to see the transition goat part of the facility in action.	
APPLY	Discuss the following prompts as a group	Does anyone do anything differently on another farm? Why are those practices different?	

# **Topic Information**

# Importance of Monitoring Body Condition

This topic is a repeat of the health sections material but is important for nutrition and health. It is a key concept for members to learn and grasp.

# **Monitoring Body Condition**

Body condition, or an animal's composition of both fat and muscle, is very important to monitor to ensure good health of the animals in your care. By keeping track of animals that are too fat, too skinny, or at the ideal body condition, we can tailor feeding, management and housing strategies to the animals in our care.

However, ideal body condition can also be dependant on:

- Breed
- Animal Purpose (Meat, Milk or Mohair)
- Frame size
- Nutritional requirements based on growth
- Stage of lactation
- If the animal is pregnant

# **Body Condition Scoring**

To quantify body condition, a subjective system called body condition scoring (BCS) can be used. This scoring system assigns a score from 1.0 to 5.0, with 0.5 increments. The activity #3 added info provides an excellent fact sheet that breaks down the differences between the scores.

## Importance of Maintaining Adequate Body Condition

Overall, by maintaining adequate body condition throughout the life of the goat we can contribute to positive health and welfare outcomes for the goat throughout their life.

In the next activity youth will use resources developed by industry experts. It is important to remember that what is ideal for one breed of goat might not be ideal for other breeds. For example, below is an image showing how body condition score and lactation curves can vary greatly at different points in lactation for dairy goats.



*Figure 1. Ideal Body Condition Score throughout lactation for a Dairy Doe (Used with permission from Dr. Paula Menzies (University of Guelph, ON, Canada).* 

The cause of these BCS differences is due to the need for fresh does to mobilize their body stores to support their initial milk production (which peaks around the 40 day mark). For the rest of the lactation, the doe will start to convert more of her nutrition into her milk production while putting on that lost condition to get ready for her next pregnancy. This flow is very important to recognize and if not monitored can result in the various diseases that affect lactating dairy goats.

# ACTIVITY #3 IDENTIFY THAT CONDITION!

	Time: 20 minutes	Split into groups with around equal amounts of both older
	Materials	
DO	needed: Goats (Barn Visit), record keeping sheet, Goat BCS fact sheets (appropriate one for goat being scored)	Assign each group a different and varying goat and get the groups to assign a body condition score to their goat. Please get each of them to do this before you give them the fact sheet with the knowledge that the score is from 1 (emaciated = too thin) to 5 (over weight = obese). Once the youth have recorded their initial prediction, hand out the appropriate body condition scoring fact sheet (meat vs. dairy). Get the youth to read over the fact sheet and discuss the reasons why they are giving the goat that score. Then when all of the youth have decided get them to write down their final condition and bring everyone back in to discuss.
		The objective is to learn how to body condition score goats
REFLECT		and to identify ideal condition for different stages and kinds of goats.
	Discuss the	What is the appropriate body condition score for your goat?
	following	Why?
	prompts as a	
	group	What factors need to be considered when scoring goats? When you first scored the goats, did your group come up
		with a range of answers? Did that line up with other groups?
APPLY		Did the fact sheets help you come up with a final decision about a score?
		Ultimately the important part of this activity is to identify
		that body condition scoring is a subjective measure; however
		these scores to be proactive in terms of the animal's health.

# Body Condition Score Record Keeping Sheet

Group Member	Goat	First BCS	Second BCS
		(1-5)	(1-5)



# **Body Condition Scoring**

### How to body condition score (BCS):

The hair coat can often prevent you from seeing the true shape of a goat and therefore, it is important that the handson assessment is done. A visual assessment alone is not adequate to assess poor body condition.

If you cannot score all your goats, choose a subset of goats in your herd. Alternatively, combine body condition scoring with other routine husbandry procedures such as hoof trimming or vaccination. Recording BCS is important as it may help you identify changes in an individual animal that may indicate disease or inform breeding and culling decisions. With practice, body condition scoring should take only 10-15 seconds per animal.

The three main locations to assess when performing body condition scoring are the lumbar spine, ribs, and sternum/ breast bone (see figure 1). You are feeling for the bones in the goat. The amount of fat and muscle the goat has will change your ability to feel the bones underneath. If it is easy to feel the bones, the goat doesn't have enough fat and muscle. If you have trouble feeling the bones, the goat may have too much fat.

### Ideal body condition (acceptable range):

For most stages of production: 3.0 (2.5-4.0)
At kidding or before winter: <b>3.5</b> (3.0-3.5)
Does at breeding: 3.0 (2.5-3.5)
Bucks at breeding: 3.0 (3.0-3.5)

Does may lose up to one point during peak lactation, but should be allowed to regain this before kidding.



Giving each goat a specific body condition score is not as important as being able to determine if your goat is under-conditioned (too thin), over-conditioned (too fat), or properly conditioned (healthy weight).

**Lumbar Spine:** This is the part of goat behind the ribcage and in front of the tail, also known as the loin. The spine is made up of many connected vertebrae. Vertebrae have three processes that stick out – one on each side (short ribs) and one straight up (top of spine). Move your fingers from one vertebrae to the next, noting the shape of the space the between processes on the sides and top. See if you can slip your fingers under the short ribs or pinch the top of the spine. Feel the amount of fat or muscle in the space between the top of the spine and the short ribs (transition) (see figure 1). **Ribs:** Assess the amount of muscle and fat cover over the ribs, behind the front leg. Try to push your fingers into the space between two ribs and note how much pressure it takes to feel for this space.

*Tip:* Having an independent person perform body condition scoring on your goats may be beneficial. If the majority of your goats are a little over- or under-conditioned, you may think that is normal. You can always ask your veterinarian or nutritionist to perform body condition scoring on your goats and compare your assessments.

**Sternum:** Assess the amount of muscle and fat over the sternum or breastbone, between the goat's front legs. This area has cartilage (slightly softer than bone) that connects the ribs to the breast bone. Note how easily the cartilage is felt. Grasp the fat pad on the sternum/breast bone to judge how large it is and whether you can move it.

**Tip:** Body condition scoring is not about ranking your goats, but comparing them to the scale. Do not pick a doe that you think has an ideal BCS and compare everyone to her. Each goat should be compared to the BCS chart.

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	<b>Body Condition S</b>	Body Condition Score 1					
	8	Lumbar spine	Ribs	Sternum			
Emaciated		Top of spine: clearly visible, can easily be pinched. Deep depression between each vertebra. Short ribs: form a continuous shelf that fingers can grasp. Deep depression between each. Transition: no fat and little muscle is felt between the top of the spine and short ribs.	<b>Ribs:</b> Clearly visible. Fingers easily penetrate space between ribs.	<b>Cartilage:</b> easily felt <b>Fat pad:</b> can easily be grasped between thumb and forefinger and moved side to side.			
	<b>Body Condition S</b>	core 2		ΙΙ			
		Lumbar spine	Ribs	Sternum	all the second		
Thin		Top of spine: visible, some muscle can be felt between skin and bone. Short ribs: form a shelf that fingers can grasp. Transition: deep depression from the top of the spine to the short ribs.	<b>Ribs:</b> some can be seen. Fingers easily penetrate space between ribs.	<b>Cartilage:</b> not easily felt. <b>Fat pad:</b> can be grasped and moved slightly from side to side.			
	<b>Body Condition S</b>	Score 3					
	S S	Lumbar spine	Ribs	Sternum			
Ideal	R	Top of spine: not prominent, slight hollow between each vertebrae. Cannot easily be grasped. Short ribs: shelf is slightly noticeable, cannot be grasped. Transition: smooth slope from top of the spine to short ribs	<b>Ribs:</b> difficult to see. Space between ribs felt with pressure.	Cartilage: barely felt. Fat pad: wide and thick. It can be grasped, but has very little movement.			
	<b>Body Condition S</b>	core 4		11	and the second		
	80	Lumbar spine	Ribs	Sternum			
Overweight		Top of spine: cannot be seen. No indent between vertebrae. Top of spine is flat and cannot be grasped. Short ribs: no ridge or shelf present. Transition: rounded from the top of the spine to the short ribs.	<b>Ribs:</b> cannot be seen. Side of the animal is flat in appearance. Space between ribs only felt with strong pressure.	<b>Cartilage:</b> cannot be felt. <b>Fat pad:</b> difficult to grasp, cannot be moved side to side.			
	Body Condition S	Core 5	Ribe	Sternum			
	TP.	Ton of onines huminal in fact all 1			1		
Obese		for of spine: buried in fat, slight indent surrounded by bulging fat. Rump looks like the top of a heart. Individual vertebrae cannot be felt. Short ribs: individual vertebrae cannot be felt. Transition: fat bulges out from the top of the spine to the short ribs.	hits: not visible. Space between ribs cannot be felt.	<b>Fat pad:</b> cannot be grasped or moved.			
	Growing Forv A telena provincial ferritoria	ward 2			Canadä		

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# MEETING 6 – FEEDING THE BREED

# **Setting Objectives**

To identify the differences between nutrition strategies for the different breeds of goats. This meeting is meant to focus on one goat breed and explore that species in depth. As a result, there is only one activity for this meeting which is to create a nutrition program for your breed of goat!

# Suggested Lesson Outcomes

- □ To learn about what milking, meat and mohair goats need and how they are different.
- $\hfill\square$  To compare these breeds of goats.
- $\hfill\square$  To evaluate production for each breed of goat and give benchmarks.

# **Suggested Roll Call Questions:**

- What type of goat are you most familiar with?
- What are some products made from goats?
- What on farm forages and concentrates do you have?

Sample Meeting Agenda Time: 1 hour 40 minutes

Welcome, call to order, pledge		10 minutes
Roll call		10 minutes
Parliamentary procedure	Minutes and Business	10-15 minutes
Topic Information	Milking Goat Nutrition Overview	15 minutes
Topic Information	Meat Goat Nutrition Overview	10 minutes
Topic Information	Angora Goat Nutrition Overview	5 minutes
Activities Related to Topic	Activity #1- Form a Goat Ration- Start to	20 minutes
	Finish	
At Home Activity		10 minutes
Wrap up, Social time and		10 minutes
adjournment		

#### **Milking Goat Nutrition Overview**

#### Feeding the Milking Doe

Once a doe kids, increase the amount of grain slowly to minimize health problems and to ensure energy requirements are met. Energy is the biggest driver of milk production for goats. Attempts should be made in the last trimester of pregnancy to increase the amount of grain offered up to close to the lactating amount. Based on current feeding practices, concentrates should make up 50-60% of the ration. Goats prefer coarse grains over ground grains.

Additionally forage quality dictates the overall need to supplement with concentrates Hay can be of high legume content once the goat is milking (which provides a high level of protein). However, it is still a good idea to continue to feed a good quality mixed hay once a day even if you feed a second-cut legume hay as well. Goats enjoy the variety, and the extra roughage is good for their rumen. Forage should also be of sufficient quality as moldy forage should never be fed to goats.

There are a few feeding guidelines for concentrate feeding to goats. Many of these recommendations are based on a goat's days in milk (days since kidding) and her overall milk production. The below table gives an outline of a simple feeding program that might be used on your farm:

Days in Milk	Kg of Grain Ration	Kg of Milk
0 to 100	1 kg for every	2.0 to 2.5
100 to 200	1 kg for every	2.6 to 3.0
200 to 300+	1 kg for every	3.5 to 4.0

# **Challenge Feeding**

This system is a variation of a feeding strategy often known as challenge feeding and can be useful when it is used to optimize rations for heavy milkers. The farmer increases the grain a little each day after freshening. The milk can be weighed every day but that is often unrealistic in a commercial setting (unless there are automatic recorders on farm). The grain is increased until the milk production does not increase in response to the extra grain. The grain can then be cut back a little. The farmer watches for any drop in production and increases grain if necessary. This is a very effective way to feed heavy producers if you are careful and always keep a close watch on the production of the goat.

# Importance of Monitoring Body Condition

Based on your goat's production, it can be important to increase the concentrate amount to keep up with her nutrient requirements. To keep her appetite strong, make sure that the amount of hay she eats never goes below 40% of the total weight of feed eaten (grain and hay). This will also ensure that weight loss associated with early lactation will be gradual and remain at an acceptable level. Many of these heavy producers will lose body condition rapidly if you do not feed them adequately. This means there is an increased responsibility to body condition score your goats regularly to ensure optimal health and production outcomes.

It is important to monitor body condition routinely at time of breeding, late gestation, kidding, peak lactation, and peak growth or productivity stages. Goats below BCS of 2 are too thin, and at that point, some kind of action must be taken to correct. It is much better to be proactive, and make diet and management changes before goat drops to a score of 2.

Overall the role of a stockperson or herdsperson is to always scan across goats in pen or pasture, and look for changes in BCS, pick out those thin or obese goats, and pull out of group is necessary to manage feed differently.

Body Condition Scoring (out of 5)	Ideal BCS	Acceptable Range
For most stages of production	3.0	2.5 - 4.0
At kidding, or before winter	3.5	3.0 - 3.5
Does at breeding	3.0	2.5 - 3.5
Bucks at breeding	3.0	3.0 - 3.5

# Acceptable Body Condition Scores for production stages (Source: Ontario Goat)

# **Meat Goat Nutrition Overview**

# Feeding the Meat Goat

After freshening, breeding age females are fed for heavy milk production. Their kids stay with them to nurse. When the kids reach market weight, they are removed from the doe. The doe should have a reduction or no grain until she dries off. The farmer wants the goat to be dry so that she isn't consuming much feed. She will also come back into heat sooner so that she may be bred for more meat kids.

# Define it!

What is ADG? Average daily gain is the amount of gain (kg) a goat increases over a period of time (days). Those numbers are divided using the following formula:

ADG (Average Daily Gain) =

Nutrient	Goat Kid	Mature	Mature	Mature	Mature	Buck-
	(25 kg)	Does	Does	(non-	(non-	Maintenance
	with 150	(early	(early	dairy)	dairy)	(75 kg)
	g/d ADG	lactation)	lactation)		Breeding	
	Boer	Single	Twin Kids		Doe (60	
		Kids (60	(60 kg)		kg)	
		kg)				
Dry matter, kg	0.85	1.79	2.23	0.99	1.09	1.55
TDN, %	65.9	53.1	52.9	53.5	53.2	39.8
Metabolizable	95	72	93	48	53	70
Protein, g/d						
Calcium, g/d	5.3	6.1	10.1	1.9	2.0	2.7

# Daily Nutrient Requirements for Meat Goats (NRC, 2007)

#### Important Notes about Meat Goats

Since Meat goat producers are incentivized by the amount of finished meat kg they can produced, producers drive for more births per goat. This occurs naturally but it is important to identify those goats that are carrying twins, triplets to supplement those with more energy. As you can see from the chart above, the cost of twins on a goats nutrients is quite high compared to a single birth.

# Feeding the Angora Goat

Angora goats have higher nutritional demands than dry goats. This is because they grow hair very quickly and hair requires many nutrients, particularly protein. The grain ration fed to Angoras is often 18% protein. If pasture or hay is very good, extra grain supplementation will not be needed. While alfalfa hay is very good for most Angoras, many breeders feed alfalfa pellets instead, as alfalfa hay gets into the goats' fleeces and is almost impossible to remove. Hay with more grass or a clover hay is preferred, although hay which contains a large number of mature timothy heads will also easily contaminate a fleece.

Nutrient	Growing 20 kg	Mature Angora	Mature Angora Male- 40
	Female Angora Kid	Female- Early	kg- Breeding with 15 g/d
	with ADG of 20 g/d	Lactation- 40 kg-	of fiber growth
	with 8 g/d of fiber	Single Kid and 15 g/d	
	growth	of fiber growth	
Dry matter, kg	0.74	1.38	1.59
TDN, %	50.0	65.9	50.3
Metabolizable	45	116	87
Protein, g/d			
Calcium, g/d	1.5	4.0	2.9
Phosphorus, g/d	1.1	2.8	2.4
	1		

# Daily Nutrient Requirements for Angora Goats (NRC, 2007)

#### Important Notes about Angora Goats

Like meat goat production, angora goat producers are incentivized based on the amount of fiber a goat can produce so twins and triplet births are preferred to increase the numbers within the herd. Compared with meat goats that target only ADG, body condition must be monitored on angora goats but profitability primarily depends on the amount and cleanliness of the fiber produced.

# ACTIVITY #1 FORM A GOAT RATION- START TO FINISH

	Time: 1 hour	Split into groups with around equal numbers of both older
		and younger members. The following are two separate
	Materials	activities for youth to discover more about diet formulation:
	needed:	
	Ruminant	(1) The task is for members to work with a feed
	Nutritionist or a	representative to create a hypothetical ration for their goats
	Producer	involving the right mix of protein, energy, vitamins and
		minerals based on their specific type of goat. You may wish
		to get a copy of the NRC 2007 or other updated resources
		to help members with this task. This task could involve
DO		members sharing what they currently feed their project and
		then suggesting improvements.
		(2) The ruminant nutritionist or producer can go over the
		different rations that are fed on farm and talk about the
		strengths and weaknesses and how they are formulated.
		The second part of this activity involves members learning
		more about the career of the speaker. Ask the presenter to
		describe what made them interested in the career!
		The objective is to opgage with industry experts and to
		learn more about nutrients, feed formulation and how the
NEFLECT		producer and putritionist work together
		What roles do you think the nutritionist has on farm?
	Discuss the	
	following	How can production be influenced by putrition on this farm
	nromnts as a	and others?
APPLY	group	
	Бюйр	What are some hig success stories you have had?
		what are some big success stories you have had?

# **SECTION 3: HOUSING**



# MEETING 1 – WHAT DOES A GOAT NEED?

# **Setting Objectives**

To demonstrate the essential items for goats to live a life that is free of stressors and promotes optimal animal welfare.



# Suggested Roll Call Questions:

- Name a part of a goat's environment.
- How can you use a goat's environment to promote animal welfare

# Sample Meeting Agenda Time: 1 hour 35 minutes

Welcome, call to order, pledge		10 minutes
Roll call		10 minutes
Parliamentary procedure	Introductions, Elections and Business	10-15 minutes
	New Executive:	
	President	
	Vice President	
	Secretary	
	Press Reporter	
Topic Information Discussion	A Few Basics	5 minutes
Activities Related to Topic	Activity #1- Get a Goat's Eye View	10 minutes
Activities Related to Topic	Activity #2- Build an Environment	20 minutes
Topic Information Discussion	Code of Practice	15 minutes
Optional At Home Activity	Read a Section of the Goat Code of Practice	5 minutes
	and be prepared to discuss at the next	
	meeting.	
Wrap up, Social time and		10 minutes
adjournment		

# A Few Basics

This section is meant to introduce the relationship between housing, health, and nutrition.

Begin by explaining what an environment is (i.e. that it is everything that surrounds a person, animal, or other living organism, and that affects its way of life. You might ask members to describe their present environment during the meetings (sounds, amount and type of light, size of room, number of other organisms around them - people or goats, etc., the air temperature). Although this section is mainly focused on housing aspects of a goat's environment, all the pieces are interconnected.

Goats also live in an environment. Ask members to describe some of the aspects of a goat's environment. A goat's environment includes aspects such as:

- Air
- Sound
- Temperature
- Space
- Light
- Other living animals or vegetation
- Unseen things such as bacterial life

It is important for goat owners to realize that various aspects of an environment can be good or bad for animal welfare. In general, a good environment promotes good health and productivity, a poor one promotes poor health and low productivity.

Members can study these to help them recognize the differences between a good and bad environment from Activity #1 "Goat's Eye View".

# ACTIVITY #1 GET A GOAT'S EYE VIEW

	Time: 10 minutes	Go into your/a goat's pen and answer these questions:
DO	Materials needed: A goat facility or video of a goat facility.	<ul> <li>How would you describe the air quality in the pen at the goat's level (about I meter above the bedding)?</li> <li>How dry is the bedding? If you kneel on the bedding and your knees get damp, the pen is too damp. Clean it out (add dry bedding if it is winter).</li> <li>How easily could a goat put its feet into a feeder or waterer?</li> <li>How easily could a goat escape by playing with the lock or jumping over a wall?</li> </ul>
REFLECT		The objective is to see a goat's environment from their eyes and to develop your animal welfare judging abilities.
		Are there any other aspects of the goat's environment that you noticed?
	Discuss the following	How can a goat's environment include the housing, nutrition,
APPLY	prompts as a group	and health aspects?
	0 ~ h	Why is it important to examine each part of the goat's environment?

# ACTIVITY #2 BUILD AN ENVIRONMENT

		u de la constante de
	Time: 20 minutes	Divide the group into two smaller groups. Flip a coin or use
		some other means to assign one group as the "goats in
	Materials	the good environment", and the other as "goats in the bad
	needed: Blank	environment". Ask members to draw their environment and
	paper, drawing	make notes of what the environment looks like.
	utensils.	Then, giving each member a turn, have each group tell
		about its environment, living conditions, and the effect that
		their environment seems to have on them. If members have
		trouble thinking of categories for discussion, you might
		suggest some of the following: temperature, space to move
		in, noise level, sanitation, air quality, access to feeders and
		fresh water, amount and type of light.
		Some examples of answers or ideas to discuss:
DO		1. Too much humidity in a barn may lead to respiratory
		disease problems like pneumonia.
		2. Poor sanitation leads to many health problems such as
		mastitis, internal parasites (i.e., coccidia).
		3. Overcrowded pens lead to little exercise, stress on
		goats, lack of room at hay feeders - all resulting in reduced
		production and potential for animal suffering.
		4. Lack of proper lighting can upset the natural reproduction
		cycle of the goat.
		5. Unusual noises lead to stress and possible ill health.
		6. Too much heat can result in heat stress and possibly death.
		7. Too much cold can result in chilling or death of newborn
		goats, or lower milk production or weight gain in older
		animals as they must use their energy to keep warm instead
		of producing milk or meat.

# ACTIVITY #2 BUILD AN ENVIRONMENT

REFLECT		The objective is to identify those aspects that make up good and bad environments.
APPLY	Discuss the following prompts as a group	<ul> <li>After completing these activities what are some other aspects that contribute to a goat's environment that might be related to health or nutrition?</li> <li>Keep feet trimmed properly</li> <li>Prevent loud noise and upsetting distractions</li> <li>Eliminate barnyard dangers</li> <li>Feed and water proper amounts at regular intervals</li> </ul>

# **Code of Practice**

The Canadian Agri-Food Research Council (CARC) produced codes of practice starting in 1980. Today the NFACC (which followed CARC) has 16 species codes either current or under revision (as of 2020). These codes undergo review every 5 years to ensure that they are meeting the current research within the field. This review can institute nothing, an addendum, or a full review.

The first goat manual was drafted in 2003 by CARC and it is currently going through a revision from 2020-2021. The Code of Practice will be explored throughout the sections of this manual with specific emphasis on those practices that promote positive animal welfare.

Within the Code of Practice there are Requirements and Recommended Practices. NFACC defines these as:

"Requirements are considered to reflect practices that are essential for the delivery or maintenance of responsible care and handling. Requirements are often animal-based, as these are most directly linked to animal welfare, and can be applied in a wide range of production systems. Since requirements often state necessary outcomes, producers have flexibility to determine how the outcomes can be achieved using individual management and husbandry practices."

Recommended Practices encourage continuous improvement in animal care and are intended to support Code requirements (though failure to implement Recommended Practices does not imply that acceptable standards of animal care are not being met).

Within the new proposed updated Code of Practice there are a number sections that relate to housing.

#### Try this at Home!

Read a section of the goat Code of Practice and come prepared with one requirement or recommendation relating to that particular section (leaders you may be able to assign one to the group or give this activity only to senior members).

# MEETING 2 – STRUCTURES AND PENS!

# **Setting Objectives**

To identify the goat's need for space and ensuring they have adequate lying space.

Suggested Lesson Outcomes

- □ To learn about the importance of ensuring optimal stocking density both in floor space and design.
- $\hfill\square$  To identify the key aspects of pen and lying area design.

# **Suggested Roll Call Questions:**

- What are some key things to consider when you are designing a pen for goats?
- What are some the requirements you identified from the previous meeting?

#### Sample Meeting Agenda Time: 2 hours

Welcome, call to order, pledge		10 minutes
Roll call		10 minutes
Parliamentary procedure	Minutes and Business	10-15 minutes
Activities Related to Topic	Activity #1- Goats Need Space!	5 minutes
	20 minutes	10 minutes
Topic Information Discussion	Focus on Stocking Density	10 minutes
Activities Related to Topic	Activity #2- Walking through the	10 minutes
	Requirements!	
Topic Information Discussion	Builds and Housing Types	15 minutes
Topic Information Discussion	Building Pens	15 minutes
Activities Related to Topic	Activity #3- Building Pens	15 minutes
Wrap up, Social time and		10 minutes
adjournment		

# ACTIVITY #1 GOATS NEED SPACE

	Time: 20 minutes	Ask members to decide how much "personal body space"
		they like. When most North Americans converse, they like
	Materials	to have at least their own arm's length distance between
	needed: String,	themselves and the person they are talking to.
	Yarn, Meter	If someone stands too close to us while we are talking, we
	Stick.	often feel uncomfortable. Often, we see this as a sign of
		aggression. Goats feel much the same about being kept in a
		small area with too many other goats. If two or more goats
		are kept in too small an area, some of the goats may feel
		that their "personal body space" is being invaded. This can
		lead to aggressive behavior such as fighting. To demonstrate
		the effects of overcrowding, have your members work in
		pairs or groups of three. Have them converse with one
		another, maintaining eye contact with each other as they
		talk. Ask them to stand at a distance that seems comfortable
DO		for normal conversation. Now, ask them to step closer
		together while maintaining eye contact. Does this seem
		uncomfortable?
		Goats also become uncomfortable when they are forced
		to stand too close together in cramped quarters. The more
		passive goats will often be bullied by an overly aggressive
		goat. This may cause the passive goat to avoid going near
		a water trough or feeder because they cannot help getting
		close to the "bully". Divide the club into smaller groups and
		point out the section on space requirements of the goat.
		Have each group mark out a pen area with string or yarn.
		Have them measure the area and decide how many of each
		age of goats could live inside this pen. Report findings to
		the rest of the club. This will prepare members for the next
		The objective is to demonstrate the need to closely focus on
KEFLECT		I STOCKING DENSITY AND TO UNDERLINE ITS IMPORTANCE TO ANIMAL
		wolfare
	Discuss the	welfare.
	Discuss the	welfare. How can you use the string activity to demonstrate the need
APPLY	Discuss the following	welfare. How can you use the string activity to demonstrate the need for close attention to stocking density?

# Focus on Stocking Density

When goats are overcrowded, they often fight with one another over food, or a place to lie down when they want to rest. Goats that spend time fighting instead of eating and sleeping will not produce well. Shy goats that do not like to fight may not get enough to eat. To prevent problems, farmers must allow enough space for their goats.

The amount of space is highly variable based on breed, age, size, presence of horns, feeding, reproductive stage, temperature, environment, production style and pen management.

However, the Goat Code of Practice states that the following minimum space allowances must be provided to goats:

Type of Goat	Production System	Weight of Goat Pounds (kg)	Minimum Pen Floor Space per doe ft2 (m2)	Recommended Space per doe (Canadian industry)
Miniature goats	Backyard	10 – 45	15 (1.4)	20 ft2/goat for
(e.g. Nigerian)	enclosure	(5 – 20)		small numbers of
				goats in outdoor
				run with shelter
Angora or fibre	Pasture with	80 – 100 (35 –	25 (2.3)	
does (full fleece)	shed/barn	45)		
Dairy does	Indoor housing	100 – 150 (45 –	15 (1.4)	15 – 25 ft2 (1.4 –
	(loose pens)	70)		2.3 m2)
				depending on
				animal size
Does with 1-2	Winter housing	100 – 160 (45 –	25 (2.3)	Actual space
kids	and indoor	72)		depends
	kidding (pasture)			on kidding
				management
				needs
Large Boer does	Indoor housing	150 – 200 (68 –	25 per doe + 10/	25 – 30+ ft2
(meat goat) with	(loose pens)	90)	kid	(2.3 – 3m2)
1-3 kids			(2.3/doe	depending on
			+ 1/kid)	animal size
Bucks	Buck shed for	150 – 300 (90 –	30 – 40	
	isolation from	120)	(2.8 – 3.7)	
	breeding does			

Additionally, the following are two other requirements and recommendations for goat stocking density (NFACC):

Requirements	Recommended Practices
1. Goats must be housed in groups and have	1. Increase space for goats in late gestation.
enough space to turn around, lie down,	2. Increase space for goats in warm weather.
stretch-out when lying down, get up, rest, and	3. Increase space for goats with horns.
groom themselves comfortably at all ages and	4. Increase space for goats in pens when
stages of production.	bucks are present for active breeding.
2. If overcrowding behaviours are observed,	
action must be promptly taken to reduce	
stocking density.	

The Goat Code of Practice states that it is important to observe goats for negative behaviours such as (NFACC):

- Overcrowding
- Clashing and butting
- Pushing and displacing
- Threatening (or bullying)
- Nipping and biting
- Dirty hair (from goats climbing over each other to access feed)
- Noticeable queuing at feeder or waterer
- Lower feed intake, lost body condition (particularly among goats of lower social ranking)

# ACTIVITY #2 WALKING THROUGH THE REQUIREMENTS!



REFLECT		The objective is to emphasize the need to measure goat space and to check requirements for space.
APPLY	Discuss the following prompts as a group	How might you use this information to inform your housing decision? For the second pen you could get part of a 7th doe in the pen but why is it important to note round up in these situations?

# **Builds and Housing Types**

Ask members if they remember some of the important factors that make up a good environment: good light, fresh air, no large drafts, adequate space, clean bedding, no loud noises, no dangerous objects or animals, access to food and clean water.

Discuss some of the possible types of buildings or structures that can be used as goat housing (i.e., new barns, older barns, coveralls, garages, sheds, and those barns used for other livestock previously). Here are a few questions that could be discussed along with some possible answers.

# Q: What is the advantage of an older building?

A: There is little cost unless it requires major repairs or renovations. It usually requires very little time to make a building suitable for goats.

# Q: What are some of the disadvantages of an older building?

A: You might have to put up with some inconveniences - e.g. The building might not be located in a convenient place on your farm; You will have to design a floor plan that works in with the general layout of the buildings (existing doors, windows, supporting beams or walls, water taps, etc.); The building may need costly repairs - and maybe the building isn't worth repairing because of its age or state of disrepair. There is also a potential that ventilation may not be adequate meaning that you will need to spend more in the long run to ensure air is able to move through the area. There may also be other physical challenges of this type of barn including removing manure, treating or moving goats and water line freezing in winter.

# Q: What are some of the advantages of a new building?

A: It can be built exactly as you wish. You can decide on a floor plan that is suitable for your goat farm, this will make the barn efficient to work in. You can choose a convenient location for your new building.

Q: What are some of the disadvantages of a new building?

A: New buildings usually cost quite a bit to build. A new building may require several months to construct (depending on its size).

# **Types of Housing Systems**

# LOOSE HOUSING

The barn is arranged with large pens that can accommodate several goats. This is the most common housing set-up found on goat farms of all sizes.

ADVANTAGES: The goats can move about at all times; the barn can be designed so that a tractor and loader can be driven into the pen areas to clean out bedding when required; large numbers of goats may be moved from one area to another with very little handling; there is less cost in materials to build a few large pens rather than many little pens; there is much flexibility in the way that a barn can be divided into pens; goats usually like loose housing because they like to "socialize" with other goats.

DISADVANTAGES: Shy goats might be bullied by aggressive goats in a loose housing set-up. (However, this can be partially prevented by partly dividing a large pen into two or three sections with movable dividers. Goats can move to a different "room" if they are being bothered by aggressive goats.)

# INDIVIDUAL PENS

Some farms use an individual pen for each goat. Each pen is equipped with its own hay manger, feeder, salt lick, and water pail or watered. This system is usually seen on hobby farms where there are only a few goats. This practice is not widespread as goats are social animals.

ADVANTAGES: Hay and grain can be provided in a controlled way, so that high producers receive extra feed, while lower producers receive proportionately less. Contagious diseases are less likely to spread through the herd when animals are kept in separate pens.

DISADVANTAGES: Goats need to be turned out into an exercise area on a regular basis, because individual pens do not usually provide adequate room for real exercise. Goats may miss "socializing" with the rest of the herd. This system is more labor intensive because each pen must be cleaned separately; and feeding and watering is done one goat at a time.

# TIE STALLS

Stanchion or tie stall housing is rarely used for goats. Although the Goat Code of Practice allows tethering, it does not allow this as a form of housing or continuous restraint. Unlike cattle, goats require much more exercise. Because they are much more active than cattle, they are easily injured by ropes, chains, or stanchions as they attempt to more around.

# **Overall Considerations**

A variety of materials such as steel piping or wood can be used to build box pens, keeping in mind the following.

Individual pens should be adequate size as described in the previous activity. Some goats like to jump out of their pens, so the minimum height for box pen partitions should be 1.2 m (4 ft.). If a deep manure pack can build up, 1.5 m (5 ft.) may be a safer height. Alleys should be kept wide enough, 2.1 m (7 ft.), to. allow for access of a tractor and scraper.

Goats like to try to stand with their front feet on partitions. This behavior is called perching. However, it can cause lameness in the hind legs if a goat spends too much time standing with its front legs up on the pen divider. This is very common in bucks because they weigh more than does. Slats or bars of pen dividers should be vertical rather than horizontal to discourage goats from standing with front legs up on partitions. Because a collar can become snagged on anything which sticks up above the top rail, vertical slats should be flush with the top rail of all partitions.

Solid pen walls can be made using plywood or wooden planks. Solid walls are more difficult to escape from and will help to prevent drafts at floor level. But goats cannot see out of the pens, so at least one wall of the pen should have vertical slats or rails. Proper ventilation may also be a problem.

Pen doors should be hinged to swing outwards, otherwise bedding can become piled up against the doors, making it impossible for them to swing inwards. All latches should be "goat-proof". Use one of the heavier sliding bar type fasteners, chains, snap links will stop curious goats from easily opening a pen. Managers should avoid using those containment methods that goats can easily chew (baler twine) or those that may cut or injure animals (fencing wire).

# Pen Floors

The best pen floors are usually of earth or sand. These will provide drainage and will not be as chilly as a concrete floor. Also, concrete floors usually trap dampness and urine — which can cause irritating odors and humidity. However, there is recent research suggesting that goats may prefer to stand and lay on harder surfaces as opposed to deep bedding. As this research continues, the ideal animal welfare environment may continue to change.

Pens should be cleaned often in summer months. Bedding may be allowed to build up in winter months. In individual pens bedding should be piled higher at the front of the pen since goats prefer to lie uphill. Concrete floors should be washed with a stable disinfectant after cleaning out. Earth and sand pens may be deodorized by cleaning them out, allowing them to dry for a few hours if possible.

#### Pens for Bucks

Bucks should be housed separately from does when not required for breeding. During breeding season, bucks will try very hard to escape from their pens. Walls should be thick and strong (welded steel or strong thick plywood)! Also want to ensure proper sized pens for the bucks.

#### **Pregnant Does**

Pregnant does need plenty of exercise to be physically strong at kidding time. If they are confined to small pens, access to an exercise yard is a necessity. Before putting the doe in the pen, remove all manure and clean the pen thoroughly with barn detergent and water. Add a deep layer of fresh, clean bedding.

Remove or place water pails high enough so the kid cannot be dropped in and drowned during kidding.

# Kid Housing

Kid housing must be clean, draft-free, and allow for plenty of exercise. Kids are often reared separately to reduce disease transmission. Toys in the pen will encourage exercise. Some possible toys are:

- Soccer balls to push around
- A tire hanging from a rope
- Strong wooden boxes to climb
- A wooden box with a long board nailed to it to make a ramp.

Kids soil bedding often, so check that the bedding is not wet beneath the surface. Many disease problems occur when kids are in damp, unsanitary conditions.

When goats are raised with their mothers (with CAE negative herds), a creep area can be used to protect kids from dominant does and so that the kids can eat to prepare for weaning. Cleaning this area is generally not an issue as young kids tend to not urinate or defecate in this space.

# **Hospital Pen**

Most larger goat farms should have a pen that is reserved for goats that are recovering from illness. This pen should be used only for this purpose. It should never be used as a maternity pen. Locate it in an area where sick goats can see other goats. After each use, the pen should be cleaned out and scrubbed down with disinfectant. Water buckets and feed tubs should be washed and set aside for use only in this pen.

# ACTIVITY #3 DESIGNING BARNS

	Time: 15 minutes Materials needed: A guest	Possible guest speakers for this meeting could be a farmer who has built his or her own barn, a building contractor who builds barns in the area, or a goat farmer who has a barn that is well set up for goats.
DO	speaker	Ask the speaker to explain what they are looking for when designing goat housing and how this differs for retrofits or new builds.
REFLECT		The objective is to hear how experts in the field design facilities for goats.
APPLY	Discuss the following prompts as a group	Are there any questions members have? How does the farmer/designer use documents like the goat code of practice to inform their decisions?

# MEETING 3 – FEED AND WATER ESSENTIALS

# **Setting Objectives**

To identify the requirements to keep goats fed and hydrated.

#### Suggested Lesson Outcomes

- □ To learn about best management practices related to feed and water offerings for goats.
- □ To describe methods that we can use to optimize animal welfare through housing design.

# Suggested Roll Call Questions:

- What are some key aspects to consider when you are designing your water and feed areas?
- How is water provided to your goats?

# Sample Meeting Agenda Time: 1 Hour 50 Minutes

Welcome, call to order, pledge		10 minutes
Roll call		10 minutes
Parliamentary procedure	Minutes and Business	10-15 minutes
Topic Information Discussion	Feeders and Waterers	10 minutes
Activities Related to Topic	Activity #1- Judge the Feeder	10 minutes
	10 minutes	10 minutes
Topic Information Discussion	The Great Outdoors	20 minutes
Activities Related to Topic	Activity #2- Assessing the quality of water	20 minutes
Wrap up, Social time and		10 minutes
adjournment		

# **Feeders and Waterers**

Mangers, waterers, gates, and dividers should be located in the barn where they will be most useful and to minimize walking and carrying of feed and water.

# **Feeders and Mangers**

• Goats like to pick through hay or grain and may waste it. Design feeders so hay cannot be pulled out and dropped onto the floor.

• Goats like to stand up on feeders or waterers. This is a bad habit because the goats could contaminate the feed or water with urine, manure or earth stuck to their feet. Build all feeders and waterers so that it is difficult for goats to climb into or onto them (young goats like to squeeze through the bars of a feeder).

- Provide enough feeder space so less aggressive goats can always find room.
- Build feeders so that goats cannot become trapped or strangled by them. Sometimes, especially at crowded feeders, two goats will put their heads into the same feeding slot and one or both will get choked.

• "Throat height" of feeders is important to minimize wastage. The proper height for does should be 38 to 46 cm (15 to 18 inches); kids should be 20 to 25 cm (8 to 10 inches).

# Waterers

Goats require lots of CLEAN water to produce meat, milk, and hair. If their water pails or automatic waterers become contaminated with manure or urine, they will drink less. As a result, milk production will be lower, and kids will be exposed to disease. Male kids are more prone to urinary calculi when they drink less and so this only further promotes the need for access to water. Here are ideas for waterers that are difficult to contaminate.

All waterers should be:

• Checked at least once a day to be sure that they are clean.

• Checked to be sure they are working properly (if they are automatic) and more frequently in cold weather.

- Located away from feeders where chaff, grain or hay could fall into the water.
- Located at the low end of the barn, to reduce dampness from spillage.
- Located to prevent contamination from manure and urine; and
- Thoroughly cleaned and scrubbed often.

If you use pails to water your goats, empty stale water twice a day and refill with fresh water. You should also scrub buckets to remove any settled dirt or debris in the pail Goats will often refuse to drink stale water.

The next page provides a valuable resource that can be shared with youth:

# Your management and production reso

The Goat Gazette

#### DECEMBER 2015: Goats and Water Don't overlook the value of H<sub>2</sub>O on your farm

Water is an essential nutrient for all animals, including goats, but it can sometimes be overlooked in the bigger picture of livestock health and nutrition.

All goats need a continuous supply of fresh, clean water at all times. This can be water from a spring, well, or municipal supply depending on the farm. Regardless of origin, a farm's water supply should be tested to make sure it doesn't contain any mineral or organic contaminants, and is free of bacteria like coliform or E. coli.

Overall, goats are more particular about water quality than other livestock, so cleanliness and freshness is very important to ensure goats are consuming enough water. Some goats are also sensitive to water temperature. For dairy goats in particular, a water temperature of  $15^{\circ}C(59^{\circ}F)$  is ideal; their water consumption will drop off if the water is below  $5^{\circ}C(41^{\circ}F)$ .



#### How much water do goats need?

Daily water consumption will vary, depending on the size and age of the goats, their ration, feed intake, and the weather. On average:

- A 50 kg (110 lb.) doe or buck needs about 9.5 litres (2.1 gallons) of water per day.
- Kids consume about 7.7 litres (2 gal.) per day.
- Lactating does need an additional 1.9 litres of water per litre of milk they produce (0.5 gal. per gal. of milk produced), with an average intake of approximately 13.2 litres (3.5 gal.) daily.
- Goats on high protein ration feed will drink more water, consuming 3.1 to 3.7 kg of water per 1 kg of dry matter (1.4 to 1.7 lb. of water per 1 lb. of dry matter).



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#### The Goat Gazette – September 2015 Some best management practices for good water quality and quantity on your goat operation

Here are some best management practices to ensure your goats are getting the quality and quantity of water they need, both for animal welfare and for optimal production:

- A farm's watering system should be able to deliver water to various locations around the property. This includes barn areas and pens (breeding, meat, dairy), working pens, kidding pens, buck housing, isolation pens and pastures.
- Access to natural water can be given to goats on pasture, as long as the water source is fresh. A
  water hole should be fenced with a crushed stone path leading up to it to reduce erosion of soil and
  manure into the water. If a natural spring is used, it should be fenced off and water piped into a
  trough located underneath a cover of some kind.
- Troughs, bowls and other drinking locations should be of sizes suitable to the groups of goats using them to ensure both that goats can access the water and that there is a sufficient quantity available. They should be designed to keep water clean, unsoiled and fresh.
- All watering equipment should be cleaned thoroughly and regularly.
- Provide an alternate water source for any outages lasting more than 12 hours.
- Ensure your water lines, buckets, troughs and waterers are in good working order and keep up with necessary repairs.
- Take steps to protect your watering system from freezing in the winter through extra insulation or heaters with built-in thermostats, for example.

For more information or resources on biosecurity for the goat industry, contact Ontario Goat at 1-866-311-6422 or <u>info@livestockalliance.ca</u>, or visit <u>www.ontariogoat.ca</u>.


# ACTIVITY #1 JUDGE THE FEEDER

	Time: 10 minutes	Ask members to think about how a goat eats and think about
		the differences between browsers and grazers. How might
	Materials	this impact the way we design feeders?
	needed: Images	
	from Following	Examine the three photos of the different feeders that were
	Page	used in a study (Neave et al., 2018):
DO		Ask members which type of feeder they think would lead
		to the highest intake and greatest adherence to natural
		tendencies?
		If they are wared the highest feeder, they are correct While
		in they answered the highest feeder, they are correct. While cover may profer fooding at ground lovel (grazer), goats are
		browsers and prefer to eat higher up
		The objective is to think about how natural adaptations can
REFLECT		be used to promote good housing design.
	Discuss the	How might you implement a higher feeder for your goats?
APPLY	following	
	prompts as a	
	group	



#### The Great Outdoors

Split the members into two groups and ask one group to think of some advantages and the other group some disadvantages of turning goats out on pasture or browse. Some possible answers to these questions are:

ADVANTAGES	DISADVANTAGES
• Less work for the farmer. He/she doesn't	• Fencing on the farm must be checked and
have to gather food for the goats, so this cuts	repaired routinely or goats will go where they
down on labour.	aren't supposed to.
• Good pasture or browse is very nutritious -	• Some shelter must be provided for shade, to
lots of vitamins.	help protect from heat stress and to provide
	protection from rain.
• The barn stays cleaner when goats are	
outside all day.	• Fields can be overgrazed if they are not
	managed properly.
Good pasture is easy to maintain and	
provides low-cost feed.	Goats will destroy smaller trees in fields
	where they are pastured. Larger trees will be
<ul> <li>Goats can do a good job of clearing out</li> </ul>	fine.
unwanted trees and brush in fields.	
	Poisonous plants sometimes grow in
• Goats will get a lot of exercise while out	pastures or brush and can kill goats or make
grazing or browsing.	them very ill.
	• While pasture is nutritious, it takes a large
	volume of grass, branches, etc. to provide
	adequate nutrition for goats as fresh feeds
	contain a large amount of water.
	Predation from species like covotes and
	wolves can stress, injure, or kill goats.

#### **Pasture Management**

Pasture management means that you are providing good quality food for your goats while looking after the plants that produce the food.

Good managed pastures have the following qualities:

- The forage plants are tasty and interesting to the animal.
- The field is the right size for the number of goats.

o A field which is too small will become over-grazed and the plants will be killed as they are chewed off too close to the ground or stepped on by the animals.

o A field which is too big will not be grazed enough and become too mature.

The plants will grow too tall and be tough and tasteless.

• The type of plants grown provide good nutrition for the animals.

#### **Tips for Managing Pastures**

• Divide pastureland into proper sized fields for the herd. This is often done with electric fences. For optimum pasture growth it is best if animals are only allowed 3 to 4 days grazing in a paddock and then moved to the next. Each paddock should be rested for approximately 30 days before animals return to graze it.

NOTE: It is important to know when animals are beginning to over-graze a field. The farmer must watch to see how much grazing the animals are doing. Grasses should never be grazed until all leaves are gone. Make sure that enough leaves remain for the plant to continue growing well (usually no shorter than 6 cm). Do not turn goats out onto a pasture until it is about 15 cm tall.

• Grow different types of forage. Different varieties of forage crops mature (flower and go to seed) at different times. When the farmer plants a field, he/she can choose varieties of forage grasses and legumes that have different maturity dates. In this way, all fields will not mature at the same time.

• Take goats off a pasture that is growing faster than it can be eaten. The field can be cut for hay while it is still tender and nutritious enough to make good hay. Later, goats can be turned back into the field to eat the remaining grass.

• Make sure that pastures are fertilized well so that they will grow back well each year.

## **Electric Fencing Information**

Electric fencing is easy to set up and may be cost-effective. It also provides a good way to improve fencing that is in poor condition. Here is some information that might be helpful for anyone thinking about setting up an electric fencing system.

### Equipment Needed

To set up any type of electric fencing system, you must have:

A "Fence Controller" - also known as an energizer (the main "power supply" for the system). This can be either battery or electric powered.

• A battery powered fence controller is okay for smaller fencing jobs, but it is not usually as good for a large job.

• Hydro powered fence controllers are usually much more reliable and more expensive. They must be kept inside of a barn or other shelter.

• Their big disadvantage is that they require a grounded electrical plug-in to operate.

• If the fence controller must be located away from the fenced area that it is powering, a single strand of wire can be run from the controller to the fence.

Several ground rods - galvanized steel is best - it should be several feet long and at least 1.5 cm in diameter.

A cable to go from the "fence controller" to the ground rod, and a clamp to clamp the cable to the ground rod.

Fence wire to carry the charge to all areas of the enclosure.

• Heavy galvanized steel wire approved for electric fencing is the strongest and longest lasting. However, it can be difficult to install.

• Polyethylene cord woven with fine steel wire is easier to install but has a lifespan of 2 or 3 years.

• Polyethylene "tape" woven with steel wire is much stronger, very easy to install, and should have a little longer lifespan. It is very visible and is ideal for goats. It is more expensive than the polyethylene cord wire.

"Insulators" to hold the fence wire in place and out of contact with anything that might "ground" the electrical charge.

Rods or fence posts to hold insulators and fence wire at proper height to prevent animals from going through the fence.

## Setting Up an Electric Fence

- Decide on the area you wish to fence in.
- Install the fence controller in an appropriate location. Install a ground rod near the controller and attach a cable from the controller to the rod.

• Using either insulators attached to wooden posts or pickets, or any type of commercial "electric fence rod" (see electric fence dealers to see what is available), set up posts around the perimeter of the field. Space between posts will depend on which wire you are using, the terrain you are fencing (i.e. a flat area requires less posts than a hilly area or an area with ditches), and any obstacles that must be "fenced around".

- With posts or pickets in place, install wire on pickets.
- Attach wire between fence controller and strands of wire on fence.

### **Special Notes for Fencing in Goats**

• Goats usually require at least 3 strands of fencing to keep them in a field. The lowest strand should be about 20 to 30 cm from the ground (to prevent them from getting on their knees and sliding under the fence). The next strand should be set about chest-height to the goat (about 45 cm). The top strand should be about 75 cm from the ground.

• You will need to spend time "training" the goats to stay away from the electric fence. Leading a goat up to the wire and letting it receive a shock on the nose usually does the trick. You should be wearing rubber-soled shoes when you do this to minimize the shock if you happen to touch the wire. REMEMBER that you will be shocked too if you are touching the goat at the same time as it touches the electric fence! You must try to prevent the goat from jumping into or through the fence wire or it will pull down the fence and learn that it can go through a fence if it really wants to. A good way to prevent this and avoid a shock to you is to attach a nylon or baler twine leash to the goat 's collar. Lead the goat near to the fence and keep holding onto the leash. The goat will probably become curious about the wire and will reach out to touch it quite soon. When the goat touches the wire, pull on the leash. You will have to repeat this procedure with each goat that will be in the field. You may also have to repeat this in the springtime when your goats go back out into the field for the first time each year.

For more information, visit a feed store in your area and have a look at all of the electric fencing supplies that they sell. Talk to the store personnel, they can probably help you decide how best to fence your field. There are some good reference books on electric fencing available from manufacturers.

# ACTIVITY #2 ASSESSING THE QUALITY OF WATER

	Time: 20 minutes	Ask members to think about how a goat drinks and think
		about some important aspects of goat quality. List those out
	Materials	and then provide the fact sheets from earlier in this meeting.
	needed: Chart	
	Paper, markers	If you are on-farm look at the general cleanliness of the
DO		water bowls or troughs.
		Are they spaced out or all together? How can more clean
		waterers contribute to good animal welfare?
		The objective is to think about the requirements that goats
REFLECT		need and some things you might not think about.
	Discuss the	In winter, water freezes when the temperature decreases.
	following	How might we use technology to provide water to our goats
	prompts as a	during these periods?
	group	
		Deep waterers are drowning risks. How can you prevent
		these accidents from occurring?
APPLY		
		Why is it important that producers have a plan to supply
		goats water in an emergency (drought or electrical outage)?
		How can dirty water bowls affect goats? Disease?
		Palatability?

# MEETING 4 – FOCUS ON: ENVIRONMENTAL CONDITIONS

## **Setting Objectives**

To introduce how the goat's environment (inside and outside) can affect their wellbeing.

#### Suggested Lesson Outcomes

- $\Box$  To learn about how humidity and temperature can lead to stress for goats.
- □ To identify methods of ventilation to ensure heat stress is limited and air quality is adequate.
- $\Box$  To identify the importance of lighting.

## **Suggested Roll Call Questions:**

- What do you classify as a hot day?
- How does humidity in the summer affect you?
- How do you stay cool in the summertime and warm in the winter?

#### Sample Meeting Agenda Time: 1 Hour 45 Minutes

Welcome, call to order, pledge		10 minutes
Roll call		10 minutes
Parliamentary procedure	Minutes and Business	10-15 minutes
Topic Information Discussion	Temperature and Humidity Index	15 minutes
Activities Related to Topic	Activity #1- Comfort is Key	10 minutes
	15 minutes	10 minutes
Topic Information Discussion	More on Ventilation	15 minutes
Activities Related to Topic	Activity #2- Quantifying Air Flow	15 minutes
Topic Information Discussion	Shining Lights!	5 minutes
Wrap up, Social time and		10 minutes
adjournment		

#### **Temperature and Humidity Index**

Before we start this topic, we need to define a few terms:

**Temperature:** The degree or intensity of heat present in a substance or object, especially as expressed according to a comparative scale and shown by a thermometer or perceived by touch (Oxford). This is commonly given in either °C (Celsius) or °F (Fahrenheit).

*Humidity:* A quantity representing the amount of water vapor in the atmosphere or in a gas (expressed generally as a %).

#### Heat Stress

Temperature-Humidity Index (THI): A measure that accounts for the combined effects of environmental temperature (the temperature where the goat lives- which can differ inside and outside of buildings) and relative humidity.

All living things have optimal THI ranges, and these can vary greatly based on species, genetic potential, management system and nutritional status. Although goats have traditionally been looked to for their ability to resist heat stress, it is also important to recognize that these creatures also have optimal ranges. It is for this reason that the THI index is not as closely monitored for goats, as it might be for dairy or beef cattle. However, as our understanding of goat's tolerable limits increases, we may see these types of recommendations provided to farmers.

Heat Stress: Defined as an imbalance between the metabolic heat production inside an animal's body and dissipation to the surroundings. This can lead to lower feed intakes, behavioral changes, respiration rate increases, higher temperature, and increased heart rates.

The comfort zone for dairy goats is between 15 and 21°C (59 and 70°F).

#### Methods to Mitigate Heat Stress (Goat Code of Practice):

- Provide shade through natural or artificial means (e.g., shade cloths, trees),
- Provide ample cool, clean water,
- Avoid handling or other stressors especially during the hottest times of the day,
- Increase air flow: open barn vents fully, add more fans to indoor housing.

#### **Cold Stress**

Goats will be comfortable in cold weather if they have clean, dry bedding (which will provide insulation from the cold ground). Goats need higher energy in their diet to maintain body temperature and body condition during extreme cold. Cold stress can be observed in goats when they shiver and huddle together.

**Cold Stress:** Defined as the imbalance between the lower metabolic heat production inside an animal's body in relation to the dissipation to the colder surroundings. Think of this as if you were to go outside in the winter without a coat on. Even when you return back inside, you will likely still feel cold. That is because the heat your body had to produce to stay warm was lost to the outside without your coat.

#### Methods to Mitigate Cold Stress (Goat Code of Practice):

- Increase the ambient temperature in heated barns,
- Provide insulated and/or heated flooring,
- Protect goats from wind and moisture (e.g., wind break, 3-sided shelters facing south) with the addition of a screen for wind protection,
- Provide straw bedding (which offers more insulation than other bedding types) and ensure the depth permits goats to nest,
- Adjust the feeding program to meet increased energy demands,
- Prevent condensation, and
- Provide goats with clean and dry goat coats or calf coats.

# ACTIVITY #1 COMFORT IS KEY

DO	Time: 15 minutes Materials needed: Scenarios from the Case.	Pair members and give them the two cases that follow this activity. Get members to read through the cases, decide on which situation they would support for their goats and get the members to come back together to discuss the cases.
REFLECT		The objective is to judge how housing can influence good or poor animal welfare.
APPLY	Discuss the following prompts as a group	What were some of the advantages of each of the cases? What were some disadvantages?
		Why did you pick your location? What were your biggest considerations?

#### Case #1

Goats in case number 1 are overcrowded when inside the barn. They have access to pasture although that is only for the summer months. The barn only has a few windows that can be opened up and the farmers eyes sting when he goes into barn because of high ammonia levels. Goats inside have no access to a ventilation system but have many waterers down the barn that are cleaned daily. Feeders are well positioned and are elevated. Manure is cleaned out every other month and there are a lot of flies.

#### Case #2

Goats in case number 2 are understocked with plenty of space for each goat. They do not have access to a pasture but have plenty of room to play inside. Inside, the barn is tunnel ventilated with very little presence of flies. Manure is allowed to build up in the compost bedded pack. Water is offered in 2 central areas with plenty of space for goats to drink and feeders are lower than in case #1 (25-30 cm)

#### **More on Ventilation**

Fresh air is necessary for good health. Good ventilation is one of the main components (parts) of a good barn environment. Fresh air prevents the build-up of ammonia, odors and high humidity (moisture content) in the air, which can cause respiratory infections and pneumonia, particularly in young goats.

Stale air contains carbon dioxide and ammonia. Carbon dioxide is produced when all animals exhale. Ammonia is contained in the urine of animals. At some time, most of us have smelled ammonia odors in a barn - this is the sharp odor that can make it difficult to breathe. Ammonia has a sharp, irritating odor that stings your nose and lungs, makes your eyes tear up, and can make it difficult to breathe. Ammonia is produced when manure decomposes.

Goats find ammonia just as irritating as humans do. Good ventilation will remove odors, stale air, and moisture, and replace these with fresh air.

Ventilation is a tricky business. When air is moved into and out of a building, it can cause drafts that can chill goats and cause health problems. Good ventilation system brings air into and out of the building in a controlled way. It should also enter and exit at a level above the goats rather than at floor level.

These are some of the ways to provide fresh air while avoiding drafts:

1. The use of windows that are hinged at the bottom so that they open outwards at the top.



2. The use of ventilation inlets at the top of the walls (such as between roof trusses). Air can exit at the top of the roof through a covered ventilation outlet.



 A barn with a single pitch roof (sloped in only one direction) can be ventilated by leaving ventilation

inlets and outlets at the top of the walls between trusses.

4. If you are using windows or doors to ventilate a building, try not to create a "wind tunnel". This happens when a large amount of air can flow directly into and out of a building through large openings. For example, this diagram shows a barn with a large door on each end of the central aisle. If these doors are left wide open, a very strong wind will blow through the barn. A strong wind blowing along the barn floor will pick up dust and chaff and blow this into the goat pens. Dust and chaff can cause eye and respiratory irritations. Also, a strong wind could also chill goats if the weather is cool.

5. A better way to ventilate this barn would be to leave one of the doors partly opened, and to open a side window instead. Or, you could close the door on the leeward side (the side away from the wind) most of the way so that it will limit the air that can flow out of the barn. This will limit the air that flows into the barn as well.



# ACTIVITY #2 QUANTIFYING AIR FLOW

	Time: 15 minutes	Air flow is normally measured in cubic feet per minute
		(CFM). This measure determines the amount of air that can
	Materials	move through the room while fans are operating at their
	needed:	highest speed.
		You can do this activity in one of two ways. You can multiply
		the result from a digital wind speed meter (which measures
		feet per minute) and the total volume of the barn.
		Or
		You can build an anemometer like the Robinson anemometer
		(Source Education.com):
		Materials Needed:
		• 5 small paper cups
		• Hole punch
DO		• Scissors
		• Duct tape
		• 3 thin wooden dowels
		• Empty water bottle
		Stopwatch
		Procedure:
		1. Use the hole punch to make a hole in the side of each of
		the 4 paper cups.
		2. Use the hole punch to make 4 holes spaced evenly
		around the rim of the last cup. This will be the center of the
		anemometer.
		3. Slide 2 of the wooden dowels through the holes in the
		center cup. They should cross in an "X."
		4. Insert the ends of the dowels into the holes of the other
		cups and tape them into place. Make sure the cups are all

DO		<ul> <li>5. Take the last wooden dowel and make a hole in the bottom of the center cup.</li> <li>6. Push the dowel up until it meets the X and tape everything together. This will be your rotation axis.</li> <li>7. Put the center dowel into an empty water bottle and begin testing</li> <li>You will need to calibrate your anemometer. You can do this by driving down the street at 15 km/h and holding the device out the window. If you count how many times it spins around at 15 km/h you can then create a standard table and extrapolate the speed.</li> </ul>
REFLECT		The objective is to think about how you can quantity ventilation on your own farm to attempt to improve it.
APPLY	Discuss the following prompts as a group	How was the air flow at the barn? How might air flow be related to fly control? What is the problem with too much air flow? (Hint: Health)

## Topic Information Shining Lights!

### **Light for Reproduction**

Goats are naturally fertile in the fall or autumn as the day gets shorter. In does, the heat cycle is primarily influenced by the differences in day length but are also influenced by temperature and presence of a buck.

You can influence the doe's cycle by maintaining a daily 16 hours of 200 lux light and then reducing the daylight to 8 hours per day. Using these methods, we can influence the cycle of the goat.



#### Light for Animal Welfare

The Goat Code of Practice defines two requirements for goats:

- 1. Goats must have sufficient light to facilitate care and observation.
- 2. Goats must be allowed to experience their natural day and night (diurnal) cycles.

Along with four recommended practices:

- 1. Artificial lighting should be considered in buildings with low natural light.
- 2. Window area should equal a minimum of 5% (1/20) of ground surface area.
- 3. Clean windows to maximize light entry.

4. Ensure that all electric wires and fittings are well out of reach of the goats and well protected.

These recommended practices exemplify the importance of light to the goat and dictate the importance to maintain good lighting.

# MEETING 5 – FLOORING, BEDDING AND MANURE MANAGEMENT

## **Setting Objectives**

To introduce the different types of bedding and how you can minimize pests while managing your manure.

Suggested Lesson Outcomes

- □ To introduce the different types of bedding and give the advantages and disadvantages.
- $\hfill\square$  To introduce the importance of managing fly populations.
- $\hfill\square$  To demonstrate good nutrient management practices to the members.

## Suggested Roll Call Questions:

- What types of bedding are you aware of?
- Where might you store your manure?
- What are some consequences of improper bedding or manure management?

Sample Meeting Agenda Time: 1 Hour 55 Minutes

Welcome, call to order, pledge		10 minutes
Roll call		10 minutes
Parliamentary procedure	Minutes and Business	10-15 minutes
Topic Information Discussion	Bedding Considerations	10 minutes
Topic Information Discussion	Flooring Considerations	10 minutes
Topic Information Discussion	Manure Management	15 minutes
Activities Related to Topic	Activity #1- Design your Ideal Barn	30 minutes
Topic Information Discussion	The Importance of Controlling Flies	10 minutes
Wrap up, Social time and		10 minutes
adjournment		

### **Bedding Considerations**

The following is a general list of common bedding types. Advantages and disadvantages are given:

Bedding Type	Advantages	Disadvantages
Shavings (Wood)	Very Absorbent	Can be problematic if not kept
	Inexpensive	clean and dry.
	Easy to Remove when wet	Goat kids can also be irritated
		by dust
Straw	Widely available in Ontario	Goats sometimes eat straw
	Easy to handle and manage	(which is not really an issue)
	Not expensive	
Pelleted Bedding (Wood)	Absorbent	Can be more expensive than
	Easy to handle and manage	other alternatives
Sawdust	Light	Can be dusty
	Easy to Spread	
Wood Chips	Insulating substance	Not very absorbent
	Keeps the goat off the ground	
Sand Bedding	Inorganic material which can	Can be cooler in the winter
	decrease Somatic Cell Count	
	(SCC)	

There is also a newer type of bedding system known as a compost bedded pack. The next page breaks down the practice.

# Bedding Packs in Goat Barns

By Peter Doris, Environmental Specialist, Ontario Ministry of Agriculture, Food and Rural Affairs



Bedding pack, a mixture of straw or other bedding material along with manure, urine and wasted leed, is important to manage in goat barris. Successfully managing the pack results in clean, healthy and comfortable goats and promotes the production of high quality mik. Bedding pack can be used interchangeably with the terms straw pack and manure pack. A critical point in the success of managing any manure pack barn is keeping it at the proper moisture level - keeping it dry. This article explores packs from an animal husbandry and milk quality viewpoint, and discusses manure management considerations.

#### ANIMAL HUSBANDRY AND MILK QUALITY

Goats can be very comfortable on a dry bedded pack. Two aspects to consider are the density of goals in the area and the ventilation of the barn. Keeping the number of goals at the proper density with good ventilation will be more comfortable for the goals, and is easier for you to keep the bedding pack dry. The recommended space for goals is 1.1 to 1.7 square metres (sq. m) per head (12 to 18 square feet per head) for mature does. Figure 1 shows the recommended stocking density for each class of animal. In terms of ventilation, air flow through the pens should be sufficient to minimize humidity and prevent the accumulation of odours and gases such as ammonia.

Figure 1: Minimum toor space for goals. Source: Best Management Peichois for Communitial Goal Production, 2014.

	Minimum Building/Area Floor Space		
Class of Animal	(sq. m/head)	(sq: ft./head)	
Does	1.1 -1.7	12-18	
Bucks	2.8-3.7	30-40	
Young Kids >30 kg (66 lb.)	0.7 - 0.9	8-10	
Weaned kids <30 kg (66lb.)	0.3 - 0.5	3-5.5	

Milk quality goes hand-in-hand with proper sanitation practices in the milk pariour, robust animal health protocols AND good husbandry. 5000 including a dry bedding pack. Bacteria thrive in moist environments, so keeping the goats and the pack dry are critical. Somatic cell counts (SCC) can help you identify issues in the herd; an elevated SCC may indicale an on-going udder infection. There may be some issues with your housing if the majority of your animals have a SCC above di 1.5 million cells per millifitre. Assessing your bedding and making Agriculture, Food and Rural Affairs' (OMAFRA) website.

management changes can help improve your milk guality and udder health.

Bam management can significantly influence the condition of the pack. Leaky water bowls can contribute to wet packs and need prompt attention. The use of complete feeds can result in "looser" manure from goals, which would require more bedding: providing dry hay or straw in conjunction with the complete feeds for rumination can help to stiffen up the manure. Kids fed milk or milk replacer will produce more urine and may require more frequent bedding changes. Build-up of the bedding pack may require you to clean out the pack more frequently.

Your sense of smell and touch can tell you a great deal about how comfortable the goats are in their environment. If you smell ammonia, you may need to improve ventilation or add bedding. More bedding is likely required if you feel moisture after "taking a knee" down in the pack. for a few seconds and it comes up wet or damp. The addition of bedding varies from farm to farm and depends on barn design, stocking density of the goals, and the feeding and watering system used.

#### MANURE MANAGEMENT

A typical pack will be approximately 30 centimetres deep, but in some barns it can be deeper. Because the pack can accumulate to these depths, it is also classified as a manure storage area. The bedded pack is a viable option for manure storage for farms required to have a Nutrient Management Strategy (NMS). A producer can use the days of storage from the pack area (i.e. days between clean out) along with other storage options to demonstrate that there is adequate manure storage capacity on the farm. Typically, farms with a NMS are required to have a minimum of 240 days of manute storage capacity. Additional guidance on nutrient management requirements can be found on the Ministry of

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BEDDING FACKS IN GOAT BARNS. CONTINUED

Once the bedding pack reaches its maximum depth, it will need to be removed from the pen. Maximum depth of the manure pack is determined by the strength of the surrounding structure wall, ammonia and odour buildup, and pen management (i.e. challenges with goat access to feeders and the ability to open pen gates with increasing pack depths). For some goat farms, it may take a number of months for a pack to reach its maximum depth.

Once the pack is removed from the pen, a suitable location is needed for the manure. During the growing season, an option may be to directly spread it on nearby fields if conditions are dry and the fields are available for spreading.

During the non-growing season, such as the winter or with well field conditions, placing the manure in storage is a better option. Spreading is not recommended at these times because of increased risk of runoff and nutrient loss. If a permanent manure storage area is not available near the barn, you could consider a temporary field storage (i.e. stockpiling) of the manure. This will allow you to clean out the barn but defer spreading until field conditions have improved. Stockpiling has the added benefit of allowing the pack material to break down, resulting in a more uniform application on the field (fewer clumps).

It using temporary field storage, select a level spot for the stockpile (less than three per cent slope) and adhere to the following setback distances for stockpiled manure:

- At least 125 metres (m) (410 feet) away from a single neighbour's house, and double that distance If you want to stockpile near a residential area (four or more houses)
- At least 45 m (148 feet) away from a drilled well, 90 m (295 feet) from a dug well and 100 m (328 feet) from a municipal well
- At least 50 m (165 feet) from surface water, tiles inlets and catch basins
- Al lease 0.9 m (three feet) from bedrock.

The bedding pack approach offers several advantages for producers, including all-in-one manure storage and livestock housing. Keeping the pack dry is critical to goat comfort, herd health and milk guality.

By: Peter Dons, Environmental Specialist, Ministry of Agriculture, Food and Paral Attains (CIMAFRA), with Input Itom Jitilan Capig, Small Ruminand Specialist, OMAFRA, Markee Palbomesal, Dairy Specialist, OMAFRA, and Phillip Wilman and Michael Fotan, Raw Mik Dairy Specialists, OMAFRA

### **Flooring Considerations**

Barn floors are often overlooked in discussions - but they are very important. Goats should not slip when on floors. In an older barn, we must often make do with existing floors because they are difficult to change.

Usually, the best type of floor for the goat pen is an earth floor - covered with clean sand if possible. An earth floor provides a good base but allows moisture to drain away through the sand. It is usually less cold than a concrete floor - concrete or stone floors can be quite cold in winter.

Wooden floors are not usually desirable because wood rots when exposed to dampness in the bedding.

All floors should be constructed so that they slope away to an area that can be drained. This is particularly important when using a concrete floor because moisture cannot drain away through the concrete. If the floor is slightly lower on the end near the waterer or water pails, this will help to confine water spills to one area of pen.

Concrete is best used in aisles and milk rooms or feed rooms. It is level for the farmer to walk on. Feed carts and wheelbarrows can easily be pushed across it. It can be washed down and disinfected when necessary. It is rodent-proof.

If concrete is used as a floor, it should be poured over crushed stone. Any room that will be washed down (such as a milk room) should have some type of floor drain installed beneath. This illustration shows a concrete floor equipped with a floor drain.

Licensed Grade "A" dairy milk houses require special floors and drainage systems. A Milk Quality Advisor will have regulations on a proper system for a dairy goat farm.

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### **Manure Management**

Manure storage needs to be considered early in the process of designing a housing facility for goats.

#### Nutrient Management Plans (Adapted from the 4-H Ontario Dairy project)

Nutrient Management Plans (NMP) are developed to protect water, soil, and air quality, maximize crop production, and reduce odours. For NMP to be effective, they need to include:

1. Have at least 240 days of manure storage

2. Minimum Distance Separation – A specified distance between new barns and existing homes or businesses that is determined by the number of animals the barn could hold, the type of manure produced, the size of the expansion and other factors.

- 3. A formal plan including:
  - a. Soil test results
  - b. Nutrient storage areas (i.e. for fertilizers and manure)
  - c. When and how to apply nutrients to crops
  - d. Manure test results
  - e. Contingency plans in case a problem arises
  - f. Manure spreaders that calibrate for accurate nutrient application
  - g. Good neighbour policy

#### Talk About It!

Does your farm have a Nutrient Management Plan in place? If you aren't sure, find out when you go home. If your farm has NMP plan, what does it look like?

## Manure Storage Problems

As manure is often used as fertilizer for fields it is important to see how nutrients can leach into the environment over time:

		Concentration of nutrients (kg/tonne wet)			
Storage Time	% DM	Nitrogen	Phosphorus	Potasium	Sulphur
(months)					
0	34	11.8	2.5	9.1	5.8
1 to 6	33	8.2	2.7	8.8	1.5
6 to 12	37	5	2.2	8.2	6.6
> 12	30	5.4	2.4	4.0	2.8
Fresh Kid	36	5	2.0	11.1	1.1

This process can be slowed through managing the manure (anerobic storage/composting)

# ACTIVITY #1 DESIGN YOUR IDEAL BARN

	Time: 30 minutes	This is the introduction of the final activity for this club.
		Members should be put in groups of 3-5 members (with age
	Materials	well distributed in each group).
	needed: Paper	The task for each of these groups is to think about all aspects
	for brainstorming	of a goat facility. This can be as broad or as narrow as the
		members would like but they should be able to defend their
		design at the next meeting.
		Presentation of their design might be as a PowerPoint, bristol
DO		board or a pitch. Alternatively, a really great idea for this
		activity is to build a diorama of their barn using clay, popsicle
		sticks, toothpicks, a shoe box or other materials. This activity
		could be expanded into a building project for members to
		exhibit at their fair.
		Time in this activity is given for members to brainstorm and
		share their ideas. This should be finished at home and may
		be used as an achievement project.
		The objective is to work as a member of a team to apply
REFLECT		concepts learned in this section.
	Discuss the	
	following	
	prompts as a	
	group	

### The Importance of Controlling Flies

Flies can spread diseases by walking on one surface and then walking on another.

Example: A fly can spread an eye infection such as "pinkeye" by walking on the eye area of an infected goat, and then flying to another goat's face.

The following fact sheet is provided to further members' knowledge of the importance of controlling flies.

#### Ontario 🞯

#### Ministry of Agriculture, Food and Rural Affairs

#### Fly Control Strategies on Dairy Goat Farms

High fly populations can be an irritant for animals, farm workers and neighbours. With livestock, flies can cause reduced feed intake, negatively affecting weight gain and milk production. Flies can also spread bacterial and viral diseases. For example, bacteria that cause mastitis can be transferred from the teats of an infected doe to a healthy doe by flies and fly bites. There is no magic bullet for fly control but good management and a multi-pronged approach will result in more productive goats and happier dairy goat farm workers.

#### The Pests and Their Biology



#### Figure 1: Fly Life Cycle

The most common types of flies found on dairy goat farms are the stable fly, house fly, and sometimes fruit flies. The stable fly has piercing mouth parts (in other words, they bite). Both male and female stable flies feed on blood several times a day, normally attacking the legs and belly. Stable flies take about three weeks to develop. The stages are egg, larva (also known as maggot), pupa to adult. Adult female flies can live 30 days and lay up to 400 eggs. Stable flies breed on organic debris such as: wet straw, manure and spilled feed.

The house fly is non-biting. House flies breed in organic matter such as bedding, manure decaying silage, and spilled feed. During warm conditions they can complete their life cycle in just ten days!

#### Control Options and Tools

#### Sanitation

Keep all areas of the barn clean. Insecticides cannot be expected to control flies under poor sanitary conditions. Some producers spend too much money on insecticides and ignore that flies require moist organic matter to reproduce. The immature fly takes ten to 21 days to develop. Cleaning goat pens weekly helps break the fly's life cycle. Attention should be given to the perimeter of the pens and area around water bowls, as more maggots are often present at these locations. The drying action of desiccants such as Dry Start or Stalosan spread after pen cleaning can play a role in reducing fly populations. These desiccants also reduce manure odours which attract flies. It is important to not overlook the kid pens. The kids are on high liquid diets and thus excrete more liquid making these pens a perfect area for fly reproduction. Eliminate spilled feed, rotting hay and moist decaying organic matter, repair any water line leaks, and keep vegetation around the barn and manure pile well mowed to reduce areas where flies can rest.

The importance of good sanitation in controlling fly populations cannot be over emphasized. In addition to pens, keep the entire milking parlour and milk house as clean and fly free as possible. This includes in and around the drain and receiver jar of pit parlours. Tight-fitting, self-closing doors and screens are required. The entire floor surface needs to be kept clean including under the bulk tank, the drain and area close to the drain, floor areas along walls and in corners, around cleaning chemical containers, etcetera. If milk replacer is mixed in the milk house, any spills need to be cleaned up promptly. A poorly rinsed milk filter can attract flies often making garbage cans the perfect reproductive site for flies. Empty the garbage container frequently and clean the garbage can. Small fruit flies can also be a serious issue in a milk house since they are small enough to get into the bulk tank - particularly flat top tanks. Bulk Tank Milk Graders grade milk tanks by sight and smell and have rejected tanks with flies including fruit flies. Sanitation is the key to keeping fly populations under control.

#### Mechanical Control

Sticky tape and traps can play a role in controlling small or moderate fly populations. A clean, well-managed milk house may only require sticky tape for fly control. Sticky rope placed above a highline pipeline (a warm area where flies congregate) will help. Electronic fly zappers are a onetime cost and can help in localized areas.

Screens and tight-fitting, self-closing doors in the milk house are regulatory requirements for a good reason - they limit entry of flies into the milk house. Using large fans to circulate air in the milking parlour and animal housing areas makes conditions less favourable for flies by preventing them from resting and helping to dry damp areas.

#### **Chemical Control**

Always read and follow product labels. Some fly control products require Ontario Pesticide Certification. For more information on Ontario Pesticide Certification you can visit <a href="https://www.ontario.ca/environment-and-energy/pesticide-licences-and-permits">www.ontario.ca/environment-and-energy/pesticide-licences-and-permits</a> <a href="https://www.ontario.ca/environment-and-energy/pesticide-licences-and-permits-and-permits-and-permits-

Baits are useful in controlling moderate fly populations. Baits need to be put in shallow dishes or mesh bags rather than spread directly on the floor, window sill or milk stand. This will prevent possible cross contamination of milking equipment or milk.

Space sprays provide a quick knockdown of flies in an enclosed air space. Space sprays have little residual activity: therefore, flies usually do not develop resistance and remain susceptible to them.

Residual sprays are fly control products typically applied to walls, posts and other fly resting areas. Flies can develop resistance to residual sprays so they should be used with caution and only when outbreaks cannot be managed by other techniques. Rotation of pyrethroid and organophosphate products can reduce the potential development of resistance.

#### Consider Biological Control

Flies have natural enemies such as parasitic wasps that can be used to biologically control fly populations.

Parasitic wasps find and kill fly pupae. However flies have some reproductive advantages over the wasps. Flies develop twice as fast from egg to adult, live longer and lay more eggs. Fly populations also begin to grow earlier in the spring than the wasp population. Therefore to be successful as a biologic control, natural populations of parasitic wasps need to be enhanced by frequent releases of large numbers of commercially available parasitic wasps. Note that parasitic wasps should only be one part of the farm fly control program.

Ontario Companies that Supply Parasitic Wasps

- Bugs for Bugs Guelph, ON 519-836-8166
- Koppert Canada Scarborough, ON 416-291-0040
- Natural Insect Control Stevensville, ON 905-382-2904

# MEETING 6 – HUSBANDRY AND PRESENTATIONS

## **Setting Objectives**

To introduce the principles of good animal handling and allow members to share and defend their barn designs.

Suggested Lesson Outcomes

- □ To outline proper animal handling.
- □ To allow members to aggregate their learning on barn design.

## Suggested Roll Call Questions:

- What do you believe is the most important aspect of barn design?
- What is something you will be attentive of when evaluating barn design in the future?

Sample Meeting Agenda Time: 1 Hour 50 Minutes

Welcome, call to order, pledge		10 minutes
Roll call		10 minutes
Parliamentary procedure	Minutes and Business	10-15 minutes
Topic Information Discussion	Husbandry Practices	5 minutes
Activities Related to Topic	Activity #1- How would you like to be	15 minutes
	treated?	
Presentations from Previous	Design Your Ideal Barn	45 minutes
Meeting		
Wrap up, Social time and		15 minutes
adjournment		

#### **Husbandry Practices**

Sometimes it is essential to handle goats for various purposes. Handling refers to moving or engaging with a goat. No matter what the reason is for the handling, a goat should always be handled in a calm manner with care taken to avoid injury (Goat Code of Practice).

#### Expand on it!

After your local fair or achievement project, set up an obstacle course that goats can be walked through. The rules are that you cannot drag, push, hurt, or carry goat. Put together some gates, bales, tires, horse jumps, children's toys, etc. This is a similar activity to rabbit hopping and will allow members to show off their connection and work that they have put into their animal.

# ACTIVITY #1 HOW WOULD YOU LIKE TO BE TREATED?

	Time: 15 minutes	es This section brings up a few prompts for members to thir	
		about. Using the Goat Code of Practice (NFACC) as your	
DO	Materials	guide, navigate members through the different husbandry	
	needed: Goat	sections.	
	Code of Practice		
		This manual was written during the period when the Code	
		of Practice for Goats was under revision. Therefore, the	
		material on the next three pages may not be the official	
		draft.	
		Members can engage with producers to see how they move	
		their goats to get some additional tips.	
REFLECT		The objective is to work as a member to think about the way	
		they handle their goats.	
APPLY	Discuss the		
	following		
	prompts as a		
	group		

# 5 Husbandry Practices

**Desired Outcome**: To maintain content, productive, and healthy animals through good management practices.

#### 5.1 Handling

Goats are subjected to different handling and management procedures within dairy, meat, and fibre production systems. Handling can be stressful to goats even when conducted for health and welfare reasons (e.g., medicating, hoof trimming).

Being aware of goat behaviours will facilitate handling and reduce stress and injury to both goats and handlers. Goats are very familiar with their environments and adapt quickly to routines. They are sensitive to changes and sudden movements. Stockpersons should perform their working routines on a regular schedule and move about with minimum disturbance.

Goats should be handled in a calm manner. Care should always be taken to avoid injury (20).

#### Catching

Goats should not be chased during catching. Instead, animals should first be herded into a smaller spaces such as a pen or handling system. Handlers can catch individual animals with the use of a crook, by holding onto a collar, with hand restraint under the jaw and over the poll of the head, or briefly by the back leg. Horned goats can be caught, held, and guided by the base of the horn but not pulled (71). Kids should not be handled by their horns as these can break. Goats are never to be lifted, dragged or pulled by the tail, legs, ears, neck or skin on their body. Suggested equipment for restraining in place includes a halter, stanchion/head gate, shearing headstall and/or goat handling chute (20). The objective is to choose an appropriate restraint technique that will cause minimum stress and discomfort. Goats should be always restrained for the least amount of time possible.

#### Handling during shearing

Angora goats may be caught by the horns or by the hair under the chin, but never by the hair on the rest of their body. During shearing, Angoras can also be acceptably controlled by sitting them between the shearer's legs.

#### Facility designs

Handling goats in groups reduces stress to individuals. Good handling facility designs should make use of goats' natural behaviours. Goats have a natural flight zone (see *Appendix* H – *Goat Flight Zone*) within which they try to distance themselves from handlers. An effective distance to follow behind a herd when trying to encourage calm forward movement, is 3 to 4 meters (21). Using positive reinforcement during handling (e.g., a food reward) and habituating goats to a handling areas by using familiar equipment can reduce stress during handling procedures (21). Unfamiliar humans, movement, shouting, and the presence of dogs – particularly if barking – can cause fear. Reducing fear in goats when handling can increase handling efficiency, reduce injuries, and create a calmer herd.

Goats learn from, and may remember, good and bad experiences. Previously learned aversion, related to a stressful handling procedure, may diminish over time if not repeated. Because goats have a strong

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#### Section 5 – Husbandry Practices

ability to recognize and remember individual humans, fostering positive human-goat interactions is important for animal welfare (31).

Herding dogs

It is essential that dogs used for herding goats be well trained. If canine instincts are not properly managed, dogs may cause harm by chasing goats erratically, running through the herd, or becoming overly aggressive and biting.

#### REQUIREMENTS

All handlers must understand goat behavior and be competent in goat handling techniques.

Handlers must work calmly and quietly with goats at all times using the minimum force necessary.

Goats must be handled at all times so as to minimize the risk of pain, injury, or distress (e.g., goats must not be dragged, lifted, grabbed by the tail, legs, ears, horns or skin (hair).

Goats must not be subjected to mistreatment (including kicking, hitting, or tail twisting).

Electric prods must never be used.

Goats must not be left unattended while restrained for a procedure.

Herding and guard dogs must not stress goats (e.g., by chasing, playing with, or biting).

Dogs must not have access to goats unless under the control of a stockperson (with the exception of trained and acclimated livestock guardian dogs; 21).

#### RECOMMENDED PRACTICES

- a. Use a well-designed and maintained handling system and equipment (see *Section 2.6 Handling Systems*).
- b. Goats should be familiarized with handling equipment and provided with positive reinforcement to encourage positive responses to future handling.
- c. Goats' natural behaviours should be used to encourage free movement to desired pens or other locations (see *Appendix H Goat Flight Zone*).
- d. Supervise goats when crowded in races (alleyways), pens, or yards for prolonged periods.
- e. Minimize isolation of individual animals. Goats should be able to see, smell, and hear other goats whenever possible and be returned to their herds as soon as possible.
- f. Plan procedures to avoid extreme weather conditions and to minimize the frequency, duration, and degree of restraint.
- g. Avoid inverting or holding goats on their sides or backs for longer than necessary during procedures especially if the rumen is full or the animal is heavily pregnant (21).

Social Environment

Goats are herd animals and must have both physical contact with other goats and enough space to permit natural behaviour (e.g., running, playing, mutual interaction). However, they will retreat from herd to kid.

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#### Section 5 – Husbandry Practices

Each time a group of goats changes members, animals try to re-establish social dominance (or pecking order; 72, 73). Some fighting is normal, but a tight space per animal adds to stress and negative behaviours from overcrowding. It is normal for a herd to have a queen, or dominating doe.

Goats can become stressed and depressed and refuse feed if kept alone in a pen (74, 75, 76, 77). This can become an issue for goats recovering from illness, or in isolation before joining a new herd.

#### REQUIREMENTS

Goats in individual pens must either see or hear other goats or companions.

Timid and lower social ranking goats must be monitored for bullying, injuries, and drop in feed intake and body condition score. Prompt action must be taken for animals showing signs of inadequate feed intake or injuries.

#### RECOMMENDED PRACTICES

- a. House goats in compatible groups.
- b. Add new goats to a pen <u>before</u> returning the main group.
- c. Add multiple goats (rather than a single goat) to an existing group.
- d. Provide extra space per goat when blending new groups.
- e. Monitor goats after moving.
- f. Sell breeding does with at least one companion.

### 5.1.1 Yokes and Tethering Devices

Yokes and tethering devices are occasionally used to control animal movement. Goats are naturally curious and will investigate gates, fences, and pens meant to keep them safely contained. At times, this can result in goats escaping or getting stuck. This is more common in horned goats.

Goats that are fitted with yokes or tethered may be less able to eat and drink normally, may get entangled or trapped, injure themselves, or be more vulnerable to predation (from dogs or wildlife). Temporary use of a yoke, horn bars, and tethering may be the last practical method of preventing a stubborn animal from repeatedly getting entrapped or injured. Risks must be carefully balanced when determining what is best for an individual goat's welfare.

Use of yokes, horn bars or tethers carry with them risks to the goat and should not be used instead of correcting housing and fencing deficiencies. If more than one goat needs to be fitted with a device to prevent escape or entrapment, this is a sign that housing/fencing is inadequate and must be repaired or upgraded.

#### Yokes and Horn Bars

Goats are sometimes fitted with yokes around the neck, or have a bar attached horizontally across their horns (horn bar) with the effect of making the goat's head wider in order to prevent them becoming entrapped in fences or penning. These devices should only be used as a temporary measure until fences/penning can be properly repaired. Devices should be removed at least daily. Yokes and horn bars should always allow goat to access food and water.

#### REQUIREMENTS

Yokes and horn bars must not cause pain, injury, or distress.

Animals must not wear a yoke or horn bar continuously.

CODE OF PRACTICE FOR THE CARE AND HANDLING OF GOATS

# SECTION 4: BREEDING, GENETICS AND SHOWING



# MEETING 1 – A DIFFERENT BREED!

# **Setting Objectives**

To identify the differences and breed characteristics of the different goat breeds (including milk, meat, and fibre)

Suggested Lesson Outcomes

- □ To identify milk component yields of milking goats from different breeds.
- □ To identify breed characteristics and factors that might prevent a goat from being registered as a specific breed.

# Suggested Roll Call Questions:

- Name a breed of goats.
- Name a reason for keeping goats.
- What are some of the different purposes for goats?

## Sample Meeting Agenda Time: 2 Hour 50 Minutes

Welcome, call to order, pledge		10 minutes
Roll call		10 minutes
Parliamentary procedure	Introductions, Elections and Business	20 minutes
	New Executive:	
	President	
	Vice President	
	Secretary	
	Press Reporter	
Topic Information Discussion	Overview of the Breeds of Goats	30 minutes
Activities Related to Topic	Activity #1- Purpose and Breeds	30 minutes
Wrap up, Social time and		10 minutes
adjournment		

# **Topic Information**

## **Overview of the Breeds of Goats**

This section is meant to introduce the differences and breed characteristics of the different goat breeds (including milk, meat, and mohair).

### **Milk Goat Overview**

Breed characteristics for milking goats are set by the Canadian Goat Society. This organization sets out what constitutes the differences between breeds of goats which will be outlined on the next couple of pages (Source of Information- Canadian Goat Society).

### **Milk Yield Differences**

Between the different breeds there are also differences in milk component yield. As you will notice from the chart below, many breeds may have higher or lower fat, protein, or milk volume. It is a farmer's preference as to which goat breed to use or whether they use a mixed breed system to achieve the optimal components that they are looking for. It is important to mention that good goats from any breed type may exceed the averages in this table. (Source: Penn State Extension).

### Apply it!

You will also notice that some breeds might have different height, colour, eye or other conformation requirements. Pay attention to these and see if you notice any that surprise you! Try to see if you can identify the goats on a farm visit.

Breed	Average production (kg/ lactation)	Production range (kg/lactation)	Milk fat (%)	Milk protein (%)
Alpine	1,030	359-2,486	3.4	2.9
LaMancha	955	336-1,964	4.0	3.2
Nubian	827	255-1,941	4.9	3.7
Oberhasli	975	423-2,023	3.9	2.9
Saanen	1,171	277-2,495	3.3	2.9
Toggenburg	961	427-1,991	3.2	2.7

### **Mohair Breeds**

Fiber breeds are also regulated by the Canadian Goat Society. Information on breed standards for mohair goats is also provided in the fact sheet pages.

### **Meat Goats**

While Dairy and Mohair goats are regulated by the Canadian Goat Society, the meat goat breeds are regulated by the Canadian Meat Goat Association. There are two main breeds of meat goats in Canada (Boer and Kiko). These goat breeds are outlined in the fact sheets on the following pages (Source: Canadian Meat Goat Association).

There are also other breeds of meat goats that are less common in Canada (Myotonic and Spanish). Dairy buck kids are also commonly raised for meat in Ontario. Additionally, meat, dairy and fibre breeding stock that is culled at auction also becomes goat meat.



The Alpine dairy goat is also referred to as the French Alpine and registration papers for this dairy goat use both designations and they are synonymous. The Alpine dairy goat is a medium to large size animal, alertly graceful, and the only breed with upright ears that offers all colours and combination of colours giving them distinction and individuality. These are hardy, adaptable animals that thrive in any climate while maintaining good health and excellent production. The hair is medium to short. The face is straight or dished. A Roman nose (a nose with a prominent bridge), Toggenburg colour and markings, or all-white is discriminated against. The Alpine is described by using the following terms:

**COU BLANC:** white neck, with white front quarters and black hindquarters with black or grey markings on head.

**COU CLAIR:** light neck, with front quarters are tan, saffron, off-white, or shading to grey with black hindquarters.

**COU NOIR:** black neck, with front quarters and white hindquarter.

**SUNDGAU:** black with white markings such as underbody, facial stripes, etc.

PIED: spotted or mottled.

**CHAMOISEE**: brown or bay with the characteristic markings that are black face, dorsal stripe, feet, and legs, and sometimes a martingale running over the withers and down to the chest. Spelling for male is chamoise.

**TWO-TONE CHAMOISEE:** light front quarters with brown or grey hindquarters. This is not a cou blanc or cou clair as these terms are reserved for animals with black hindquarters.

**BROKEN CHAMOISEE:** a solid chamoisee broken with another colour by being banded or splashed, etc.

Any variation in the above patterns broken with white should be described as a broken pattern such as broken cou blanc.

Disqualifications: pendulous, gopher, or elf ears, bucks that are all white in color.



The LaMancha is a medium-sized breed. The face is straight. A Roman nose is a moderate-toserious defect, depending on degree. The hair is short, fine, and glossy, and may be any colour or combination of colours. There are two types of LaMancha ears; the gopher ear (not more than one inch in length with very little or no cartilage, no cartilage preferred), and the elf ear (an approximate maximum length of two inches with cartilage allowed shaping the small ear). The ends of both types of ear must be turned up or down.

Only bucks with gopher ears may be registered. Bucks with any type of ear other than the gopher ear are disqualified. One ear type has no advantage over the other for does but does are disqualified if they have ears other than true LaMancha type.

Disqualification: anything other than ears as above



The Nubian is a relatively large, proud, and graceful dairy goat of mixed Asian, African, and European origin, known for high quality, high butterfat milk production. The head is the distinctive breed characteristic, with the facial profile between the eyes and the muzzle being strongly convex. The ears are long (extending at least one inch (2.54 cm) beyond the muzzle when held flat along the face), wide and pendulous. They lie close to the head at the temple and flare slightly out and well forward at the rounded tip, forming a "bell" shape. The ears are not thick, with the cartilage well defined. The hair is short, fine, and glossy. Any color or colors, solid or patterned, is acceptable.

Disqualifications: dished face, upright, elf, or gopher ears



The Oberhasli is a Swiss dairy goat. This breed is of medium size, vigorous and alert in appearance. Its color is chamoisee. Does may be black but chamoisee (M.-chamoisee is preferred. Chamoisee is described as: bay ranging from light to a deep red bay with the latter most desirable. A few white hairs through the coat and about the ears are permitted. Markings are to be: two black stripes down the face from above each eye to a black muzzle; forehead nearly all black, black stripes from the base of each ear coming to a point just back of the poll and continuing along the neck and back as a dorsal stripe to the tail; a black belly and udder; black legs below the knees and hocks; ears black inside and bay outside; bucks often have more black on the head than does, black whiskers and black hair along the shoulders and lower chest with a mantle of black along the back; bucks frequently have more white hairs through the coat than does. The face is straight. Ears should be erect. A Roman nose is discriminated against.

Color must be Chamoisee with black markings such as facial stripes, forehead, dorsal stripe, martingale, and belly: udder gray or black (black does are permitted but will be identified with "black" as a suffix to their registered name).

**Disqualifications:** Pendulous, gopher, or elf ears, black bucks, large white spot in hair (more than 1-1/2" in any direction), any color other than chamoisee in bucks, any color other than chamoisee or black in does.



The Saanen dairy goat originated in Switzerland. It is medium to large in size with rugged bone and plenty of vigor. Does should be feminine and not coarse. Saanens are white or light cream in color, with white preferred. They have erect ears (pendulous ears accepted). Color is white or cream for does and the bucks must be white. Spots on the skin are not discriminated against. Small spots of color on the hair are allowable, but not desirable. The hair should be short and fine, although a fringe over the spine and thighs is often present. Ears should be erect and alertly carried, preferably pointing forward. The face should be straight or dished. A tendency toward a Roman nose is discriminated against.

**Disqualifications:** Large dark spot in hair (more than 1-1/2" in any direction), any color other than white in bucks, gopher or elf ears.



The Toggenburg is a Swiss dairy goat from the Toggenburg Valley of Switzerland. This breed is of medium size, sturdy, vigorous, and alert in appearance. The hair is short to long in length, soft and fine. Its color is solid, varying from light fawn to dark chocolate with no preference for any shade. Distinct white markings are as follows: white ears with dark spot in middle, two white stripes down the face from above each eye to the muzzle, hind legs white from hocks to hooves, forelegs white from knees downward with dark vertical stripe below knee acceptable; a white triangle on each side of the tail; white spot may be present at root of wattles or in that area if no wattles are present. Varying degrees of cream markings instead of pure white acceptable, but not desirable. The ears are erect and carried forward. Facial lines may be dished or straight, never Roman. Ears should be erect. Color must be a shade of fawn or brown with the following white or cream color markings (white preferred)- facial stripes, outline of ear, below knees and hocks and inside the top of the legs, and a triangle on each side of tail base. White spot may be present at the point of elbow and at root of wattles or where wattles would be if there are none. A dark vertical line may be present below the knees. Does which are black with Toggenburg markings, are permitted but will be identified with "Black" as a suffix to their registered name.

**Disqualifications:** Tricolor or piebald, black bucks, white stomach (except on British Toggenburg), large white spot in hair (more than 1-1/2" in any direction), pendulous, gopher, or elf ears.

## **Nigerian Dwarf**



A miniature goat which must have erect ears and a straight face. Any color is allowed however, it is a serious fault to have "agouti" coloration (agouti defined as the intermingling of light and dark hairs.) It is also a very serious fault if the animals do not conform to the body measurement chart. This goat must have erect ears and a straight face.

24 months of age: male or female maximum height at withers: 22 inches (55.88 centimeters) 30 months of age: male maximum height at withers: 23 inches (58.42 centimeters) 30 months of age: female maximum height at withers: 22 inches (55.88 centimeters)

Note: Nigerian Dwarfs are of dairy type and are judged according to the dairy goat scorecard

**Disqualifications:** Convex or dished profile, polled (born naturally hornless), pendulous, gopher, or elf ears, over maximum height.

# Angora



The Angora is unique in its hair coat, which is referred to as mohair. The lustrous, curly locks grow at around one inch per month, and are sheared twice a year. Breeding programs aim at high weight of hair production, small fibre diameter, and structural soundness in the breeding stock.

The Angora goat is the only breed that produces mohair and when you cross one with any other breed the first thing that disappears is the mohair. Angoras are on the vulnerable list in Canada. Only 33 new registrations in 2017 and 59 in 2018.

Horns are not removed from Angora kids. Bucks, as illustrated, grow a rack of horns that generally spread and twist outward at the ends, while does' horns are more simply curved. There is no Special Registry for Angoras. When an Angora is bred to any other breed, mohair characteristics disappear; even after many generations using purebred Angora sires, the hair coat is unacceptably kempy.

### Breed Standards:

Pendulous ears: no colour other than white. Animals may, however, appear light grey in colour because the oils in the skin make dust particles stick to the hair. Animals must be horned.

### **Disqualifications:**

- \*Completely blue or black horns or hooves.
- \*Sheepy fleece
- \*Excessive kemp, more than a total of 24 square inches.

# The Boer Goat

Over 50 years ago, using the goats available to them, several goat breeders in the Eastern Cape of South Africa developed a true meat type goat. They called this goat "Boerbok" which, in Afrikaans, means "farmer's goat". Striving for good conformation, fast-growing kids, high fertility rates, hardiness, and adaptability, these early South African breeders have brought the present-day Boer goat very near to the ideal.

In 1987, Boer goat genetics from South Africa were exported to Australia and New Zealand. Both countries significantly increased their number of Boer goats through breeding during the five-year quarantine.

In 1993, a New Zealand company, Landcorp Farming Inc., worked with Olds College in Olds, AB to bring the fist Boer goat genetics to North America. Canadian farmers



became involved, purchasing frozen Boer goat embryos, and the Canadian Boer goat industry began. The following year, frozen Boer goat embryos were imported directly from South Africa, where the Boer goat population



numbers over five million. What had taken South African breeders over 50 years to create had arrived in Canada in a single year!

Canada now has some of the best meat goats in the world, and Canadian breeders continue to strive towards the perfect meat goat. Farming is a business, and a farmer must produce an animal or crop which will ensure the best production and profit for his climate and soil conditions, without weakening the natural resources of the area. This is where the Boer goat fits in.

Because goats are browsers, rather than grazers, they can utilize range and pasture land that is unsuitable for other livestock. As well, Boer goats are suitable for companion grazing with cattle, as they provide little competition for available forage.

In Canada, goats have traditionally been kept for milk and fibre, with meat being mostly a sideline (excess kids or cull animals). The Boer goat was imported into Canada for the same reason that Charolais beef cattle were – for the meat! The Boer goat is a true meat animal, developed and bred for carcass quality. The Boer goat has had great impact on the meat goat industry worldwide, providing a viable choice for new producers as well as existing farmers wishing to diversify.

Boer goat genetics have increased meat goat productivity worldwide. As the Canadian meat goat industry grows to meet Canada's proven demand, the Boer goat will continue to be front and centre.



# Boer Goat Breed Standards

The goal of the CMGA Boer Breed Standards is to improve the breed and to increase productivity by identifying what the Association has deemed the Ideal Boer Goat. Although any animal may be registered if parentage is correct and it conforms to the minimum standard of a convex profile, roman nose and pendulous ears, the Boer Breed Standards provide a guideline for producers to follow when selecting breeding stock, herd replacements and show stock.

# **General Appearance**

The Boer goat is a meat animal and should display volume with symmetry, giving a strong and vigorous appearance. All of the component body parts should blend together smoothly to form a refined, well-fleshed animal that stands squarely on its feet and legs and moves forward freely.

It is important that bucks be obviously masculine in appearance while does should display femininity. Bucks will tend to carry more mass through the shoulders and chest blending smoothly back to a muscular hindquarter while the doe's body has a wedged appearance showing lots of capacity for carrying young.

#### UNDESIRABLE CHARACTERISTICS:

A doe or buck which gives the impression of being of the opposite sex

# Head & Neck



The Boer Goat has a convex profile with a roman nose and pendulous ears of sufficient length to lay smoothly against the head without interfering with the eyes. Head must be of medium length, strong and feminine (masculine) in appearance. The muzzle is broad with large, open nostrils. The jaw is strong, even and correctly aligned with bite neither undershot nor overshot. The eyes are full and bright, and the forehead wide. Horns, if present, should be well spaced and curve back and out to allow full range of movement without rubbing the neck at maturity. The curve of the horns should follow the convex profile of the face. The neck should be proportional to the body size and thick at the base, blending smoothly into the shoulders and brisket.

www.canadianmeatgoat.com

CMGA BOER GOAT BREEDERS GUIDE

#### UNDESIRABLE CHARACTERISTICS:

- Neck that is too long, short or thin
- Vertically folded ears

#### **CULL DEFECTS:**

- Crooked face (wry face)
- Dish face
- Disfiguring malocclusion (very crooked teeth)
- Total blindness
- Misalignment of jaws: overshot or undershot more than 5mm (1/5th of an inch)
- Helicopter, gopher, elf or erect ears (not a cull defect in percentage animals)

# Coloring

Traditional Boer goat coloration consists of a white body with reddish brown on both sides of the head, the color patch being a minimum of 10 cm (about 4 inches) across in any direction. Ears must be 75% reddish brown; reddish brown may extend as far as the withers and brisket. The body may have a reddish brown mark not exceeding 15 cm (about 6 inches) across in any direction. Hairless areas must be 75% pigmented.

#### UNDESIRABLE CHARACTERISTICS:

 Weak pigmentation in the low hair and/or hairless areas under the tail, around the eyelids and mouth, etc. as this could lead to sunburn and possibly skin cancer.

# Forequarters

The shoulders should be well muscled with an even covering of firm flesh set smoothly against the chest wall and withers. The withers should be slightly rounded and barely defined, evenly fleshed and blend smoothly into the chine. The brisket should be broad, deep, muscular and firm. The forelegs should be straight, strong and medium in length; they should be wide apart and squarely set, adequately proportioned to support the animal's weight. The feet should be sound, wide and pointed forward with a deep heel, level sole and closed toes. Strong pasterns are a must.

#### UNDESIRABLE CHARACTERISTICS:

- Shoulders too loose
- Toes pointed in or out
- Weak pasterns
- Feet that don't grow evenly



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# Body

The heart girth should provide ample respiratory capacity as evidenced by long, well sprung foreribs and a muscular chest floor along with fullness at the point of the elbow. The barrel should be uniformly long, deep and broad thus providing ample digestive capacity. Females should show a wedge shape widening towards the rear to evidence lots of room for carrying kids. The back should be strong and broad with an even covering of smooth, firm flesh. A strong, straight and nearly level topline is desirable. The loin should be well muscled, wide, long and thick.

#### UNDESIRABLE CHARACTERISTICS:

- Narrow heart girth
- Slab sided body
- Pinched behind shoulders
- Weak in the chine area (sway back)
- Lameness



# Hindquarters

The rump should be long, broad and level from thurl to thurl, cleanly fleshed and have a slight slope from hips to pins. The tail head is slightly above and neatly set between pin bones with the tail being symmetrical with the body. The twist should be deep, full and firm with the escutcheon (rear udder attachment area) low and wide. The thighs should be deep, wide, muscular and firm. Medium length hind legs are desirable; they should be wide apart and nearly straight when viewed from the rear. When viewed from the side a vertical line could be drawn from the pins to the hocks to the dewclaw. The rear leg bones should be strong and adequately proportioned to support the animal's weight. Strong pasterns are a must. The feet should be sound, short, wide and pointed forward with a deep heel, level sole and closed toes.

#### UNDESIRABLE CHARACTERISTICS:

- Rump too short or too steep
- Flat buttocks
- Cow hocked
- Sickle hocked
- Posty legs (poor angulation)
- Weak pasterns
- Pigeon toed or splay footed



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# Mammary/Reproductive System

The doe's udder should be long and wide, extending well forward and showing adequate capacity without exaggerated size. The texture should be pliable and elastic, free of scar tissue and well collapsed when empty or dry. In the fore area the udder should be carried well forward, tightly attached, blending smoothly into the body. In the rear area the udder should be high, wide and strong with udder halves evenly divided and symmetrical with a strong medial suspensory ligament. The doe must have well defined, fully functional teats of desired length and size for nursing. Teats on both does and bucks must be free from obstruction and properly placed with a maximum of two well-separated teats per side. A buck must have two firm, fully descended testicles of similar size with a maximum scrotal split of 2.4 cm (1 inch) on a mature buck.

#### UNDESIRABLE CHARACTERISTICS:

- Poorly attached udder
- Teats too large (calabash teats)
- Teats too small for effective nursing

#### **CULL DEFECTS:**

- Hermaphroditism (displaying characteristics of the opposite gender)
- Teats that are joined or partially joined, including double teats, fish teats and cluster teats
- Bucks with only one testicle or abnormal testicles



# The Kiko Goat in Canada

The first Kikos were introduced into Canada in the 1990s and are now represented in this country by more than 450 registered animals. The Kiko goat, as a maternal breed, has numerous qualities like high milk production, hardiness, prolificacy and resistance to internal parasites. It also has good feed conversion, good carcass characteristics, high growth rate, ease of kidding, slow growing hooves and high resistance to hoof diseases. For years, the meat goat breed with the highest numbers in Canada has been the Boer goat which was originally selected for, and still is, its paternal line qualities such as carcass quality, high growth rate and fertility. The Kiko breed will play a major role in the future of the Canadian meat goat industry because now Canadian meat goat producers have a choice to use the Kiko breed (maternal line) in crossbreeding with a terminal line, like the Boer. In crossing two very different and unrelated breeds, producers can take advantage of heterosis to improve performance, productivity and efficiency in order to reduce production costs. To be able to achieve these objectives, Canadian meat goat producers need to have access to good genetics from purebred registered animals selected according to Canadian breed standards.

# Common genetic origin and history

In 1991, the Kiko goat was first imported into North America from New Zealand. This breed was selected from feral goats having superior production and meat



characteristics. Anglo-Nubian, Saanen and Toggenburg genetics were introduced to improve the ferals. This breeding program began in early 1970 and continued until late 1980. After about 20 years of ruthless culling and rigorous selection, a new maternal meat goat breed was created. The Kiko breed is now quite standardized and most of their numbers are in the United States. Canadian Kiko breeders, after more than 10 years of selection according to

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American and International breed standards in their own Canadian environmental and financial conditions, felt the need for an all-Canadian Kiko Registry to promote the Kiko Goat, assist members in breeding Kiko Goats selected according to breed standards established by Canadian breeders and register Kiko Goats according to these standards.

# Distinct characteristics of the breed

The physical characteristics of the Kiko goat reflect the fact that it has been bred specifically as a hardy, productive meat producer. A typical Kiko should have a strong head with well-fitting jaws, medium-length muscular neck, well-muscled tight shoulders, strong pasterns and hocks, well-fleshed loin, strong back and broad rump. The most common coat colour is white, but Kikos can be almost any other colour. As a breed specifically developed for meat production, the Kiko has more muscling than all the recognized Canadian dairy goat breeds and the following characteristics distinguish it from the other meat goat breeds (namely, the Boer goat): straight profile

of the nose; ears that are moderate in length, not too pendulous nor too erect; thighs with sufficient, not excessive, muscle down to the hock; udder with very good capacity for milk production.



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# Kiko Goat Breed Standards

# **Explanation of Kiko Breed Standards**

The goal of the CMGA Kiko Breed Standards is to improve the breed and to increase productivity by identifying what the Kiko committee of the Association has deemed the ideal Canadian Kiko Goat. In recognizing the correlation between physical traits and efficient production, the Standards of this maternal breed provide a guideline for producers to follow when selecting breeding stock and herd replacements.

# **General Appearance**

The Kiko goat is a medium- to large-framed, hardy, vigorous and alert meat animal with high fertility, prolificacy, and high mothering abilities in order to raise multiple kids with high daily gain on natural conditions without supplementation. It is important that bucks be obviously masculine and substantially larger than does. Does should display femininity with a wedge-shaped body showing lots of capacity for carrying young. The dominant coat color for the Kiko goat is white, but any other color patterns are accepted. The coat can vary, according to environment, from short and smooth to quite thick. Kikos have a smooth, supple skin with a darker pigment preferred; however, lack of pigmentation is permissible. Wattles, if present, should not be penalized.

### Undesirable Characteristics:

- A doe or buck which gives the impression of being of the opposite sex
- Extremely long legs

# Head and Neck

The Kiko goat has alert eyes and a strong head with a straight profile, neither

convex nor concave. Females must have a feminine head. Ears are alert and moderate in length, not being too pendulous nor too erect. The muzzle is broad with large, open nostrils; the jaw should be correctly aligned. Horns are well-spaced and sweep outward; older animals with cropped horns should not be penalized. Horns on mature bucks should display a shallow spiral. The neck is proportional to body size



and medium in length. It is well-muscled and blends smoothly into the forequarter.

#### Undesirable Characteristics:

- Concave or convex profile
- Horns set too closely together
- Horns too straight
- Horns swept back too tightly, touching the neck
- Neck too long, too thin, or too short

#### **Cull Defects:**

- Roman nose
- · Misalignment of jaws: overshot or undershot more than 5mm
- Crooked face (wry face)
- Disfiguring malocclusion (very crooked teeth)
- Total blindness

# Forequarters

Shoulders are well-muscled and tightly attached with good angulation. Brisket is broad and proportionate to body size. Forelegs are strong and attach to elbows with good angulation. When viewed from the front, forelegs are parallel and squarely set. Pasterns are strong with sound, well-formed hooves.

#### Undesirable Characteristics:

- Toes pointed in or out
- Weak pasterns
- Shoulders too loose
- Cull Defects:
  - Lameness
  - · Any hoof abnormalities that affect the animal's movement

# Body

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Body is long, wide and deep with long, well-sprung foreribs and a large heartgirth. The back is strong and straight with a long, wide and well-muscled loin. Body must have sufficient capacity to allow for the ingestion of a maximum of forage with minimal supplementation.

#### Undesirable Characteristics:

- Slab-sided body
- Back extremely short



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# Hindquarters

Rump is long and broad with a slight slope downward from hips to pins and the tail is straight. Thighs have sufficient, but not excessive, muscle down to the hock; muscle should not be too predominant to avoid kidding problems. Hocks are correctly angulated when viewed from the side; legs are parallel and nearly straight when viewed from the rear. Pasterns are strong with sound, well-formed hooves.

### Undesirable Characteristics:

- Rump too short or steep
- Thighs with too much muscling
- Poor angulation in the hocks
- Sickle hocked
- Cow hocked
- Weak pasterns

### Cull Defects:

- Lameness
- Any hoof abnormalities that affect the animal's movement

# Mammary / Reproductive System

Doe's udder is medium size and must be well attached with very good capacity for milk production; udder has two well-defined, well-placed, small- to medium-sized functional teats. Small non-functional teats without orifices are permissible if they are supernumeraries (a third teat for example). Buck's scrotum should not be divided and should contain two well-formed fully descended testicles of similar size. Bucks must be aggressive breeders with high fertility, females must be very fertile and give birth to multiple kids. Kidding should be easy and fast to ensure a high rate of survival in kids.

### Undesirable Characteristics:

- Poorly attached udder
- More than two functional teats
- Teats too large
- Divided scrotum
- Small testicles

#### **Cull Defects:**

- Hermaphroditism (displaying
- characteristics of the opposite gender)
- Bucks with only one testicle or abnormal testicles
- Completely divided scrotum



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KIKO GOAT BREEDERS GU

# ACTIVITY #1 PURPOSE AND BREEDS

	Time: 30 minutes	As a part of this section, members should research a goat
		breed (can include those in the fact sheets along with
	Materials	myotonic, and Spanish breeds) and give a presentation to
	needed:	members at the end of the meeting. Ideally groups will
	Presentation	include 2 members with one senior and one junior member
	materials, fact	in each group.
	sheets.	Members can select which breed they would like to focus
		on, but no group should focus on the same breed. Your
		information is not limited to the fact sheets provided and you
DO		can use any resources you might find. Presentations should
		be 5-10 minutes in length.
		Presentations will be given in meeting 5 so prepare what
		you need during the time provided and work as a group
		to get the presentation together before the meeting.
		Depending on your meeting format you might want to
		change your presentation to reflect your audience and form.
		Get members to try and answer the apply questions in this
		meeting as you will
		The objective is to identify breed differences between goat
REFLECT		breeds and to link those differences to the goat's functions.
	Discuss the	What are some of the disqualifications for your chosen
	following	breed?
	prompts as a	
	group	Where is your goat originally from?
		What is the primary use for your goat and how does the
		production/form help them do their job?

# MEETING 2 – PEDIGREES AND BREEDING

# **Setting Objectives**

To assess pedigrees for meat and dairy goats to understand how they function, the importance of registration and the differences between breeding methods.

Suggested Lesson Outcomes

- $\hfill\square$  To identify differences between pedigrees for meat and dairy goats.
- □ To compare and contrast different breeding styles.

# Suggested Roll Call Questions:

- Why do we keep track of a goat's pedigree?
- Give an example of a trait.

### Sample Meeting Agenda Time: 2 Hours 20 minutes

Welcome, call to order, pledge		10 minutes
Roll call		10 minutes
Parliamentary procedure	Minutes and Business	10-15 minutes
Topic Information Discussion	Importance of Pedigrees and What is a	20 minutes
	Trait	
Activities Related to Topic	Activity #1- Reading a Goat Pedigree or	30 minutes
	Registration Certificate	
	30 minutes	10 minutes
Topic Information Discussion	Focus on Traits and Breeding	10 minutes
Topic Information Discussion	Time of Breeding	20 minutes
Activities Related to Topic	Activity #2- Breeding Techniques	10 minutes
Wrap up, Social time and		10 minutes
adjournment		

# **Topic Information**

### **Importance of Pedigrees**

### Pedigrees and Registration

Registration is a permanent record of a goat's family history. As mentioned in the previous meeting, both milk and mohair goats are registered with the Canadian Goat Society while meat goats are registered with the Canadian Meat Goat Association. Both organizations are the only groups registered in Canada that can provide registration for goats under the Animal Pedigree Act.

The act lays out several requirements for breeders and buyers. First, animals should not be marketed as purebred unless they are registered with the respective breed association. Requirements for registration have been outlined in this manual but at minimum, animals must meet the breed characteristics and any additional requirements stated by the breed association. One of those requirements is that no animal may be purebred if less than seven-eighths of its genetic background comes from the animals previously registered as purebreds by the association.

Using these records and developing an extended pedigree, you can see if there are any proven sires and dams in a goat's family. Proven animals are those that pass on qualities such as high butterfat and milk production in a milking animal; better gain and meat quality in a meat goat; or a finer, more lustrous hair in an Angora. Many desirable traits or qualities can be traced through registration papers.

### What is a Trait?

A trait is an observable characteristic of an animal that is partially or full determined by their genetics. The appearance or performance we measure is always influenced by an animal's environment and their genetics, but a goat's genetics truly determines the potential of an animal and their value in the breeding herd. Registration is one of the tools that can be used for genetic improvement. Overall, by keeping track of production and other records we can influence the productivity of our animals in future generations.

### How does one register their goats?

That is very dependent on which type of goat you are looking at. The organizations mentioned previously have great websites in the resource section of this guide. Typically, registrations need to be from either cases where both parents are purebred or a DNA test is submitted. However, if you fail to meet those requirements you can register your animal as grade and continue to breed to registered animals for the required number of generations. Until 1/8 or less is from non-purebred stock.

### Try it!

Print off a registration form and go over it with a producer. Becoming familiar with the language used and the requirements can often be one of the best ways to learn!

Although both the Canadian Goat Society and Canadian Meat Goat Association handle registrations for their respective breed, there is a third not-for-profit organization that handles record keeping for most livestock groups in Canada. The organization is known as the Canadian Livestock Records Corporation (CLRC) and was established in 1905 with power given under the Animal Pedigree Act. The CLRC works with over 50 breed associations (including beef, sheep, and goats).

The CLRC employs registrars to process all goat registrations according to the standards set out by the breed associations. They collect fees from breeders according to fees agreed upon by both organizations. The CLRC also keeps a record data base of registrations for both organizations that can be accessed online. These records are kept up to date with additional records and are comparable to registration paperwork that a producer might have on farm (https://www.clrc.ca/). As a part of the next activity you can look up animals that might be in your area to examine the terminology and language used during registration.

### **Reading a Pedigree**

The pedigree is like a goat's family tree and gives you an idea of the parentage of the goat. There are two sides (Buck and Doe) and this overview will give you an idea of what you need to know from this information.

The pedigree will look like a tree on its side with a single name on the left-hand side and all of that animal's ancestors to the right. The pedigree diagram below shows a registered goat and three generations of ancestors, from the goat's parents to their great-grand parents.



A: Offspring (Current Animal)

B: Buck of the Offspring

C: Doe of the Offspring

D: Buck's Buck (Grand Buck on the Buck's Side)

E: Buck's Doe (Grand Doe on the Buck's Side)

F: Doe's Buck (Grand Buck on the Doe's Side)

G: Doe's Doe (Grand Doe on the Doe's Side)

H: Buck's Great Grand Buck (Grand Buck on the Grand Buck's Side)

I: Buck's Great Grand Doe (Grand Doe on the Grand Buck's Side)

J: Buck's Great Grand Buck (Grand Buck on the Grand Doe's Side)

K: Buck's Great Grand Doe (Grand Doe on the Grand Doe's Side)

L: Doe's Great Grand Buck (Grand Buck on the Grand Buck's Side)

M: Doe's Great Grand Doe (Grand Doe on the Grand Buck's Side)

N: Doe's Great Grand Buck (Grand Buck on the Grand Doe's Side)

O: Doe's Great Grand Doe (Grand Doe on the Grand Doe's Side)

Not every goat that members own will be purebred but keeping track of breeding can be very important to improve the breeding herd and prevent the mating of closely related individuals (inbreeding).

# ACTIVITY #1 READING A PEDIGREE

	Time: 20 minutes	Get members a copy of a goat pedigree or look up a
		registered meat, dairy or mohair goat on
	Materials	https://www.clrc.ca/
	needed: Milk	
	Goat Pedigree or	Go through the pedigree and explain anything that members
	online database	might have questions on.
DO		Try and look up a variety of goat information including those
		from goats with and without ears, different production
		categories, etc.
		Look at the pedigree. Does this make sense, and can you
		trace back the goat's genetics on this registration?
		The objective is to examine pedigrees and registration for
REFLECT		various types of goats.
		How might you look at the goat's genetic history to inform
		your breeding decisions?
	Discuss the	
	following	How useful is registration in your opinion?
APPLY	prompts as a	
	group	As you will find later, there is a rising topic of identification
		in goats? How can registration and identification go hand in
		hand?

# **Topic Information**

## Focus on Traits and Breeding

### Traits

For centuries, selective breeding has been used as a way to improve livestock to be more productive and have better health outcomes. That selective breeding was once used based off solely the appearance and production of animals but today can be based on several tools that producers have in their toolbox. These include:

(1) Registrations – By registering animals, you have the ability to see the animal's pedigree and important information recorded on its ancestors.

(2) Production Records – Through a milk recording or meat grading program, which will be covered later. Information from these tests help calculate genetic evaluations, provided up-to-date production records, and allow you to see if your animal is meeting their genetic potential.
(3) Classification - Official Classifications judge the conformation of the goat relative to the ideals for the breed and they are provided by the two breed organizations.

(4) Genomic Testing – The use of information on the DNA to make selection decisions. See Meeting 5 for more information on this and genetic indexes.

(5) Genetic Evaluations and Indexes - These values are made up of performance data, pedigree records and even genomic information. The more data that goes into this information the more accurate the data is. These inform producers of the animal's potential performance in all traits.

There are many ways that these tools can be used.

### Apply it!

Have an expert in genetics come to a meeting to discuss ways that they use the above information to inform breeding decisions.

# **Topic Information**

## **Time of Breeding**

### **Out of Season Breeding (Source: Ontario Goat)**

For both meat and dairy operations, successful breeding is of critical importance to the farm's production; in fact, no production will occur without it. However, the demand for goat meat and milk throughout the year doesn't always coincide with the natural breeding and kidding cycle of goats in Ontario.

Goats are seasonal breeders that can be manipulated to breed out of season. Managing timing and intensity of breeding allows producers to take better advantage of the best marketing opportunities in both meat and milk sectors.

For any breeding program to be successful, good nutrition, veterinary care, management, and environmental conditions must be provided to the goats. Knowledge of goat reproduction and a relationship with your herd veterinarian are also essential to breeding success. Finally, be prepared to address challenges that may arise during breeding, gestation (pregnancy), kidding, and raising kids.

### Natural breeding

Bucks will naturally come into rut (become ready for breeding and attempt to attract does) and does will naturally cycle (come into heat and be receptive to breeding) as the days get shorter. In Ontario, this is approximately from mid-August to March, resulting in kidding from approximately January to August. Breeding from April to August is considered out-of-season.

Natural breeding allows for one kidding period per year, which reduces workload and results in kids of similar ages and weights, which can simplify kid management and meat kid marketing. However, for dairy operations, this means many does will reach their dry period at approximately the same time, creating periods where little or no milk is produced on the farm. Additionally, meat goats on a natural breeding program will often not be ready at major market peaks, causing a loss of potential revenue. Therefore, natural breeding can cause income to fluctuate throughout the year.

Breeding from April to August is considered out-of-season. Long days and hot days reduce the
breeding activity of males and reduce the natural estrus cycle of females which contributes to lower numbers of fall born kids. Year-round kidding creates more consistent availability of milk and meat goats for various holidays, but the labor of kidding and raising kids is spread out over a longer time.

#### **Extended** lactation

Dairy producers can create a more stable year-round milk supply by not rebreeding does and not drying them off, creating an extended lactation. This will allow producers to milk the doe longer than the average 305-day lactation, but the boost in milk production seen after kidding will only occur once, before stabilizing at a lower level of production for the rest of the lactation. Further, some does may spontaneously dry off on this management system. Extended lactations also reduce the number of kids born on the farm. This can be positive, by reducing the workload associated with kidding, or negative, by reducing available replacement does that can join the milking herd, replace cull does, or be sold for additional income.

Some producers will rebreed does and not dry them off before kidding. This can create a yearround milk supply but also increases the risk of mastitis and decreases colostrum quality, among other negative health outcomes for both the doe and kids. There are regulations based on when the milk is able to be shipped. Check with your herd vet on how many days before and after kidding that the milk will need to be separated to be sure (as this will sometimes also depend on medication).

## Extended natural breeding or accelerated breeding

Extended natural breeding lengthens the natural breeding season by manipulating lighting and/ or using hormone treatments to create a kidding season of seven to eight months per year. With accelerated breeding, it is possible to initiate cycling more frequently, allowing three kiddings per doe over two years. Both extended natural breeding and accelerated breeding can be achieved by carefully timed breeding, and the use of hormones.

These programs can help create a more consistent supply of kids, which leads to a more consistent milk supply in dairy herds and gives meat goat producers the ability to market kids in advance of major holidays, leading to increased profitability. Additionally, kidding can be planned around feed or labour availability, further allowing producers to control costs while optimizing their production for various seasons. Kidding over such a long period can become tiring for animal caretakers, so additional staff to care for close up does, fresh does, and kids may be needed depending on herd size. It is important to note that programs that manipulate the natural breeding season have varied levels of success, and reduced fertility may be expected. However, does that were bred out-of-season should produce kids more likely to successfully breed out-of-season.

#### The Buck Effect

Suddenly introducing a buck to does that have been out of sight and smell of bucks for at least three weeks is a common approach to induce cycling. Farmers can also use a buck battery to breed large groups of does more effectively. This practice uses several bucks that will be more competitive and breed a larger number of does.

Bucks also display several behaviors that relate to breeding:

• Urine Spraying- Bucks will spray themselves during rut (when the does are in estrus or heat). More specifically, they will spray their front legs and beard (if applicable). The resulting odor is meant to denote sexual maturity.

• Gland Excretion- Another scent aspect that is excreted from male goats to denote sexual maturity.

• Flehmann Response- This is the name given to the behavior when animals curl back their upper lips to transfer pheromones and certain scents into their vomeronasal organ.

#### Lighting

For extended natural breeding or accelerated breeding, sexually mature does and bucks should be housed separately and exposed to at least 18 hours of light for a period of 40 to 50 days. Dark periods must be completely dark, with no natural or artificial light (even a very small amount of light can disrupt this program and prevent goats from cycling on schedule). After this period, daylight exposure is shortened to ten hours of light per day for forty days. This mimics shorter days and causes does and bucks to begin cycling. This program can increase energy bills and may require management changes to create buck housing out of sight and smell of does as well as reduce light entering goat housing from artificial light outside (such as security lighting) during the dark period and to prevent goats from accessing dark areas during the light period.

#### Hormones

Hormones can be used to bring does into heat as well. Hormones are used to replicate the natural cycle of the doe. Progesterone impregnated controlled internal drug releasing (CIDR) is one way of delivering these hormones at specific times.

#### Do it!

Get a veterinarian to outline the steps involved with applying a CIDR and the process of breeding.

The CIDR technology uses lutalyse, a type of prostaglandin that stimulates cycling outside of the normal breeding season.

#### **Caution:**

Hormones are not approved for use in goats. Always consult your herd veterinarian before use.

There are many varieties of hormones and protocols that can be used to modify the doe's reproductive cycle, including feed additives. It is important to remember that hormones are used off-label for goats, so producers must have a prescription from the herd veterinarian to use these protocols. As the products are off-label, milk and meat withdrawals are not known for many of these products. Your herd veterinarian can determine safe withdrawal times as well as correct dosages and protocols for a herd.

#### **Types of Breeding Methods**

#### **Natural Breeding**

An intact male goat is called a "buck" and will come into breeding age starting as early as 4-months of age. However, by waiting until a buck is a year of age you can ensure a buck is at its best and has obtained the appropriate weight to sustain breeding. Additionally, a buck should be selected based on pedigree and desired traits to ensure that bucks are not overused. The buck has the greatest genetic impact on a herd so you should always be selective.

#### **Artificial Insemination**

There are several companies that supply semen to the Ontario Goat market. These companies often do not provide service meaning that producers must breed their own goats. However, artificial insemination does not rely on having the buck in the herd, allowing producers more

options to control the genetics that they are bringing into their breeding herd. These companies also offer proven bucks which have been verified to be of superior genetics. It is also worth noting, however, that conception rates (the percentage of does that become pregnant from a breeding) can be variable with artificial insemination.

#### **Embryo Transplant**

This practice is rarely used in small ruminants (sheep and goats) as it primarily relies on surgical techniques. Additionally, hormone therapies used for this practice are not well studied in small ruminant models. This may change in the future, but the cost of the practice is also another factor limiting uptake of embryo transfer in small ruminants.

# ACTIVITY #2 BREEDING TECHNIQUES

	Time: 10 minutes	This activity will involve separating members into two groups	
		and having them discuss the benefits of either AI or natural	
	Materials	breeding.	
	needed: None		
DO		This is meant to be an open discussion but leaders or an	
		expert can monitor the debate. It is more about asking	
		the right questions and no one side should necessarily be	
		declared the winner.	
		The objective is for members to think critically about the	
REFLECT		different breeding methods and to think about why there	
		might be advantages of one over another.	
		Having bucks on farm can increase the risk of inbreeding but	
		with the right record keeping can have other advantages.	
	Discuss the	With genetic proofs and improved selection procedures why	
	following	do producers still use these older practices?	
APPLY	prompts as a		
	group	What might be some questions you ask a producer to	
		determine the reasoning behind their preference for natural	
		or AI breeding?	

# MEETING 3 – ASSESSING CONFORMATION

# **Setting Objectives**

To identify the parts of the goat and judge conformation of goats.

Suggested Lesson Outcomes

- $\Box$  To identify the parts of the goat to be able to recall in your reasons.
- □ To review goat scorecards that way you will be more prepared to give reasons on the classes.

## Suggested Roll Call Questions:

- What are some keywords to use when giving reasons?
- What are some tips you use when giving reasons?

#### Sample Meeting Agenda Time: 1 hour 30 minutes

Welcome, call to order, pledge		10 minutes
Roll call		10 minutes
Parliamentary procedure	Minutes and Business	10-15 minutes
Activities Related to Topic	Activity #1- Label Me	20 minutes
	20 minutes	30 minutes
Topic Information	What is Ideal?	15 minutes
Activities Related to Topic	Judge a Class!	15 minutes
Activities Related to Topic	Activity #2- Judge Me!	20 minutes
Wrap up, Social time and		10 minutes
adjournment		
Wrap up, Social time and		10 minutes
adjournment		

# ACTIVITY #1 LABEL ME!

	Time: 20 minutes	At Home (Virtual) or No Access to Goats:
DO	Materials needed: numbered anatomy of the goat picture, the word bank and the fill in the blanks.	<ul> <li>In pairs (try to pair up older and younger youth), give each pair a numbered anatomy of the goat picture, the word bank and the fill in the blanks.</li> <li>Get each pair to go through the goat and label it the best they can (15 minutes).</li> <li>At the end of the 15 minutes, go around and go through each number on the goat (blue = easy; green = hard) (10 minutes).</li> <li>For each hard answer that is correct assign 2 points and for each easier answer award 1 point.</li> <li>Sum all points together and see how everyone did!</li> <li>On Farm with Goats:</li> <li>Get all members to look at one goat and go over the anatomy of the goat. In 15 minutes, how many parts of the goat can they name.</li> <li>Go over the additional anatomy that members missed and the sample questions below (10 minutes)</li> </ul>
REFLECT		The objective is to learn the anatomy of the goat to judge health and conformation.
APPLY	Discuss the following prompts as a group	Why do you need to know the anatomy of your goat? Why else might your goat anatomy be important? What connections were you looking for?



# Fully Labelled Goat Anatomy





Fill in the Blanks	
1.	2.
3.	4.
5.	6.
7.	8.
9.	10.
11.	12.
13.	14.
15.	16.
17.	18.
19.	20.
21.	22.
23.	24.
25.	26.
27.	28.
29.	30.
31.	32.
33.	34.
35.	36.
37.	38.
39.	40.
41.	42.
43.	44.
45.	46.
47.	48.
49.	50.
51.	52.

#### Word Bank:

Back	Neck
Barrel	Nostrils
Bridge of Nose	Point of Shoulder
Brisket	Poll
Dew Claw	Rear Udder
Ear	Ribs
Eye	Shoulder Blade
Fore Udder	Sole
Forehead	Tail
Heart Girth	Teat
Hip	Thigh
Hock	Throat
Jaw	Тое
Knee	Udder Floor
Muzzle	
Cannon Bone	Orfice
Chest floor	Pastern
Chine	Pin Bone
Сгор	Point of elbow
Dewlap	Rear Udder Attachment
Flank	Rump
Forearm	Stifle
Fore udder attachment	Tail head
Heel	Tendon
Loin	Thurl
Milk Vein	Withers

Answer Key	
1. Poll	2. Neck
3. Shoulder Blade	4. Withers
5. Crop	6. Chine
7. Back	Barrel
Loin	Rump
Нір	Thurl
Tail Head	Tail
Pin Bone	Rear Udder Attachment
Thigh	Stifle
Rear Udder	Medial Suspensory Ligament
Tendon	Hock
Dew Claw	Pastern
Heel	Udder Floor
Orifice	Teat
Fore Udder	Fore Udder Attachment
Milk Vein	Flank
Ribs	Sole
Тое	Cannon Bone
Knee	Fore arm
Chest Floor	Point of Elbow
Brisket	Heart Girth
Point of Shoulder	Dewlap
Throat	Jaw
Muzzle	Nostril
Bridge of Nose	Eye
Forehead	Ear

# **Topic Information**

#### What is Ideal?

When judging a class, it is important to recognize what is ideal to help make your decisions. Part of that decision making is to be able to point to parts of the goat during your reasons. The following scorecards and information can be used to help inform your judging decisions.

#### Do it!

As much as knowing what is ideal is important it is also important to apply this information to as many situations as you can to be able to recall it while giving reasons. Practice makes perfect!

# Dairy Goat Scorecard

			Perfect	t Score
			Doe	Buck
General Appearance			35	54
Attractive individuality indicating femininity, vigour and stretch with a harmonious blending and correla impressive style and attractive carriage; graceful and	r, strength ation of parts, d powerful w	, alk.		
	Doe	Buck		
Style (includes shoulders)	5	8		
Breed Character and Head	5	8		
Topline	5	8		
• Rump		10		
Feet and Legs	12	20		
Body Capacity			15	23
Relatively large in proportion to the size of the anim ample digestive capacity, strength and vigour; widt starting at head.	nal, providing h throughout	t,		
<ul> <li>wide, deep barrel and heart girth</li> </ul>				
<ul> <li>wide in head, full in crops</li> </ul>				
<ul> <li>wide through back and loin</li> </ul>				
<ul> <li>wide chest floor between front legs</li> </ul>				
• full at elbow				
Dairy Character			15	23
Animation, angularity, general openness and freedo excess tissue, giving due regard to stage of lactation	om from n for does.			
<ul> <li>long, lean neck blending into shoulders</li> </ul>				
well-defined withers				
<ul> <li>flat, long, well-sprung ribs</li> </ul>				
<ul> <li>fine-textured, loose, supple skin; fine hair</li> </ul>				
lean and angular lines				

	Perfect S	core
	Doe	Buck
Mammary System (Does only)	35	0
A capacious, strongly attached, well-balanced udder of good quality, indicating heavy production and a long period of usefulness.		
Medial suspensory ligament,     shape, texture		
Fore Udder8		
Rear Udder8		
• Teats		

# Judge's Eye

The ideal slope of rump should resemble the middle diagram. The goat on the left has an extremely steep slope of rump, while the goat on the right has a level rump; both undesirable characteristics.



The set of the rear legs should resemble the middle diagram. The goat on the left has extremely sickled legs, while the goat on the right has extremely posty rear legs; both undesirable sets of legs.



Scorecard courtesy of the Canadian Goat Society. Diagrams copyright 2000 Angela Beltane for the CGS.

Source: 4-H Ontario Judging Tool Kit

# Market Kid Scorecard

	Perfect Score
General Appearance	
Quality and Condition	15
<ul> <li>well muscled, with smooth firm flesh</li> </ul>	
clean, strong bone	
<ul> <li>smooth, glossy hair and loose, supple skin</li> </ul>	
Size and Development	15
<ul> <li>size appropriate to age; high growth preferred</li> </ul>	
Fore Quarters	
Shoulders	
well muscled with smooth, firm flesh	
<ul> <li>withers barely defined</li> </ul>	
Brisket	7
<ul> <li>broad, deep and muscular</li> </ul>	
Forelegs	
<ul> <li>heavily muscled, round, clean bone</li> </ul>	
<ul> <li>strong, straight legs with strong, flexible pasterns</li> </ul>	
Hind Quarters	25
Rump	
<ul> <li>long and broad with smooth, firm flesh</li> </ul>	
Twist and Thighs	
<ul> <li>low, wide, well fleshed twist</li> </ul>	
<ul> <li>deep, wide, firm and muscular thighs</li> </ul>	
Hind legs	5
clean and strong bone	

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Body	15
Capacity	2
<ul> <li>ample room for digestive system</li> </ul>	
Heart girth	2
large girth with wide chest floor	
<ul> <li>fullness at point of elbow</li> </ul>	
Barrel	4
<ul> <li>deep and broad; well supported</li> </ul>	
Loin	7
<ul> <li>broad and strong with full, deep flanks</li> </ul>	
Head and Neck	5
Head	2
<ul> <li>clear, bright eyes; large, open nostrils</li> </ul>	
Neck	3
<ul> <li>medium length, strong and thick</li> </ul>	
<ul> <li>blending smoothly into shoulder and brisket</li> </ul>	
Total	

Source: 4-H Ontario Judging Tool Kit

# ACTIVITY #2 JUDGE ME!

	Time: 20 minutes	Ask members to judge a class of 4 goats based on the judge's
		score card provided for either meat or dairy goats on the last
	Materials	meeting page.
	needed: Chart	
	Paper, markers	Get a few members to give reasons as to why they placed the
		class the way they did.
DO		On the chart paper: Get a member to keep track of some of the good things for each goat in one category of the chart paper and those that may not be as good in the other. Get members to use terminology and strong language (i.e. More correct, greater, etc.). If members would like to get a stronger handle on vocabulary and example statements, the breed associations have many great resources.
REFLECT		The objective is to gain better experience in judging goats.
APPLY	Discuss the following prompts as a group	Discuss what might be disqualifying factors for the class and ensure that none are present.

# 4-H STANDARD JUDGING CARD

Name/Number	Age	
Class	Club	
Placing: First Second Third Fourth		
REASONS (list only main points):		
I place at the top because:		
I place over becaus	e:	
I place over because	e:	
I place over because	:	
FOR THESE REASONS I PLACE THIS CLASS OF		

# MEETING 4 – KEEPING GOOD RECORDS

## **Setting Objectives**

To introduce both classification, and milk recording programs and other good management practices to members.

Suggested Lesson Outcomes

- $\Box$  To introduce the concept of classification for the different breed associations.
- □ To give members background on the purpose and need for milk recording.
- □ To explain the importance of keeping good records.

## Suggested Roll Call Questions:

- From your experience what is the most important trait for your type of goat to possess?
- Describe one thing that makes a great goat.

Sample Meeting Agenda Time: 2 hour 15 minutes

Welcome, call to order, pledge		10 minutes
Roll call		10 minutes
Parliamentary procedure	Minutes and Business	10-15 minutes
Topic Information Discussion	Basics of Classification	15 minutes
Activities Related to Topic	Activity #1- Classify It!	30 minutes
	15 minutes	15 minutes
Topic Information Discussion	Milk Recording	15 minutes
Activities Related to Topic	Activity #2- Taking a Milk Sample	15 minutes
Topic Information Discussion	Importance of Record Keeping	5 minutes
Wrap up, Social time and		10 minutes
adjournment		

## **Topic Information**

#### **Basics of Classification**

In the last meeting we covered judging of animals but to be objective in livestock betterment a classification scheme is often created to assign an objective score to each animal. In shows, animals are judged relative to the others in a class, whereas during classification each animal is scored according to what is believed to be ideal for the breed or purpose. The following guides are labelled for dairy and meat goats and provide the scoring mechanisms. You will notice these are much more specific than the judging scorecard so these may provide clarity to those members wishing to gain more from this club.

#### Dairy Goats (Source: Canadian Goat Society)

For this section, when diagrams are given, optimal range is indicated in green. This will score maximum points for that section.

#### **Breed Standards**

Animals not meeting breed standards for height or weight will see their overall scores dropped by 5 points and are not eligible for Excellent scores. The following is a table outlining the breed standards which are meant to make the process less prone to interpretation:

		Height	Weight
Largest breeds	Does	30"	135 lbs
(Nubian, Saanen & Alpine)	Buck	32"	170 lbs
Medium breeds	Does	28"	130 lbs
(Lamancha & Oberhasli)	Buck	30"	160 lbs
Smaller breed	Does	26"	120 lbs
(Toggenburg)	Buck	28"	150 lbs
Miniature breed	Does	22"	N/A
(Nigerian Dwart)	Buck	23"	N/A

#### Rump (10% of Score)

- ✓ A well-sloped, wide, and strongly anchored to back/vertebrae
- Impacts position of reproductive tract to be held high within abdominal cavity
- ✓ Improved fertility
- ✓ Better kidding ease & healthy recovery following kidding

#### Rump Angle (47% of rump score)

This is the relationship of the pins with respect to the hook bones. Desired is when the angle is a 25-degree slope.



#### Thurl Width (31% of rump score)

The width of the rump of an animal is evaluated by standing at the rear. The measurement is taken from the middle point of the thurl to the middle point of thurl from the top of the rump.



Loin Strength (22% of rump score)

The desired loin is described as "broad, and slightly arched; vertebrae defined; attachment to hook bones high and wide."

Therefore, loin strength in this evaluation is to measure the degree to which the vertebrae are defined and the slight arch to the loin and the height of attachment to the hook bones. The desired loin is broad, with vertebrae defined, level from ribs to rump.



Thurl Placement (Research- Recorded for Future Use)

The thurls are high and wide apart, giving consideration to stage of lactation. When viewed from the side, the thurls should be located 2/3 of the way from the hip bones and 1/3 of the way from the pin bones.



#### Rump Defects

#### A-Shaped

The hook bones are lower than the vertebrae forming, an A-shape slope when hands are placed over the rump.

#### Short Rump

Refers to the distance between hooks and pin bone.

#### Mammary System (42% of final score)

- ✓ Soft, high, wide, and strongly attached, with good teat length and placement
- ✓ Healthy udders that are resistant to breakdown
- ✓ Easy to milk with effective milk letdown and milk-out
- ✓ Capacious udders for high milk volumes
- ✓ Ligament strength and udder attachment to keep udder free from contamination

#### Udder Depth (14% of mammary system score)



The depth of udder is measured relative to the hocks, according to age. The mature goat's udder is at least 5-7.5 cm (2-3 inches) above the point of the hock (desired 5). When the mature goat's udder floor is well below the point of the hocks, it would be assessed as extremely deep (1). The udder floor of 1st fresheners should be well above these points.

#### Udder Texture (10% of mammary system score)

Defined as softness and freedom from excess tissue (meaty). Milked out udder illustrated.

Fleshy udders which do not decrease in size when milked out or carry excessive flesh are to be discriminated against. The udder is soft, pliable, elastic and well collapsed after milking.



Medial Suspensory Ligament (20% of mammary system score)

Evaluated considering the depth of cleavage and evidence of division between halves of the udder. Also, evaluate the degree of stretch (prominence) of the ligament in center (top) of rear udder attachment.



## Fore Attachment (20% of mammary system score)

Tightly attached, wide and long, blending smoothly into the body. Extending well forward onto the abdominal wall. This is the attachment of the udder to the body wall. Good width, well attached, extending from side to side. It should be noted that a doe with a bulgy fore udder does not necessarily have a weak fore attachment.



Rear Attachment Height (14% of the mammary system score)

This is the height of rear attachment. The stage of lactation and amount of milk in the rear udder must be taken into consideration in making this evaluation. The measurement is the distance between the base of the vulva and the top of the milk secreting tissue.



#### Rear Attachment Width (12% of the mammary system score)

As well as being high, the rear attachment should be wide. The width of rear attachment is assessed as the width at the top of the milk secreting tissue.



Teat Placement (8% of mammary system score)

Teat placement is to be evaluated independently of the plumpness of the teats.



Teat Length (2% of mammary system score)



Excessively large, long, or small teats are discriminated against.

Mammary System Defects:

#### Lacks udder shape

This condition refers to the lack of symmetrical shape, no indication of division between halves, the udder cannot be seen behind the doe's leg when viewed from the side etc.

#### Bulgy Rear udder

Is when viewed from the side the rear udder protrudes well past the vulva

#### Twisted/Tilted udder

This refers to a twist in the udder from the attachment where the udder is turning towards the left or the right.

#### **Unbalanced Half**

The term "unbalanced" would be interpreted as being unbalanced between the two halves of the udder. If the udder is unbalanced without any apparent injury, it should be discriminated against and more so in younger animals since this may be an inherited trait.

Reclassification for goats with unbalanced udders: The classifier will ask whether the previous classification report is available. If so, they will check whether the udder was ticked "unbalanced". If so, then he/she will probably not raise the final classification. If the udder was not ticked "unbalanced", then he/she will give consideration to raising the animal. If the breeder does not have the classification slip, then the classifier will average both sides, whichever is unbalanced, and estimate an average.

Blind Half Blind half is one which has never given milk.

#### Short Fore

Short refers to the length of fore udder. Care should be exercised in the use of the term "short" when referring to an animal which is nearly dry. Shelved Fore udder

Refers to front of udder forming a shelf.

#### Abnormal teats

Webbed, spur, double teats, extra teats, and double orifice would be considered as the same basic condition and would be called "Abnormal".

### Dairy Strength (20% of final score)

- ✓ Well-sprung, open ribs with adequate width
- ✓ Adequate capacity for the consumption of a high forage diet
- ✓ Sustains proper body condition with high milk output
- ✓ Healthier doe with room for vital organs to operate
- ✓ Symmetric, and balanced head indicating femininity/masculinity. Broad muzzle with full, correctly formed nostrils, jaws meeting correctly, strong lower jaw, and a broad forehead.

## Stature (12% of Dairy Strength)

Stature refers to the height of the animal at the hip bones. Breed standards are used in evaluating the stature of animals. Animals that meet the breed standard receive a code 7-8, animals far exceeding breed standards will receive a 9 and animals extremely short code 1.



## Height at Front End (3% of Dairy strength score)



The animal is equal or slightly taller at the withers than at the hips.

Chest Width (23% of dairy strength)

Width of chest (floor) is important in the breed. Care should be taken to note the width of the floor rather than the distance between the front legs.



Body Depth (17% of dairy strength)



Body depth refers to the depth of the animal's body at the rear rib.

### Angularity (28% of dairy strength score)

Dairy form is evaluated considering angularity, freedom from coarseness (head to tail), spring of rib and cleanness of thighs.



#### Body Condition Score (5% of dairy strength score)

Animals who grade less than 2.0 are in need of immediate medical intervention as they are at great risk of chilling and dying quickly. Likewise, animals that are a 5.0 risk of metabolic problems due to being so obese. A doe should be in the 2.25 to a 3.5 range at dry off. She should be about a 2.75 to a 3.5 at kidding. And, she needs to be at least a 2.0 or more at 45 days into lactation. This is the bare minimum and really, she needs to be closer to 3.0 in order to maintain proper condition through a 305-day lactation. A buck should be at least a 3.0 at the beginning of rut in order to carry any condition at all throughout the breeding season.

#### Dairy Strength Defects

#### Wry face/Malformed Jaw

Discriminated against in accordance with the severity of the condition; usually dropped about one class in final class.

#### Undesirable Heads

Refers to miscellaneous conditions of the head which indicates the need for discrimination such as: narrowness, coarseness, short, abnormal jaw, lacking breed character, etc.

#### Weak Chine

This is the middle of the back where the loin and chine join. The ideal is to be level along the loin and chine area.

#### Weak crops

The crops are to be considered as the part of the animal behind the shoulder just below the chine.

#### Not well sprung

This refers to spring of rib. An animal not well sprung in the rear rib may also not be well sprung in the fore rib. In that case, the animal would be ticked as being narrow heart and narrow chest.

#### Lacks balance

The stylish animal has alertness, style, and walks well. Classifiers should avoid placing too much emphasis on the udder for style. Only animals which lack a great deal of style will be double ticked.

Feet & Legs (28% of final score)

- ✓ Widely placed legs, intermediate curvature, and a steep foot with a deep heel
- ✓ Greater resistance to lameness and foot diseases
- ✓ Straight-tracking locomotion with ample freedom of movement
- ✓ Mobility to get to the feed bunk, milk parlour, and for heat detection
- Clean and strong boned, with shape and movement of feet and legs resulting in proper carriage of the animal
- ✓ FEET: Well shaped, with deep heel, toes slightly spaced
- ✓ LEGS: pasterns strong, of medium length, and flexible, fore legs straight and wide apart, with feet squarely placed. Hind legs nearly perpendicular from hock to pastern from the side view, straight and wide, apart from the rear view. Hocks have clearly molded bone, flat and strong, with tendons well defined

#### Pastern strength (20% of Feet and Legs score)

Pasterns should be strong and flexible.



Heel Depth (20% of Feet and Legs score)

A deep heel is the most desirable. Consistency throughout the components of the foot, including claw size, heel depth, and width of sole (proportionate to the size of the animal).



Bone Quality (12% of dairy strength)

Should be interpreted as flatness of bone in leg, ankle to stifle, including the hock.



Rear Legs-Side View (17% of feet and legs)

The set of the rear legs is to be evaluated as intermediate (5), desired (9), extremely sickle; (1), extremely posty. This determination is made, by standing at the side of the animal and determining the curvature of the rear leg. An overall picture of the curvature of the rear leg from the stifle to the ankle (side view) should be used in making this determination. The condition of an animal being straight on the rear legs is discriminated against as much as an animal being sickled on the rear legs.


Rear Legs-Rear View (31% of feet and legs)

When viewed from behind, the rear legs are widely set, parallel with each other. When on the move, there is ample space between the hocks.



## Feet and Legs defects

## Weak pasterns

This condition refers to a lack of strength where the pastern joins the ankle. A springy pastern is not necessarily a weak pastern. Care should be taken in evaluating this characteristic giving due regard to housing conditions.

## Swollen joints

Swollen joints are an inherited rheumatic condition and should be penalized. Goats with severe swollen joints will not be classified higher than "Good Plus" on overall score and not higher than "Good" on feet and legs.

Toes out front All animals appear to walk with a slight amount of toeing out. Tick only when pronounced.

Open toed This condition will not be ticked unless serious.

## Bowed rear legs

This section refers to rear legs being bowed at the pasterns when animal is standing. The leg tends to curve inward instead of being straight.

## Bowed front legs

This section refers to front legs being bowed at the knee when animal is standing. The leg tends to curve forward instead of being straight.

## Genitalia (Males only)

Genitalia are relatively large, symmetric, and balanced. Free from abnormal and extra teats. It has a strongly attached scrotum without excess division. Firm, even testes.



## Report

Following the complete evaluation, you will receive a report that outlines what the classifier identified which will state the score (on a scale to 100) and the rating:

2/0	No.							Classi	fication Cla	D wner: <b>0</b> n Date: <b>2</b> 1 ssilier:	P18-04-28
NAME DOE SIRE DAN	R R R	D138539 D138558	Registrat	ion # Breed	NIG	BUN	DWAR		Fred Lac Days	h Date: 21 ctation: 3 Fresh: 81 Age: 2	-9 -9
Section	Descriptive Trait	Code	-	1 2	3	4 5	679	9		(Ideal)	Defect
Rump (	10%)		1			1		- 11			
90	Rump Angle (47%)	5	High			1		T Lo		(46)	
	Thurl Width (31%)	9	Narrow			Шİ		VW	de	(8-9)	
	Loin Strength (22%)	6	Weak		Π	TIP	7	1 90	ong	(8-9)	
	Thuri Placement (Research)	6	Badk			Ţ		1 Ah	ead	(6)	
Dairy S	trenath (22%)										
82	Stature (12%)	5	Short			1VI		Та	8	(7.9)	
10	Height at Front End (3%)	5	Low		Π	1VI		Пн	th I	(5-7)	
	ChestWidth (23%)	6	Narrow		Π	TI		TW	de	(7-8)	
	Body Depth (17%)	6	Shallow		Ē	TT	7	1 De	ер	(7-8)	
	Angularity (28%)	6	Coarse	T		TI	11	T An	gular	(9)	
	Body Condition Score (5%)	9	Low		D			N H	an i	(6-7)	
Feet & I	Legs (26%)										
86	Pastern Strength (20%)	6	Weak		0.	Щ	<u>/  </u>	30	ong	(7-8)	
	Heel Depth (20%)	6	Shallow		0	111	7	De	еp	(8-9)	
	Bone Quality (12%)	6	Coarse		0	TI.		Fir	æ	(7)	
	Rear Legs-Side View (17%)	6	Straight						rved	(45)	
	Rear Legs-Rear View (31%)	6	Hocked-in		0.	ΞŪ	<u>/ _ </u>	<u> </u>	night	(9)	
Mamma	ry System (42%)	1.1		-			_			5.2	
88	Udder Depth (14%)	D	Deep	22				L Sh	Adje	(46)	
	Udder Texture (10%)	5	Reshy		U.			5	R	(0)	
	Medial Suspensory Ligament (20%)		Weak		<u>D</u> .	14	∕ _ _	1 30	ong	(8)	
	Fore Attachment (20%)	8	Weak		U.	Ц		1 91	ong	(9)	
	Rear Attachment Height (14%)	9	Low		П.	4		N H	\$h	(9)	
	Rear Attachment Width (12%)	8	Narrow		D,	Ц		III W	de:	(9)	
	Teat Placement (8%)	6	Wide		0.				ose	(6-8)	
	Teat Length (2%)	3	Short	1	V	- FF		Lo	ng	(5-6)	
Final	Score: VEF	Y GOOD	86								

## Meat Goats (Source: Canadian Meat Goat Association)



## Scorecard for Purebred and Percentage Animals

GENERAL APPEARANCE TOTAL POINTS	DOES 40	BUC 40
<ul> <li>Quality and condition</li> <li>Deep bodied, well-muscled with a smooth even covering of firm flesh and showing vigour. Strong bone, healthy hair, loose and pliable skin.</li> <li>Graceful and powerful walk with impressive style. Back should be wide, straight and nearly level.</li> <li>Does should be feminine and have a well-defined wedge shaped body when viewed from the side.</li> <li>Bucks should be masculine. Colour should be traditional colouration consisting of white body with reddish brown on both sides of the head, the colour patch being a minimum of 10cm across in any direction.</li> <li>Ears should be 75% reddish brown; reddish brown may extend as far as the withers and brisket; body may have a reddish brown mark not exceeding 15cm across in any direction. Hairless areas must be 75% pigmented.</li> </ul>	20	20
<b>Note</b> : colour and pigmentation are only to be given a maximum of one point each within this section.)		
<ul> <li>Breed character</li> <li>Head &amp; neck: convex profile with a roman nose and pendulous ears of sufficient length and lying flat against the head, not interfering with the eyes.</li> <li>Head must be medium length, strong and feminine (masculine) in appearance.</li> <li>Muzzle broad with large, open nostrils.</li> <li>Jaw strong, even and correctly aligned with bite neither undershot nor overshot.</li> <li>Eyes full and bright, forehead wide.</li> <li>Horns, if present, should be round and curving to rear and out enough to allow head movement without the horns excessively rubbing the neck.</li> <li>The curve of the horns should follow the convex profile of the face.</li> <li>Dehorned animals shall not be penalized.</li> <li>Neck should be proportional to body size and thick at base, blending smoothly into shoulders and brisket.</li> </ul>	10	10
<ul> <li>Size and development</li> <li>According to age, preference given to animals showing superior growth and muscle development without soft fleshing.</li> </ul>	10	10

FORF OUARTERS		DOES	BUCKS
	TOTAL POINTS	15	15
Shoulders		4	4
<ul> <li>Strong and well-muscled with even covering of firm flesh; sho smoothly against chest wall and withers.</li> </ul>	oulder blades set		
Withers		4	4
<ul> <li>Slightly rounded and barely defined with even flesh consmoothly into the area of the chine.</li> </ul>	vering; blending		
Brisket		3	3
- Broad, deep, muscular and firm.			
Forelegs		4	4
- Medium in length, wide apart, squarely set, straight with strong	g bones.		
<ul> <li>Adequately proportioned to support weight; feet sound, s pointed forward with a deep heel, level sole and closed toes.</li> </ul>	short, wide and		

- Strong pasterns are a must.

BODY	TS	DOES	BUCKS
Heart girth		3	5
<ul> <li>Large heart girth resulting from long, well sprung (wide, flat, long and wide spaced) fore ribs; wide muscular chest floor between front legs; fullness point of elbow, thus providing ample respiratory capacity.</li> </ul>	ly at		
Barrel		4	5
- Uniformly long, deep and broad thus providing ample digestive capacity.			
Back		4	5
- Broad and strong with even covering of smooth, firm flesh.			
- Topline strong, straight and nearly level.			
Loin		4	5
- Well-muscled, wide, long and thick.			

HIND QUARTERS TOTAL POINT	DOES S 15	BUCKS 20
Rump	5	5
<ul> <li>Long, broad and slightly sloping with smooth even covering of flesh.</li> </ul>		
- Hips wide apart and level with back.		
<ul> <li>Thurls wide apart and nearly level from thurl to thurl.</li> </ul>		
- Pins wide apart and lower than hips. Tail head slightly above and neatly set		
between pin bones.		
- Tail symmetrical with body.		
Twist and thighs	5	5
- Twist deep, full and firm. Escutcheon low and wide.		
- Thighs deep, wide, muscular and firm.		
Hind legs	5	10
- Medium length; wide apart and nearly straight when viewed from the rear,		
nearly perpendicular from hock to pastern when viewed from side.		
- Hocks wide apart when viewed from rear and showing correct angulation when		
viewed from side. Bones strong and adequately proportioned to support		
weight. Strong pasterns are a must. Feet sound, short, wide and pointed		
forward with a deep heel, level sole and closed toes.		

MAMMARY/REPRODUCTIVE SYSTEM	OTAL POINTS	DOES 15	BUCKS 5
Udder condition and capacity - Long, wide, extending well forward and showing adequate capacity exaggerated size. Pliable and elastic, free of scar tissue, well co	acity without llapsed when	5	0
empty or dry. <b>Udder attachment</b> - In the fore area carried well forward, tightly attached without poo	ket; blending	5	0
<ul> <li>smoothly into body. In the rear area high, wide and strong; evenly divided and symmetrical with strong medial suspensory liga</li> <li>Teats</li> <li>A doe must have teats of desired length and size for nursing; well of the strong /li></ul>	udder halves ament. defined.	5	2
<ul> <li>Doe's and buck's teats must be free from obstruction; squarely placed. Maximum of two teats per side.</li> <li>Teats must be totally separated and functional.</li> </ul> Scrotum	and properly	0	3
<ul> <li>A buck must have two firm, fully descended testicles of simila maximum scrotal split of 2.4cm/1 in. on a mature buck.</li> </ul>	r size with a	Ū	5
		DOFS	BUCKS

**TOTAL POINTS: ALL SECTIONS** 

List of Disqualifications	
(Revised May 2003)	

- Misalignment of jaws; overshot or undershot more than 5mm
- Total blindness
- Crooked face (wry face)
- Dish face (concave)
- Disfiguring malocclusion (very crooked teeth)
- Helicopter, gopher, elf or erect ears (not a disqualification in percentage animals)
- Serious emaciation
- Lameness (if due to recent injury must be cleared by Health Check Committee)
- Hermaphroditism (displaying characteristics of the opposite gender)
- Teats that are joined or partially joined, including double teats, fish teats and cluster teats
- Bucks with only one testicle or with abnormal testicles

100

100

## ACTIVITY #1 CLASSIFY IT!

	Time: 15 minutes	As a part of this meeting you can bring in a classification expert from one of the breed organizations or have a
DO	Materials needed: Scenarios from	knowledgeable leader discuss the classification program that they are familiar with.
	the Case.	If you cannot, then try and classify a doe in a herd that you already know the rating for. See how close members can apply the scoring criteria.
REFLECT		The objective is to understand how judging and classification are closely linked and important.
APPLY	Discuss the following prompts as a group	Ask the classifier what is the best part of their job? Do they have any advice for producers looking to increase their classification scores?

## **Topic Information- Milk Recording**

Milk recording is a way that a herd can accurately keep track of a goat's production to assist with genetic selection indexes. Through this program a producer can see which does contribute the most and which does are candidates for culling.

Milk recording also gives the opportunity to have publishable records. These are records of what each goat produced which are considered official if you were ever to sell a goat or want to buy a proven goat.

There are a number of rules for participating in the milk recording program, but farmers must first be members with the Canadian Goat Society. All testing occurs through Lactanet.

There are two types of tests:

• \*P- Under this program, a producer must test throughout the whole year to get 305day records. Each animal must be verified, and her milking amount is added up across her whole lactation. This value is then compared with the qualification scale to award the \*P designation.

• \*M- This is the alternative to \*P and is an official one-day milk recording. These are often done at fairs or other exhibitions and to be publishable they must test all 1st lactation goats. The point system is based on the following calculation:

o 2.2\*(kg of milk) + 0.1\* (Days in Milk) + (kgs of milk) (Butter fat%)/0.0227 These values with a cap placed on Days in milk of 3.6 (for standard breeds) and 1.44 (for Nigerian Dwarfs) constitute the points for each animal and must be greater than the qualification scale to achieve the \*M designation.

More information on the rules associated with milk recording can be found on the Canadian Goat Society website (goats.ca).

## ACTIVITY #2 TAKING A MILK SAMPLE

	Time: 15 minutes	Use the attached guides (Source: Canadian Goat Society) to
		take a milk sample or demonstrate for members.
	Materials	
	needed:	You may wish to ask a qualified tester to come demonstrate.
DO		Please note, the bottle may be slightly different than the one
		shown but it should not affect the demonstration.
		Also note that some larger herds may use an automatic
		recording system.
REFLECT		The objective is take an objective milk sample.
	Discuss the	How might this milk sample inform your selection decisions
	following	for your herd?
APPLY	prompts as a	
	group	How can understanding components and total volume help
		you to stay productive and profitable?

## SCALES AND SAMPLES

Two of the most important aspects of Milk Recording are weighing the AM and PM milk and taking the butterfat samples. Obviously, any errors at this stage will seriously affect the milk record and the butterfat and protein yield. This Manual has been prepared to help in these operations and is a composite of the requirements of the various provincial DHIA labs.

#### Scales

The CGS Rules require the use of an approved dairy type scale, calibrated in kilograms. The most commonly used hanging scale is the Salter 235. (For a list of approved scales contact the CGS office) YOU MUST USE A SCALE CALIBRATED IN SUDGRAMS TO PARTICIPATE IN EITHER OF THE MILK RECORDING PROGRAMS.

#### Dairy Dippers

The CGS Group Test Rules require the use of a 30 ml (one-ounce ) dairy dipper to take butterfat samples. These are available from agricultural supply houses or kitchen supply stores in various styles. The length of the handle is not important, provided that it is convenient to use. The important factor is the size of the cup. Salad dippers can also be used, as they are made of stainless steel, are virtually identical to dairy dippers, and are available at a fraction of the cost.

#### Sample Bottles

All Lactanet labs supply plastic sample bottles. A preservative pill is included in the bottle. THESE PILLS ARE TOXIC. This chemical can be absorbed through the skin and is extremely dangerous to small animals and children. Please take special care when handling the sample bottles, so that none of the contents come in contact with the associated milking equipment. It is recommended that a pail of water be provided, so that the dipper may be washed off (between samples) to avoid contamination of the milk pail. This is an extremely important item and cannot be overemphasized.

#### Handling Of Milk Sample Bottles

Under the CGS Test Rules, it is the responsibility of the tester to personally deliver the milk samples to the local drop-off point. Every effort is to be made to keep the samples in good condition (refrigerated) and to deliver them within 24 hours of the test. The samples can deteriorate rapidly under certain weather conditions, and will result in lower butterfat and protein yields.

2.3 kgs

kilograms



#### To calibrate the scale:

- Hang the scale in a suitable location and place the milk pail on the hook.
- Only use this milk pail for weighing the milk.
- Set the point at zero.
- Empty all the milk out of the pail between
- weightings.



#### **Protect Your Investment**

To Check the Accuracy of the Scale: 80 ounces of cold water should weigh

One liter of water should weigh 1.0

Your scale is a precision instrument that is costly to replace. Inaccurate or loconsistent scales must be replaced. Some types of scales are affected by dust and humidity.

When not in use, keep your scale covered and in a dry place. The scale face must be easily read to within 1/10" of a kilogram. Graduations finer than this are not required for DHI. Reports indicate that some types of scales deteriorate rapidly if stored in the barn or milk house.







BEFORE A BUTTERFAT SAMPLE IS TAKEN, stir the milk with the dipper or pour the milk back and forth into another pail. This will guarantee that the milk is well mixed, so that your butterfat and protein levels are accurate.

MIX WELI



DAIRY DIPPERS are available in various styles. Two examples are illustrated here. A syringe may be used if necessary, provided it is capable of holding 15 ml.



Samples



- Note preservative pill in empty sample bottle.
- 2. Fill sample bottle 1/3 full from first milking.
- 3. Fill sample bottle with another 1/3 from the second milling.
- 4. Close lid on cample bottle and shake to dissolve pill.



#### DO NOT OVERFILL THE BOTTLES

The bottles should be filed 1/3 full for the first test, and 1/3 for the second test. There must be an air space above the milk. Make every effort to make the samples of equal size. After the lid has been firmly replaced, shake the bottle to dissolve the pill in the milk.

## **Topic Information**

## Importance of Record Keeping

Keeping accurate records is an important component of both herd management and the breeding program. It is important to keep accurate animal inventories, treatment records, rates of mortality, breeding records, pedigree and production records (weight of market kids, milk production, number of kids born etc.). Animals should be uniquely identified with a tag, leg band or other method so that records can be taken for every animal. These records can be used to monitory your herd's health and productivity as well as to make selection and culling decisions to improve the genetic merit of the herd.

Some goat farmers do not collect a lot of information but may be able to build upon the information they currently collect. Meat goat producers may keep a record of the weight gained each week by their kids and number of kids raised per doe. Milk goat producers may weigh the milk produced by their goats on a regular basis. Angora goat producers weigh the fleece that is sheared from their goats. All of these relate to the farmer's bottom line. It's impossible to know if a particular doe is making a profit or costing you money without accurate individual production records. They may also be able to be used along with the breeding information for that animal.

There are five aspects to consider when developing and using a record keeping program to improve your herd:

1. Herd Goals – What traits are important to your herd? What do you want your herd to look or perform like in five or ten years? Without goals you do not know what you're aiming towards and will not be able to make appropriate selection or management decisions.

2. Identification – It is critical to be able to individually identify bucks and does in order to monitor their performance and keep track of pedigrees.

3. Performance Records – To make informed selection and culling decisions, it's necessary to have objective records of performance (e.g. milk records, classification, weights, number of kids born etc.). You can't manage (or improve) what you don't measure! Your record keeping system should be designed to be simple and include all the necessary information for your herd. It could include paper records, spreadsheets or herd management programs.

4. Improving the Herd – Using the performance records you have collected; you can make changes to your breeding program or herd management in order to move the herd towards your breeding goals.

5. Evaluating Progress – It's important to review production records and performance routinely to track your progress towards your goals!

It is important to remember that the quality and depth of information that you collect will help all farm advisors to examine where improvements might be possible. Therefore, it is important to keep records up to date.



Example of the way that records can be formatted (for Does; Source: Ontario Goat):

Example of the way that records can be formatted (for Bucks; Source: Ontario Goat):

					Fa	Farm name: Identification # Born (D/M/Y):				
100	Dr.	LEDING	DUCK NO	COND	Di	im:		Sire:		
Date of entry (D/M/Y)	Body Condition Score (BCS) or weight	Breeding soundness evaluation	Bred with (doe ID #)	# live at kidding	Kid ID #s	Kid weights at kidding (kg/lbs.)	Weaning weight	Remarks		

These sheets can be downloaded from the Ontario Goat website, but you can also make these sheets the way you want them!

## MEETING 5 – GENETIC INDEXES AND OTHER GENETIC TOPICS

## **Setting Objectives**

To introduce the importance of the different programs discussed already.

Suggested Lesson Outcomes

- □ To assess the importance of genetic indexes.
- $\hfill\square$  To present a topic relating to a specific goat breed.
- $\Box$  To identify the importance of biosecurity when selecting good genetic stock.

## Suggested Roll Call Questions:

• What is one valuable tool that you have learned about as part of this club to allow for your genetic selection of goats?

## Sample Meeting Agenda Time: 2 hours 15 minutes

Welcome, call to order, pledge		10 minutes
Roll call		10 minutes
Parliamentary procedure	Minutes and Business	10-15 minutes
Topic Information Discussion	Basics of Classification	15 minutes
Activities Related to Topic	Activity #1- Classify It!	30 minutes
	15 minutes	15 minutes
Topic Information Discussion	Milk Recording	15 minutes
Activities Related to Topic	Activity #2- Taking a Milk Sample	15 minutes
Topic Information Discussion	Importance of Record Keeping	5 minutes
Wrap up, Social time and		10 minutes
adjournment		

## **Topic Information - Genetic Indexes**

## Background

Goats have a large amount of genetic variability with many important traits that have medium to high heritability (e.g., milk production, conformation, growth). Heritability refers to the ability for goats to pass on their traits to the next generation. Additionally, goats have a shorter generation time than many other farmed animals, allowing more rapid genetic progress.

Trait	Heritability
Kg Milk/lactation	0.27
Kg Protein/lactation	0.30
Kg Fat/lactation	0.29
General Appearance	0.26
Body Capacity	0.29
Dairy Character	0.34
Feet and Legs	0.30
Suspensory Ligament	0.26
Fore Udder	0.37
Rear Udder	0.45
Teats	0.36

Example of some goat traits and their heritability (Source: Paul Stewart- EastGen)

Genetic evaluations of dairy goats in Canada have been available since 1987 when researchers from the University of Guelph, Semex Canada and Agriculture and Agrifood Canada contributed to the development of the program. The program continued and with the help of both the Quebec and Ontario governments continued to be developed. Today, online tools are being used that allows for evaluations and selections tools to be used by producers for their own herds. To date, the program is primarily used for milk goats but has the potential to be used in the future to improve the production of meat and fibre goats.

## Canadian Dairy Goat Improvement Program

Canadian Goat Society data collected by classifiers, milk records and pedigrees are combined in a central database. These evaluations can be accessed online and securely by producers through http://www.goatgenetics.ca/. This tool provides Estimated Breeding Values (EBV) as an estimation of the genetic value of an animal as a potential parent. EBVs are effective selection tools as those individuals with the best EBVs for a given trait have the highest probability of producing offspring with desirable performance for that trait.

Each parent contributes half of their own genetics to each offspring. For this reason, the genetic merit of offspring is expected to be the average of the genetic merit of the two parents for a particular trait.

EBVs are expressed in the same unit that they are measured in (for example kg) but EBVs are relative and not absolute, they show the genetic merit of an individual relative to the average of the population. They are also standardized to the specific breeds that they belong to. In total there are 11 traits evaluated as EBVs under the Canadian Dairy Goat Improvement Program (3 milk production and 8 type traits):

	EBV code	Onth	Destriptore	Breed
Production	Milk Prof	Kg	EBV for milk protein production in kg per lactation EBV for protein vield, in Kg per lactation	0
	Fat	Kg	EBV for butter fat yield, given in Kg per lactation	0
Тура	S/R	Points	Structure and Rump	5
24	SL	Points	Suspensory Ligament	5
	RU	Points	Rear Udder	5
	FU	Points	Fore Udder	5
	DC	Points	Drairy Character	5
	TE	Points	Teat	5
	BC	Points	Body Capacity	-5
	FL	Points	Feet and Legs	5
Indexes	PINDX	Points	Production Index based on milk production EBVs	100
	TINDX	Points	Type Index based on type EBVs	100
	CINDX	Points	Combined Index based on production (60%) and type (40%) indexes	100

## ACTIVITY #1 EXPLORING GENETIC INDEXES

	Time: 20 minutes	Potentially get a geneticist to come in to talk about EBVs. Are
		there any questions that you might have for them?
	Materials	
	needed. Dice	Think about ways that EBVs might help breeders make
		decisions. Roll the dice. Record the next 5 dice rolls. What
		was the breakdown of your rolls?
		Next roll the dice 2 times and select the highest number 5
		times. You prohably and ad up with numbers that were much
		times. You probably ended up with numbers that were much
		higher by doing this. That is the impact of an EBV. You gain
		more information about the potential offspring so that you
		can be more successful in your selection decisions. By using
		milk recording classification and registration you can beln
		the process by generating valuable data.
		The objective is to determine the importance of EBVs for
REFLECT		goat breeding.
		How valuable do you think that EBVs and genetic evaluations
	Discuss the	
	following	
	prompts as a	Many genetic companies publish proofs of their bucks that
	group	allow for producers to see which goat's might be the best in
		terms of family lines, etc.
APPLY		
		Inbreeding percentage is very important due to the wide
		availability of genetics. As inbreeding percentage goes up
		there is a higher risk of health defects. Why is it important
		that the index and the breeder consider this percentage?
		that the mack and the precuer consider this percentage:

### **Topic Information - What is Scrapie?**

One of the potential risks that relate to breeding is the transmission of scrapies. The following information has been provided by Ontario Goat:



**SCRAPIE IN GOATS** 

Frequently Asked Questions Last updated February 2016

This Frequently Asked Questions document has been prepared collaboratively by Ontario Goat, the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) and the Canadian Food Inspection Agency (CFIA) to assist Ontario goat producers and provide a better understanding of scrapie in goats.

#### What is scrapie?

Scrapie is a fatal disease that affects the brain and central nervous system of sheep and goats. It is not a new disease and was first reported in sheep over 250 years ago. Scrapie belongs in the family of diseases known as transmissible spongiform encephalopathies (TSE). These diseases are associated with the presence of abnormal prions. Prions are normal proteins in an animal that change their structure when they come in contact with abnormal infectious prions.

#### Is scrapie a risk to human health?

According to Health Canada, there is no known link between scrapie and human health. The disease is not spread to humans by consuming goat milk, cheese or meat.

#### How is scrapie transmitted and spread?

Scrapie is spread most commonly from an infected female to her offspring at birth, or other animals exposed to the birthing environment, through infectious prions in the placenta and birthing fluids. As well, scrapie prions have been found in the manure, saliva and milk of clinically and sub-clinically infected animals, so transmission may also occur by exposure to these routes. This is an animal to animal problem.

#### Isn't scrapie just a sheep issue?

Scrapie can affect both sheep and goats in a similar manner. Until recently, most cases of scrapie confirmed in Canada were in sheep flocks. The previous cases of scrapie in goats (1976, 2007) were connected to a sheep source because the goats and sheep were co-mingled.

#### What are the clinical signs of scrapie?

Scrapie is a disease that affects the central nervous system of goats and sheep, and develops slowly. Clinical signs are only seen in adult animals, typically between two and five years of age, and in some animals it can be much older. However, once an animal appears ill, it will typically die within months. In Canada, the disease frequently presents itself as thin, weak/wasting goats even with a good appetite. Other signs may include trembling, excitability and lack of coordination.

#### How is scrapie diagnosed?

For goats, scrapie can only be positively diagnosed after death by examination of the brain tissue.

#### Is there a live animal test for scrapie for goats?

Biopsies of lymphoid tissue from live goats may be used as a herd screening tool to look for the presence of scrapie infection. However, a negative lymphoid biopsy does not rule out the possibility that a particular animal has scrapie. The only way to definitively test goats for scrapie is to take samples of the brain.

#### What is a genotype?

A genotype is the genetic make-up of an individual. It is comprised of genes that are inherited from the parents for a specific trait.

### What is genotype testing?

Genotype testing involves assessing the differences in the genotypes of individuals. In goats or sheep, this testing can be done by first taking a blood sample or nasal swab from an individual and then performing laboratory tests to determine each individual's DNA sequence. In the case of goats, a genotype test is used to assess the prion protein (PrP) gene to determine the genetic susceptibility or resistance to scrapie. A genotype test will NOT tell us if an individual has scrapie disease.

#### How long will it be before a genotype test is used in an outbreak?

A connection between specific genetics and related scrapie resistance has been identified in goats based on samples from the two scrapie positive herds in Ontario. However, there is no international consensus at this time as to what genotypes confer resistance as other genetic markers have been identified in goat scrapie cases from other countries. Any genotype test must be validated for the specific scrapie genetics found in goats in Canada. While research is ongoing, it is uncertain as to if or when this test could be accepted for use by the CFIA. Use of genotype testing in scrapie disease control programs is a relatively recent advance and was only approved by the CFIA for use in sheep in Canada in 2004.

### What is the scrapie disease control protocol that CFIA follows?

When a scrapie-positive test result is confirmed by the CFIA, immediate science-based internationally recognized "stamping out" disease control actions are initiated and normally include some or all of the following:

- Strict guarantine and animal movement controls to prevent spread;
- Investigation of potentially infected or high-risk animals that could potentially spread the disease to new premises and investigation of all potential source farms;
- Humane destruction and disposal of all infected and at-risk animals with compensation;
- Strict cleaning and disinfection of the infected premises; and
- Follow-up active surveillance requirement.

#### What happens if my herd is diagnosed with scrapie?

Please refer to the following website for the info sheet "Scrapie- what to expect if your animals may be infected" (also available at your local CFIA office).

http://www.inspection.gc.ca/animals/terrestrial-animals/diseases/reportable/scrapie/if-your-animalsmay-be-infected/eng/1355963623752/1355963789207

#### How is scrapie treated?

There is no treatment or vaccine currently available worldwide. The disease does not cause an immune response in the infected animal, therefore vaccination is not an option.

#### Is there compensation available from the government?

Under the *Health of Animals Act*, the CFIA may compensate goat producers for animals ordered destroyed during disease response situations. Compensation is not provided for the cleaning and disinfection of farm premises. More details about compensation can be found online or at your local CFIA office:

### http://www.inspection.gc.ca/animals/terrestrialanimals/diseases/compensation/eng/1313712524829/1313712773700

### What can I do to protect my farm and animals?

It is important that you record all animals coming onto, born and leaving the farm. Records should include the source of the animals, when they were purchased, animal identification (tattoo, ear tag/neck chain/leg band number), breed, age, and birth dates. Only purchase animals from herds with a known health status equal to or greater than your own. It is also important that you work closely with your herd veterinarian to investigate animal health concerns. Best management practices should be implemented for:

- Prompt isolation of sick animals;
- Separation of females giving birth;
- Increased cleanliness of the maternity area; and
- Disinfection of equipment between animals.

While scrapie is a concern today, goat producers need to be aware of other production limiting diseases that will affect their herd and implement good biosecurity practices. *The National Farm-Level Biosecurity Standard for the Goat Industry* is a good source of information. Copies of this resource have been previously distributed to Ontario goat farmers by Ontario Goat and can also be found at: <a href="http://www.inspection.gc.ca/animals/terrestrial-animals/biosecurity/standards-and-principles/goat-industry/eng/1367131154680/136713123133">http://www.inspection.gc.ca/animals/terrestrial-animals/biosecurity/standards-and-principles/goat-industry/eng/1367131154680/136713123133</a>

#### Why is scrapie considered a reportable disease?

In Canada, scrapie has been a federally reportable disease since 1945 and, under the *Health of Animals Act*, all owners and veterinarians must notify the CFIA of suspected cases of scrapie. In turn, the CFIA is responsible for notifying the World Organization for Animal Health (OIE) of all cases of scrapie.

As scrapie is an OIE listed disease, Canada has international and trade obligations to respond to scrapieinfected goat herds and sheep flocks. To remain competitive and ensure the long-term sustainability of the Canadian small ruminant industry, the CFIA instituted a national scrapie eradication program with industry support in 2005. This serves to protect the health of the national sheep flock and goat herd, thereby reducing the economic and animal health impacts of scrapie.

## As a producer involved with a reportable disease investigation, how does CFIA protect my personal information?

As directed by the *Privacy Act* and other federal statutes, the CFIA is required to protect private information collected. Any information provided by you during a disease response situation is treated as confidential, unless otherwise indicated.

Ontario Goat also respects the privacy of its members during disease investigations and will respect the protocols as set out by the *Privacy Act*. Ontario Goat is never made aware, by CFIA or OMAFRA, of the names or locations of the farms as part of the disease investigation, unless the farmer notifies Ontario Goat directly.

## Why don't we know the county in which the scrapie infected farms are located like other disease reports (eg. PEDv)?

Scrapie is a federally reportable disease versus an emerging infectious disease like Porcine Epidemic Diarrhea virus (PEDv). While scrapie is an infectious disease, it is not highly contagious like PEDv or

spread through the same pathways as PEDv. PEDv is not a federally reportable disease and was managed by OMAFRA with the swine industry.

#### How many goat farms have had scrapie in Ontario?

At present (February 2016), two commercial goat operations have been confirmed with scrapie disease in their herds. There have also been a number of lifestyle farms with goats confirmed with scrapie. As a result of the positive scrapie tests, the CFIA has conducted an extensive investigation looking at animals moving both in and out of the infected farms.

#### What is Ontario Goat doing to help goat farmers?

As a first step towards potentially eliminating scrapie susceptibility in the provincial goat herd, Ontario Goat has partnered with the Centre of Excellence for Goat Research & Innovation and Trent University to test goat breeds and herds for genotypes that may indicate resistance or susceptibility to scrapie disease. This new project will build on findings from a previous scrapie disease study looking at infected and unaffected goats involved in the two recent Ontario scrapie disease outbreaks.

#### Why doesn't the goat industry have mandatory animal identification and traceability?

The CFIA is currently proposing enhanced regulations for the livestock industry that will include the goat sector and will address animal identification, animal movement and traceability. There currently is not an approved animal identification protocol for use in the goat industry. Ontario Goat continues to work with CFIA to ensure that the needs of the Ontario goat industry are addressed in a proactive, cost effective manner.

#### FOR MORE INFORMATION:

Ontario Goat info@livestockalliance.ca 1-866-311-6422 www.ontariogoat.ca

#### **Canadian Food Inspection Agency**

www.inspection.gc.ca 1-800-442-2342 Or contact your local CFIA district office

Scrapie Canada www.scrapiecanada.ca 1-866-534-1302

## ACTIVITY #2 BREEDING FOR SCRAPIE RESISTANCE

	Time: 20 minutes	The workbook on the next page provides a fun activity to
		outline the possibility of breeding for scrapie resistance. Get
DO	Materials	members to work through the material in small groups or as
	needed:	a club.
	Worksheets	
		The objective is to introduce punnet squares and their
REFLECT		importance.
		How might you use a punnet square in the future?
	Discuss the	
	following	Some genetics do not follow simple inheritance as defined
APPLY	prompts as a	in the activity and are influenced by multiple factors. How
	group	might we use selection indexes and genomics to breed for
		those traits?

## **Breeding for Scrapie Resistance**

## **Background:**

- Scrapie is a serious disease in small ruminants that cannot be cured, so it's very important that we reduce the risk of goats getting sick from this disease.
- The risk of goats being infected with Scrapie is controlled by variations (alleles) in the Prion Protein gene (*PrP*). Scientists have found that the K allele is a resistance allele that protects goats from Scrapie, while the Q allele puts them at risk of Scrapie. So, one way to reduce the risk of Scrapie in the herd, is to breed for this trait.
- Goats have two copies of every gene, one from their sire and one from their dam.
  - The allele they receive from a parent is random, like a flip of a coin!
  - Some goats will have the same version of a gene from both parents (e.g., KK or QQ) these animals are known as *homozygotes*. Others will have different versions from each parent, these animals are *heterozygotes* (e.g., KQ).
- The combinations of letters in the animal's genetic code (*genotype*) determine how protected they are from becoming sick from Scrapie (*phenotype*). The possible genotypes (letters) and phenotypes (risk of Scrapie) are shown below.
- We can use a tool called a **Punnett Square** to figure out how likely an offspring is to be
  protected from Scrapie, if we know the genotypes of the parents we would like to mate.



## The Challenge:

- A neighbour would like to breed for scrapie resistance in their goat herd. They have done genetic testing on their does and know that half are At Risk of Scrapie (QQ), and, luckily, half are at an Intermediate Risk (KQ).
- The neighbour has the option between purchasing two bucks:
  - 1. **Buck A** Protected from Scrapie (**KK**), but very expensive.
  - 2. Buck B Intermediate protection from Scrapie (KQ), but less expensive.
- Use the Punnett Square tool on the following pages to determine the expected phenotypes of offspring from the two bucks and answer these questions:
  - 1. Would the choice of buck impact the expected protection of offspring from Scrapie?
  - 2. Which buck would you recommend to the neighbour? Would your answer change if the herd only had At Risk does?

Created by: Erin Massender, Acting Small Ruminant Specialist, OMAFRA; Ph.D. Candidate in Goat Genetics, University of Guelph

## How to Use a Punnett Square

- 1. Pick the parents you would like to breed and write the parents' alleles (the letters of their genotype) for the trait on the outside (shaded) boxes of the square.
- Match up the sire and dam alleles for each of the four blank boxes of the square and write the offspring genotype. Note: the order of the letters doesn't matter, KQ and QK genotypes are the same.
- 3. Use what you know about Scrapie genotypes to determine how likely the offspring is to be protected from Scrapie. Write the phenotype below the genotype in the box.
- 4. Add up all the identical boxes to determine the proportion of offspring with a given phenotype. **Hint:** each box represents a 1 in 4 (25%) chance of a given phenotype.

Sire Genotyne:	KQ	Sire Allele 1	Sire Allele 2
Dam Genotype:	KQ	к	Q
Possible Offspring Genotypes:	Dam Allele 1	KK	QK
25% KK: 50% KQ: 25% QQ	— К	Protected	Intermediate
Possible Offspring Phenotypes: 25% Protected: 50% Intermed	Dam Allele 2	KQ	QQ
25% At Risk	Q	Intermediate	At Risk

Did You Know?	Dread	Frequency of Genotypes		
	breed	KK	KQ	QQ
Research has shown that the frequency of the protective alleles for Scrapie vary by country and	Alpine	<1%	12-14%	88-86%
The percentage of the population protected from	Saanen	<1%	2-8%	92-98%
Scrapie is high in some breeds (like Boer) and low in many dairy breeds.	Toggenburg	0-9%	4-42%	50-96%
What impact would this have on selection as a strategy to protect animals from Scrapie in	Boer	6-10%	37-43%	48-57%
strategy to protect animals from Scrapie in different breeds?	Source: Migliore, S., R. Population: Has the	Puleio, and G.R. L Last Gap B	oria. (2020) Scrapie ( een Overcome?	Control in EU Front Vet

## How to Use a Punnett Square

- Pick the parents you would like to breed and write the parents' alleles (the letters of their genotype) for the trait on the outside (shaded) boxes of the square.
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Sire Genotype:	KQ	Sire Allele 1	Sire Allele 2
Dam Genotype:	KQ	к	Q
Possible Offspring Genotypes:	Dam Allele 1	КК	QK
25% KK: 50% KQ: 25% QQ	- K	Protected	Intermediate
Possible Offspring Phenotypes: 25% Protected: 50% Intermedia	Dam Allele 2	KQ	QQ
25% At Risk	Q	Intermediate	At Risk

<b>KK</b>	KQ	QQ
<1%	an adde	
	12-14%	88-86%
<1%	2-8%	92-98%
rg 0-9%	4-42%	50-96%
6-10%	37-43%	48-57%
5	6-10% S., R. Puleio, and G.R. / s the Last Gap	6-10% 37-43% S., R. Puleio, and G.R. Loria. (2020) Scrapie ( s the Last Gap Been Overcome?

# **Scrapie Punnett Square Activity**

Sire Allele 1 K Dam Allele 1 K Dam Allele 2 Q

Buck A (KK)

	Sire Allele 1	Sire Allele 2
	K	K
Dam Allele 1		
Q		
Dam Allele 2		
Q		
_		

Buck A - Offspring Genotypes & Phenotypes:

KQ Dams

QQ Dams

Buck B (KQ)





Buck B - Offspring Genotypes & Phenotypes: *KQ Dams* 

QQ Dams



Intermediate Intermediate

Intermediate Intermediate

50% KK: 50% KQ

50% Protected: 50% Intermediate

100% KQ

100% Intermediate

KQ

KQ

Buck A - Offspring Genotypes & Phenotypes:

## **Punnett Square Answer Key**



Buck B (KQ)

Sire Allele 2

Q

QK

Intermediate

QQ

At Risk

Sire Allele 1

KK

Protected

KQ

Intermediate

κ

Dam

Allele 1

κ

Dam

Allele 2

Q

Dam

Allele 2

Q

KQ Dams

**QQ** Dams

## **MEETING 6 – SHOWING**

## **Setting Objectives**

To introduce the topic of showing goats to youth so they may learn the rules and how they may differ from other livestock shows.

Suggested Lesson Outcomes

- $\hfill\square$  To introduce the different parts of the goat show.
- $\hfill\square$  To demonstrate how to properly set up your animal

## **Suggested Roll Call Questions:**

- What is your favourite part of a goat show?
- What is one thing you should bring to a goat show?

## Sample Meeting Agenda Time: 2 Hours

Welcome, call to order, pledge		10 minutes
Roll call		10 minutes
Parliamentary procedure	Minutes and Business	10-15 minutes
Topic Information Discussion	Controlling Feed and Other Costs	20 minutes
Activities Related to Topic	Activity #1- Return over Feed	60 minutes
Wrap up, Social time and		10 minutes
adjournment		

## **Topic Information - Goat Show Basics**

## Preparation

Weeks before the show:

- Ensure that the goat has been fed well so that they have good condition.
- Trim feet so they are the correct shape and to allow goats to walk comfortably.
- Brush the goat regularly to remove hair and dandruff.
- Handle the goat and practice, practice, practice!

A few days before the show:

- Bathe the goat with warm water and soap (if the weather is nice).
- Make sure that the goat is dry before returning the goat to a cool area.
- You may choose to clip the goat if your breed type explains that is a recommended practice but ensure that the weather is not too cold. Additionally, do not clip the end of the tail.

### Do it!

Get an experienced clipper or fitter and prepare the goat for the show. You may use other materials contained in this manual or find online resources to answer any questions you may have!

## Collars

Make sure that you have a well-fitting collar for the goat. It should be a narrow leather collar, a chain collar, or a plastic collar. A narrow collar or chain is better as it is not very noticeable and helps to show off the goat's long neck to the judge. Be sure that the collar fits properly (not so loose that is slips off over the head and not so tight that you can't hold it comfortably). However, no matter which collar type you select: be sure that the collar won't break when showing.

## **Show Attire**

Make sure that you have clean, clothes to wear in the showring. General tradition is that white clothes are to be worn when showing dairy animals. Meat and mohair shows often ask for a darker pant with a button-down shirt. However, shows will often tell you what their show requirements are far in advance and if you are unsure, please ask!

Additionally, make a checklist of all the things needed on show day. This will ensure you do not forget anything and that you bring everything that you might need to the show.

## What Happens in the Show Ring (the basics)?

Good showmanship is an art. It takes a great deal of work to be skillful in the showring. With work, you can learn to be excellent at showing:

When you bring the goat into the ring, the judge will probably ask you to circle and walk in a clockwise direction.

## Do it!

You might practice deciding which way is clockwise and counter clockwise so that you don't get confused by these terms when you hear them.



The judge will ask the class to stop and line up in certain ways from time to time:

A head-to-tail line-up means that the goats are standing in a line one after the other.

GOATS FACING IN SAME DIRECTION IN A HEAD-TO-TAIL LINE-UP. A **side-by-side line-up** has goats standing side by side facing in the same direction. The judge will always indicate which way he/she wants the goats to be facing.



When a judge asks the class to stop (either in one of the line-up types or in the circle), quickly set your goat up into a show stance that will best show its good points. If there are any low spots in your area of the ring, move to an area where the ground is more even OR position the goat so that its front feet are on a rise. Never stand a goat with its front feet lower that its rear feet. A good exhibitor will always find a good spot in the ring to best show off the goat.

Always keep the goat between yourself and the judge. When you must change sides, change hands on the collar and step across in front of your goat. Never try to cross behind — it looks clumsy, is not proper and the goat could get away from you.





Lead the goat at a comfortable speed. Do not jerk and pull on the collar. Hold the head up slightly, but do not bend it up into an unnatural position.





Pose your animal quickly and neatly when you are asked to stop. Do not fuss with it once it is into position. Don't overstretch the goat into an unnatural show stand. This is a very common mistake made by many exhibitors. When the goat is in position, stand on the opposite aide of it away from the judge. You may squat if you have control, but don't put your knees on the ground.

The judge may ask you to exchange animals during the class (if the class is showmanship related). The judge will do this to see how well each exhibitor can handle an unfamiliar goat. Do your very best to show any goat given to you. The judge may also ask you what the strengths and/or weaknesses are of the goat you have been asked to show. Be ready by quickly examining the goat as soon as you begin showing it.

Be courteous to other exhibitors. Don't chat with others when in the ring. If you are distracted, you will miss instructions or forget to switch sides as the judge moves about the ring. Be sure to hold the goat properly when the judge wishes to check the ears, mouth, udder, etc. When the judge is examining the teeth or ears, hold its collar firmly and place your leg across in front of the chest so that it cannot leap forward or up.



When showing a large goat, it is often easier to set up its legs by having the goat step back into a good position. Do this by gently pressing two or three fingers into the spot where the front leg meets its chest. The goat will move that leg back a little. By gently doing this once or twice, you can get the animal to position itself without having to lift and place its feet. This is also a good technique to use if you are asked to show a goat that kicks when you touch its legs while setting it up. However, this can often be avoided by ensuring practice schedules are maintained.

Always show the goat at its best in the showring and not just while the judge appears to be watching you. When the placings are finally made, keep the goat well posed as the judge gives the reasons for the class. Do not leave the ring until the placings are read or the exhibitors are excused. Whatever the outcome of the class, be courteous to your fellow competitors. Be sure to congratulate the winner!

## What is a Judge Looking for in a Showmanship Class?

Here are the main things that a judge watches for during a showmanship class.

- Exhibitor always paying attention to the judge.
- Exhibitor always aware of where the judge is in the showring.
- Exhibitor quickly getting the goat set up into position without fussing around too much.
- Exhibitor showing the goat in a way that emphasizes the goat's best points while downplaying the weak points.
- Exhibitor always courteous to other competitors.
- Exhibitor is knowledgeable and knows all the parts of the goat if asked.
- Exhibitor can recognize strong and weak points on any goat given to him/her to show.
- Exhibitor always has control of the goat.
- Exhibitor knows the proper manoeuvres when in the showring (a manoeuvre is a special way of moving an animal around the ring you should learn to do these properly).
- Exhibitor has properly prepared the goat for the class and the goat is spotlessly clean and well-behaved.

## **Advanced Techniques**

As a part of the class, a judge may ask you to do certain techniques that may be new to you. These include:

## Walking Two Goats Out of a Line Side by Side

The most difficult manoeuvre happens when a judge asks two exhibitors in a side-by-side lineup to walk forward out of the line for a distance and then return to the line. While moving the two goats through this manoeuvre, the exhibitors should be sure to keep the goats close to one another (about one metre apart). This is because the judge wants to compare the two goats while they are walking away from, and back towards the line. If they are several feet apart, the judge cannot compare them properly. Both exhibitors should try to keep them moving at about the same speed so that they are side by side throughout the whole manoeuvre. ALSO, do not make too tight a turn at each end of manoeuvre. The judge will want to see a gentle turn that does not put stress on the hind legs as it turns.



Moving into Another Position in a Side-By-Side Line-Up

Another difficult manoeuvre takes place when the judge asks one exhibitor to move a goat to a new place in a line-up. If the judge is standing ahead of the line, the goat should be led forward out of the line, then led out across in front of the line. The goat should then be led through the line in the space where it has been indicated that it should move to. Once past the line, the exhibitor should make a smooth circle behind the line and come back into the line in the new position.



Another variation of this manoeuvre occurs when the judge is standing behind the line and ask for the same manoeuvre. The exhibitor should lead the goat forward a few steps and then come back through the line, then turn and go across the back of the line until coming to the new position. The exhibitor then turns the goat into the new position and sets it up.



Moving to a New Position in a Head-to-Tail Line-Up

The exhibitor is asked to move the goat up or down the line into a new position. When the exhibitor is moving up in the line-up, he/she should lead forward out of the line on the side of the line that the judge is standing on. The goat is then led up the line into the new position and placed in that spot. If the exhibitor is moving a goat down the line towards the end, he/she should circle out and back towards the end of the line and come around into the new position.



## Why are the Techniques Important?

When a judge asks an exhibitor to move a goat in a line-up, he or she is watching for something important. The judge not only wants to watch how the exhibitor does the move, but also wants to see if the other exhibitors are courteous and make room for the goat in the new position. Exhibitors on either side of the new position should ensure that there will be a big enough space for the exhibitor to take the goat into. This may require some careful movement in the line. All movements should be made with a minimum of fussing and noise.

## ACTIVITY #1 HAVE A PRACTICE SHOW!

	Time: 30 minutes	Ask a leader or senior member to serve as the judge. Get	
		them to go through the different potential requirements at a	
	Materials	goat show and explain the practice.	
	needed: Goat,		
DO	show materials.	You can also ask a senior member to explain the material	
		presented in the previous topic information section to allow	
		members to become more familiar with the material. This	
		explanation can be done by practicing the specific maneuver	
		as would happen in a goat show.	
		The objective is to give newer members the opportunity to	
NEFLECT		learn more about showing.	
		How might you use this practice in a show?	
	Discuss the		
ΛΙΟΟΛ	following	On a scale of 1-10 how comfortable are you with showing?	
AFFLI	prompts as a		
	group	What is the biggest thing you are taking with you?	
## **Topic Information -Setting Up your Show Animal**

## **Clipping a Goat**

Some breeders clip their goats in the spring to get rid of long hair that could be hiding external parasites on the goat's skin. With production systems today this practice is not as common, but this activity is still done today for goat shows.

## **Tools and Equipment**

- a set of electric livestock clippers (with clipping blades and not sheep shearing blades).
- light machine oil to oil the blades.
- an extension cord (if necessary).

## How to Clip

Tie the goat up in a way which will prevent it from moving around. This can be done by clipping the goat's collar to a tie-up ring placed on the wall about 1/2 metre above floor level. Some people prefer to clip goats while they are on a milking stand. The milking stand should be very steady and secure so that it won't tip over if the goat misbehaves.

Get your clippers ready and adjusted properly. Be sure that the blades are clean. Most clippers have an adjusting screw that holds the blades in place. This should be turned until it begins to tighten and then turned back about a quarter of a turn. If it is too tight, it will make the blades press too hard together and wear them out and strain the electric motor.

Squirt a generous amount of oil onto the clipper blades before you turn them on. Also drip oil into the little holes marked "OIL" that should be located on the clipper head near the blades. Check to make sure that there are no pieces of hair clogging the little screen that is located near the back of the blades. This screen allows air to go into the clippers to cool the motor. If pieces of hair clog up this screen, the motor will overheat and burn out. CHECK THE SCREEN every few minutes while you clip. It gets clogged very quickly!

When everything is ready, turn the clippers on. Let them run for a few seconds so that the goat gets used to the noise.

Begin clipping the goat. You should clip against the direction of the hair growth (see diagram above). Hold the clippers almost parallel to the goat's skin. Don't "dig in" towards the skin with the blades. The clippers work best when the bottom blade is resting against the skin as it cuts. Use long, continuous strokes as you clip. This will give a better "finish" to your clipping job. Short strokes will give a patchy look to the goat's hair — especially on a black-colored goat.

Clip the body of the goat. Clip the legs. Be sure that you clip cleanly from the knees and hocks down to the feet. Clip the tail smooth BUT leave a little tuft of hair on the tip. Carefully clip the udder (some people even keep a smaller set of fine clippers for clipping udders — but this is not a necessity). It is usually best to leave the goat's head until last. The head should be carefully clipped as much as possible. Do not clip off eyelashes or hair close to the eyes (eyelashes prevent dust and dirt from getting in goat's eyes). Most people clip the long hair that grows out of the ears. This can be done by pressing the ear shut flat and then trimming hair that sticks out of the shut ear (this will leave ample hair inside the ear to prevent dust from going down into the ears).

When you are all finished, treat any small nicks with a little bit of wound ointment (but if you were careful, there should not be any cuts).

## **SECTION 5: BUSINESS AND MARKETING**



# MEETING 1 – FINANCIAL MANAGEMENT

## **Setting Objectives**

To identify the importance of proper financial management, budgeting and the importance of minimizing costs while maximizing production.

Suggested Lesson Outcomes

- $\hfill\square$  To identify the components that make up a good budget.
- $\hfill\square$  To compare personal and business budgets.
- □ To explain the role of costs and to identify the different costs associated v the various types of goat farming.

## Suggested Roll Call Questions:

- How do you spend, save and give money?
- What are some of the ways that you or your parents use money in your every day lives?

## Sample Meeting Agenda Time: 2 Hours

Welcome, call to order, pledge		10 minutes
Roll call		10 minutes
Parliamentary procedure	Introductions, Elections and Business	20 minutes
	New Executive:	
	President	
	Vice President	
	Secretary	
	Press Reporter	
Topic Information Discussion	Budgeting and Financial Management	20 minutes
	Basics	
Activities Related to Topic	Activity #1- Personal Budgets and Farm	30 minutes
	Budgets	
Presentations from Previous	Costs of Production	20 minutes
Meeting		
Wrap up, Social time and		10 minutes
adjournment		

## **Topic Information- Budgeting and Financial Management Basics**

(Adapted from the 4-H Dairy Project)

## Budgets

The topic of budgeting should be the first item that is ever brought up when discussing a successful business. Operating a farm is no different and involves managing the same factors that most other businesses need to manage.

## Experience It!

Invite an accountant that is familiar with accounting for farm businesses to discuss proper book-keeping for farms. Find out why the accountant chose the career they have and what their day-to-day job looks like. A budget is a plan. It is how you are going to use the money that you have in order to accomplish what you want. This plan can include saving (maybe for a rainy day, or a big purchase), to purchase something you want or to support your needs (food, clothing, housing, etc.). Businesses must also make many of these same decisions including feed costs, veterinary bills, housing, equipment, electricity, among other items. By comparing the budget to the actual cost of the expenses, farmers can track their spending throughout the year and ensure that they do not take on debt.

## **Financial Documents**

Farmers (or their financial representatives) are responsible for maintaining two financial documents when analyzing their finances. These include the:

## Explain it!

Debt is not always a bad thing. There are many good forms of debt that allow farmers to use their current business assets to support larger purchases. These purchases may not have been possible otherwise. If farmers pay these off, they often do not accumulate and can improve the farm business faster than if no money was borrowed. However, bad debt includes mismanaged bills and items that are not paid on time which rack up large amounts of interest. Interest is the amount of money that banks, and other lending agencies charge for their money and can build up fast if not controlled.

Financial Statement: Shows what is owned and owed (the 2 O's), by the business at the time when the document was drafted. Owned items (i.e. tractors, equipment, feed, land) are considered assets while money owed to purchase items are considered liabilities.

Farm Income Statement: Ensuring that a farm remains profitable is very important for the viability of a business. Everything that the farm sells (i.e. crops, livestock, food products like eggs, milk or meat, custom work) is referred to as "revenue", while everything that is spent is termed "expenses". For example, feed, seed, herbicides, electricity, maintenance, interest, etc. The calculation of revenue – expenses = profit is a great equation to determine how the farm did in that particular time frame and can be useful when developing a budget.

### **Debts and Loans**

As mentioned previously, not all debt is bad. Money may be borrowed from the bank, another person, a lending institution, or a government organization. When money is borrowed, that is called a loan, and these can be long or short term in duration. A mortgage on a farm is spread over many years and is referred to as a long-term loan. In contrast, a loan that a farmer gets to help pay to plant his or her crop is a short-term (or operation) loan because it will be repaid in a few months when the crop is sold.

## Check It Out!

For samples on how to create income statements and other important financial documents, OMAFRA has a great online calculator (Ontario Farm Accounting Workbook) available on their website.

### **Experience It!**

Invite an agricultural bank account manager to your meeting to discuss what they look for from farmers that are seeking a loan. Find out why the agricultural bank account manager chose the career they have and what their day-to-day job looks like.

#### Savings

Along with debt and loans, there may also be savings on farm. This is often money that is kept away for larger purchases or to support future hardship. This money helps soften rough years and allow farms to continue when there may not be the finances to do so.

#### Insurance

All farms should have insurance. Insurance is money that you pay voluntarily in case something happens. What if a drought damaged all your crops? What if you lost your barn in a fire?

Purchasing insurance provides peace of mind and should ensure that if something happens to your farm or animals you will receive compensation to fix it. You need to figure out how much and what types of insurance you need. This is one area where it is important to ask experts, such as insurance brokers, for advice. You may want to examine deductibles and what the insurance covers.

## ACTIVITY #1 PERSONAL BUDGETS AND FARM BUDGETS

	Time: 30 minutes	Ask members to explain what a budget is and why it is
		important. Ask members to define:
	Materials	
	needed: paper	• Savings
	and pencil	• Income
		• Expenses
		Ask members to create a budget for themselves that includes
		items that they might want to buy and come up with a
		list of their monthly income (could be allowance or a job
		they might have) and their expenses (school lunch, toys or
		gifts). From this list, members can see where their money is
		currently going and how they might save more to get what
DO		they want.
		NOTE: This activity is primarily for older members so you
		may want to create a scenario for younger members to
		understand the importance around potentially getting a new
		club banner or other 4-H item.
		Now, as a group, brainstorm some ways that a goat farm
		can make money (this might be from fiber, meat, milk or
		from selling some of their goats). Next get members to list
		the expenses (such as feed, electricity, housing, equipment,
		veterinary costs). Explain that the farm business is like a
		scale. Expenses cannot be higher than income, otherwise the
		lann will be in debt.
		The objective is to learn the importance of budgeting and to
REFLECT		learn about the ways expenses and revenue contribute to
		the farm business.
	Discuss the	What are ways that you might use these budgeting principles
	following	in your life?
APPLY	prompts as a	
	group	Ask members ways they might think of to (1) Increase
		income/revenue, (2) Decrease expenses on a farm operation

## **Topic Information- The Goat Business**

Factors that affect cost of production are important to categorize to understand how farm budgets can be influenced. The following pages provide some helpful handouts from Ontario Goat that explain some consideration that make up the goat business.

There are also tools that exist that will be used in future meetings including the Dairy Goat Herd Enterprise Budget. These tools will be placed in the 4-H Goat Online Portal but will also be included in the next meeting.

## Discuss it!

Ask members to read over the handouts and break down what they think are the highest to the least expenses. The sheet from OMAFRA breaks down the cost of production by feed cost (highest) and the following list:

Total Feed Costs			322.42
	Head	\$/Head	\$/Doe
Livestock Replacement			
Buck Purchase	3	400	3.00
Buck Lease	0	0	0.00
Milking Doe Purchase	. 0	0	0.00
Replacement Doe Purchase	0	0	0.00
Other - Description	0	0	0.00
	Use \$/doe 0	S/Year colu	mn
	\$/Doe	400 Does	\$/Doe
abour	53.00		53.00
Veterinany & Medicine	19.39	-	18 39
Breeding Costs	3.66	1	3 65
Bedding	. 0.00	1	0.00
Marketing & Transportation	57.74	-	57.74
Itilities	34.93		34 93
Livestock Supplies	28.03		28.03
Custom Work Manure Handling	g 32,68	1	32.68
Tags			0.00
Miscellaneous			0.00
Fuel			0.00
Mach, Repair & Maint,	13.50		13.50
Bidg and Fence Repair & Maint.	24.09		24.09
Equip/Land Rent	The State of the S	1	0.00
General Variable Costs	16.65		16.65
(including professional fees, once, venic	cie expenses ercj		
interest on %int	%year		100
Operating Capital 4.95	20		4.96
Total Variable Costs			613.04
	Use S/doe C Typical	S/Year colu S/Year	imn
ixed Costs:	\$/Doe	400 Does	\$/Doe
Depreciation	102,82		102.82
Interest on building and machinery investment	t 31.41		31.41
Long-term Leases	1		0.00
General Fixed Costs**	39.42	1	39.42
"(including property taxes, fire and liability	y insurance etc)	-	
Total Fixed Costs	and the second second		173.65



# So You Want to be a Goat Farmer

## **Commercial Dairy Goat Farming**

Deciding to become a commercial dairy goat farmer takes a lot of thought and planning. This fact sheet will help answer some of your questions and guide you in the right direction to learn more. A commercial dairy goat farm is a farm that profits from the sale of goat milk.

#### Who is Ontario Goat?

Ontario Goat (OG) is a united producer organization proudly representing Ontario's dairy, meat and fibre sectors. OG is dedicated to enhancing the goat industry through education, collaboration, innovation and strategic alliances. OG represents Ontario's goat producers with an organization focused on sustainable growth, industry development and profitability, for all sectors of the industry to reach their full potential. OG is governed by a Board of Directors of nine elected producers and works to advance the goat industry through lobbying and government relations, research and industry development, consumer marketing and promotions, communications, and organizational development.

#### How do I get started as a commercial dairy goat farmer?

If you do not have previous goat experience the best place to start is to volunteer at an established dairy goat farm. This will give you an idea of whether or not goats are right for you. Goats as a hobby are very different than a herd of milking goats. Working on a commercial dairy goat farm will not only give you experience but you will learn first-hand the amount of work involved with caring for a herd of milking goats, especially at kidding time.

#### Do I need a business plan?

As with any new business you need develop a business plan. This process will help you think about what you really want to achieve. The business plan should include asking yourself the following questions:

What is your strategy?

What is your marketing plan?

What do you need to get started?

What is your vision for your business?

- What are your goals, what do you want to achieve?
- What is your risk management tolerance?
- How do you plan to achieve your plan?

## Insurance

It is important to contact an insurance broker before beginning to milk to ensure you and the farm are adequately prepared in the event of an unforeseen incidence. Ask if your broker offers a dairy specific package.

#### Can I be a full-time dairy goat farmer?

In order to be a full-time dairy goat farmer with no other off-farm income there are a lot of points to consider and the best place to start is by determining cost of production. This will help you determine if there will be income over the cost of production. By crunching the numbers you will know if you can afford to be a full-time dairy goat farmer.

#### How do I market the milk?

In order to market fluid goat milk you must first receive Grade A status from the Ontario Ministry of Agriculture Food and Rural Affairs (OMAFRA) and have one of the following: an agreement with one of the brokers of milk, a direct contract with a licensed processing plant or be a licensed processing plant. Geographic location may be a factor; it depends on established milk truck routes.

An OMAFRA inspector will visit your farm to ensure you are complying with the *Milk Act*. This act outlines practices that are important for ensuring you are producing safe, high quality milk. The inspector will look at your milk house, milk house waste, cooling equipment, milking procedure, milking equipment, livestock housing and care, and other important factors influencing milk quality and food safety. If your facility is not certified or any load of milk is not Grade A quality, it will not be collected and must be disposed of by the producer. Your facility must be inspected prior to the startup of a new operation and on an ongoing basis. Detailed requirements and points of inspection can be found on OMAFRA's website: <u>http://www.omafra.gov.on.ca/english/food/inspection/dairy/page-1.htm#3</u>.

It is advisable to contact the Dairy Food Safety Program at OMAFRA in the Food Inspection Branch at 519-826-4583 to arrange an on-farm meeting to review the Grade A requirements to milk goats.

For more information about marketing fluid milk contact:

<u>Gay Lea Foods Co-operative Ltd.</u> Hewitts's dairy Ltd. 128 King Street East, P.O. Box 400 Hagersville, ON NOA 1H0 Ontario Dairy Goat Cooperative General Manager Box 71, 5 Industrial Road Teeswater, ON NOG 2SO Office: 519-392-8926

Kevin Weaver, Dairy Goat Industry Advisor Office: 519-644-1881 Cell: 519-615-2311 Email: <u>kweaver@gayleafoods.com</u>

Gerald Townsend, Dairy Goat Industry Advisor Office: 519-848-5527 Cell: 519-820-5736 Email: gtownsend@gayleafoods.com

#### What is the minimum amount of milk required for a pick up?

Goat milk is typically picked up every other day year round except when the minimum of 500 litres is being produced only then it is twice a week pick up, specific details would be discussed with your broker. The average dairy goat produces three litres/day, production fluctuates throughout the goat's milk production cycle, you will need to plan production accordingly.

#### Can I process my own goat milk?

In order to process your own milk and milk products you must have a license to pasteurize your own milk. Any products derived from milk (e.g. cheese and soap) must also be pasteurized.

The sale of unpasteurized milk and milk derived products is illegal in Ontario under the <u>Health Protection</u> <u>and Promotion Act</u>

#### Financing

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In order to proceed, you will need to ensure your financing is in order. Starting a new venture is expensive, consult with a lender experienced in agriculture. It is also recommended to review your business plan with your accountant before beginning. Depending on programs there may be grants available through the <u>Ontario Soil and Crop Improvement Association</u>.

#### Where can I purchase goats?

In order to finalize your contract with one of the brokers a new producer must secure their milking goats. There are a couple of approaches to purchasing goats, including:

- Purchasing goats that are already milking
- Purchasing young doelings, bred or not
- Purchasing registered or grade goats
- Experienced producers recommend purchasing pregnant does/doelings no more than 90 days pregnant or at the time of dry off, especially during the winter months. For additional management information refer to the *Best Management Practices for Commercial Goat Production*.

Whichever route you decide the most important factor before you purchase goats is, what is the disease status of the seller's herd? Your best investment for long-term profitability is proven disease-free goats. A verbal verification that the goats are disease free is **NOT** satisfactory; in order to prove the goats are disease-free the seller must provide a health certificate from their veterinarian proving the status. Purchasing goats with an unknown health status should not even be considered when deciding on where to purchase goats. Once you have diseases in your herd you will not easily eradicate them. It will end up costing more money in the end. Just remember **BUYER BEWARE.** Also refer to *So You Want to be a Goat Farmer: Buying Goats*. Breeder directories are available on Ontario Goat's website.

#### Housing

There are a variety of possibilities available for housing dairy goats. Regardless of the option you choose, one of the most critical aspects to determine, before you purchase the goats, is how many goats your facility can handle comfortably. Each adult animal needs at least  $2.3m^2$  or  $25ft^2$ . To calculate square footage or meterage, measure the length and width of the pen area and multiply those numbers together to determine the pen area in feet or metres squared. It is very important that the pen area is measured in advance of the goat purchase to avoid overcrowding. For further information about housing refer to the *Best Management Practices for Commercial Goat Production*.

#### Do I need a veterinarian?

Before you purchase goats it is advisable to contact a veterinarian specializing in goats to discuss what diseases you should be screening for. You may wish to have the veterinarian perform a health check or take samples for additional testing before you finalize the deal to purchase goats. It is also highly advisable to establish a working relationship with a veterinarian, this is key to the success of your goat farm. The veterinarian along with your nutritionist are part of your farm team to make educated, consistent changes to benefit your herd. The veterinarian will be more up-to-date on your herd health practices and will be able to give a sound diagnosis should any health issues arise. To find a veterinarian specializing in goat production visit the <u>Small Ruminant Veterinarians of Ontario's website</u>.

#### **Feeding and nutrition**

Along with your veterinarian a goat feeding specialist is critical to establishing feeding protocols for your herd. Before purchasing milking goats contact a couple of feed companies to see the type of feeding

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programs they offer and if their protocols fit with your feeding plans. When planning your feed requirements for the year, be sure to stockpile extra feed, especially hay. Goats require a lot of hay and you never want to run out or limit feed hay to goats, because it could affect their health, the function of their rumen and the developing kids if they are pregnant. Keep track of your feed supply during the year to make sure you will have enough feed through the winter months. Also in your planning process ensure there is a reliable source of clean water, watering systems and equipment that are accessible to goats and that are easy to clean, especially in the winter months. For additional management information refer to the *Best Management Practices for Commercial Goat Production*.

#### **Raising young stock**

Ensure you have proper housing for the kids. It should be free of drafts, warm and separate from adult goats. It is important to work with a nutritionist to establish a feeding program for replacement stock. The average feed cost to raise a doeling to breeding age is approximately \$125.00

As part of your fact finding mission into starting a dairy goat farm it is highly recommended to visit as many dairy goat farms as possible. No two dairy goat farms are the same and a lot of valuable information will be learned from each and every visit.

For more information on farming goats refer to:

- Best Management Practices for Commercial Goat Production
- Biosecurity Planning Guide for Canadian Goat Producers
- > National Farm-level Biosecurity Standard for the Goat Industry
- Canadian Goat On-Farm Food Safety Program
- Recommended code of practice for the care and handling of farm animals-Goats
- Recommended code of practice for the care and handling of farm animals-Transportation
- Facts and Figures about Canadian Goat Farming

#### **Ontario Goat**

449 Laird Rd, Unit 12 Guelph, ON N1G 4W1 Tel: 519-824-2942 E-mail: info@livestockalliance.ca www.ontariogoat.ca

Disclaimer:

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## So You Want to be a Goat Farmer

## **Commercial Meat Goat Farming**

Deciding to become a commercial meat goat farmer takes a lot of thought and planning. This fact sheet will help answer some of your questions and guide you in the right direction to learn more. A commercial meat goat farm is a farm that is set up for the purpose of producing meat goats for sale as breeding animals and/or meat.

#### Who is Ontario Goat?

Ontario Goat (OG) is a united producer organization proudly representing Ontario's meat, meat and fibre sectors. OG is dedicated to enhancing the goat industry through education, collaboration, innovation and strategic alliances. OG represents Ontario's goat producers with an organization focused on sustainable growth, industry development and profitability, for all sectors of the industry to reach their full potential. OG is governed by a Board of Directors of nine elected producers and works to advance the goat industry through lobbying and government relations, research and industry development, consumer marketing and promotions, communications, and organizational development.

**How do I get started as a commercial meat goat farmer?** If you do not have previous goat experience the best place to start is to volunteer at an established meat goat farm. This will give you an idea of whether or not goats are right for you. Goats as a hobby are very different than a herd of meat goats. Working on a commercial meat goat farm will not only give you experience but you will learn first-hand the amount of work involved with caring for a herd of goats, especially at kidding time. It is also a good idea to attend industry events, meetings, shows etc. It is a great way to network with producers and learn about the industry.

#### Do I need a business plan?

As with any new business you need to develop a business plan. This process will help you think about what you really want to achieve. The business plan should include asking yourself the following questions:

- What are your goals, what do you want to achieve?
- What is your risk management tolerance?
- How do you plan to achieve your goals?

#### • What is your strategy?

- What is your vision for your business?
- What is your marketing plan?
- What do you need to get started?

#### Can I be a full-time meat goat farmer?

In order to be a full-time meat goat farmer with no other off-farm income there are a lot of points to consider and the best place to start is by determining cost of production. This will help you determine if there will be income over the cost of production. By crunching the numbers you will know if you can afford to be a full-time meat goat farmer.

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#### Marketing

As a goat farmer you want to plan breeding in advance. Producers should be aware of their customers' religious holidays and customs, which may require changes in breeding, feeding and management. For example, production of goat products in Ontario is seasonal due to a goat's natural breeding cycle. Some producers, in meat goat operations, use management of lighting and hormone regimens to extend breeding cycles. Applying these production techniques can potentially improve profitability on goat farms and allow producers to target religious holidays year round. Please visit our website for your copy of the <u>ethnic holiday calendar</u>.

#### How do I market finished kids?

As a meat goat farmer there are a couple different options to market your finished kids. You can market direct to packer, or you can send finished kids to a sales barn. Another option is to develop a freezer trade business.

A listing of provincially licensed goat plants is available at: http://www.omafra.gov.on.ca/english/food/inspection/maps/TblGoats.htm

## To find a licensed auction market close to you visit <a href="http://www.omafra.gov.on.ca/english/food/inspection/meatinsp/lscsa">http://www.omafra.gov.on.ca/english/food/inspection/meatinsp/lscsa</a> list.htm.

#### How do I develop a freezer trade business?

As a farmer it is your responsibility to know the rules and regulations about selling goats for meat. According to the *Food Safety and Quality Act, 2001 – 3.1 (1&2)* it is illegal to sell a farm slaughtered carcass, part of a farm slaughtered carcass or a farm slaughtered product. It is also illegal to transport or deliver a farm slaughtered carcass, part of a farm slaughtered carcass or a farm slaughtered product 3.1 (1&2). That means you as a farmer are not allowed to slaughter an animal and sell, donate or give it away to a consumer and it also means that it is illegal for a person to transport the animal after it is dead for consumption.

If you are caught slaughtering and selling goat meat in pieces or a whole carcass the fines can be substantial. It is always better to take an order and have the animal processed in an approved licensed slaughter plant. To learn more about the regulations of the Food Safety and Quality Act, 2001 visit http://www.e-laws.gov.on.ca/html/statutes/english/elaws statutes 01f20 e.htm

#### Financing

In order to proceed, you will need to ensure your financing is in order. Starting a new venture is expensive, consult with a lender experienced in agriculture. It is also recommended to review your business plan with your accountant before beginning. Depending on programs there may be grants available through the <u>Ontario Soil and Crop Improvement Association</u>.

May 5, 2015

#### Where can I purchase goats?

Starting with good breeding stock is highly recommended in order to keep diseases under control and to start with a good line of genetics. It is also important to take into consideration what traits you are looking for in a goat. If your intent is to sell breeding stock then papered purebreds of good conformation are a good starting point. If looking to produce fast growing kids for the terminal market then perhaps crossbred, moderate sized does that milk heavy are a better fit. Some traits will be important no matter what you are doing but some traits become more important than others depending on your market. There are a couple of approaches to purchasing goats, including:

- Purchasing registered or grade goats
- Purchasing young doelings, bred or not
- Purchase mature does, bred or not, with or without kids
- Experienced producers recommend purchasing pregnant does/doelings that are no more than 90 days pregnant or at the time of dry off, especially during the winter months. It gives pregnant does time to adjust before kidding. Careful attention should be paid to body condition of pregnant does, poor condition could impact kidding. For additional management information refer to the *Best Management Practices for Commercial Goat Production*.

Whichever route you decide the most important factor before you purchase goats is, what is the disease status of the seller's herd? Your best investment for long-term profitability is proven disease-free goats. A verbal verification that the goats are disease free is **NOT** satisfactory; in order to prove the goats are disease-free the seller must provide a health certificate from their veterinarian proving the status. Purchasing goats with an unknown health status should not even be considered when deciding on where to purchase goats. Once you have diseases in your herd you will not easily eradicate them. It will end up costing more money in the end. Just remember **BUYER BEWARE.** Also refer to *So You Want to be a Goat Farmer: Buying Goats*. Breeder directories are available on Ontario Goat's website.

#### Do I need a veterinarian?

Before you purchase goats it is advisable to contact a veterinarian specializing in goats to discuss what diseases you should be screening for and to develop a parasite control and vaccination program. You may wish to have the veterinarian perform a health check or take samples for additional testing before you finalize the deal to purchase goats. It is also highly advisable to establish a working relationship with a veterinarian, this is key to the success of your goat farm. The veterinarian along with your nutritionist is part of your farm team to make educated, consistent changes to benefit your herd. The veterinarian will be more up-to-date on your herd health practices and will be able to give a sound diagnosis should any health issues arise. To find a veterinarian specializing in goat production visit the <u>Small Ruminant Veterinarians of Ontario's website</u>.

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May 5, 2015

#### **Feeding and nutrition**

Along with your veterinarian a goat feeding specialist is critical to establishing feeding protocols for your herd. Before purchasing meat goats contact a couple of feed companies to see the type of feeding programs they offer and if their protocols fit with your feeding plans and available storage. Where possible work with your nutritionist to utilize the grains and feeds available off the farm, this will help to reduce feed costs. When planning your feed requirements for the year, be sure to stockpile extra feed, especially hay. Goats require a lot of good quality hay and you never want to run out or limit feed hay to goats, because it could affect their health, the function of their rumen and the developing kids if they are pregnant. Feeding good quality hay will help to keep your reduce grain feed costs. Keep track of your feed supply during the year to make sure you will have enough feed through the winter months. Also in your planning process ensure there is a reliable source of clean water, watering systems and equipment that are accessible to goats and that are easy to clean, especially in the winter months. For additional management information refer to the *Best Management Practices for Commercial Goat Production*.

#### **Raising young stock**

Ensure you have proper housing for the kids. It should be free of drafts, warm and well ventilated. It is important to work with a nutritionist to establish a feeding program for replacement stock. The average feed cost to raise a doeling to breeding age is approximately \$125.00

As part of your fact finding mission into starting a commercial meat goat farm it is highly recommended to visit as many meat goat farms as possible, attend as many industry events and meetings as possible. No two meat goat farms are the same and a lot of valuable information will be learned from each and every visit, industry event and meeting attended.

For more information on farming goats refer to:

- Best Management Practices for Commercial Goat Production
- Biosecurity Planning Guide for Canadian Goat Producers
- National Farm-level Biosecurity Standard for the Goat Industry
- Canadian Goat On-Farm Food Safety Program
- Recommended code of practice for the care and handling of farm animals-Goats
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May 5, 2015

# MEETING 2 – EXAMINING FEED COST

## **Setting Objectives**

To identify the ways to evaluate costs and discuss transition planning.

Suggested Lesson Outcomes

□ To conduct return over feed cost (ROFC) calculations and to evaluate the full cost of production (COP).

## Suggested Roll Call Questions:

- What is the biggest cost on a goat farm?
- What are some ways you can save money on your farm?

## Sample Meeting Agenda Time: 2 hours

Welcome, call to order, pledge		10 minutes
Roll call		10 minutes
Parliamentary procedure	Minutes and Business	10-15 minutes
Topic Information Discussion	Controlling Feed and Other Costs	20 minutes
Activities Related to Topic	Activity #1- Return over Feed	60 minutes
Wrap up, Social time and		10 minutes
adjournment		

## **Topic Information - Controlling Feed Costs**

As described at the end of the previous meeting there are several different costs that a farmer must take on when in the goat business.

Variable costs change day to day and month to month, and include:

- Labour
- Veterinary and medicine
- Breeding
- Bedding
- Marketing and transportation of milk or goats
- Utilities (hydro, water)
- Livestock supplies
- Manure handling or other custom work (fieldwork)
- Identification tags
- Fuel
- Mechanical repair and maintenance
- Building or fence repairs
- Equipment expenses
- Land rental
- Other expenses (accountant, office, vehicle expenses)

Fixed costs tend to be:

- Depreciation on assets
- Interest on borrowed money
- Long term leases or rentals
- Property tax
- Insurance costs

However, typically the biggest costs on the farm is the feed that they goat eats (variable cost). That is typically followed by the housing and labor costs.

## Feed Cost

Goats need to eat in order to produce meat, milk, or mohair. Without a proper intake, goats will not meet their protein, energy, or other requirements to be healthy and productive animals. A typical diet for goats is composed of two types of feeds:

- Forages
- Concentrates

Forages are the straw, hays, baleage and silage that farmers typically grow themselves with the option to buy in if they do not do fieldwork or do not have enough inventory. The concentrates are the concentrated (containing high levels) part of the diet containing the various aspects that the goat needs (protein, energy, vitamins, minerals). Forage and concentrate categories can further be separated to include:

- Purchased feed costs
- On-farm feed costs

Farmers must pay for the purchased feed which will have a well-defined value. These are often from mills, elevators, or other farmers. Alternatively, if a feed is produced on farm (such as hay or corn), this feed would still carry value if sold to another farmer. This means that the total feed cost a farmer pays is a combination of the purchased feeds and the value of the on-farm feed that is used in the diet.

## Total Cost = Purchased Cost + On-Farm Feed Value

## Working out the per head cost

When discussing feed, it is often difficult to compare the cost of feed from one farm to another based on the different breeds and number of goats from farm to farm. That is why these numbers are often standardized to the goat level (or per goat) to give a better comparison. To do this you can take the feeding rate and value of each ingredient in the ration and multiply these two together as so. You can also work out a per liter cost or per kg of gain cost.

## Apply it!

For example, if corn is valued at \$300 per metric ton (1000 kg) and there was a 0.2 kg feeding rate in the ration then that means that (\$0.300/kg)\*(0.2 kg) = 6 cents per day for this specific ingredient per head per day.

By calculating out the per head cost for each ingredient and adding that up you can find out how much the cost of the ration is. This will be the topic of the next activity which will explain the process further.

## Comparing the feed cost to production

Milk in Canada is component priced, meaning that instead of getting paid on volume, farmers get paid on kg of each component in their milk (this topic will be covered in depth later). These factors come together to form a blend price that a farmer is paid for their milk.

Similarly in meat and mohair goat breeds, farmers are paid for kg of meat produced or the amount of hair produced. These items have value and can be converted into total value and divided by the total number of goats contributing to the end product. This value can then be compared to the feed cost to get a return over feed cost (ROFC). A ROFC takes into account the biggest expense on farm and when the rest of the costs are subtracted (all costs), you get the total revenue on farm.

## ACTIVITY #1 RETURN OVER FEED

younger and older members together. Get members to	
Materials de coch ster of the attached sheet on their own before	
do each step of the attached sheet on their own before	
needed: Pencil, discussing the prompts below.	
paper, calculator,	
attached sheet If you do this club over multiple years, then you can	
change the numbers or adjust them to better reflect your	
goat species (meat or mohair) or a different milk pricing	
framework.	
You may also use the online OMAFRA calculator to calcula	te
the cost of production and return on investment.	
<b>REFLECT</b> The objective is to go through the process of calculating fe	ed
costs and the return over feed cos calculations.	
Discuss the Part 1:	
following	
prompts as a What is the highest cost in the ration attached?	
group What is the lowest cost?	
what would be the cost of the corn for the whole farm for	
the day?	
Part 2:	
What was the production per goat per day?	
What was the total earnings from the farm? Does this see reasonable?	n
APPLY What would happen if the milk price were to drop? Figure	
out the total earnings if milk was to be valued at \$0.50/hL	
Part 3:	
Subtract the amount of money made from the milk from t	he
feed costs. What is left over? Try that for the \$0.50/ hL pri	ce
as well. How does this change the linancial situation?	_
find costs. How would that effect the better line of the	
farm?	

## **ROFC Worksheet (Dairy)- Answer Key**

## Part 1

Ration Ingredient	Kg AF* per goat	Cost	Cost of Ration
Baleage #1 (68 DM)	0.75 kg	\$0.136/kg	\$0.102
Baleage #2 (64 DM)	0.75 kg	\$0.128/kg	\$0.096
Corn	0.15 kg	\$0.325/kg	\$0.049
Goat Rtn	2.5 kg	\$0.500/kg	\$1.20
	4.15 kg		\$1.45

## Part 2

## Scenario #1

Milk Production	Price of Milk	Revenue from Milk
4.0 L	\$0.90 / L	\$3.60
	Deductions	-\$0.20
		\$3.40

#### Scenario #2

Milk Production	Price of Milk	Revenue from Milk
4.0 L	\$0.50 / L	\$2.00
	Deductions	-\$0.20
		\$1.80

## Part 3

Scenario	Revenue from Milk	Cost of Ration	Total Income
(1)	\$3.40	-\$1.45	\$1.95
(2)	\$1.80	-\$1.45	\$0.35

\*AF= As fed intake is the total intake of a goat with the water weight included. This is in contrast to Dry Matter (DM) which is what the intake of the goat is actually based on.

## **ROFC Worksheet (Dairy)- Answer Key**

## Part 1

Ration Ingredient	Kg AF* per goat	Cost	Cost of Ration
Baleage #1 (68 DM)	0.75 kg	\$0.136/kg	
Baleage #2 (64 DM)	0.75 kg	\$0.128/kg	
Corn	0.15 kg	\$0.325/kg	
Goat Rtn	2.5 kg	\$0.500/kg	

## Part 2

## Scenario #1

Milk Production	Price of Milk	Revenue from Milk
4.0 L	\$0.90 / L	
	Deductions	-\$0.20

### Scenario #2

Milk Production	Price of Milk	Revenue from Milk
4.0 L	\$0.50 / L	
	Deductions	-\$0.20

### Part 3

Scenario	Revenue from Milk	Cost of Ration	Total Income
(1)			
(2)			

\*AF= As fed intake is the total intake of a goat with the water weight included. This is in contrast to Dry Matter (DM) which is what the intake of the goat is actually based on.

# MEETING 3 – SO YOU WANT TO START UP, WHAT'S NEXT?

## **Setting Objectives**

To identify the requirements of the different sectors of the goat industry, start up procedures and transition planning.

## Suggested Lesson Outcomes

- To identify the necessary aspects for start up for the different breed type (mohair, milk, and meat).
- To discuss the co-op system for milk production and the requirements to start a goat farm.
- $\hfill\square$  To identify the importance of transition planning.

## **Suggested Roll Call Questions:**

- Can you name a form of a co-op?
- What is one thing you need to start a goat farm?
- You are starting a farm as a club. What do you bring to the farm?

## Sample Meeting Agenda Time: 1 Hour 50 Minutes

Welcome, call to order, pledge		10 minutes
Roll call		10 minutes
Parliamentary procedure	Minutes and Business	10-15 minutes
Topic Information Discussion	Starting up a Goat Farm!	10 minutes
Activities Related to Topic	Activity #1- Special Considerations for Milk	20 minutes
	Goats	
Topic Information Discussion	Co-op System and How Milk is Marketed	20 minutes
Topic Information Discussion	Succession Planning	20 minutes
Wrap up, Social time and		10 minutes
adjournment		

## Topic Information- Starting up a Goat Farm!

<u>A solid business plan is the first step to starting up a successful goat farm.</u> That involves working out the costs, ensuring that you have a market for your product and determining how much you will need to borrow to start up.

These answers may be different for every farmer and will help form the basis for how successful the farm business will be. You need to examine which operation that you would like to start:

## Meat Goats

The meat goat operation is focused on producing the greatest number of kids per doe per year to be sold for market. Quality and quantity are important here.

Background - The market for fresh goat meat has been undersupplied in Canada for years, and it is one of the few livestock sectors where demand far exceeds supply. Marketing live kids and goats at auction barns is common. To be successful at the auction, the trick is to have the right size/age of kid available at the right time to maximize profit. The prices paid at auction vary throughout the year but tend to peak before certain holidays.

## Fibre Goats

Mohair and cashmere are both harvested from goats with very specific genetic makeups. Farmers are paid for the quality of their fibers but also the amount. It takes a lot of energy to grow fiber which can drive lower supply when commodity prices are high, and the price of hair is low.

## Milk Goats

The market for milking goats is significantly more complicated than the previous examples. Traditionally, farmers would obtain contracts to ship milk to processors for a certain amount. In Canada, the dairy goat industry is not a supply managed sector. Meaning that there is no quota for milk production that is regulated by a provincial marketing board (as is the case for dairy cows).

Instead, dairy goat produces have a purchasing agreement with a broker and/or processor. The purchasers of milk manage the volume of milk that their producers produce to what their customers are looking for. Individual contracts are less common today when compared to cooperative systems where each producer has a certain number of shares in the cooperative. Cooperatives operate to ensure that the supply of goat milk that is shipped matches demand more closely.

Overall, there are also a few additional considerations for farmers looking to enter the industry with dairy goats.

## ACTIVITY #1 SPECIAL CONSIDERATIONS FOR MILK GOATS

	Time: 20 minutes	Ask members to read the special consideration as a group
DO		and answer the questions in the apply section.
	Materials	You can also do this as a pop-up or jeopardy style trivia game
	needed:	by using an online tool or chart paper.
	Handout and	
	online tool, chart	
	paper.	
REFLECT		The objective is to examine the additional requirements that
		milk goat farmers must meet to start up with milking.
	Discuss the	As a part of the process, you must secure the ability to ship
	following	milk through a cooperative. Where would this fit in the
	prompts as a	process? Cooperative shares are not always available, so how
	group	might you address these problems?
APPLI		
		By meeting with a raw milking specialist, you can get an idea
		about how to meet these requirements. Why is meeting with
		a specialist so important?

## Planning is Key (Source: OMAFRA)- For Senior Members

**OMAFRA's Dairy Food Safety Program** has the regulatory responsibility for the Raw Goat Milk Quality Program in Ontario. For new producers interested in producing goat milk, there are several steps in the process to become a Grade A goat milk producer. All regulatory requirements must be met prior to shipping milk.

## **Securing Your Market**

A potential dairy goat producer must first secure a market for the milk to be produced. There are two main brokers of goat milk in Ontario: Gay Lea Foods / Hewitt's and Ontario Dairy Goat Co-operative Inc. New entrants are advised to secure a written contract with a broker prior to investing in the business. In addition to these brokers, potential producers may secure a market through an independent agreement with a licensed dairy processor. Alternatively, if a producer plans to process their milk into dairy products for sale to consumers, they may consider operating their own licensed dairy plant. This may be on the farm or off the farm.

Raw goat milk can only be marketed to licensed dairy plants. Milk may only be collected on the farm by certified bulk tank milk graders. Milk transport vehicles must be inspected and approved by OMAFRA.

## **Information Package**

Contact OMAFRA's Dairy Food Safety Program directly at 1-519-826-4583 to request a new goat milk producer information package outlining production and building requirements, and tips on caring for animals and producing high quality milk. After reviewing this information, you should contact an OMAFRA raw milk specialist (RMS) to discuss your plans.

## Consultation Meetings with a Raw Milk Specialist (RMS)

New entrants to the industry are advised to meet with an RMS as a first step in the process and well before construction of a milk house or a barn begins. Your RMS will visit the proposed site with you and provide you with information that will assist in ensuring that your new operation will be in compliance with the Milk Act and Regulations.

Pre-approval requires an on-site visit and is followed by a final inspection prior to any milk shipments. This pre-approval step ensures that the producer is aware of all regulatory requirements and that any construction or renovation will meet Grade A standards. It is important that you work with a RMS well in advance of your proposed first day of shipping in order to avoid unnecessary and costly delays. Facilities that comply with the requirements of Regulation 761 of the Milk Act (Ontario) and that have passed a regulatory inspection are referred to as "Grade A" farms.

In the planning process, independent dairy equipment specialists should be consulted early, and producers should also consider driveway requirements by contacting their milk transporter or broker. Building permits and, in most cases, nutrient management strategies will also be required for construction of milk houses or barns.

## **Building Code Requirements**

The Ontario Building Code Act, 2006, (OBC) is the main regulation that governs farm building construction in Ontario. For ALL (including fibre, mohair and dairy) agricultural construction projects, the farm owner is responsible for obtaining a building permit. Contact your local municipality.

## **Nutrient Management Strategy**

The Nutrient Management Act, 2002, requires any building project relating to livestock housing or manure storage facilities to have an approved Nutrient Management Strategy (NMS) before a building permit will be issued. This applies to all farms that generate more than five nutrient units and are proposing to build, expand or renovate. For more information about Nutrient Management, see the OMAFRA website or call the Nutrient Management Information Line at 1-866-242-4460.

## **Environmental Recommendations**

To be in compliance with environmental legislation OMAFRA recommends the following:

All milking centre wash water is to be disposed of in a manner that does not pollute the environment as per Ontario Regulation 267/03 under the Nutrient Management Act.
All below ground disposal systems for milking centre wash water must be issued a building permit by the municipality before installation, extension, or alteration.

Failure to meet environmental recommendations can result in:

• The removal of your Grade A rating, due to excessive odours or contamination of the area around the milk house caused by milking centre waste.

• Charges by the Ontario Ministry of Environment and Climate Change under the Ontario Water Resources Act if pollution of the environment does occur. A certificate of environmental compliance approval for systems handling milking centre wash water does not prevent charges from being laid.

These regulations and others need to be considered when planning to build or renovate any farm structure.

## **Final Inspection**

The final inspection of premises to be used for producing goat milk must be conducted prior to any milk being collected for sale and the bulk tank must be empty. For final inspection, the producer is required to give the RMS at least one week's notice prior to their anticipated shipping date. Milk shipments cannot commence until a complete premise inspection has been conducted by the RMS. Approval to begin milk shipment is granted when the farm meets Grade A requirements.
## Topic Information - Co-op System and How Milk is Marketed

As mentioned previously in this meeting, the co-op system is used for marketing goat milk in Ontario. The quota system and the coop system are very similar with a few exceptions:

Quota: Quota is provincially regulated and sets up a milk board to handle sale, promotion, and supply of milk. Farmers, transporters, and processors hold quota which allows them to produce a specific amount of kg of butterfat. The board oversees allocations and quota is openly available for purchase from the quota exchange but only when producers sell part or all of their holdings.

Co-op: In Ontario, there are two co-operatives (Hewitt's Dairy/Gay Lea Foods Co-operative Ltd. and Ontario Dairy Goat Co-operative) that receive/broker goat milk from their member owners or from designated goat milk producers/suppliers. Farmers are then paid by the co-op for their milk. This gives farmers the ability to maintain a relatively constant supply of milk and pool their milk with other producers to have more power in the marketplace.

Hewitt's Dairy/Gay Lea Foods Co-operative Ltd. (https://www.hewittsdairy.com/ https:// www.gayleafoodsmembers.com/membership/)

As noted previously, dairy goat producers supplying milk to Hewitt's Dairy / Gay Lea Foods are not required to be member owners to ship milk to Hewitt's Dairy. All producers need to plan for producing a consistent supply of milk all year-round. Gay Lea Foods / Hewitt's and its customers require milk throughout the year. As of February 1, 2018, each dairy goat producer supplying milk to Gay Lea Foods/Hewitt's Dairy was assigned a yearly Allotment. This is the volume of milk that a producer can supply Gay Lea Foods / Hewitt's Dairy on an annual basis. The yearly allotment is then calculated down to a daily allotment to assist producers with the volume of milk they can produce each day in order to maintain the yearly allotment. Producers are paid on a monthly allotment. The allotment system is designed to allow fluctuations through out the year by utilizing both under production credits and over production credits. These credits allow producers to produce under their allotment during low production times and then produce milk over their allotment during higher production times.

Hewitt's Dairy- If a dairy goat producer would like to become a member owner, they are required to purchase, or be working towards, 3 shares for every 1,000 litres of annual milk production for Gay Lea Foods fiscal year October 1 – September 30th. The par value of a producer share is \$17 and your return on investment is comprised of patronage earned on milk shipments to DFO, DFM (cows) and milk shipments to Gay Lea Foods / Hewitt's (goats). (Source: Gay Lea Foods Cooperatives Ltd).

There are two options to meet these requirements:

- 1% gross milk cheque deduction + a minimum 25% down payment (October 1 April 30)
- Complete upfront purchase of required shares (October 1 April 30)

## **Ontario Dairy Goat Co-operative** (https://www.ontariodairygoat.com/membership.htm)

Disclaimer: Membership as described below is the policy on July 2021 set out by the Board of Directors and is subject to change per the Board's direction, at any time. For information about membership in the cooperative use the site above.

In order to ship milk to the Co-op, a new member must purchase investment shares, as follows:

• 5 x \$100.00 membership shares

• Shipping shares @ \$100.00 each for 4,000 litres of milk production annually (a minimum of 15 shares is required)

A new producer must also pay a \$1500.00 administration fee. The Ontario Dairy Goat Cooperative and the new member will sign a contract (supply agreement)

## **Experience It!**

Invite a guest to your meeting that specializes in Goat Cooperatives (potentially from either OMAFRA or one of the cooperatives above). Have them explain the share process and their business.

## **Topic Information- Succession Planning** (Sourced and Adapted from: Ontario 4-H Dairy Project)

## Introduction to Succession:

You or one of your farming friends may be considering taking over the family farm someday. In order to ensure a smooth transition from one generation to the next, it is important to create a Farm Succession Plan. This reduces the possibility of fights among siblings or extended family when it comes to the day-to-day operation, management, and distribution of farm assets.

## Note it!

It is important to note that succession does not have to be from family member to family member but can be anyone who would like to take over the farm operation.

## Share It!

If you are comfortable sharing with the group, share if your farm has a succession plan in place and what that plan looks like. Was it an easy process to create the succession plan?

## Succession plans have three main purposes:

- 1. Transfer of labour and task from one generation to the next
- 2. Transfer decision making and control from one generation to the next
- 3. Transfer ownership from one generation to the next

Since every farm business is unique, there is no standard way to design a succession plan, however, there are some basic steps to follow for any plan:

Preliminary Step – involves communicating ideas with family members, setting goals and objectives, deciding who the successor(s) will be, and making sure that the goals of the retiring and succeeding generations can fit together into a plan that will work. For example, if the retiring generation wants the farm to be carried on as a purebred operation focusing on elite genetics, and the successor wishes to turn it into a commercial operation, they may not be able to come to an agreement.

Step 1 – Collect and Analyze Information – it is important to know all details of the farm business, both operationally and financially, before deciding if succession planning will be financially and logistically feasible.

Step 2 – Generate Options – brainstorm about different ways the plan could be put together to best suit the needs of everyone involved.

Step 3 – Make Preliminary Decisions about how the farm transfers will be made.

Step 4 – Develop a plan and review it. Common elements of a plan include:

- Description of business
- Goals and expectations (both business and personal)
- Retirement plans for the retiring generation
- Successor Development Plan to give the new generation some initial direction
- Farm Business Plan because if the farm will continue it needs some future direction
- Operating Plan to define everyone's roles and responsibilities
- Outline the transfers of management, control, and labour
- Description of the transfer of ownership
- Timeline of the entire transfer
- Communications strategy to ensure that everyone works together
- Contingency plan in case something does not work as originally thought

Step 5 – Implement the plan and monitor its progress to ensure that the transition goes smoothly. Some components of the plan may need to be reworked if there are problems when it is put into practice. Make sure that everyone agrees to any changes that are made.

## **Research It!**

Are there statistics available for how many farms are transferred each year in Canada? Within those statistics, does it give an average age for someone that is taking over the family farm?

Change is often difficult since people get used to doing things the way they have always done them. It will take time for everyone to adjust to the farm transfer and will involve many difficult personal and financial decisions along the way. Remember that you do not have to do it all yourselves. There are many advisors who specialize in farm succession planning that could help to ensure that all details of the farm business are accounted for in the plan. Since it is often difficult mixing business with family, involving an objective third-party advisor will be beneficial because they have no emotions attached to the business.

## Experience It!

Invite a guest to your meeting that specializes in farm succession planning. Have them explain their process for helping farm families with farm transfers.

## The Do's and Don'ts of Succession Planning

#### DO:

- Recognize that succession planning takes time and a lot of effort. It won't happen over night.
- Start planning early. Things may take longer than expected and plans can change.
- Keep communication with the family (and all associated parties) open. All parties involved should be aware on how things will unfold in the future.
- Consider each person's opinions and goals.

• Have a team of 3rd party, professional advisors. These people are experts and are unbiased. They keep emotions out of the process and put the business first. Your team should include lawyers, accountants, financial advisors, and bankers.

• Consider any tax implications – have your goal be "do things efficiently and effectively" not "I don't want to pay taxes".

• Ensure all parties take ownership of the plan. This is a family plan. Family members need to buy into it to be effective.

• Write it down. By writing it down, all parties will know exactly what the plan is and there will be no surprises in the future

## DON'T

• Procrastinate. Plan early for the future

• Be afraid to ask questions. Succession planning can be very complicated and detailed. It is important to understand what is happening and why certain things are happening.

• Assume you know how other people feel or what other people's goals are. Keeping communication lines open, and expressing your goals is important to creating a plan that works for all.

• Forget to share the responsibilities. Both generations need to be involved in succession planning to make the transition easier on both parties.

• Forget to plan for your future – consider other investments your life might have (homes, families, retirement).

• Use just one advisor. Have a team of experts to help you through the process

## **Experience It!**

Invite a farm family that has successfully completed the transition of their farm from one generation to the next. Find out how the process worked for them and what challenges they had along the way.

## **Succession Planning and Taxes**

Transfer of farm businesses can have very complicated taxation. For information on what type of tax exemptions and tax credits apply, as well as other information about taxation on the farm visit: http://www.omafra.gov.on.ca/english/busdev/facts/16-039.htm or view the Taxation on the Transfer of Farm Business Assets to Family Members fact sheet by OMAFRA which is attached as an appendix.

## MEETING 4 – NICHE MARKETS AND FINDING OPPORTUNITIES

## **Setting Objectives**

To introduce niche markets and opportunities for growth in the goat industry.

## Suggested Lesson Outcomes

- □ To identify niche market opportunities and to explore potential growth in the industry.
- $\hfill\square$  To discuss on-farm processing and to tour a facility that does processing.

## **Suggested Roll Call Questions:**

- What are some innovative ways to market goat products?
- Look up a unique product and be prepared to discuss at this meeting.

## Sample Meeting Agenda Time: 2 Hours 40 Minutes

Welcome, call to order, pledge		10 minutes
Roll call		10 minutes
Parliamentary procedure	Minutes and Business	10-15 minutes
Topic Information Discussion	Finding Opportunities	10 minutes
Activities Related to Topic	Activity #1- Explore the Processor	20 minutes
	60 minutes	20 minutes
	OR	
Activities Related to Topic	Activity #2- Create a Product Pitch	60 minutes
Senior Member Project	Explore a Niche Product	10 minutes
Wrap up, Social time and		10 minutes
adjournment		

## **Topic Information- Finding Opportunities**

Within the goat sector there are a number of different opportunities available to market your milk. As mentioned previously, the cooperatives allow farmers to purchase shares to ship a specific amount of milk but there are also other opportunities for goat farmers to start up on-farm processors. The attached material to this topic information section shows the requirements for this process as of July 2021.

It is important to note that on-farm processors need to secure a market for their product before proceeding with this kind of business endeavor. If there is not a sufficient market for the product then it may not make financial sense to start this kind of business.

## Explore it!

If you are interested in finding a business opportunity the best place to start is to explore an ongoing production facility to see how the business works.

Outside of the milk industry there may be niche markets in the meat or mohair business that you may want to explore.

#### Define it!

What is a niche market? A niche market is a smaller defined market which is often a great way to start a business if there are very few people offering that product. It can often act as a starting point for a business (examples of these include on farm meat goat sales, on-farm processors or those processors that make products that are not otherwise available in the local market).

When exploring a niche business opportunity, it is important to find one that is not well represented in the local market. Alternatively, you can set it up so that things are done differently than an already established business (for example, by providing a value-added component to the business- focusing on welfare or a tour style business model).

Overall, if you are thinking about starting a niche business the first steps are to build a supportive team of those people that are not afraid to challenge your ideas. These diverse opinions will end up making your business better and will generate the right business partners for you!

## Licensing a Dairy Plant (Source: OMAFRA)

The Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) is responsible for licensing dairy plants in Ontario. The licensing of any dairy plant is based on food safety requirements and not the size of the plant nor the volume of product produced.

Prior to beginning construction, an "Application for a Permit to Construct or Alter a Building Intended for Use as a Plant" (referred to as an "Application for a Permit") must be submitted to the Director under the Milk Act at OMAFRA. This application must demonstrate, through drawings and other information as necessary, that the plant will be built to meet the <u>regulatory</u> <u>requirements</u> under the Milk Act (Ontario).

An "Application for a License for the Operation of a Plant" must be submitted at the same time as an "Application for a Permit". However, the license will not be issued until the plant is complete and OMAFRA has confirmed, through inspection, that it meets all applicable regulations under the Milk Act (Ontario).

In addition, applicants should inform their local public health unit that a dairy plant will be constructed in the area.

Note - If you plan to process dairy products on-farm we have specific requirements detailed in our "Guidelines for On-farm Dairy Processing Plants". To obtain a copy of the guidelines please call (toll free) 1-877-424-1300 or email <u>ag.info.omafra@ontario.ca.</u>

Steps for Licensing New Applicants

1. Applicant submits a "Letter of Intent" describing plan and goals to the Director under the Milk Act at OMAFRA. The "Letter of Intent" should include but not be limited to:

o name/contact information of applicant

o type of product(s) to be made

- o type (species) of milk to be used
- o estimated volume of milk

o source of milk

o type of facility (e.g., new or existing building)

o location (e.g., industrial area, rural, on-farm and address if known)

o type of processing (raw or pasteurized, extended shelf life, aseptic

processing and packaging, etc.)

2. Once the letter of intent is received OMAFRA sends a licensing package to the applicant. The package includes:

o Application for a Permit to Construct or Alter a Building Intended for use as a Plant

o Application for a License for the Operation of a Plant

o Permitting and Licensing Guideline for Dairy Plants in Ontario

o Copy of Regulations 753 and 761 of the Milk Act (Ontario)

o New Plant Requirements document (or Guidelines for On-farm Dairy Processing Plants)

- o Instructions for Submitting the Completed Applications
- o Preventive Control Programs information sheet
- o List of the Public Health Units in Ontario
- o List of Ministry of Environment Regional/District Offices
- o Information on securing a supply of milk, which is the responsibility of the applicant

3. Applicant submits completed applications to the Director under the Milk Act at OMAFRA. The license fee is \$150.00 and is payable when the applicant applies for the license.

If an applicant is planning to ship product outside of Ontario, they will need to contact CFIA to apply for federal registration.

4. OMAFRA's Dairy Food Safety Program staff review the completed applications and a dairy plant specialist (DPS) is assigned to work with the applicant to assist in interpretation of the regulations.

5. If an applicant is proposing to process cow's milk, the Dairy Farmers of Ontario (DFO) and the Ontario Dairy Council (ODC) are notified of receipt of an application by OMAFRA, and they are provided with an opportunity to submit comments in support of, or in opposition to, the application.

6. The Director makes a decision on the "Application for a Permit" based on dairy food safety program staff recommendations and industry submissions.

7. If the decision is favorable, the applicant receives approval for their "Application for a Permit" in the form of a letter from the Director and may now proceed to construct their plant.

If the Director decides that a permit should not be issued, the applicant may appeal the decision to the Agriculture, Food and Rural Affairs Appeals Tribunal.

Industry may also appeal the decision of the Director. If an appeal is made the decision of the Director is stayed until the Tribunal has made a ruling.

8. The assigned DPS is available to assist in the interpretation of regulatory issues throughout plant construction. Once the plant construction is completed and the operator is ready to begin operations, the DPS conducts a regulatory compliance audit and makes a recommendation (to the OMAFRA Director) regarding issuance of a plant license.

9. The Director makes a decision on the Application for a License for the Operation of a Plant.

10. If the decision is favorable, a License to Operate a Plant is issued to the applicant for the manufacture of dairy products as declared in the application.

If the decision is not favorable the applicant has the option of appealing the decision to the Agriculture, Food and Rural Affairs Appeals Tribunal.

## ACTIVITY #1 EXPLORE THE PROCESSOR

	Time: 60 minutes	The goal of this activity is to get members to tour a facility
		that processes goat products. This could be meat, milk or
	Materials	mobair related
	noodod: Nono	
	needed. None.	Beach out to a processor and ask if your 4 H group can tour
		and ask questions about the operation. There is a list of
		current goat milk processors on the OMAFRA website which
		includes those that produce cow and goat dairy products
DO		(http://www.omafra.gov.on.ca/english/food/inspection/dairy/
		licenseddairyplants.htm).
		This also includes some of the on-farm processors mentioned
		in the last topic information section. Alternatively, you may
		be able to find connections to these places within your
		community (maybe through a goat farm's connection).
		The objective is to see a goat processor in process and to
REFLECT		understand how these businesses work.
		What was something that surprised you about the
	Discuss the	operation?
	following	
APPLY	prompts as a	What is your biggest takeaway?
	group	
		How did the business diversify or secure their market?
		,

## ACTIVITY #2 CREATE A PRODUCT PITCH

	Time: 60 minutes	Members will create a product that fills a niche market and
		create a three-minute pitch on the topic. This can also be
	Materials	brought up as an infomercial type of activity.
DO	needed: None.	
		Members should answer the who, what, when, where, why
		and how questions for their product.
		The objective is to think of a niche goat product and create a
REFLECT		strong reason as to why their product is the best in the club.
	Discuss the	
APPLY	following	
	prompts as a	
	group	

# SENIOR MEMBER PROJECT - EXPLORE A NICHE PRODUCT

	Time: 10 minutes	Depending on the number of senior members in the club,
		this activity can be done together or as smaller teams.
	Materials	
	needed:	Senior members should examine a niche product, explore
	Anything	the market for that product and show ways that the product
	to make a	is successful. For inspiration you may use the following list:
	presentation.	
		Goat Ice Cream
		Specialty Cheese
		• Goat Meat
		• Fibre markets- Clothing, yarn, socks, custom fibre weaving
		services, etc.
		There may be emerging industries at any time in the goat
		industry. For example, meat goats have boomed in popularity
		over recent years due to shifting dietary preferences among
		some Canadians. Canada is a multicultural nation which
		welcomes all people. As a result, demand may shift overtime
		as our demographics and food demands change.
		The task of this activity is for groups to answer the 5 w's and
		how of what makes the niche market work. Senior Members
		will share this with the younger members in Meeting 6.
		The chiestive is to evelope the world of sight merulate and to
REFLECT		The objective is to explore the world of niche markets and to
	Discuss the	understand the importance of carving our market share.
	following	
APPLY	ionowing	
	prompts as a	
	group	

# MEETING 5 – THE REGULATORY ENVIRONMENT

## **Setting Objectives**

To explore the Canadian regulatory environment relating to goats so that members can appreciate all of the intricacies that are included.

## Suggested Lesson Outcomes

- □ To understand the importance of medications and the withhold periods associated with them (both for milk and meat).
- $\hfill\square$  To explore the importance of biosecurity.
- $\Box$  To introduce the transport decision tree established by the CFIA.
- □ To assess the importance of identification and traceability for the goat industry.

## Suggested Roll Call Questions:

- What does the word regulation mean to you?
- Can you give an example of a regulation (or rule) that you follow in your life?

## Sample Meeting Agenda Time: 2 Hours 10 minutes

Welcome, call to order, pledge		10 minutes
Roll call		10 minutes
Parliamentary procedure	Minutes and Business	10-15 minutes
Topic Information Discussion	Medications and Withhold Periods	15 minutes
Topic Information Discussion	Activity #1- Drops in the bucket	15 minutes
Topic Information Discussion	The importance of Biosecurity	10 minutes
Activities Related to Topic	Activity #2- Can you Contain the Outbreak	30 minutes
Topic Information Discussion	Introduction to Traceability and	10 minutes
	Identification	
Topic Information Discussion	Fit for Transport?	10 minutes
Wrap up, Social time and		10 minutes
adjournment		

## **Topic Information- Medications and Withhold Periods**

Medications are great tools that farmers and veterinarians have access to as a way to improve health and welfare for their animals. These medications may be antibiotics or pain related but either way they are meant to improve the life of the animals in your care.

One of the biggest aspects of medications to consider is the long-term effects of them within the animal. Withhold or withdrawal period refers to the amount of time that the drug, antibiotic, or treatment requires to no longer be a concern for the end-user. Usually, each drug will have different meat and milk withdrawal times.

These periods of time are important to consider as if they are not recorded and followed can compromise the food safety system and erode (lead to less) consumer confidence.

## How to examine the medication label?

All of the information that you need to know about a medication can be found on the label. On the next page an example product label is broken down for reference. You can go through this label as a club and explain the different parts. Annotation have been added to the label in the answer key to explain all the parts.

## Did you know?

It is important to note that most drugs in goats are used extra label. This means that the drugs are not approved for use in goats but can be used upon the recommendation of a veterinarian with defined instructions on use, dosage and withdrawal periods relative to the drug.

## Apply it!

Read the following label and answer the following questions!

- (1) What species is the drug used for?
- (2) What are the meat and milk withdrawal times?
- (3) What are the storage conditions?
- (4) What is the dosage?

## PRODUCT LABEL

## METACAM<sup>®</sup> 20 MG/ML SOLUTION FOR INJECTION

Meloxicam 20 mg/mL Sterile Veterinary Use Only DIN 02330059 Nonsteroidal anti-inflammatory drug (NSAID) for cattle. Each mL contains 20 mg meloxicam and 150 mg ethanol, as preservative. Boehringer Ingelheim

Boehringer Ingelheim (Canada) Ltd. Burlington, Ontario L7L 5H4.

**Indications:** As an aid in improving appetite and weight gains when administered at the onset of diarrhoea, in combination with oral rehydration therapy, in calves over one week of age. For relief of pain following de-budding of horn buds in calves less than 3 months of age.

**Dosage and Administration:** Single subcutaneous or intravenous injection of 0.5 mg meloxicam/kg body weight (2.5 mL/100 kg).

**Contraindications:** Do not use in breeding, lactating or pregnant animals. Do not use in bulls intended for breeding. Do not use in animals suffering from gastrointestinal disorders such as irritation and hemorrhage, impaired hepatic, cardiac or renal function and hemorrhagic disorders or where there is individual hypersensitivity to the product. Do not administer concurrently with steroidal, other nonsteroidal anti-inflammatory drugs or with anti-coagulant agents. Concomitant use of NSAID's with aminoglycoside antimicrobials in very young animals may result in renal toxicity.

**Cautions:** Avoid use in very severely dehydrated, hypovolaemic or hypotensive animals which require parenteral rehydration, as there may be a potential risk of increased renal toxicity.

Use of anti-inflammatories in very young or debilitated animals may involve additional risk.

Transient, slight injection site swellings may occasionally be seen following subcutaneous injection and intravenous injection.

**Warnings:** Treated animals must not be slaughtered for use in food for at least 20 days after the latest treatment with this drug. Do not use in dairy cows 20 months of age or older. Do not use in calves to be processed for veal as a withdrawal period has not been established for pre-ruminating calves. Keep out of reach of children.

**Pharmacology:** Meloxicam is a nonsteroidal anti-inflammatory drug (NSAID) of the oxicam class which acts by inhibition of prostaglandin synthesis, thereby exerting anti-inflammatory, analgesic and anti-pyretic properties. Meloxicam also has anti-endotoxic properties because it has been shown to inhibit production of thromboxane B<sub>2</sub> induced by *E. coli* endotoxin administration in calves.

**Toxicology:** The acute oral toxicity (LD<sub>50</sub>) of meloxicam assessed in rats, mini-pigs, mice and rabbits was >80 mg/kg, 1600 mg/kg, 470 mg/kg and 320 mg/kg, respectively. Repeated dose toxicity studies in rats, mice and mini-pigs demonstrated that the primary target organs for toxicity were the gastrointestinal tract (pyloric, duodenal and small intestine ulceration) and kidneys (scarring, necrosis and pyelonephritis).

Adverse Reactions: In very rare cases, anaphylactoid reactions may occur and should be treated symptomatically.

Storage: Store at or below 25° C. Keep from freezing.

Boehringer Ingelheim (Canada) Ltd., Burlington, Ontario L7L 5H4. 40793/003 Presentation: 20 mL, 50 mL, and 100 mL. NAC No.: 12300673

	A Boehringer	
	VIIIV Ingelheim	Information in this box gives the (1) Drug Name, (2) the
METACAM® 20 MG/ML SOLUTION FOR INJECTION	Î	concentration of the drug (3) Drug Identification number (DIN) (4)
Meloxicam 20 mg/mL	Boehringer Ingelheim (Canada) Ltd. Burlington, Ontario L7L 5H4.	The species for use: Cattle (5) the active ingredients, and (6) The
Sterne Veterinary Use Only DIN 07330059		place of manufacture.
Nonsteroidal anti-inflammatory drug (NSAID) for cattle. Each mL contains 20 mg meloxicam and 150 mg ethanol, as preservative.	1	Indications refers to the intended usage of the medication.
Indications: As an aid in improving appetite and weight gains when administered with oral rehydration therapy, in calves over one week of age. For relief of pain following de-budding of horn buds in calves less than 3 months.	d at the onset of diarrhoea, in combination of age.	The dosage of the drug usually as a calculation of the body weight.
Dosage and Administration: Single subcutaneous or intravenous injection of 0. mL/100 kg).	.5 mg meloxicam/kg body weight (2.5	
Contraindications: Do not use in breeding, lactating or pregnant animals. Do no Do not use in animals sufferind from castrointestinal disorders such as irritation a	ot use in bulls intended for breeding.	When to not use the drug.
Concorrigation and hemorrhagic disorders or where there is individual hyperser or renal function and hemorrhagic disorders or where there is individual hyperser Do not administer concurrently with steroidal, other nonsteroidal anti-inflammator Concomitant use of NSAID's with aminoglycoside antimicrobials in very young an	institution to the growing and a second a se	Any cautions to drug use. Things to watch for.
<b>Cautions:</b> Avoid use in very severely dehydrated, hypovolaemic or hypotensive i rehydration, as there may be a potential risk of increased renal toxicity. Use of anti-inflammatories in very young or debilitated animals may involve additi Transient, slight injection site swellings may occasionally be seen following subci-injection.	animals which require parenteral tional risk.	<b>These are the withdrawal or withhold period.</b> If no period is indicated for goats,herd vet is the only person who can tell you what
Warnings: Treated animals must not be slaughtered for use in food for at least 2 drug. Do not use in dairy cows 20 months of age or older. Do not use in calves to period has not been established for pre-ruminating calves. Keep out of reach of c	20 days after the latest treatment with this o be processed for veal as a withdrawal children.	the withdrawal period is for goats. This is a pretty important concept.
Pharmacology: Meloxicam is a nonsteroidal anti-inflammatory drug (NSAID) of t of prostaglandin synthesis, thereby exerting anti-inflammatory, analgesic and ant	the oxicam class which acts by inhibition it-pyretic properties. Meloxicam also has	Mode of action of the drug. This explains how the drug works.
anti-endotoxic properties because it has been shown to inhibit production of thror administration in calves.	mboxane B <sub>2</sub> induced by <i>E. coli</i> endotoxin	LD50 refers to the toxicity of the drug where the dosage described
Toxicology: The acute oral toxicity ( $LD_{ss}$ ) of meloxicam assessed in rats, mini-pi, mg/kg, 470 mg/kg and 320 mg/kg, respectively. Repeated dose toxicity studies in that the primary target organs for toxicity were the gastrointestinal tract (pyloric, and theorem neurois and nucleonentritis).	igs, mice and rabbits was >80 mg/kg, 1600 n rats, mice and mini-pigs demonstrated duodenal and small intestine ulceration)	lead to 50% of the species dying.
Adverse Reactions: In very rare cases, anaphylactoid reactions may occur and	should be treated symptomatically.	Adverse reactions and storage are given for information
Storage: Store at or below 25° C. Keep from freezing.	1	
Boehringer Ingelheim (Canada) Ltd., Burlington, Ontario L7L 5H4. 40793/003		
Presentation: 20 mL, 50 mL, and 100 mL	roduct comes in the following size	ά.

## ACTIVITY #1 DROPS IN THE BUCKET

	Time: 15 minutes	Get members to gather in a group. Explain that medications		
		are meant to help animals, but they can also transfer into the		
	Materials	milk and meat of the goat.		
	needed: 2			
	glasses of milk,	Start with the first glass of milk. This is from a healthy		
	food dye, 1	goat that is not on medication. Say that with the use of		
	empty glass,	medication, this medication may be able to transfer into the		
	medication	milk for a defined period of time (known as a withdrawal).		
	packaging.	In the second glass of milk, drop a few drops of food		
		colouring and stir the glass. Members will notice a colour		
		change. Explain to members that the same happens when		
		there are antibiotics in the milk and that labs can pick up		
		smaller concentrations.		
DO				
		Next mix half of the one glass of milk with half of the other.		
		Stir the new glass and compare to the healthy and antibiotic		
		glasses. Members should notice a colour in between the two		
		original glasses. Explain to members that there is no true way		
		to dilute antibiotics meaning that withdrawais must always		
		chain		
		Next get members to locate the withdrawal time on		
		the medication package or vet script (if possible). Is the		
		withdrawal different for milk and meat? Explain that this is		
		due to the way that the goat is able to deal with medication		
		differently. These times may be longer for milk or meat, but		
		they are important to follow to ensure a safe food supply.		
		The objective is to understand how residues from		
REFLECT		medications can be detected to understand the importance		
		of ensuring a clean milk and meat supply.		
	Discuss the	How would medication in foods change consumers		
APPIY	TOIlOWING	perception of the industry?		
	prompts as a	Why is it important that we minimize this risk?		
	group	why is it important that we minimize this risk?		

## Topic Information- The importance of Biosecurity

This topic was also covered in the health section of the goat project but is being brought up here for its effect on the business of goat sales.

Attached are two fact sheets from Ontario Goat. One is about buying goats and one is about selling goats

## **Biosecurity and Zoning**

There are three components or pillars to a good biosecurity program:

- 1. Bio-Exclusion: stop those infected individuals from entering the herd.
- 2. Bio-Management: Stopping infection from spreading within the herd or farm.
- 3. Bio-Containment: To prevent infected animals from leaving the herd.

Each of these components is key to a good biosecurity process. However, in the past ruminant industries have seen variable adherence to these strategies that would not be possible to avoid for pork or poultry producers. This is because of the ever-present potential for animal health and economic disaster that has occurred in these industries in the past. However, any of the diseases outlined already could impact the industry at any time.

By buying animals in to your herd you are potentially introducing new pathogens or infectious agents into your herd. Buyer beware but always know that these transactions are a huge part of the industry.



## So You Want to be a Goat Farmer

## **Buying Goats**

The first part of your new venture or expansion is securing a supply of goats. If you are new to the goat industry, this is an ideal time to start with goats that are low risk for specific diseases. Producers can reduce the risk of introducing diseases by purchasing goats with known health status. Selecting good quality healthy stock goes a long way to starting a profitable business.

Points to consider when buying goats:

#### Health

- What is the health status of the goats I wish to purchase?
- Are the goats low risk for diseases like Caprine-Arthritis-Encephalitis (CAE) or Johne's? If so, ask for documented proof.
- What is the seller's herd vaccination protocol?
- What is the seller's herd de-worming schedule?
- Is there a health certificate from the herd veterinarian?
- Will the current veterinarian provide withdrawal dates for goats currently being treated; including those fed medicated feed, stating meat and milk withdrawals?
- Be sure to get a statement if any broken needles are in the goats and the approximate location.
- Ask about the seller's kid rearing program.
- Talk to your vet about testing that should be done on the goats prior to purchase. What is the health guarantee of the goats from the time of arrival on farm?
- What are the guarantees for does and doelings sold pregnant and for reproductive soundness if they are sold not bred?

#### **Record keeping**

- Will the owner provide copies of the records for each goat?
- Review production information and the milk test results, if available.
- Are the goats classified?
- Are the goats registered? If so, match the tattoo number to the papers. Who will pay to transfer the pedigrees?
- If a tour of the operation is not offered, ask for a tour. A lot can be learned by what you observe. Be respectful of biosecurity practices when on-farm.

#### Purchase agreement

- What is the agreed upon price? Is a deposit required to hold the goats?
- If you are unable to take the goats on the agreed upon date will the deposit be forfeited?
- If the seller and buyer agree the goats can stay past the original agreed upon date, are ther additional costs associated with the goats staying longer? This may be a dollar value per hea per day.
- Ask for the agreement in writing and have both parties sign the document, clearly stating the agreed upon price, possession and transportation dates and other information necessary.

#### Facility

- Is your facility **really** ready to receive the load of goats? A few key areas to double check include water, bedding, feed supply, and ventilation.
- If your facility is not ready will the owner hold the goats longer? If so, what are the additional costs? Is there an absolute final date the goats need to be moved by?
- If you are milking goats has the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) been contacted for the final inspection?

#### Transportation

How close are the does and/or doelings to kidding? Canadian Food Inspection Agency (CFIA) regulations prohibit the transport of animals likely to give birth during transport. Knowing that transport stress can induce labour, producers need to use caution during the last 10 per cent of gestation. Other points to consider:

- Who will be trucking the goats?
- Are the trucks clean, disinfected and well bedded before moving the new goats?
- What will the weather conditions be on the day of transportation?

For more information on farming goats refer to:

- Best Management Practices for Commercial Goat Production
- Biosecurity Planning Guide for Canadian Goat Producers
- National Farm-level Biosecurity Standard for the Goat Industry
- Canadian Goat On-Farm Food Safety Program
- *Recommended code of practice for the care and handling of farm animals-Goats*
- *Recommended code of practice for the care and handling of farm animals-Transportation*
- Facts and Figures about Canadian Goat Farming

Ontario Goat 449 Laird Rd., Unit 12, Guelph, ON, N1G 4W1 Tel: 519-824-2942 E-mail: info@livestockalliance.ca



## So You Want to be a Goat Farmer

## **Selling Goats**

As a goat farmer you may find yourself in a position to sell goats from your herd, either as purebred breeding stock or because you may have extra milking goats or replacements to sell. Whatever the reasons, there are points to consider when selling your goats. As a seller of goats it is not your responsibility to screen potential buyers. However, as a goat farmer you should ask some questions to ensure goat farming is for them. People with little to no experience may become overwhelmed and come back to you for advice and guidance. Are you prepared to support the buyer?

Outlined below are some points to help get you started as a seller:

- 1. What is the health status of your goats? If you are selling goats as health status unknown (meaning you are not guaranteeing those animals are low risk for specific diseases) then let potential buyers know that.
- 2. If you are selling goats as low risk for specific diseases, then provide written proof from your herd veterinarian indicating that they have not seen evidence of the disease in question and documentation showing that the animals were tested for a certain disease. A verbal statement does not constitute proof. It is important to remember that no test is 100 per cent accurate, so there may be false positives and negatives.
- 3. Ensure the goats are moved well in advance of their freshening dates, if applicable. The Canadian Food Inspection Agency regulations prohibit the transport of animals likely to give birth during transport. Knowing that transport stress can induce labour, producers need to use caution during the last 10 per cent of gestation.
- 4. When potential buyers come to your farm provide biosecurity wear, i.e. disposable boots or boots worn on your farm, to prevent new diseases being introduced to your farm.

#### Purchase agreement

Have a written agreement between you (the seller) and the buyer, clearly stating the conditions of the offer and have both parties sign the document. When the conditions of sale are clearly outlined less problems will occur. Consider including the following points:

- What is the agreed upon price? Is a deposit required to hold the goats?
- If the potential buyer is unable to take the goats on the agreed upon date will the deposit be forfeited? Ensure there is a clear guideline if the goats do not move by the agreed upon date. If the goats do not move by the agreed upon date, clearly state what happens to the goats, including if the owner is free to resell the goats.
- If the seller and buyer agree the goats can stay past the original agreed upon date, are there additional costs associated with the goats staying longer (i.e. for feed, labour, etc. This could be a dollar amount per head per day)?

- State the disease status of the herd in the agreement, either health status unknown or provide a written report from your veterinarian stating the disease status and withdrawal dates for meat and milk for any goats receiving treatment or medicated feed. If any goats have broken needles in them, include a written statement identifying which goat and the approximate location of the broken needle.
- If additional testing is required by the buyer who is responsible for the additional costs?
- What is the health guarantee of the goats from the time of arrival to the new farm?
- Who is responsible for the transfer of pedigrees for registered animals?
- Who is responsible for trucking?

For more information on farming goats refer to:

- Best Management Practices for Commercial Goat Production
- Biosecurity Planning Guide for Canadian Goat Producers
- National Farm-level Biosecurity Standard for the Goat Industry
- Canadian Goat On-Farm Food Safety Program
- Recommended code of practice for the care and handling of farm animals-Goats
- > <u>Recommended code of practice for the care and handling of farm animals-Transportation</u>
- Facts and Figures about Canadian Goat Farming

#### **Ontario Goat**

449 Laird Rd., Unit 12, Guelph, ON, N1G 4W1 Tel: 519-824-2942 E-mail: info@livestockalliance.ca

Disclaimer:

This resource is for educational purposes only. Ontario Goat is not responsible for any business decisions made by consulting this resource.

## ACTIVITY #2 CAN YOU CONTAIN THE OUTBREAK

	Time: 30 minutes	This activity introduces a game that can be applied to many
		different levels of outbreak control. Specifically, the game
	Materials	will cover the different components of outbreak response
	needed: dice,	and ensure good practices for each step of the process. This
	game board	activity can also be done in a big field with pylons serving as
		the farms.
		To start, split the group into two equal groups: one group will
		serve as the viral group. In contrast, the other will perform
		as the government emergency response personnel. The virus
		strikes first, so it automatically goes first.
		On the board, there are 10 farms. The viral group will choose
		which farm they would like to start at and can move one to
		three spaces each turn depending on the roll of a dice:
DO		1. A roll of 1-2 means you can move 1 space on the board.
		2. A roll of 3-4 means you can move 2 spaces on the board.
		3. A roll of 5-6 means you can move 3 spaces on the board.
		Your goal as the viral team is to reach the next farm and
		make it to each farm on the board (to infect all of the farms).
		To start the response, the response personnel must roll a 5 or
		6. If they do not, they will have to give up their turn and let
		the other team go again (giving the virus more time to move
		to infect more farms).
		If the response personnel do roll a 5 or 6, then they can roll
		again to see if they do anything to stop the viral progression:

		1 A roll of 1 means you cannot do anything and the viral
		team also gets to move one sten
		2 A roll of 2.4 moons you got to set up a roadblock. Poll
		2. A foil of 2-4 means you get to set up a foadblock. Non
		again to determine the number of lines your foadblock can
		span (the line can go vertical and horizontal to try and block
		1. 2 means you get 2 lines
		a. 1-2 means you get 2 lines
		b. 3-4 means you get 3 lines
		c. 4-5 means you get 4 lines
		d. 6 means you get 5 lines
DO		3. A roll of 5-6 means that nothing happens for that turn.
		The game ends when the virus is surrounded by roadblocks
		or when the virus infects all 10 farms (this game is heavily
		skewed to the response personnel, but it is possible to get
		stuck at the first step of the game for a while).
		This activity can be done in paint or PowerPoint if this is
		a virtual club. If the activity ends early, switch teams (the
		strategy used should be very different).
REFLECT		This activity aims to identify how emergency response works
		in terms of reporting and containment procedures.
		How difficult was it for the personnel to start? How does that
		relate to how diseases can spread quickly if not reported?
	Discuss the	How many farms did the virus infect before they were
	following	cordoned off? If each farm represented 100 animals, how
	prompts as a	many animals were affected? Could that have been less if
APPLY	group	your dice rolls were different?
		How did the starting position of the viral infection affect the
		game? Did the second group change their strategy?
		How can you apply this game to your life? (think COVID
		pandemic).

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## **Topic Information- The importance of Biosecurity**

Topic Information- Introduction to Traceability and Identification

The Canadian Food Inspection Agency (CFIA) defines traceability as the ability to follow an item or group of items from one point in the supply chain to another. In the case of goats, the purpose of a traceability system is to track the movement of goats to protect animal health, public health, and food safety. In cases where there is an outbreak or natural disaster this allows CFIA to have a record of all of the animals that may be affected and to limit the economic, environmental, and social costs.

Traceability has three primary pillars:

Premises Identification- Each barn, animal housing, show site, sales house is given a unique identifier (alphanumeric or numeric) to show where goats are being kept.
Animal Identification- Each animal is given an identifier (alphanumeric or numeric) that stays with that animal throughout their life and tracks that specific animal.
Animal Movement- Every time an animal moves, that movement is captured, and the new premises ID becomes the home of that animal.

As of July 2021, there is still ongoing discussion about how this system will be enacted but there is no doubt that CFIA wishes to align the goat industry with other animal groups in Canada.

## **Goat Identification**

One aspect that has limited the ability for goats to use the same system as other species group is the topic of identification. In other types of livestock, ear tags alone are used to identify the animals. These ear tags stay with the goat throughout the whole life and can be replaced if lost. However, some breeds (La Mancha) of goats do not have ears that are big enough for tagging. Therefore, I.D. tags must be applied to the tail web or leg bands may be used.

Therefore, the following goat approved indicators (source: Canadian National Goat Federation) can be used to identify goats:

• Shearwell ASet tag – available as either radio frequency identification (RFID), full duplex (FDX) or visual (non-RFID). This tag has been approved for application to the ear or the tail web of goats.



• Allflex OS Combi tag – available as an RFID (FDX) tag, approved for application to the ear.



• Datamars ARaymond leg band – available as either RFID, half duplex (HDX) or visual.



These tags can be purchased from the Canadian Cattle Identification Agency's (CCIA) webstore and toll-free Call Centre Order Desk at 1-877-909-2333.

## Application

The following document can be used as a reference guide for tagging application:





## National Goat Identification Program Tag Trial





For more information on the tag trial or the National Goat Identification Program:

Canadian National Goat Federation Phone: 1-888-839-4271 Fax: 1-866-909-5360 info@cangoats.com 130 Malcolm Road Guelph, Ontario N1K 1B1

www.cangoats.com



Agriculture and Agriculture et Agri-Food Canada Agroalimentaire Canada



This project was made possible by funding from Agriculture and Agri-Food Canada (AAFC) through its Canadian Industry Traceability Infrastructure Program (CITIP). AAFC is pleased to participate in this project and is committed to working with its industry partners to increase public awareness of the importance of the agri-food industry to Canada.

## Goat ID Tag Trial Seeking producer feedback

The Canadian National Goat Federation (CNGF) has launched a tag trial to gather valuable producer feedback for the development of the National Goat Identification Program (NGIP).

Canadian goat producers play an important role assisting in identifying potential issues that CNGF may need to examine with tag manufacturers. Feedback on tag performance will help ensure the industry has access to the best possible identification (ID) tags. Regardless of which tag they choose, producers will receive an assessment form upon purchase to assist CNGF in evaluating tags over time and in farm situations. Producers who have previously purchased NGIP-recommended tags can download an assessment form from www.cangoats.ca.



#### Finding the best tags

The NGIP is currently recommending three types of tags: Reyflex strip tag, Reyflex small panel tag and the Reyflex RFID tag.



**1) Strip tags** are well suited for newborn dairy animals, fibre animals and tail tagging.

**2) Small panel tags** are ideal for pasture animals, meat animals and for producers who want more visual identification.

**3) RFID (radio frequency identification) tags** will appeal to goat producers who want to use an electronic management system.

#### Benefits of participating in the trial

Producers who are already using their own management tags may want to change to one of the recommended ID tags so they are prepared for the next phase of the NGIP. Animals tagged during the trial phase should not need to be retagged later.

For producers who are not yet using management tags, now is the perfect opportunity to provide valuable feedback, and to take advantage of the on-farm management and husbandry benefits of animal ID.

To order tags, visit www.cangoats.ca or call Ketchum Manufacturing directly at 613-342-7550. The CNGF is currently working on getting more ear tags and animal identifiers included in the trial. Producers will be made aware as soon as this is solidified.

Canadian goat producers play an important role in helping ensure the industry has access to the best possible ID tags.



## National Goat Identification Program

## Designed for producers by producers

The NGIP is a developmental step towards a mandatory animal identification program for goats, which will be a future regulatory requirement once the federal government's National Agriculture and Food Traceability System (NAFTS) is in place. The program will include identification tags and numbers, and reporting guidelines that are anticipated to be included in the mandatory ID program.

There are several benefits of a national goat ID program. Animal ID provides accessible records to support on-farm management decisions. Additionally, it provides valuable information facilitating effective industry response to any emergency requiring traceability information such as disease, tainted product, or weatherrelated emergencies.

## Addressing producer needs

The information gleaned from the tag trial will k critical to the next phase of the NGIP. While an exact date for mandatory tagging is unknown, the CNGF is working with the Canadian Food Inspection Agency (CFIA) to define a mandatory program that will address the needs of goat producers. Once mandatory, all goats leaving premises of origin will be required to bear an approved tag.

In order to assist with traceback investigations and on-farm management, producers are encouraged to record the following information and keep it on-farm for at least five years:

- Animal ID number
- Date entering the premises
- Date leaving premises
- Destination of animal leaving the premises

## Critical for the future

The NGIP is critical to industry sustainability an growth. In a marketplace that is concerned about traceability, food safety, and animal health, an animal ID program is essential to maintaining domestic and international markets A national ID program for goats also supports the traceability efforts of the agriculture and food sector.



Canadian goat producers are encouraged to tag their animals with NGIP identifiers as part of the tagging trial and provide CNGF with feedback on tag performance.

## Tagging Tips

The ideal tagging environment is clean and dry with good lighting.

## How should tags be applied?

Proper placement of the tag is essential to prevent tag loss and other problems. Currently, goat producers have the option of tagging animals in one of two locations on the animal; either in the ear or in the tail webbing. The latter option is provided to address the concern of breeders of certain species of goats with small or very little ear tissue, and is also desirable for many dairy producers.



## Ear tagging

Tags should be placed close to the head for best retention and approximately mid-point in the ear from top to bottom. The male (post) portion of the tag should be at the back of the ear and the female portion inside the ear. The tag should be placed between the two main supporting veins of the ear.



## Tail tagging

For tagging animals in the tail web area it is important that the male (post) portion of the tag enter from the skin side as opposed to pushing through the hair side of the webbing. The tag should be placed mid-point of the webbing and sufficiently deep into the web and close to the body of the animal (i.e. behind the thickened 'rib' of the web).



Tagging animals as kids can result in fewer incidents of infection and provide for easier restraint of the animal and therefore better tag placement with less stress to the animal or handler and less chance of damage to the ear (or tail).

## **Topic Information**

## Fit for Transport?

Fit for transport refers to the guidelines around transporting only those animals that can handle the transport. Additionally, animals must be able to withstand the entire journey without pain or distress.

Typically, animals that are fit for transport are:

- Animals are bright, alert, moving and breathing normally
- Animals are in good body condition
- Animals are able to bear weight evenly on all limbs
- Animals are free from signs of disease (for example, normal feces, normal breathing, normal nasal discharges, no unhealed injuries, lesions or wounds)
- No inside body parts outside
- Not likely to give birth during the journey or be affected by metabolic conditions associated with late pregnancy or birth

The following guideline gives an overview of the whole decision tree and can be discusses with members to outline the requirements for transport.


# MEETING 6 – TEST THE PRODUCTS

## **Setting Objectives**

To allow members to try some recipes and to hold a BBQ!

Suggested Lesson Outcomes

- $\Box$  To cook with goat products.
- □ To have senior members present their senior member projects.

## Suggested Roll Call Questions:

- Find a cool recipe that uses a goat product and share it with the group.
- How do you use goat products?

### Sample Meeting Agenda Time: 2 Hours 20 Minutes

Welcome, call to order, pledge		10 minutes
Roll call		10 minutes
Parliamentary procedure	Minutes and Business	10-15 minutes
Senior Member Presentations	Niche Product Presentation	10 minutes
Activities Related to Topic	Activity #1- Have a BBQ	80 minutes
Wrap up, Social time and		20 minutes
adjournment		

## ACTIVITY #1 have a bbq?

DO	Time: 80 minutes Materials needed: The various ingredients from the attached recipes or other	Cook some recipes that focus on different breeds of goats (milk and meat) and have a BBQ to celebrate the achievements of the club. The following recipes are provided for ideas and it is highly suggested that members select recipes to try as a group!	
	members find.		
REFLECT		The objective is to cook with goat products.	
APPLY	Discuss the following prompts as a group	Will you cook with goat again? What did you like and what would you change?	

## Sour Cream (Source: Old 4-H Manual)

People used to make sour cream by letting the natural fermenting bacteria in cream sour it naturally. Since pasteurization destroys most of these organisms, the dairy industry produces commercial sour cream by adding a bacterial culture. The result is a delicious product with just the right degree of acidity.

You can make sour cream the same way at home, using cultured buttermilk as a starter.

500 mL table cream (10% butterfat) 25 mL buttermilk

Combine cream and buttermilk in stainless steel or glass bowl. Cover and let stand undisturbed at room temperature until set (20 to 24 hours). Refrigerate. Store in refrigerator for up to 3 days.

### Crème Fraiche (Source: Old 4-H Manual)

This product, from French cuisine, was traditionally made by allowing heavy cream (cream with a high butterfat content) to ferment naturally until it thickened and became fairly firm. Because it required unpasteurized cream, however, we have to alter the recipe to use modern pasteurized products.

Creme fraiche has a slightly acid taste which goes well with fresh, cooked, or processed fruit. It can also be used as a dessert topping.

250mLwhipping cream 250mLsour cream

Gradually add whipping cream to sour cream, beating only until smooth. Cover and let stand at room temperature until very thick (8 to 12 hours). Stir cream with a fork, cover and refrigerate at least 24 hours before using. May be stored up to 7 days.

Maple Peach Dessert (Source: Old 4-H Manual)

2 - 540 mL cans of peach halves well-drained150 mL maple syrup175 mL Creme fraiche

For each serving, place two peach halves in dessert dish. Drizzle with 25 mL maple syrup. Top each half with about I5 mL creme fraiche. Makes 6 servings.

## Homemade Ice Cream (Source: 4-H Ontario- Cloverbud Program)

Time: 25-30 minutes

Materials Needed:

- Small re-sealable bag
- 1 mL (1 tsp.) vanilla
- 15 mL (1 tbsp.) white sugar
- 125 mL (1/2 cup) 35% whipping cream (10% table cream or homogenized milk can also be used)
- Large re-sealable bag
- Ice
- 90 mL (6 tbsp.) table salt

Fill the large bag half full of ice. Add the 90mL of salt and seal the bag. Put the whipping cream, vanilla and sugar into the small bag and seal it. Place the small bag inside the large one and seal again, carefully. Shake the package (or rock back and forth) until the mixture turns into ice cream. This will take about 5 minutes. Wipe off the top of the small bag. Then open it carefully and enjoy!

Place ice/salt into a large can (e.g. large coffee can) and place the small can in the ice inside the large can. Put the lid on the large can tight! Have participants 'kick' the can around the room to shake the mixture inside to make it turn into ice cream.

2/25/22, 3:57 PM

#### allrecipes

## Pressure Cooker Goat Curry

#### \*\*\*\*

Tantalizing goat curry in a fraction of the time. Using an electric pressure cooker cuts down on the cooking time while still rendering tender meat. Serve over jasmine rice or with naan.

By jmerar

#### Ingredients

1/4 cup vegetable oil, divided

2 large onions, thinly sliced

2 large tomatoes, peeled and diced

2 tablespoons garlic paste

1 tablespoon ginger paste

 $2\,{}^{1\!\!/_{\! 2}}$  pounds goat meat, cubed

1 cup water

1 potato, cubed

1 large carrot, sliced

2 teaspoons garam masala

2 teaspoons ground coriander

1 teaspoon ground cumin

 $\frac{1}{2}$  teaspoon ground turmeric

2 teaspoons salt, or to taste

1/2 teaspoon ground red chile pepper

#### Directions

#### Step 1

Heat 2 tablespoons oil in an electric pressure cooker on the "Sear" setting. Add onions; cook and stir until golden brown, 10 to 15 minutes.

#### Step 2

Transfer onions to a food processor; grind into a paste. Remove to a bowl.

#### Step 3

Combine tomatoes, garlic paste, and ginger paste in the food processor; puree until smooth.

#### Step 4

Heat remaining 2 tablespoons oil in the pressure cooker using the "Sear" setting. Add onion paste; cook, stirring constantly, until browned, about 2 minutes. Stir in the tomato mixture. Add goat meat, water, potato, carrot, garam masala, coriander, cumin, turmeric, salt, and red chile pepper.

#### Step 5

Close pressure cooker and seal according to manufacturer's instructions. Set the timer for 50 minutes at high pressure. Release pressure using the natural-release method according to manufacturer's instructions.

#### **Nutrition Facts**

**Per Serving:** 255 calories; protein 25.8g; carbohydrates 13g; fat 10.1g; cholesterol 66.4mg; sodium 800.4mg.

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https://www.allrecipes.com/recipe/254958/pressure-cooker-goat-curry/?printview

1/2



Prep: 30 mins Cook: 1 hr 2 mins Total: 1 hr 32 mins Servings: 8 Yield: 8 servings

## Goat Masala (Source: https://www.meatpoultryon.ca/)

1 tbsp (15 mL) oil or ghee
1 lb (500 g) Ontario goat loin, trimmed & cut into bitesized pieces
1 large onion, chopped
1 carrot, chopped
2 tbsp (30 mL) mild curry paste\*\*\*
1 28 oz (796 mL) can diced tomatoes
1 cup (250 mL) chicken broth
1 cinnamon stick
¼ cup (50 mL) chopped, fresh cilantro



Steps:

(1) In a large skillet, heat oil or ghee over medium high heat. Add goat and brown, about 5 minutes. Transfer to bowl.

(2) In same skillet, cook onions until golden brown, stirring often, about 10 minutes. Add carrots and curry paste and cook one minute. Pour in tomatoes, scraping any brown bits from pan. Stir in broth and cinnamon stick and return goat to saucepan.

(3) Bring liquid to a simmer, cover and continue simmering for 20 minutes until goat is tender and vegetables are cooked through. Sprinkle with cilantro.

(4) Serve over steamed basmati rice.

Makes 4 servings

\*\*\*This recipe is for a mild curry, if you wish to increase the spiciness use a medium to hot curry paste.

This recipe can also be made in a slow cooker. Set to low and cook for 6-8 hours

## Roasted Beet, Spinach and Apple Salad



This salad is almost a meal in one and it's so good, you'll likely make it frequently.

Preparation Time: 10 minutes Cooking Time: 1 hour Servings: 6

## INGREDIENTS

- > 2 medium Ontario Beets, unpeeled and scrubbed
- > 2 slices Ontario Bacon
- > 3 tbsp (45 mL) olive oil
- > 2 tbsp (25 mL) red wine vinegar
- > 1 tbsp (15 mL) Ontario Maple Syrup
- > 2 tsp (10 mL) horseradish
- > 1/4 tsp (1 mL) **each** salt and pepper
- > 8 cups (2 L) lightly packed torn Ontario Spinach
- > 1 small unpeeled Ontario Apple, cored and diced
- > 1 pkg (113 g) creamy Ontario Goat Cheese, crumbled

## INSTRUCTIONS

Individually wrap each beet in double layer of foil. Roast on baking sheet in 425°F (220°C) oven until tender, about 1 hour. Let cool enough to handle; peel and cut into 1/2-inch (1 cm) thick wedges.

Meanwhile, cook bacon in skillet over medium heat until crisp. Let cool on paper towel; crumble.

Whisk together oil, vinegar, maple syrup, horseradish, salt and pepper. Place spinach in large bowl; toss with bacon, beets and apple. Toss with dressing. Serve sprinkled with crumbled goat cheese.

## NUTRITIONAL INFORMATION

- > Protein: 7.0 grams
- > Fat: 14.0 grams
- > Carbohydrate: 14.0 grams
- > Calories: 201
- > Fibre: 2.5 grams

## Chicken and Goat Brie Braid



Baking Time: 15 minutes Preparation Time: 20 minutes Cooking Time: 20 minutes Serves: 8

## INGREDIENTS

- > 2 tsp (10 mL) vegetable oil
- > 4 cloves Ontario Garlic, minced
- > 1 Ontario Leek (white and light green part), thinly sliced
- > 1 pkg (227 g) sliced Ontario Button Mushrooms
- > 6 boneless skinless Ontario Chicken Thighs (about 1-1/2 lb/750 g), chopped
- > 2 tbsp (25 mL) fresh Ontario Parsley Leaves
- > 1/4 tsp (1 mL) crushed red pepper flakes
- > 1/4 tsp (1 mL) **each** salt and pepper
- 1 round (165 g) Ontario Goat Brie Cheese, cut into bite-size pieces
- 🔉 1 pkg (600 g) pizza dough
- > 1 Ontario Egg, beaten Coarse Salt

## INSTRUCTIONS

In large nonstick skillet, heat oil over medium heat; cook garlic, leek and mushrooms until softened, about 5 minutes, stirring occasionally. Add chicken, parsley, red pepper flakes, salt and pepper; sauté 12 minutes or until cooked through. Remove from heat, stir in Brie; cool slightly.

Meanwhile, on lightly floured surface, roll out dough to 12- x 16-inch (30 x 40 cm) rectangle. Place on parchment paper-lined baking sheet. Spoon chicken mixture in centre of dough, leaving 2-inch (5 cm) border at short ends and 3-inch (8 cm) on long sides. Cut diagonal slashes, about 2-inches (5 cm) wide, along both long sides of dough. Criss-cross strips over filling to cover and create a braided look.

Brush braid with egg and sprinkle with coarse salt. Bake in 400°F (200°C) oven until golden brown, about 15 minutes.

### NUTRITIONAL INFORMATION

1 Serving (When recipe serves 8):

- > PROTEIN: 27 grams
- > FAT: 14 grams
- CARBOHYDRATE: 39 grams
- > CALORIES: 390
- > FIBRE: 2 grams

## Goat Cheddar Crusted Pepper Onion Tart



Chilling Time: 30 minutes Baking Time: 30 minutes Preparation Time: 20 minutes Cooking Time: 15 minutes Serves: 8

### INGREDIENTS

- > 1-1/2 cups (375 mL) all-purpose flour
- > 1/2 cup (125 mL) shredded Ontario Aged White Goat Cheddar Cheese
- 1/4 tsp (1 mL) salt
- > 1/2 cup (125 mL) unsalted butter, cubed
- 6 tbsp (90 mL) cold water (approx)

#### Filling:

- > 1 tbsp (15 mL) vegetable oil
- > 2 Ontario Greenhouse Sweet Red Peppers, chopped
- 1 large Ontario Onion, chopped
- > 1-1/2 tsp (7 mL) dried thyme leaves
- > 1/2 tsp (2 mL) each salt and pepper
- > 4 Ontario Eggs
- > 1 cup (250 mL) 10% half-and-half Ontario Cream
- > 1 tbsp (15 mL) all-purpose flour
- > 1/3 cup (75 mL) Ontario Herb Goat Cheese

## INSTRUCTIONS

In large bowl, combine flour, cheese and salt. Cut in butter using pastry blender until mixture begins to clump together. Add water, 1 tablespoon (15 mL) at a time, until dough holds together. Gather into ball and form disc. Wrap in plastic wrap and chill for 30 minutes.

**Filling:** Meanwhile, in large nonstick skillet, heat oil over medium-high heat; cook red peppers, onion and thyme for 5 minutes; stirring occasionally. Reduce heat to medium; add half each of the salt and pepper; cook, stirring, until softened, about 8 minutes. Set aside. On floured surface, roll out pastry to 14-inch (35 cm) circle. Place in 10-inch (25 cm) deep dish pie plate. Fold over excess and crimp edge. Spread onion mixture evenly in crust. In medium bowl, whisk together eggs, cream, flour and remaining salt and pepper. Pour evenly over onion mixture. Bake in lower third of 400°F (200°C) oven for 15 minutes. Sprinkle herb goat cheese over top; bake another 15 minutes or until knife comes out clean when inserted in centre. Let stand for 10 minutes.