



NOVA SCOTIA DEPARTMENT OF AGRICULTURE

Sheep Production Manual

A Guide for 4-H Leaders
and Beginning Farmers

Sheep Production Manual

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Disclaimer

This manual is intended to be a resource that provides educational information for 4-H leaders and people who are interested in getting involved in raising livestock. It covers topics such as breeds, husbandry, nutrition, health, safety, and business.

This manual's appendix includes a section that outlines topics and activities for 4-H meetings. The content included in this guide is meant to be a reference only.

Readers who require additional information, specific regulations, or more details are asked to contact the Nova Scotia Department of Agriculture Regional offices for assistance:

<https://novascotia.ca/agri/programs-and-services/regional-services/>

While care has been taken to ensure the information in this booklet is accurate, recommendations, guidelines, and regulations may change at any time. Authority rests with the relevant regulatory body.

Thank you

Special acknowledgment and thanks to Susan Schoenian, Sheep and Goat Specialist, at the University of Maryland Extension. With permission, content found in this manual has been sourced from Susan's two online resources: www.sheep101.info/ and www.sheep101.info/201/.

Introduction

Sheep originated in the mountains of central Asia and were among the first animals to be domesticated 10,000 years ago. These wild sheep did not look much like domesticated sheep. They had coarse hair instead of wool and were much bigger than most domestic sheep today.

Gradually, the domestic sheep evolved from their wild ancestors. After many generations, their coarse hair was replaced by soft wool. At first, sheep were raised to produce hides and milk, not meat or wool, as they are today. Sheep have only become important as meat animals during the past 200 years. Also, they were sometimes used as pack animals.

Today, domestic sheep are raised around the world. Careful breeding selection over centuries has resulted in more than 800 different breeds of sheep worldwide, 52 of these breeds are present in Canada. These breeds vary in wool type, flocking instinct, physical characteristics, meat production, and other economically important traits. In Australia, the leading sheep raising country, there are thirteen times as many sheep as there are people.

In 1664 the first sheep were introduced to Canada. By 1667 in what is now known as Quebec, there were 45 sheep that had been brought from France. In the area now known as Nova Scotia, there were 407 sheep in 1671. Sheep were not introduced into western Canada until approximately the middle of the 19th century.¹

¹ The Canadian Encyclopedia – “Sheep Farming” by Francois Castonguay

Section 1: Selecting an Animal

What to Look For

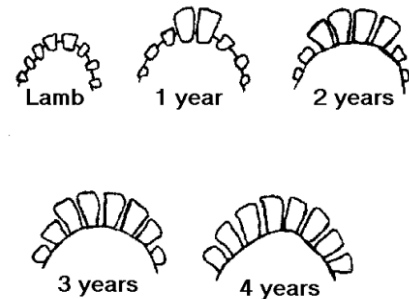
It can take years of experience to be able to accurately select a good lamb. If it is your first time purchasing sheep, you should seek the advice of others. There are many characteristics to look for and the following lists provide some information on selecting lambs, as well as adult sheep.

Growthiness—This refers to the size of the sheep for its breed. Ideally, you should select a rapid-gaining sheep as they make the most efficient use of feed.

Soundness—Examine the feet and legs for any faults or blemishes. When the feet are well trimmed, a sheep should stand squarely on them. Select sheep with short, strong pasterns (ankle bones), and straight legs, with plenty of width between them. Crooked legs and weak pasterns decrease a sheep's ability to move and perform. They can also decrease the number of years of reproductive usefulness.

Udder—If purchasing a ewe that has produced at least one lamb crop, check its udder to be sure both teats are present and functional. Also check that there are no lumps or hard areas.

Age—Sheep can be aged by examining their lower incisor teeth. Until one year of age, lambs are limited to eight small, temporary incisors on their lower jaw. The top jaw has no teeth, only a dental pad. From one year on, the pairs of temporary teeth are replaced by two permanent teeth, which are noticeably larger. The central pair are the first set of teeth to be replaced. By age four, all temporary teeth have been replaced by permanent teeth, which is known as “solid mouth.” Once this point is reached, it is no longer possible to accurately determine age by teeth. After age four, permanent incisors will spread, wear, and can break or fall out. Sheep missing one or more permanent teeth are referred to as “broken mouth.”



Condition of birth—Your first choice should always be a ewe from a multiple birth. By selecting for twinning, you can further increase your lambing percentage. A set of twins can be more profitable than a good single lamb.

Wool—Select sheep with a dense, uniform, high-quality fleece, with no dark fibres.

Sex character—Try to select ewes that appear feminine, and rams that appear masculine.

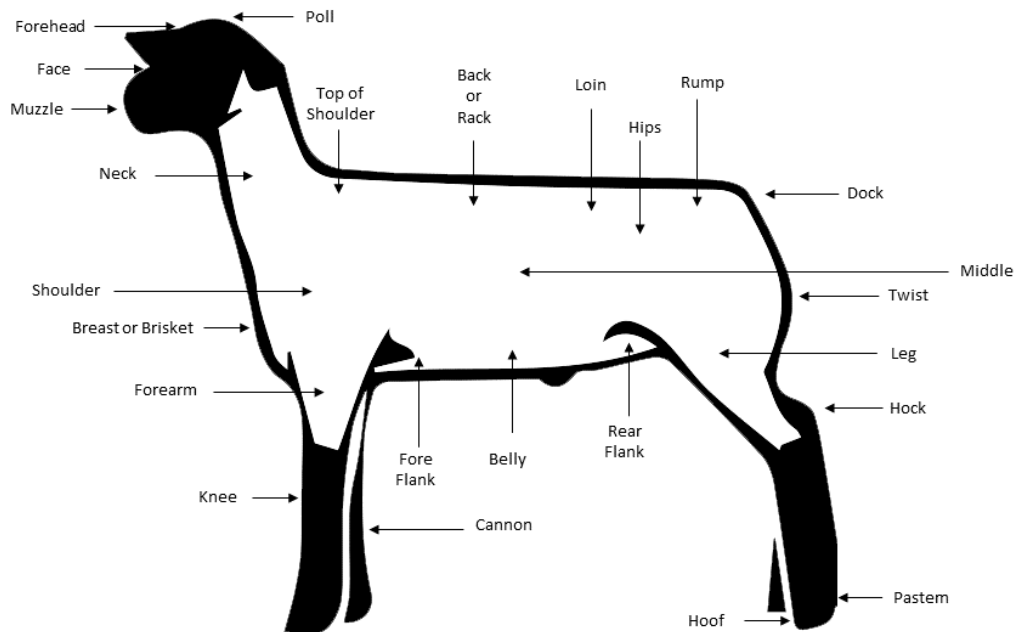
Breed type—When purchasing a lamb, keep the ideal characteristics for the particular breed in mind and compare your potential purchase to them. This is especially important when you are purchasing purebred livestock and livestock for show.

Fertility—Fertility can really only be judged once the animals begin to perform. When selecting rams, you may wish to have the semen tested to determine the fertility level.

Conformation

The ideal conformation will vary among different breeds of sheep, and every breed has an ideal standard. Generally, a sheep with good conformation has the following qualities:

- Smooth shoulders
- Fullness through the heart and spring of rib
- Long body, especially in the length from the last rib to the dock
- Wide and straight top line
- Long, wide and level rump
- Deep, thick and full hind legs
- Overall balance—blending together of body parts



The following is a scorecard from the Canadian Sheep Breeders' Association. This scorecard can be used to judge or evaluate purebred breeding stock on their physical appearance. It is important when selecting breeding stock that you consider other factors such as performance data, extended pedigree, etc.

POINTS

	Meat Breeds	Wool Breeds	Hair Breeds
General appearance	25	20	25
Physical soundness	20	20	20
Body conformation	40	20	40
Wool	15	40	0
Colour and covering	0	0	15
Total	100	100	100

General Appearance

- The overall appearance should be pleasing.
- Rams are masculine with strong bone.
- Ewes are feminine and refined.
- Breed characteristics are displayed.
- The sheep is balanced and all body parts blend smoothly together.
- The animal has a lot of conditioning and finish.

Physical Soundness

- The animal has a smooth gait.
- The legs are strong, straight, and have heavy bone.
- The animal appears healthy and vigorous.
- The legs stand squarely under the body.

Body Conformation

- Deep, wide, and full chest and heart girth.
- Straight, strong, broad back.
- Thick, wide and long loin.
- Large spring of rib.
- Deep bodied.
- Even covering of firm flesh.
- The animal is well muscled but not over conditioned.
- The size and scale is consistent with the breed, age, and sex of the animal.
- Sound mouth with the teeth meeting the upper pad evenly. Under or overshot mouths are a serious defect.

Hindquarters

- Deep, thick, and firm thighs.
- Deep, full and firm twist.
- Long, level, and wide rump.
- Squared at the dock.
- Hind legs are set wide apart.
- Strong pasterns and hocks.

Forequarters

- Broad, deep, and full brisket.
- Clean boned.
- Front legs are wide and straight.
- Strong front pasterns.
- Sound feet.
- Compact and smooth shoulders.

Head and Neck

- Rams have a strong, masculine head with a thick neck.
- Ewes have a feminine and refined head.
- Face is broad.
- Clean through the throat.

Fleece

- Finest quality wool is found at shoulder.
- Colour conforms with breed standard.
- Consider length, wave, and density.
- Fleece should be uniform in fineness.
- Clean, shiny, and soft fleece.

Breed Type

Sheep are commonly classified according to their purpose (dairy, maternal, meat, prolific or wool) and by the type of fibre they grow (fine, medium, long, or hair).

Dairy Breeds

There are not many breeds of sheep in Canada known for their milk production. This is partially due to the Canadian sheep milk dairy sector not being well developed. Breeds in Canada known for quality milk production are East Friesian and British Milksheep.

Maternal Breeds

Maternal breeds are known for their ability to raise lambs. They have well developed maternal instincts, higher than average milk production and a record for low lamb mortality. In Canada, Dorset and Polypay are popular breeds with these characteristics.

Meat Breeds

Meat, or terminal breeds, have a fast growth rate, mature to a larger size, and produce meat that is low in fat deposition and has good muscular development. Lamb carcasses have well-muscled shoulders, loin, and legs, and have a lean fat cover. Ewes tend to have a lower lambing percentage, but the resulting lambs have a higher birth weight. This could potentially cause problems for a smaller ewe.

A terminal sire is a ram whose offspring are marketed for slaughter. The most common breeds of terminal sires in Canada are Hampshire, Canadian Arcott, Charolais, Suffolk, Texel, and Ile de France.

Prolific Breeds

Prolific breeds of sheep are renowned for their ability to produce multiple lambs, sometimes averaging three lambs per lambing. Prolific breeds of sheep are often crossed with maternal breeds to produce a cross bred ewe for commercial sheep production and often are able to naturally breed out of season. The most commonly used prolific breeds in Canada are Canadian Arcott, Rideau Arcott, Dorset and Romanov.

Wool Breeds

Most sheep breeds produce wool. The Canadian Cooperative Wool Growers will buy wool of any sheep breed although the price is generally low. Wool can be sold profitably to fibre artists and hand-spinners in Canada, who tend to prefer the wool from the long wool breeds of sheep that are known for their crimp, diameter, staple, strength and luster. Examples of wool breeds commonly found in Canada are Border Leicester, Cotswold, Icelandic and Romney. For more information about the wool quality of different sheep breeds, visit www.localfibrelove.ca.

Sheep Breeds

Bluefaced Leicester

Maternal, Meat, Wool

This breed is also known as Hexham Leicester and they are an English long-wool type. This breed was selected for performance, dark-blue facial skin, and finer fleeces. In North America, the North Country Cheviot, Scottish blackface, Clun Forest, and Shetland are commonly crossed with Bluefaced Leicester to produce mules. Mules inherit prolificacy, milking ability, body length, and fleece quality from the Bluefaced Leicester. This breed is popular with hand spinners because of the fineness, lustre, and length of staple.



Image Copyright: bib.ge

Border Cheviot

Meat

The Border Cheviot originated from Scotland and has been bred in Canada since the 1850s. The breed is said to be a cross between Merino and local Scottish sheep. They are a vigorous and hardy breed that can survive harsh conditions. The ewes are small framed and good foragers so they take less feed for maintenance. They make great mothers and need little help at lambing.



Image Copyright: sheepbreeders.ca

Border Leicester

Maternal, Meat, Wool

The Border Leicester is an old British long-wool breed that was imported to Canada from England in the mid-nineteenth century. This breed was extremely popular in the early Canadian sheep industry; however, an emphasis on meat production caused the population to decline in the 1950s. Today the Leicester line is present in many modern breeds and is an excellent maternal breed for producing lamb on pasture. The ewes are moderately prolific, good milkers, and lamb easily. They are a forage-based breed and do not have heavy protein requirements.

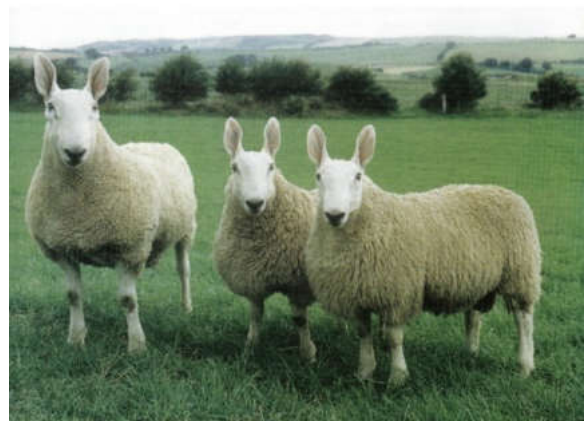


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Charollais

Meat

The Charollais was developed in France and further improved in the UK in 1977. In 1994, Charollais embryos were exported to Canada where the primary purpose of the breed is as a terminal sire for prime lamb meat production. The lambs have an excellent carcass with wide and long loins and a high meat yield. The breed's smaller head and wedge-shaped body makes delivery during lambing easy. The ewes work well on pasture or confinement-based system. The fleece of a purebred is medium quality.



Image Copyright: sheepbreeders.ca

Clun Forest

Maternal, Meat

Clun Forest sheep are local to upland hill country between England and Wales. The first flock was imported into Nova Scotia in the 1970s. They are easy keepers and are able to withstand harsh conditions while still producing good lambs. For these reasons, they have become popular in pasture-based systems across Canada and the United States. The breed is maternal and the ewes generally produce twins. They are typically used in a crossbreeding program with Suffolk and Hampshire rams to produce market lambs.



Image Copyright: petmapz.com

Cotswold

Wool

Cotswold are a long-wool breed from England. They were imported into North America during the nineteenth century. After the 1920s, the breed's popularity declined in favour of Merino for wool and the Dorset and Suffolk for meat. Cotswold ewes are docile, easy keepers, and good mothers that are best suited to pasture management. Lambs are slow finishers and ewes are often crossed with Dorset or Suffolk rams to produce vigorous and fast-growing lambs.



Image Copyright: thegrocer.co.uk

Dorper

Meat

Dorpers are white sheep with a black head and neck and complete dark pigmentation of exposed skin. They have a short and loose mixture of hair and wool with a natural clean kemp underline. The Dorper was originally developed as a meat sheep. The breed is able to breed out of season. They are non-selective grazers and can withstand severe conditions. They are known for their increased natural resistance to parasites.



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Dorset (Polled and Horned)

Maternal, Meat, Prolific

The Polled Dorset is one of Canada's most popular breeds. Dorset ewes are very prolific and are good mothers with heavy milk production. They are known for breeding well out of a season. The lambs are light feeders with quick weight gain. Horned Dorset rams make good terminal flock sires, producing lambs with heavy-muscled carcasses. Dorsets are easy keepers and respond well to a confined management system; therefore, they are a favourite among producers interested in intensive production on a small acreage



Image Copyright: sheepbreeders.ca

East Friesian Dairy

Dairy

This breed originated in Friesland, Holland, and Germany. These sheep have high milk production and adapt well to intensive parlour milking. They are prolific and a good ewe will have a lactation period of 220 days while averaging 400 L of milk. Friesians are often used in crossbreeding to improve milk yields and prolificacy of other breeds. In Canada, this breed was used to develop the Rideau Arcott.



Image Copyright: eastfriesians.com.au

Hampshire

Meat

Alongside the Suffolk and the Dorset, Hampshire sheep have been a consistently popular breed in Canada. They are a large, stocky sheep and their faces and legs are black with wool on them. The Hampshire is known for their extremely fast growth rate and superior meat characteristics. The ewes are average in prolificacy, long lived, easy keepers, and adaptive to confinement or pasture management. Hampshire rams make excellent terminal sires. They consistently birth large lambs with the Hampshire loin and leg; therefore, large ewes should be used. Due to their docile nature and easy management, Hampshires are ideal for a small-farm flock.



Image Copyright: sheepbreeders.ca

Icelandic

Wool

This breed originated from Northern European short-tail breeds brought to Iceland by the Vikings in the middle ages. They are a vigorous and hardy breed and were first imported to Canada in 1985. They are one of the oldest and purest domesticated breeds of sheep. Genetically, they are the same as they were 1,100 years ago. They are a medium-sized, low-set and stocky sheep that produces a thick, light fleece in a variety of colours. They are genetically horned but there are a number of naturally polled individuals. Ewes are seasonal and are generally bred from October to May. Canada maintains a registry for all Icelandic sheep in Canada and the US.



Image Copyright: icelanddefrosted.com

Ile de France

Meat, Wool

This breed has two primary purposes: act as a terminal sire to produce hardy and fast-growing lambs with excellent carcass traits; and improve crossbreeds with maternal breeds in commercial flocks. This breed adds hardiness, longevity, feed conversion, and out-of-season breeding ability. Their wool is high quality, they have great flocking instincts, and are very successful when raised on pasture.



Image Copyright: bib.ge

North Country Cheviot

Maternal, Meat, Wool

North Country Cheviot sheep are intelligent, independent, resourceful, and among the healthiest and most long-lived breeds. They are vigorous and hardy in harsh climates, which makes them well suited for non-intensive pasture-management systems. The breed evolved in the rugged Scottish Highlands where ewes were left to lamb alone. Newborn lamb survival was credited to their ability to get up, nurse, and run minutes after birth. Carrying forth those traits, North Country ewes are superior mothers that deliver spry lambs with ease. Also, they have the longest lactation period among the more popular sheep breeds. Their carcass quality is very good, with a high red meat content and above-average yield despite their average rate of gain. North Country rams are popular in crossbreeding programs due to their strong maternal instincts and improved carcass quality. Although primarily raised for meat, hand spinners are known to enjoy working with North Country fleece.



Image Copyright: northcountrycheviot.ca

Oxford

Meat

This breed originated in Britain from a cross between Hampshire rams and Cotswold ewes during the mid-nineteenth century. The breed was exported to Canada in the 1860s and was popular for its toughness and adaptability. Since the early 1970s, the breed has lost its popularity due to wool blindness and lack of full hindquarters; however, improvements in these areas are being made. Ewes are excellent mothers with a high survival rate for lambs. Lambs are slow developers but thrive on pasture-based management.



Image Copyright: bib.ge

Polypay

Maternal, Meat, Prolific

The Polypay breed of sheep was developed at the U.S. Sheep Experiment Station in Dubois, Idaho, in 1975. Researchers were looking to develop a sheep that could produce two lamb crops and one wool crop per year, and they took their genetics from four breeds (Targhee x Dorest and Rambouillet x Finnsheep). The resulting Polypay breed is a medium-sized, very prolific sheep. The ewes are good mothers and strong milk producers. They breed well out of season and produce fast-growing lambs and high-yielding carcasses. Polypay are docile and versatile; they will thrive in pasture, rotational grazing, and confinement systems.



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Rideau Arcott

Maternal, Meat, Prolific

The Rideau Arcott is a purebred sheep developed by Agriculture Canada at the Animal Research Centre in Ottawa during the late 1960s and into the 80s. Researchers mainly combined the Finnish Landrace, Suffolk, and East Friesian breeds to produce a dam-line breed for crossbreeding that had high prolificacy, strong milk production, and good body conformation and growth rate. Rideau Arcott ewe lambs reach sexual maturity at seven to eight months and can lamb at one year. Ewes require extra management at lambing as 50 per cent of ewes carry triplets or more during pregnancy and another 40 per cent carry twins.



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Romanov

Meat, Prolific

Romanov sheep were introduced to Canadian farms in 1986. They are a fine-boned, medium-sized breed, with extraordinary prolificacy. While most breeds give birth to singles and twins, the Romanov averages two to five lambs per lambing. Strong fertility genetics has made the Romanov breed popular among intensive commercial operations with accelerated lambing programs. Lambs are born pure black but turn grey with age. They are hardy and grow well, producing lean carcasses. Their grey wool, mixed with black guard hair, is used in wool textile production.



Image Copyright: romanovsheep.eu

Southdown

Meat

This breed was developed in Sussex during the late 1700s and early 1800s. In Canada, it is known for its ability to flesh out a small carcass. Through careful breeding selection, the breed is able to produce meaty carcasses for medium and light lamb markets. It is a docile breed and adapts well to confinement. Due to its size and temperament, it is an excellent breed for starter flocks.



Image Copyright: worldofwool.co.uk

Suffolk

Meat

The Suffolk is the dominant sheep breed in Canada, and other parts of the world. They are a large breed with distinctive black, wool-free head and legs. Ewe lambs normally produce twin lambs with exceedingly high gain rates and they thrive in a confined system. Combining those traits, along with high carcass quality and high red meat content, Suffolk are believed to offer the best economic return in the industry. Rams are desired as terminal sires to pass along valuable meat production traits. Research has shown that moderate-sized Suffolk sheep are efficient converters of feed, shorter-lived than white-faced breeds, and thrive best on small, well-managed acreages and farms.



Image Copyright: sheepbreeders.ca

Texel

Meat

This breed originated on the island of Texel and is a meat sheep that produces a lean, high-yielding, and well-muscled carcass. This sheep breed has made significant contributions to Canada's prime lamb trade through using Texel rams as terminal sires in crossbreeding programs. Ewes have average prolificacy and are docile and easy to manage. They adapt well to pasture or feedlot management and have excellent feed conversion in all systems.



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Section 2: Care and Management

Code of Practice

Canada's National Farm Animal Care Council has developed a *Code of Practice for the Care and Handling of Sheep* that outlines proper care and handling techniques for these animals. The code contains recommendations for housing and management practices, as well as transportation and processing. Find the full code at http://www.nfacc.ca/pdfs/codes/sheep_code_of_practice.pdf.

The codes of practice are nationally developed guidelines that serve as the foundation for ensuring farm animals are looked after using sound management and welfare practices that promote animal health and well-being. Codes are used as educational tools, reference materials for regulations, and the foundation for industry animal-care assessment programs. The codes aim to provide feasible and scientifically informed approaches to meeting an animal's health and welfare needs, contributing to a sustainable and internationally competitive farming industry.

The management provided by the person(s) responsible for the daily care of animals has a significant influence on the animals' welfare. If you are the one responsible, you should consider the following key aspects of care:

- Shelter and comfort
- Feed and water to maintain health
- Social needs
- Humane handling
- Disease prevention and control
- Veterinary care, diagnosis, and treatment
- Timely euthanasia of any animal that is not responding to treatment or is experiencing pain that cannot be relieved
- Emergency preparedness

Housing

In Canada, sheep are raised in a variety of different systems such as outdoor, indoor, total confinement, and hybrid systems that allow sheep access to both indoors and outdoors. Your sheep's housing needs will vary depending on the environment, season, breed, and type of production. You should always take your sheep's adaptability, physical attributes, and behavioural patterns into consideration when deciding on what type of housing you will use.

A sheep's ability to cope with its environment depends on several factors:

- Age—Lambs are especially vulnerable
- Degree of fleece covering—Have your sheep been recently sheared?
- Body condition
- Access to feed, water, and shelter
- Degree of acclimation—Genetics, flock and previous exposure
- Health status—Are your sheep currently ill?

Sheep shelters can consist of buildings, a pole shed, or may be as simple as a shelterbelt tree plantation or a windbreak. When building an indoor shelter, design it to be clean, sanitary, and well ventilated. No matter what management style you choose, you must provide shelter, either natural or human made, from extreme temperatures, rain, snow, and wind. All housing should be designed and maintained to keep sheep in and prevent them from being injured. The building must be large enough that the sheep have sufficient floor space to lie down, turn around, and move freely.

Table 1. Minimum Recommended Floor Space Requirements for Sheep

	Ewes or Rams	Feeder Lambs
Feedlot		
m ² /head [ft ² /head]		
Hard surface	1.4 [16]	0.6 [6.5]
*Soil	6.5 [70]	2.8 [30]
Open-front Shed Floor Area		
m ² /head [ft ² /head]		
Pregnant ewe	1.4 [15]	0.6 [6.5]
Ewe and lamb(s)	1.5 [16]	
Ram	1.0 [11]	
Dry ewe	0.93 [10]	
Ceiling height (min)	2.7m (9ft)	2.7 m (9ft)
Slotted floors m ² /head [ft ² /head]	0.65 [7]	0.4 [4.3]
% Floor area slotted	100%	100%
Slot width (mm) [in]	19 [0.75]	16 [0.6]
Slat width (mm)	50-75 [2-3]	50-75 [2-3]

**Soil-surfaced feedlots should only be used where annual precipitation is less than 500 mm (20 in). You should provide a paved feeding strip next to each feed bunk. This paved strip should be at least 1.8 m (6 ft.) wide and be wide enough to fit a tractor for cleaning. The strip should slope 1:25 away from the feed bunk*

Types of Housing

Loose Housing

This is the most common type of housing. Benefits of loose housing:

- Sheep are free to wander.
- Sheep can get more exercise.
- Sheep can easily socialize.
- Feeders and waterers can be quickly filled.
- Pens can be set up for cleaning with a tractor and loader.
- Requires few dividers so there is minimal cost and time spent setting up.

Disadvantages of loose housing:

- Aggressive sheep can bully shy sheep.
- Sheep do not usually receive individual attention.
- You cannot adjust feed for individual needs.

Individual Stalls

Sheep can be housed in individual stalls and turned out for exercise. Stall doors should be designed to swing outwards; otherwise, bedding can become piled up against the doors making it difficult to open them.

Advantages of individual stalls:

- Sheep usually receive more individual attention.
- Sheep can be fed individually.
- Sheep do not have to compete for food or living space.

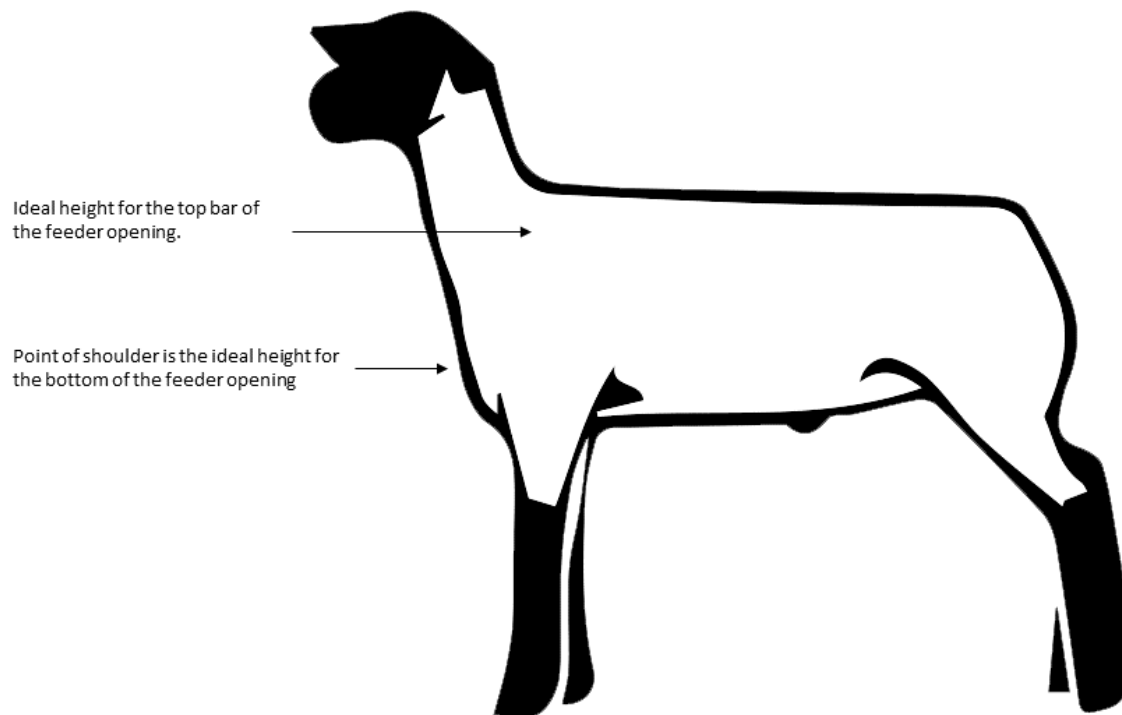
Disadvantages of individual stalls:

- Sheep must be let out for exercise.
- Not as much opportunity for socialization.
- Feeders and waterers must be individually filled, requiring increased labour.
- Stalls are usually cleaned out by hand with a pitchfork and wheelbarrow.
- Individual stalls require more dividers, doors, feeders, and waterers so the cost and time to build is greater compared to loose housing.

Feeders and Waterers

Feeders and waterers should be designed to ensure the following:

- The height and design make it easy to eat and drink comfortably and naturally for all sheep.
- Animals do not become trapped or injured.
- There is sufficient feeding and drinking space to ensure all sheep have access to food.
- Feed/water does not become contaminated by animals jumping or defecating into the containers.



Bedding and Manure Management

All sheep housing should be well drained to avoid damp conditions. Bedding should provide warmth and insulation. It should be used in all stalls unless slotted floors are used. Straw, wood shavings, paper, and peat moss are all commonly used as bedding. Manure and waste can harbour and spread disease, so it is important to frequently clean pens and properly manage waste.

Ventilation

Ventilation is the process of intentionally letting fresh outside air into an indoor space to control the air quality. Air quality is regulated by diluting and displacing pollutants such as dust, odours, or gases. Dust from grain, hay, and dried manure floats around in barns; this can cause respiratory problems and worsen allergies. It is important to be careful around enclosed areas containing manure as gases from the manure can kill people and animals.

Along with air quality, ventilation can also control the temperature and humidity to make the space more comfortable for you and your animal. Humidity is moisture in the air. Too much of it can cause your animals' housing to become damp, which may result in sick animals. Sheep are better off cool and dry, versus warm and damp. Humidity can also be damaging to milking equipment and machinery. Sheep naturally give off heat and moisture, so you need to make sure there is adequate ventilation to let excess heat and moisture escape the barn. Ideally, humidity levels in the barn will stay under 75–80 per cent.

Predators

Sheep are docile animals and are unable to protect themselves. Losing your flock to predation has massive economic implications, so it is important to follow proper predation management techniques. In Nova Scotia, the most common predators for sheep are coyotes. However, domestic dogs, eagles, and bears are also a threat. Some common indications of a possible predator attack are

- agitated livestock
- holes dug under a fence
- hair on fence
- wool pulls on a sheep (especially on sides, shoulders, or rumps)

Proper fencing is an excellent way to keep your flock safe. There are two objectives in fencing sheep: 1) to keep the sheep in, and 2) to keep predators out. Woven wire is the most common fencing material used for sheep, but boards, rails, and barbed wire can also be used. High-voltage electric fences tend to be less expensive and are easier to maintain. Electric fencing can be used alongside or in combination with net-wire. Barbed-wire and board fences are the least desirable as they can damage wool and also have a higher cost.

Guard animals, such as dogs, donkeys, and llamas, are also an excellent option. It is important if you are using a guard animal that the animal is well bonded with your flock so it develops a protective instinct towards them.

It is also important for farmers to properly dispose of any dead carcasses or afterbirth as predators may develop a taste for it and continue to return to your farm. There are also several repellents and frightening devices available on the market to scare predators away from your flock. After a while, predators may become accustomed to these devices so variation is key.

If all other methods to deter predators have failed, predator reduction may be an option. Farmers are able to hunt and shoot coyotes on their own land. To trap or snare, a farmer must obtain a trapper's licence.

When dealing with predators that a combination of methods to successfully keep your flock safe.

Sheep Management

In Canada, there are currently four main sheep-management systems in use:

1. Extensive sheep production
2. Intensive sheep production
3. Farm flock
4. Feedlot production

The type of sheep-management system used depends on a number of factors, such as the number of sheep, the amount and quality of grazing land, the amount of labour available, and the climate. Most management systems will require some physical structures, such as pens, feeders, and fences.

Extensive Sheep Production

This type of management system involves large flock sizes that are kept outside year-round on pasture. Lambs are born in the pastures during spring. They are raised on grass and weaned in the fall. Then they are shipped at eight to ten months of age. This management system is primarily found in the prairie provinces, although there are sheep raised this way on the islands off south-west Nova Scotia. These systems are characterized by spring lambing, and range pastures during the summer grazing season. Lambs are marketed in the fall as either finished or feeder lambs. Ewes are bred on range in the late fall and winter, usually with some sort of shelter.

Intensive Sheep Production

This type of production focuses on effectiveness in reproduction, lamb management, and finishing. Often these lambs are raised inside year-round. As a result, this is the most expensive management system and there are few controlled-environment operations in Canada. Lambs can be marketed all the time and can be shipped at finished weights earlier, at three to six months of age. Ewes in an intensive-production system are selected for their ability to produce vigorous multiple litters and have an extended breeding season.

Farm Flock

This is the most common management system in Canada. Lambs are born in barns, pasture grazed during the summer, weaned and sold in the fall to a feedlot, or corralled and kept in a feedlot over the winter until market. Farm flocks tend to be a more expensive operation than range flocks due to the cost of buildings, land, feed, and labour. Effective management of resources and maximizing market potential is necessary for these operations to be profitable. Generally, the greater the amount of lamb marketed annually, the greater the profitability in farm flocks. The producer can often use out-of-season marketing, accelerated lambing, purebred operations, and careful breeding to increase profitability.

Feedlot Production

Feedlots usually obtain their feeder lambs from range or farm flocks. These lambs usually have yet to be sufficiently finished for slaughter. Feedlot lambs are typically purchased at weights of 22.6–27.2 kg (50–60 lbs.) or more and marketed at 40.8–54.4 kg (90–120 lbs.). Lambs are kept at the feedlot for 60 to 90 days before reaching market weight. A feedlot producer has no need to maintain a breeding flock if they are primarily in the business of finishing lambs. Disease and health issues can be a serious problem with feedlot production as sheep are bought from multiple different sources. Monitoring lambs and good record keeping is essential. Compared to other types of sheep production, the margin of profit associated with feeder lambs is often very slim. Therefore, care must be taken to ensure maximum gain and feed efficiency. Chutes and sorting facilities can often reduce the labour costs associated with disease prevention at feedlots.

Handling Sheep

Sheep may need to be handled for a variety of reasons, such as to provide veterinary care, production, moving sheep on the farm, and for transportation, etc. Handling sheep is often stressful for the animal. Understanding sheep behaviour and proper handling techniques is key for both animal and handler safety.

Sheep Behaviour

Sheep are social animals and their flock behaviour protects them against predators. Dams and their lambs can form a strong social bond that remains intact until separation. Subgroups within a flock can also form a bond and become distressed if they are separated. Sheep are able to recognize the faces of other sheep and interpret their emotions. Sheep may fight to establish a social hierarchy, especially in single-sex and single-aged groups. Sheep should always have visual contact with other sheep. A sheep's strong flocking and following instinct can be utilized to help in the handling process.

Sheep are easily startled by sudden changes, such as loud noises or quick movement. You should always move slowly and quietly around sheep without sneaking up on them. Sheep have a flight zone and a safe following distance behind the flock is three to four metres. You can help reduce stress by using positive reinforcement, such as food rewards; by getting them used to the handling area; and by being consistent in your handling methods.

Handling Techniques

When handling sheep, use the minimum amount of restraint possible. Do not lift or pull a sheep by its fleece, tail, legs, ears, neck, or horns as this can bruise and injure the sheep. A well-trained dog can be a great asset and save a lot of time and effort when moving sheep. However, a poorly trained dog can frighten the sheep and make handling more difficult. If you are using a dog, make sure it is properly trained and your sheep are familiar with it.

Transporting Sheep

Most sheep will have to be transported at some point in their life. The federal requirements for animal transportation are covered under the Health of Animal Regulations. The Canadian Food Inspection Agency (CFIA) enforces these regulations with the help of other federal, provincial, and territorial authorities. Here are some tips to ensure the trip is as stress free as possible for both the sheep and the handler:

- Before transporting animals, ensure all the sheep are fit for transportation. If the animal is deemed unfit for transport, it should not be shipped.
- Animals should be segregated based on size, sex, age, and temperament.
- When lifting sheep onto a truck, be sure to lift by supporting their chest and abdomen and not by the fleece, head, horns, ears, or legs.
- When using chutes and ramps, make sure they are properly designed. Footing should be safe, and sides should be high enough to prevent sheep from falling or jumping off.
- Make sure the sheep have enough space during transportation. They should not be crowded.
- Make sure the transport vehicle is appropriate for transporting sheep. It should have high sides, a floor with secure footing, be properly ventilated, and provisions should be made for urine absorption.
- On long trips, check sheep within the first hour of loading, and every two to three hours following this.
- Special precautions must be taken in hot/humid weather and in cold weather. In hot weather, reduce loading density and ensure lots of airflow. In cold weather make sure sheep are kept dry and protected from direct contact with cold metal surfaces.

NOTE

For more information on handling sheep and transportation, view the link for the National Farm Animal Care Council *Codes of Practice for the Care and Handling of Sheep* as well as *Code of Practice for Transportation* provided under the Additional Resources section at the end of this manual.

Traceability

In Nova Scotia, sheep fall under the Nova Scotia Premises Identification (PID) program. Farmers should apply for a PID number. A PID number is a unique number, based on national standards, that is assigned to a premise. Each premise will be issued a single PID number, regardless of the number of animal types or premise types on that parcel of land. Either the owner or renter of a land location may apply for a PID for a location. Land ownership must be indicated on the application.

A premise is defined as a parcel of legal land where animals are grown, kept, assembled, or disposed of. Premises include farms, hobby farms, stables, feedlots, pastures, hatcheries, egg-grading stations, abattoirs, assembly yards, auctions, sale facilities, rendering plants, zoos, petting farms, fair grounds, racetracks, competition facilities, veterinary facilities, etc.

Benefits of the PID program include the ability to

- notify premise owners of disease outbreaks in their vicinity and recommend biosecurity precautions
- determine which species are near a disease outbreak
- respond in a rapid and informed manner when emergencies occur
- address all phases of emergency management (preparedness, prevention, response, and recovery phases)
- reduce the impact of marketing restrictions by enabling quicker resolution of emergency situations

You can find the application form to apply for a PID on the website listed under Additional Resources at the end of this manual, by calling 902-890-3377, or by emailing NSPID@novascotia.ca.

NOTE

For more information on traceability, see the information sheet in the appendix at the end of this manual.

Identification

The Canadian Sheep Identification Program (CSIP) is a mandatory, industry-led initiative that is important for farm management, food safety, quality assurance, and animal health. Identification can be temporary or permanent, such as ear tags, notching, or tattoos. In Canada, all sheep must be identified with an approved radio frequency identification (RFID) ear tag before they leave the farm they were born on. These tags must be bought from an approved distributor. If a tag is lost, a new one must be purchased immediately. Report the new identification number (and old one, if known) as well as information on the origin of the sheep.



Shearwell Data Tag



Allflex RFID Tag

Image Copyright: Canadian Sheep Federation

NOTE

For more information on the Canadian Sheep Identification Program, visit the link provided in the Additional Resources section at the end of this manual.

Shearing and Crutching

While shearing may be stressful for the sheep, it is often necessary as a bulky fleece can hinder a sheep's mobility, predispose them to casting (when a sheep has laid down and cannot get up because its centre of gravity is off), and result in the sheep overheating. Shearing is typically done at least once a year, while crutching (removing wool around the tail and rear legs) is done before lambing.

Prior to shearing, reduce the animal's feed and water for 6 to 12 hours to reduce the chance of the sheep defecating or urinating while shearing and soiling the area. Shearing can be done with hand-operated shears or electrical devices. There is always a risk of transferring disease and external parasites between sheep while you are shearing, so take care to disinfect your equipment between flocks, and shear diseased sheep last.

Shearing removes most of a sheep's insulation that is used for protection against the elements and insects. Therefore, you must consider the weather, time of year, and available shelter before deciding when to shear your sheep. If you are shearing in poor weather conditions, consider using a comb cover or lifter to leave an insulating layer.

Castration

A castrated male is called a wether. Ram lambs are normally castrated for management purposes. However, castration is often not necessary if lambs will be finished and sent to slaughter before they reach puberty. The three most common methods of castration are 1) rubber ring, 2) clamp, and 3) surgical. Castration typically takes place 24 hours after birth, as young lambs heal quicker than older lambs. You should consult your veterinarian to choose the best method and timing of castration for your flock.

Tail Docking

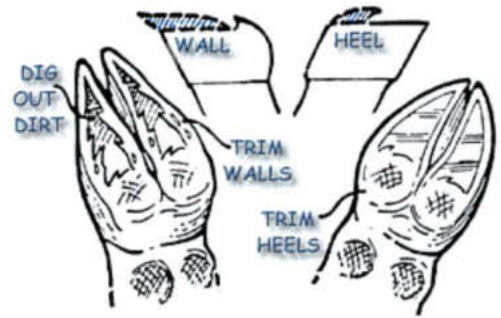
Tail docking is often done for health and hygiene reasons. If lambs are not docked, manure can collect on the hindquarters, which can lead to infection. Docking improves the general appearance of a lamb and older ewes that have been docked are more likely to be successfully bred. Short-tailed breeds do not need to be docked and it may not be necessary to dock the tails of hair breeds as well.

Docking a tail too short can lead to more problems than not docking. Docking at the fourth tail joint causes fewer problems than docking shorter. There are five main methods for tail docking: 1) hot iron, 2) rubber ring, 3) rubber ring and clamp combination, 4) crush and cut, and 5) surgical method. Tail docking using a surgical method must be completed by a veterinarian. Tail docking is typically done between 24 hours to seven days following birth. Rubber rings should not be applied after a sheep is over six weeks old. Any tail docking after this time period needs to be done by a veterinarian.

Hoof Trimming

It is important that you keep your lamb's feet well trimmed as overgrown hooves may affect a sheep's mobility. Feet should be trimmed every four weeks or as needed.

When trimming feet, set the lamb in an upright position and tilt it slightly backwards so it rests against you. Sheep can be held in this position by pressing your knees firmly against their sides. Each foot should be trimmed in the following manner:



1. Clean all manure and dirt from the bottom of the foot and between the toes.
2. Use pruning shears or a sharp knife to remove the outer hoof wall until it is level with the sole or bottom of the foot.
3. Level the bottom of the foot, so the entire surface strikes the ground at the same time.

Dehorning/Horn Trimming

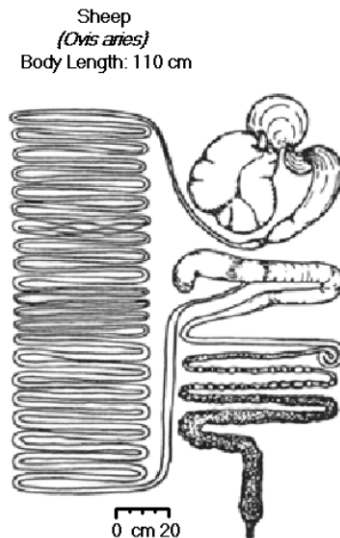
Many sheep breeds found in Canada are polled, meaning they do not have horns. The National Animal Welfare Code of Practice does not recommend dehorning or disbudding sheep. However, it may be necessary to trim horned sheep to prevent the horns from becoming ingrown or interfering with the sheep. When trimming, the smallest amount of horn possible should be removed to avoid soft tissue damage and bleeding. If dehorning is necessary, a licensed veterinarian must perform the procedure.

Section 3: Nutrition

What is a Ruminant?

Sheep are ruminant animals. Ruminants are characterized by their four-stomach digestive system and cud-chewing behaviour. Ruminant animals lack upper incisors. They have lower incisors for tearing, and upper and lower molars in back for grinding food. The food is initially lightly chewed and mixed with saliva to form a food bolus. The sheep then swallows the bolus and it enters the rumen. The rumen is the first stomach and it contains healthy flora that consists of 200 trillion bacteria, 4 billion protozoa, and millions of yeast and fungi. The flora works to break down the food through fermentation. Once broken down, the bolus is regurgitated into the mouth from the rumen and is now referred to as cud. The cud is chewed more thoroughly this time and then re-swallowed. This process adds additional mechanical grinding

to aid in digestion. It also provides a steady source of saliva for the rumen, which sustains a healthy environment for the rumen flora. Sheep spend about six hours a day chewing their cud on and off. When the cud is swallowed, it will re-enter the rumen and the well-fermented slurry of feed will pass through the second (reticulum), third (omasum), and fourth (abomasum) stomachs. The abomasum is often referred to as the true stomach because it functions most like a typical monogastric (single) stomach. The latter part of digestion is primarily a chemical process, where food is broken down by enzymes.



Sudden changes to diet can disrupt the flora and the healthy function of the rumen. Therefore, all dietary changes should be made slowly so the flora have a chance to adapt to new feed routines. Fermentation, which occurs in the rumen, produces a large amount of gas. Sheep will pass this gas by belching. Excess built-up gas can result in bloat, a serious condition that can be fatal within hours. While too much of any kind of feed can cause bloat, it is most commonly a result of too much grazing on lush legume pastures, such as leafy alfalfa and clover. It is recommended sheep are given a feeding of dry hay prior to moving them from sparse to lush pasture. The coarse forage helps to stimulate the belching mechanism while keeping the green feed from forming a compact mass in the rumen.

Although ruminants are capable of digesting grain (starch), their more natural diet is forages, which includes grass, weeds, browse, hay, and silage. If too much grain is consumed, or the diet is switched too quickly, excess lactic acid is produced in the rumen and its pH drops. This can be fatal to the animal; therefore, slow introduction of grain is important. Also, if not regulated, sheep will choose to overeat grain. When feeding mature sheep, whole grain is better because it requires them to grind and process it themselves, which results in less digestive upset. Most importantly, ruminants always require at least some type of forage (fibrous feed) in their diet for proper rumen function.

Essential Nutrients

Feed, whether grown at home or purchased, is your greatest cost in raising sheep. Nutrition is one of the most important parts of raising sheep. A proper diet allows your sheep to grow, promotes health, and results in a more productive animal. Sheep can effectively digest roughage and this should form the bulk of their ration. However, a combination of feed should be supplied to ensure your sheep are receiving an adequate amount of protein, carbohydrates, fats, minerals, and vitamins. Sheep require these nutrients for the following:

- **Maintenance**—Many of the nutrients a sheep consumes are used to maintain a sheep's current condition. The principal requirements for maintenance are energy and heat-producing nutrients. Maintenance takes first priority on the use of food. Maintenance requirements are proportional to the sheep's weight. If fed below maintenance needs, sheep will use their fat reserves and other nutrients. Eventually, when these are used up, starvation or serious malnutrition occurs.
- **Growth**—Growing sheep require nutrients to produce new tissues as the body increases in size. Growth requires an abundance of protein, minerals, vitamins, and energy.
- **Milk production**—Nursing ewes require nutrients to produce milk. Milk is high in protein, minerals, vitamins, and energy and sheep require a lot of these nutrients.
- **Reproduction**—Pregnant ewes require additional nutrients to support the growth of their lamb(s), especially during the last two to three months of pregnancy. During this period, the fetus is rapidly growing.
- **Fattening**—The nutrients that supply energy are responsible for fattening. These include carbohydrates, fats, and any protein not needed for other purposes.
- **Work**—Work requires energy and calls for the same nutrients as fattening. When sheep walk long distances or climb over hills, they may be using much of the energy they get from their food to do work.



The term “nutrient” is applied to any chemical compound (natural or human made), or a group of compounds of the same general chemical composition, that aids in the support of animal life. The primary food nutrients required by all animals are

- fibre
- carbohydrates
- fats
- proteins

Minerals and vitamins are classified as secondary food nutrients. Water and air are also important nutrients but they are obtained from sources other than feed.

Energy

Energy allows the animal to do work (grow or reproduce) and keeps the body warm. Energy is considered the most common limited nutrient for sheep. This means that, most often, it is not found in sufficient quantities in a sheep's diet. The major energy sources in a sheep's diet are pasture, browse, hay, silage, and grains. Grains contain starch, which is a high source of energy. Comparatively, forages tend to be less rich in energy, but higher in fibre or cellulose. A well-maintained pasture may provide some energy, however, as it matures, the provided energy decreases. As a rule, cool-season grasses during the spring and fall are high in protein but low in energy. When kept vegetative, warm-season grasses during the summer are lower in protein but have more energy.

Early signs of energy deficiency in lambs includes reduced growth, followed by weight loss, and, eventually, death. In reproductive ewes, reduced conception rates, fewer prolific births, and reduced milk production are also signs of an energy deficiency. When energy is restricted for fibre sheep, their wool will grow slower, fibre diameter will lessen, and breaks will develop in the wool fibre. Undernourished sheep are more susceptible to disease as energy deficiency has a direct link to a weakened immune system. On the other end of the spectrum, sheep given access to too much energy can also have problems. Excess energy gets stored as fat in the body, which can negatively impact reproduction for both ewes and rams.

Fibre

Fibre adds bulk to the diet and keeps the sheep's rumen functioning properly by increasing rumination and salivation. Most ruminant nutritionists agree that sheep should always have roughage in their diets, at least a half kilogram (1 lb.) per head per day. Sheep that do not consume adequate forage may chew on wood or wool.

Carbohydrates

These are complex substances that contain only carbon, hydrogen, and oxygen—the latter two always in the same proportion as water. Carbohydrates are the main source of energy in a ration. They are used to produce heat, energy, and fat in an animal's body. Oats, barley, wheat, corn, molasses, and roughage are good sources of carbohydrates. Good quality hay can provide enough energy for a ewe during the winter months, but ewes may require extra energy before and after lambing. Young lambs also require additional energy for rapid growth and fattening.

Fats

These are also complex substances that contain only carbon, hydrogen, and water, but the proportions of carbon and hydrogen are much greater in fats than in carbohydrates. Fats furnish 2.25 times as much heat and energy per kilogram as carbohydrates. Any fat in amounts excess

of daily requirements is stored as fat in tissues. Fat can be found in small quantities in common grains such as oats, barley, and wheat. Flax seed and soybeans are high in fat, while roughages have a very low fat content.

Proteins

The proteins are also complex compounds containing carbon, hydrogen, and oxygen, and also nitrogen. Some proteins may contain sulphur and phosphorus as well. Proteins are necessary for growth, development of glands, muscles, hide, and hair. They are especially important for young, growing animals that need to produce a lot of body tissues, as well as lactating ewes. A lack of protein can affect growth, muscle mass, and milk production, and it can also negatively affect wool production.

Sheep have a high capacity to consume roughage and legume hays, such as alfalfa or clover, are often enough to meet a sheep's protein requirements. Forages with a higher legume content provide more protein than straight-grass forage. When protein requirements cannot be met by forage alone, a protein supplement can be fed along with grain. However, protein supplements tend to be expensive.

Mature sheep can also utilize non-protein nitrogen to synthesize protein. Non-protein nitrogen sources, such as urea, can make up to one-third of the ration's protein content. However, it should be fed with grain or other sources of carbohydrate to provide enough energy.

Minerals

There are 16 different minerals that are essential in a sheep's diet. Macrominerals are required in large amounts. The following are all considered macrominerals: sodium, chloride, calcium, phosphorus, magnesium, potassium, and sulfur.

In comparison, microminerals such as iodine, copper, iron, manganese, zinc, molybdenum, cobalt, selenium, and fluoride, are required in small amounts. Mineral can be fed as supplements or in the form of a trace mineral block. When purchasing mineral blocks, be sure to choose one specifically for sheep, as cattle and horse blocks may contain too much copper.

Inadequate amount of salt (sodium chloride) in a sheep's diet can cause decreased feed and water intake, milk production, and lamb growth. Animals may chew on wood and/or lick dirt if they are lacking salt in their body.

Deficiencies, or excesses, of key minerals and vitamins, can have severe impacts on flock health. Shortages and excesses are commonly an issue of soil mineral imbalances, which vary from region to region, and even farm to farm.

An imbalance of calcium and phosphorus in the diet can cause urinary calculi in male sheep. Also, inadequate levels of calcium and phosphorus combined with a vitamin D deficiency can lead to a disease called rickets. This condition inhibits bones from hardening properly and lambs appear stiff or lame. Calcium deficiencies are most commonly found in high-grain flocks, as forages usually provide adequate quantities to meet the needs of a sheep.

Caution

If overfed for a prolonged period of time, copper in mineral supplements can poison lambs, resulting in fatality. Lambs are unable to excrete excess copper, so it is stored in the liver. For this reason, cattle supplements with added copper should be avoided. Mineral supplements and concentrate rations should be analysed to ensure that copper intake levels are not too high.

Vitamins

Vitamins and minerals can be considered regulators of a sheep's diet. Within a sheep's body, they turn things on and off as needed, adjust body temperature, and help process information. Vitamins are identified by letters and the vitamins A, D, and E are the common ones required by sheep. Vitamin B is also required but it is synthesized by the rumen. Vitamins regulate the growing process, assist in digestion and support the immune system.

- **Vitamin A**—Essential for health, growth, reproduction, and lactation in sheep. Sheep synthesize vitamin A from carotene, a yellow-coloured material found in green plants and green forages such as pasture, legume, and yellow corn. Vitamin A is stored in the liver. If sheep have been on green feed during the summer, they will have a store of vitamin A for approximately 220 days. Shortage of vitamin A causes poor growth, poor muscular control, and reproductive troubles.
- **Vitamin D**—Vitamin D is obtained from exposure to sunlight and through feed. Sun-cured hay is a good source of vitamin D, whereas green feeds are poor sources of vitamin D but good sources of vitamin A.
- **Vitamin E**—White muscle disease, or stiff lamb disease, in young lambs has been related to vitamin E deficiency. Vitamin E is contained in most feeds but is quickly lost; therefore, old hay is a poor source of this vitamin.

Supplementation

Sometimes sheep have higher-than-normal nutritional needs, such as pregnant ewes during late gestation, ewes nursing multiple lambs, and breeding ewes. Grains that can be fed to supplement their nutrition include corn, barley, wheat, and oats. A protein source, such as soybean meal and cottonseed meal, can be added to the grain rotation, along with vitamins and minerals, to make a nutritionally balanced feed. Sheep are natural grazers. Pastured sheep will graze for up to seven hours a day, mostly in the hours around dawn and in the late afternoon before sunset. If pastured sheep are fed supplements, it is best to feed them midday, so the normal grazing patterns are not disrupted.

Water

Water participates in nearly all body functions and is the most important nutrient, although oftentimes the most neglected aspect of feeding sheep. A sheep will consume anywhere from one half to four gallons of water per day, depending upon its physiological state and the environmental conditions.

Voluntary water intake is usually two or three times more than dry matter intake. Water intake will also increase with high-protein and high-salt diets. Decreased water intake may reduce milk production in ewes and growth rates of lambs. Animals that consume adequate water have fewer digestive upsets and a lower incidence of urinary calculi.

Classes of Feed

Feeds can be classified into three main groups:

1. Concentrate Feeds
2. Dry Roughage Feeds
3. Succulent Feed

Concentrate Feeds

Concentrate feeds include farm grains, mill feeds, and manufactured supplements. They are low in fibre and high in digestible nutrients. Some common concentrates are oats, barley, wheat, wheat bran, corn, dried beet pulp, linseed meal, fish meal, soybean meal, and wheat shorts. There are several different types of manufactured commercial feed for sheep available on the market. They are mainly composed of concentrates and have had minerals added. There are two types: complete concentrate rations of 14–18 per cent protein that are directly fed, and supplementary mixes of 24–35 per cent protein that are designed to be mixed with homegrown grains.

Dry Roughage Feeds

Dry roughage consists of hay and straw. These feeds are high in fibre but low in digestible nutrients. If only dry roughage is fed, then large quantities are required to sustain an animal's life. In Canada, sheep are commonly fed alfalfa and clover hay, which are rich in protein, as well as mixed hay, timothy hay, meadow hay, and grain hay. These hays all differ in their protein,

carbohydrate, mineral, and fibre content. In general, hay with a high proportion of legumes is most suitable for feeding sheep. Also, early-cut or immature grasses and legumes may contain as much as twice the nutrient percentage as late-cut, mature plants.

Succulent Feeds

These feeds are fed in the green, or preserved, stage, for example: ensilage and green grass. Corn silage is one of the best succulent feeds for sheep. It can be used as a winter feed or as a supplement when pasture conditions are poor.

Green silage is made from grass, legumes, green cereals, or any combination of these. It is considerably higher in protein and slightly lower in carbohydrates than corn silage. Green feed, both legume and grass, is the most economical feed for livestock. It is highly nutritious, palatable, and supplies many of the essential nutrients necessary for health and growth.

Pasture

One of the most economical ways to raise your sheep is on pasture. Sheep are ruminants, so they can consume a lot of forage. A carefully managed pasture can greatly increase your sheep's productivity. The amount of land required to feed a sheep depends on the quality of the land and soil, the amount and distribution of rainfall, and the management of the pasture.

Pasture Management

Pasture management means you are providing good-quality food for your sheep while looking after the plants that produce the food. In a well-managed pasture

- the forage plants are tasty and interesting to the animal
- the plants grown provide good nutrition for the animals
- the field is the right size for the number of sheep
- the fencing is safe, durable, and keeps the sheep contained
- the pasture has a shelter that protects the sheep from the element

How to Manage a Pasture

- Pasture lands should be divided up into properly sized fields for your herd to prevent overgrazing and ensure the sheep have enough space.
- For optimum pasture growth, it is best if animals are allowed to graze for only three to four days in a paddock and are then moved to another pasture. Each paddock should be rested for approximately 30 days before animals return to graze it. It is important to know when animals are beginning to overgraze a field. Make sure enough leaves remain for the plant to continue growing well. Do not turn sheep out onto a pasture until it is about 15 cm (5.9 in.) tall.

- Plants grow at different rates throughout the year. It is possible for a pasture planted in different forage species to provide almost year-round grazing for sheep, with snow cover being the only limiting factor.
- Take sheep 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. Later, sheep can be turned back into the field to eat the remaining grasses.
- Make sure the pastures are well fertilized so they will grow back well each year.
- Fencing should be robust enough to keep sheep in and predators out. Multiple strands of electric wire, page wire, wooden corrals, or a combination are good options.

Colostrum

At birth, lambs lack a fully developed rumen and reticulum. Lambs should not be weaned until their rumen is almost fully developed, when they are around 45 days old. Typically, mature sheep break down antibodies in the rumen, but lambs are capable of absorbing antibodies from the mother's colostrum into their bloodstream via their large intestine. Normally, antibodies would be too large to pass through the intestine, but nature has provided a brief window where this is possible. This helps to jump-start the lamb's immune system.

Lambs must receive colostrum immediately following birth as there is a limited time before the intestinal lining no longer allows the passage of antibodies into the bloodstream. This closing process takes anywhere from 16 to 48 hours. Therefore, it is important that the lamb receives colostrum before this point. It should receive a total of 125 ml of colostrum within the first six hours of life. While lambs can survive in those early hours without the nutritional benefits of colostrum, missing the disease-protecting antibodies colostrum contains can be fatal. If a lamb cannot receive colostrum from its mother, it will need frozen colostrum from another ewe. Ideally, replacement colostrum from a ewe vaccinated prior to lambing should be used as the vaccinated ewe will pass on its immunity through its colostrum. If a ewe is not available, cow colostrum be given as a substitute. Also, commercially prepared colostrum is available if necessary.

As lambs grow and begin nibbling on dry feeds, the underdeveloped rumen and reticulum become inoculated with micro-organisms. Those microbes multiply and stimulate the growth and development of the rumen and reticulum. Lambs can be offered a highly digestible "creep feed," consisting of feeds that have been cracked, rolled, grounded, or pelletized. Creep-fed lambs have faster-developing rumens than lambs strictly fed a forage diet.

Feeding a Lamb from Birth to Weaning

After a lamb has received enough colostrum, it is time to decide how to raise it. Lambs can be raised to weaning either with a ewe or artificially.

Ewe—Lambs are left with their mothers to suckle until they are weaned at three to four months of age. Lambs normally start to consume creep ration by two weeks of age. You should provide a creep ration that is high in protein (18–20 per cent) in an area where the lambs can eat dry hay and grain away from the ewes. Typically, creep feed is placed in a self-feeder pen that only

lambs can enter. A commercial lamb starter is recommended. This ration will provide a faster rate of gain for market and replacement ewes. Lambs should have access to water at all times.

Artificially—Sometimes lambs are unable to nurse from a ewe. Milk replacer should be fed to any lambs that are weaned at under four weeks of age. About 10 per cent of a lamb crop dies from starvation during the first week. Artificial feeding is often used in the following situations:

- Orphaned lambs
- Twin lambs on a ewe with one bad udder, mismothered lambs, or an obviously weak twin
- The third lamb of a triple
- Any lamb that shows symptoms of progressive weakness during the first week of age

If a lamb is to be raised artificially, it should be placed in a warm, enclosed area with other lambs on milk replacer. Lambs should be away from a mature flock as older lambs may transmit a disease to young lambs whose immune systems have yet to develop.

There is milk replacer specifically formulated for lambs but a high-fat yielder calf formula may be used as well. Milk replacer is mixed with water to give 20 per cent solid content (one part powder to four parts water). The milk replacer should be warmed to body temperature for the first two or three days. After that, it can be fed cold. A multinipple type of pail is preferred to a bottle for feeding milk replacer. For the first week, the lambs should be fed several times a day. In the following weeks, the feedings can be reduced to twice a day.

By the first two weeks of life, lambs can be fed creep feed and fine hay. The creep should be high in protein (18 to 20 per cent), and high in energy. Once the lamb weighs 12 kg (26 lbs.) or more at approximately three to four weeks of age, they can be weaned off milk replacer and solely fed dry ration. The lambs should have access to water at all times. Lambs should be injected with vitamins A, D, E, and selenium when placed on milk replacer and vaccinated for pulpy kidney disease.

Body Condition Scoring

Throughout your flock's lifetime, their nutritional requirements can change greatly depending on their stage of development, pasture quality, time of year, or if they are breeding or not. It is important to routinely examine your flock to ensure they are in optimal condition and you can adjust their feed intake according. Ewes should be examined in the fall prior to flushing so there is enough time for the ewe to adjust to its new diet and increase its body condition score for breeding. They should be scored again at mid-gestation, and just before lambing as well so they can be in optimal condition for lactation.

Steps for Body Condition Scoring

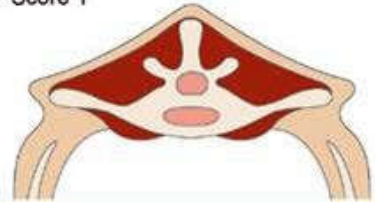
- Feel the spine in the centre of the sheep's back, behind the last rib, and in front of the hips.
- Feel the tips of the transverse process.

- Feel for fullness and fat cover.

Score of 1—Extremely Lean

You can easily feel the individual vertebrae of the spine. There is no muscle or fat covering the bones. Ensure the animal is receiving proper nutrition and doesn't have any other serious health issues.

Score 1



Score of 2—Lean

Individual bones can be felt but they are rounded and not sharp. There is some muscle covering the bones but it feels concave. Before breeding or lambing, a ewe's nutritional intake needs to be increased so it can reach a score of 3.

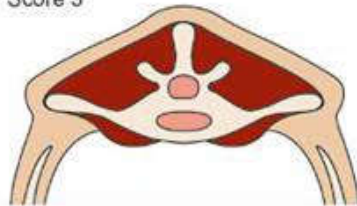
Score 2



Score of 3—Good Condition

Using firm pressure, you can feel the ends of the transverse processes of the vertebrae. The sheep has full muscle with some fat covering the bones. The fat should feel convex. This body condition is good, however, it is recommended to flush and raise the nutritional intake before breeding.

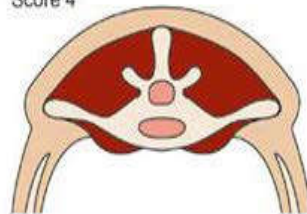
Score 3



Score of 4—Fat

It is not possible to detect the ends of bones, but their position can be determined by using firm pressure. The sheep has a thick covering of fat over the muscles and vertebrae. Fat deposits are visible over the head of the tail and brisket. A sheep in this condition usually does not need to be flushed before breeding.

Score 4



Score of 5—Obese

The sheep has a thick layer of fat over the loin. The tips of the spinous processes can't be felt underneath the fat and there is a depression where the spine would normally be felt. Sheep are overly fat and may have health problems. You should increase their exercise and adjust their nutrient intake.

Score 5

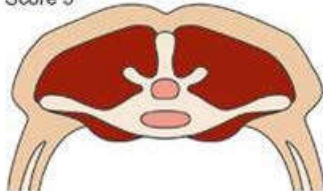


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Section 4: Health

Recognizing a Healthy Animal

Healthy Sheep Vitals

It is important to know the signs of a healthy sheep so you can recognize when a sheep may not be feeling well and address the issue immediately. The best way to detect disease is by spending a little time each day watching your flock. Here are some of the things you might want to watch for.

Healthy Signs	Sick Signs
Respiration rate: 12 to 20 breaths per minute	Out of range
Pulse: 60 to 90 beats per minute	Out of range
Body temperature: 38.8 to 39.4°C	Out of range
Sheep looks bright and alert	Sheep appears dull or distressed
Nose, mouth, and eyes are clean	Nose, mouth, or eyes are dribbling or have discharge
Sheep has a good body condition	The sheep is too fat or too thin
Feces is normal pellets	Feces is lumpy, runny, or mucus covered
Appetite is good	Sheep is not eating
Udder is soft and even	Udder is hard, lumpy, or has abnormal milk
Wool is thick and fluffy	Patchy or dull wool is a sign of parasites or poor health
Legs are clean	The joints are hot or swollen

Biosecurity

When raising sheep, it is important to practise good biosecurity as the potential for disease outbreak can pose serious threats to your sheep's overall health and longevity. Biosecurity is a system of best management practices put in place to reduce the introduction of disease. Biosecurity implementation could include screening measures for new or returning visitors/animals/equipment and/or creating an area of isolation for new/sick animals. There are three main sources of health threats to a farm:

- Physical transfer from visitors.
- Biological transfer from new, sick, or contaminated animals.
- Transfer from equipment, supplies, or machinery.

A good farm operator will take several steps to prevent the transmission of contagious diseases. These steps are:

1. **Isolation**—Prevent close contact between sick animals, newly purchased animals, and animals that have been away at a show.
 - Sick animals should be housed in a separate section of the barn, away from all other animals. If an animal dies, immediately remove the dead carcass for disposal and thoroughly disinfect its pen. If possible, leave the pen unoccupied for three to four weeks. Feed and handle sick animals last.
 - Newly purchased animals should be kept separate for three to four weeks and watched carefully for signs of disease.
 - If you compete in a lot of shows, you might want to keep a small separate area to house frequently shown animals. Look after the animals that stay at home first before you tend to any animals that leave your property.
2. **Handling practices**—Always handle sick animals last to prevent the spread of disease. Handle younger animals before handling older animals as adults are more likely to have developed immunities/tolerances to diseases.
3. **Traffic control**—Keep your farm secure from unauthorized visitors. Any visitors should wear clean clothes, sanitize their footwear, or wear footcovers. Limit traffic near your farm and consider sanitizing vehicle tires that have been to other farms.
4. **Sanitation maintenance**—Sanitize new equipment and pens that may have been in contact with other animals. Clean off organic matter such as feces and hair. Allow for proper drainage of urine and excessive water that may harbour disease. Remove manure and other debris that build up in and around pens. As a post-clean-up measure, spread hydrated lime to reduce odour and decompose manure and hay quicker.
5. **Hygiene**—Wash your hands, clothing, and footwear after visiting another farm. Use latex or rubber gloves when handling sick animals.
6. **Control pests**—Barn flies, rodents, and parasites can all be methods for spreading disease.
7. **Observation**—It's a good practice to observe healthy animals so you can notice any changes that may indicate when the animal is ill. Becoming familiar with disease symptoms ensures a quick response in isolation, treatment, and future prevention.

NOTE

For more information on biosecurity and tips for keeping your animals safe and healthy view the “*Biosecurity for Small Scale Livestock Production*” factsheet in the appendix of this manual.

Common Sheep Disease

Lamb Disease				
Problem	Description	Cause	Prevention	Treatment
Enteritis	Inflammation of the intestinal tract	A pathogen. Inadequate colostrum or low levels of vitamin in a pregnant ewe may increase a lamb's susceptibility.	Ensure lambs receive enough colostrum and pregnant ewes have enough vitamin A.	
Navel-ill	Abscesses in liver, lungs, and joints	Bacteria enter the lamb via the navel and move throughout the blood stream causing abscesses.	Ensure lambing pens are clean and lambs receive enough colostrum after birth. Treat the navel with antiseptic after birth.	
Pneumonia	Lung tissue becomes inflamed. Lambs will have a temperature, decreased appetite, and nasal discharge.	Caused by various bacteria, viruses, moulds, or irritants.	Ensure lambs receive enough colostrum and are kept warm and dry in an area with adequate ventilation.	Antibiotics, sulfonamides. Treatment depends on cause.

Pulpy kidney disease	Lambs will have poor coordination, abdominal pain, and will eventually die.	Bacteria infects the lamb and produces toxins that are carried to the central nervous system via the blood stream.	Vaccination	None
Enterotoxemia	Diarrhea, poor coordination, convulsions, coma. Some sheep may walk in circles, throw their head back or push against objects. Death usually occurs eight hours following onset of symptoms.	Bacteria (<i>Clostridium perfringens</i>) or a nutritional issue. Sudden changes in diet or suddenly ingesting a lot of rich food can initiate the disease.	Inoculate ewes and immunize lambs at eight weeks old.	None. Mortality rates are nearly 100% in affected lambs.
White muscle disease	Lambs may be born dead or die soon after birth. Older lambs will have difficulty walking and nursing. The respiratory muscles become infected and breathing becomes difficult.	An imbalance of vitamin E and selenium.		Treat with vitamin E and selenium

Mature Sheep Disease				
Problem	Symptoms	Cause	Prevention	Treatment
Blackleg	Swelling and purple discolouration around a wound. Sheep will be stiff and lame. It may have a high temperature and die within 24 to 48 hours.	A bacterium (<i>Clostridium chauvoei</i>) infects the lamb via a wound.	Immunize lambs at eight weeks old and administer a booster four to six weeks later.	None

Tetanus	The disease affects the nervous system. The animal will have muscular spasms and convulsions.	Bacteria (<i>Clostridium tetani</i>) enters via a wound.	Inoculation	No satisfactory treatment.
Mastitis	Udder becomes infected. It will be swollen and painful. A severe infection can destroy an udder. Milk may appear lumpy or discoloured.	Bacteria enters the udder. Highly productive ewes are more susceptible than less productive ewes.	Keep the udder clean and follow proper milking procedures.	Antibiotics and sulpha drugs may save the ewe, but probably will not restore the function of the udder.
Foot rot	A large portion of the hoof separates from the soft tissues. The sheep will be lame and the hoof will have a foul odour.	An infectious bacterium (<i>Fusiformis nodosus</i>) penetrates the tissues of the hoof. This usually occurs during wet weather, when the feet are soft and susceptible.	Quarantine infected flock as foot rot is contagious.	Treat feet with an antibiotic solution or use a copper sulphate foot bath.
Vibriosis (also known as Ovine campylobacteriosis)	Ewe will abort in the last six weeks of pregnancy and rarely show symptoms before aborting. After aborting, there is usually a brown, foul-smelling vaginal discharge. Vibriosis can only be confirmed by laboratory examination.	erCaused by the bacteria <i>Campylobacter fetus</i> ssp. <i>Fetus</i> . Susceptible ewes ingest the bacteria from contaminated pasture or water. The bacteria infect the placental membranes, resulting in abortion.	Inoculation. Aborted fetus and afterbirth should be burned and buried to control spread of disease.	

Listeriosis	The animal will be listless, stop eating, and may circle in one direction. Eventually the sheep will go into a coma and die.	Caused by a bacteria (<i>Listeria monocytogenes</i>) that affects the nervous system. This disease can spread to humans and can be fatal.	No vaccines available.	Antibiotic treatment is unsatisfactory.
Pink eye	The tissues around the eyeball become inflamed. The eyeball may become cloudy, have discharge, or rupture.	Many types of agents	Reduce eye irritants and keep the animal away from direct sunlight.	Antibiotics
Scrapie	A fatal, chronic wasting disease. The fleece is poor quality and very itchy. As a result, the sheep will rub against objects, destroying the wool. Diagnosis is supported by microscopic examination of the brain.	Believed to be inherited but can also be contagious.	Infected animals must be destroyed. The disease must be reported to Agriculture Canada.	
Pregnancy toxemia (ketosis)	Ewes in advanced pregnancy become nervous, go blind, and have convulsions. Death may occur two to five days after symptoms appear.	Due to impaired metabolism of carbohydrates and fatty acids. Ketosis is usually caused by a faulty diet. Overly fat ewes are more at risk.	Adequate exercise and well-balanced rations.	No effective treatment. Daily administration of glycerine by bath is effective in some cases.

Grass tetany	Sheep, especially lactating ewes, on lush pasture or green feed will appear intoxicated, may have spasms, tremors, or convulsions. Usually, more than one animal in the flock is affected.	Low magnesium or potassium intake.	Feed dry hay in the evening to sheep grazed on rich pastures. Offer magnesium via a mineral mix.	Injection of 50–100ml of 20% calcium barogluconate.
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Parasites

Parasites can be internal, meaning they live inside the sheep, or external, meaning they live on the sheep's coat. Parasites can be a major issue for sheep and can lead to disease, emaciation, anemia, irritations, and death. It is important that you use proper management practices to avoid parasite infestations. Housing should be kept sanitary and manure routinely removed. Try to avoid feeding on the ground to minimize the chance of a sheep ingesting a parasite. Proper pasture rotation can also be helpful in breaking the parasite lifecycle.

Many dusts and sprays are available on the market for external parasites, such as lice. Fecal exams can be done to identify and selectively treat internal parasites present in your flock. Parasite resistance to treatment can be a significant issue, so it is important to work with a veterinarian to design parasite-management strategies.

MEDICATIONS

Pharmaceuticals may be required to treat a sheep for infections, parasites or to prevent disease. Any sheep that received medication needs to go through a withdrawal period specific to the medication and dose given before it is slaughtered for meat and/or before its milk can be consumed. Meat and milk are regularly tested for antimicrobial residue levels. If residues are detected the milk and/or meat of the animal will be condemned and not permitted to enter the food chain.

Fly Strike

This illness occurs when blowflies lay their eggs in moist or manure-stained wool. These eggs will hatch and start feeding on the sheep's flesh. This results in open wounds, which can lead to a serious infection. In Canada, there is no approved product to prevent or treat fly strike. Sound management practices and routine flock inspections are the best solution.

Signs of Fly Strike

- A small, visible damp spot.
- Irritation or scratching.
- The sheep is biting or rubbing its hindquarters.
- The sheep has difficulty walking.

Vaccinations

Vaccinating your sheep can partly eliminate the threat of some disease. Most veterinarians recommend sheep be vaccinated for clostridium diseases. There are three-, seven-, and eight-way vaccines. The CDT vaccine offers three-way protection against enterotoxemia caused by *Clostridium perfringens* type C and D as well as tetanus (CDT). Tetanus is caused by a toxic organism that lives in the earth. It can easily enter a sheep's body through a cut or puncture wound. The seven- and eight-way vaccines protect against additional clostridial diseases such as blackleg. However, this extra protection may not be needed depending on the farm.

Vaccines are not very useful in young lambs that are one to two months old. Typically, pregnant ewes are vaccinated and they will pass on these antibodies to their lambs through their colostrum. Ewes should be vaccinated with the CDT vaccine approximately four weeks prior to lambing. Ewes in their first pregnancy should be vaccinated twice during late pregnancy. These vaccines should be given four weeks apart. Lambs should receive their first CDT vaccine at six to eight weeks of age, followed by a booster four weeks later.

Talk to your veterinarian to design a vaccination program for your flock. If you have only a few sheep, you might have your veterinarian vaccinate them for you. If you have several sheep, you might want to learn how to give vaccinations yourself. Any injections given to a sheep should be given in the neck area to avoid broken needs and damage to choice cuts of meat.

Section 5: Breeding

Factors Affecting Breeding

The following characteristics are factors that can affect your flock's ability to breed:

Daylight—A sheep's breeding pattern can be affected by changes in the amount of available daylight. Once daylight becomes less than 12 to 14 hours, the average ewe begins to cycle. This is known as short-day cycling and it is the beginning of the normal breeding season.

Breed—Depending on the breed, ewes vary on the time of year they will mate. Dorset, Rambouillet, and Finnish Landrace ewes have a long breeding season. Suffolk, Hampshire, and Oxford ewes generally accept a ram from August to March, while Cheviot, Shropshire, and Southdown ewes usually accept a ram from September to January.

Temperature—Sperm production in rams is very sensitive to temperature. During long periods of hot weather, the ram may become sterile. Shearing helps keep the ram cool. Also, most breeds of ewes begin cycling once cooler temperatures set in.

Nutrition—Flushing is when sheep are provided an increased level of nutrition to prepare for the breeding season. Depending on the condition of the ewe, flushing typically starts about three to four weeks before breeding and continues until two weeks after breeding. A ewe's nutrition is increased by improving the quality of hay, adding grain, or moving the flock to better pastures. This increase in nutrition results in weight gain and sends a signal to the ewe's reproductive system that conditions are right to produce and raise more than one lamb. As a result of flushing, ewes tend to shed more than one egg, and the possibility of twins or triplets is increased. It is important that any changes in a sheep's feed pattern or diet should be made slowly. Otherwise, the sheep may suffer from stomach upset and loss of appetite.

Body condition—Although some ewes are sexually mature at seven months of age, they should weigh about three quarters of their mature body weight before being put in with the ram. Ewe lambs are usually bred late in the season. This gives the ewe ample time to grow and be more likely to have more lambs at its first lambing. Depending on the ram's breed and physical development, it could be ready to breed at six months of age. The ram should be in good condition and be at least half of its expected adult weight before it is bred.

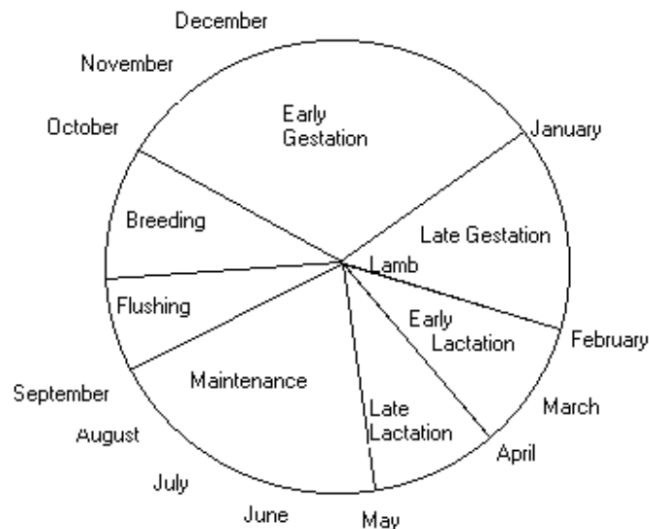
Three to four weeks before breeding your ewes, prepare them by

- scoring their body condition
- trimming their feet
- trimming their wool and manure tags around the tail area
- performing a fecal test to check for worms and treat as necessary
- flushing

The Reproductive Cycle

A sheep's estrus cycle lasts approximately 17 days. Note that not all ewes have an exact 17-day cycle; it may vary from 14 to 19 days of length. During this time period, as long as the ewe is not pregnant, it will show the signs of estrus, or heat, and is willing to breed. Heat will last approximately 35 hours once a ewe comes into it.

The ewe will ovulate (release eggs) 24 hours after estrus begins. Typically, one to seven eggs are released. However, this depends on the sheep's breed, maturity, and general health. If the sheep is bred to a ram, the eggs may be fertilized and form an embryo. The embryo will develop inside your ewe for approximately 147 days, or about five months. This period is known as gestation. If your ewe does not become pregnant, it will continue its estrus cycle. Most ewes will cycle for only a few months and very few will cycle all year-round. When the ewe is not cycling, this is known as anestrus. Most ewes are in anestrus from April to August.



Courtship Behaviour

Estrus is more difficult to detect in sheep than in any other agricultural animal. The following are some signs that a sheep may be in heat:

- The ewe responds to the ram by turning her head back toward him. The female initiates the courting behaviour.
- The ram noses or nudges the genital area of the ewe.
- The ewe urinates while the ram tastes the urine.
- The ram sniffs at the urine-wetted ground. It will raise its head in the air and curl its lip back—this is known as the flehmen response.

- A teaser, or sterile, ram can be placed with the ewes to help identify which ones are in estrus.



Early vs. Late Lambing

There are both pros and cons to having lambs arrive early or late in the year. By understanding the differences, you can decide which is best for you. Here are some things you must consider when choosing between early or late lambing:

- Labour
- Facilities
- Parasites
- Markets
- Fences
- Cost of feed
- Other farm activities

Some benefits of early lambing (January/February):

- Lambs can be grain fed creep ration and sold during Easter, when prices for lamb may be stronger.
- Any lambs not sold at Easter can be put out on pasture when the grass is at its best, or fed in the feedlot to heavier weights.
- There are fewer parasites on fresh, spring pastures. Lambs may remain in the barns and yards for most of their time.
- There are no problems with flies bothering lambs at docking and castrating time.
- Lambing is a busy time of year and usually requires extra help. This also happens to be a time when not much other farm work is done.
- Less predator damage.

Some benefits of late lambing (April/May):

- It is usually warmer and easier on the lambs, so mortality rate is lower.
- In most parts of the province, ewes can lamb out on pasture with not much additional shelter required.
- Less labour is required. Ewes and lambs on pasture need little or no hand feeding.

- Less grain is needed, as lambs are raised on pasture.
- Lower cost of production (feed, housing, and labour).

Lambing

Lambing is an exciting time and a good lamb crop is a measure of a successful breeding program and good management.

How can you tell that your ewe will soon lamb?

- Two to four weeks before lambing, the ewe's udder will begin to fill with milk.
- During the last week before lambing, the udder and teats will become large and firm.
- A day or two before lambing, the udder and teats will become dark pink or red.
- The vulva will become red, shiny, and puffy.
- The ewe will have difficulty moving around and will grunt as it lies down.

When your ewe is only hours away from lambing, it may show some of the following signs:

- Your ewe may appear to behave abnormally and separate itself from the flock.
- Often the ewe will refuse to eat and will stop chewing its cud.
- The ewe will lie down and get back up repeatedly.
- The ewe will walk in circles, paw at the bedding and make itself a nest.
- The ewe will appear nervous and make soft, low bleats.
- It will lift its head and purse its lips.
- A mucous discharge will appear from the vulva.
- The water bag will appear.
- Some part of the lamb's body will appear. If all is well, the two front feet come out first.

How long does it take a ewe to lamb?

Generally, a ewe will lamb anywhere from half an hour to two hours after early signs of labour are apparent. Mature ewes that have lambed several times before will lamb the fastest. If these mature ewes are carrying twins or triplets, they will lamb even faster.

What is Dystocia?

Dystocia occurs when a ewe has difficulty giving birth. These problems range from minor to very serious and include the following:

- The lamb is backwards.
- The lamb has its head turned.
- The lamb's feet are trapped under its body.
- The lamb could be too large for a small ewe to easily give birth.

Assisting with Lambing

It is important to be able to recognize the signs that a ewe may be having difficulty giving birth so you can provide assistance or call for veterinary help, if necessary. Help is needed if

- only the lamb's head appears
- the water bag has been delivered but there is no further progress for 30 minutes
- total lambing time exceeds 90 minutes

- only the lamb's tail or just one leg is showing

If a ewe does need assistance, keep these things in mind:

- **Hygiene**—Make sure you wash your hands and wear clean disposable gloves. Ensure the lambing pen is sanitary and dry. To avoid any infections, wash the area around the vulva with a mild non-irritating disinfectant.
- **Lubricant**—Use a good lubricant to avoid injuring the ewe.
- **Gentleness**—Remember the ewe is already under stress, and using any force is likely to cause damage.
- **Lambing aids** —Have ropes or cords ready in case you need them for securing the lamb.
- **Training**—An inexperienced worker may be more harmful than helpful. If in doubt, contact your veterinarian.

Determining the Position of the Lamb

In order to determine the lamb's position, you must check the birth canal. Before beginning, follow proper hygiene protocol. Wash and disinfect your hands and wear clean, single-use gloves. Wash the area around the ewe's vulva, then lubricate your hand and slip it in through the vulva into the birth canal. Use slow and easy pressure, do not use excessive force as this can injure your ewe.

Once your hand is in, you will likely feel a head or foot. If you feel the body, run your hand along the body until you contact a leg, head, or tail. Then try to visualize how the lamb is positioned in the ewe. Remember, there may be two or even three lambs in there, so it is important to not lose contact with the lamb's body when you're running your hand along it.

If you have trouble identifying a head, feel for an ear or a mouth. If you are not sure whether you are holding a front or rear leg, flex the first two joints up from the hoof. If both the joints bend the same way, it is a foreleg. If the joints bend in opposite ways, it is a rear leg. Once you locate a pair of legs and a head or a tail, you can more accurately visualize the position of the lamb in the uterus. This will let you know if the lamb must be moved to get it into the proper birthing position.



In the above illustration, the lamb's presentation is normal. Both feet are exiting first, immediately followed by the head and body. Even with a normal presentation, there may still be birthing problems if the lamb is very big or if the ewe is small with a tiny birth canal. Twin lambs usually present no problems when found in the normal position.

If you assist the ewe, try to help only to the point where it can finish the job itself. After you have assisted with a lambing, ensure all lambs have been born. Check that the ewe has not suffered any physical damage, and, if it has, consult your veterinarian. Watch the ewe to be sure it passes the afterbirth and that the ewe cleans properly. The ewe-lamb bond is important for raising a healthy lamb. Try to encourage this bond by not interfering.

Preventing Lamb Losses

The steps below can assist you in preventing lamb losses.

One month before the start of lambing:

- Shear wool tags and manure from the ewe's rump, legs, and udder (this process is known as tagging or crutching).
- Vaccinate ewes with a clostridial vaccine.
- Treat your ewes with a vitamin E and selenium solution if your flock has had experiences with white muscle disease and weak or stubborn lambs
- Give your ewes extra vitamin A and D, especially if they are receiving poor hay or pasture.
- Contact your veterinarian to assist you with preventative measures for this year if you had problems with coccidiosis or pneumonia last year. The ewes carry the coccidia and bacteria, which infects the lambs; by treating the ewes before lambing, you will reduce the infecting organisms in the environment at the time of lambing.

At lambing time:

- Make sure your lambs are not hypothermic. Hypothermia is when body temperatures are below the normal range of 37° to 38°C. If a lamb is hypothermic, warm it up by rubbing it vigorously with a towel and place it under a heat lamp for at least 12 hours.
- Feed 0.3 litres of colostrum immediately and another 0.3 litres two to four hours after birth.
- Immediately after birth, dip the lamb's navel into a 7 per cent iodine solution to prevent infections.
- Check the ewe's udder. Make sure the wax plug that fills the teat is milked out and the lamb can nurse freely.
- Always check each lamb. Look for lambs that are droopy or depressed and give them 0.3 litres of milk.
- Treat any weak lambs with a vitamin E and selenium treatment approximately 24 hours after birth.

Section 6: Business and Production

Whether you want to keep a few sheep in your backyard or dream of running a large sheep operation, you need to understand the basics about sheep farming in Nova Scotia. To get established, you will require around 800 square metres (1/5 acre) of pasture per sheep and a rudimentary shelter or barn to house your flock during bad weather. A draft-free barn is ideal for winter lambing. Given the nature of Nova Scotia's climate, storage of forage and feed for the winter is necessary. Pastured sheep need to be fenced in to prevent roaming and to protect them from predators. Sheep do have native predators in Nova Scotia and additional protection is often required. Each ewe will require about 500 kg (½ tonne) of hay and 55 kg (120 lbs.) of grain to get through the winter. One sheep will also consume approximately 8 L (2 gals.) of clean drinking water per day.

Dairy Products

There is interest in dairy sheep across the province, with their milk being processed into cheese and yogurt. Before investing in a milking parlours and milking equipment, investigate the market and the demand for sheep dairy products.

Sheep's milk is not a supply-managed commodity in Canada, so no quota is required to produce it for sale. However, a producer licence must be obtained from the Natural Products Marketing Council.

If the sheep's milk is sold directly to a processor, the producer does not require any further licences. However, if the producer is also processing the milk, either selling pasteurized fluid milk to retail outlets or the final consumer, and/or processing the milk into cheese, butter, yogurt, ice cream, or other dairy products, additional licences are required.

There are some regulations that apply to all milk producers. All milk producers must adhere to the Dairy Industry Act and accompanying regulations, which have stipulations that cover the following aspects of dairy production:

- The farmyard
- Barn construction
- Barn water supply
- Milking parlour construction
- Milk house construction
- Bulk milk tank specifications
- Milk handling equipment
- Hygiene during milking operations
- Animal health requirements
- Handling and transport of bulk milk
- Milk transport vehicles
- Milk transfer
- Criteria for raw unpasteurized milk. Note that this refers to unpasteurized milk sold for processing, not unpasteurized milk sold to consumers, which is not permitted.

There are other regulations that apply to dairy farms in Nova Scotia, including municipal zoning regulations and environmental regulations. For more information on municipal zoning regulations, contact your municipal office. For more information on environmental regulations, contact your Agricultural Resource Coordinator with the Nova Scotia Department of Agriculture.

NOTE

For more information on starting a dairy farm view the link to “Getting Started in Small Scale Dairy Production” provided in the Additional Resources section the end of this manual.

Milking Parlour and Milk House

Your milking parlour is where you will milk your ewes. You should provide a holding area near the parlour’s entrance to help manage traffic flow and to hold milking groups in the order they will be milked in. Milking parlours may be a raised platform, a pit type, or a hybrid/semi-pit. Raised platforms should be at a height that is comfortable for the operator. They should also have a ramp or steps so the sheep can access the platform.

You should work with an experienced equipment dealer to design and install a dairy sheep milking system. If you’re using a pipeline system, you must install and maintain a pipeline to carry milk from the milking units to the receiver jar and the bulk tank. Low lines are installed below the milking stalls and are more commonly used in pit-style parlours. They provide a more stable milking vacuum than high lines, which are installed above the milking stalls. No matter what system you use, ensure all the material in the facility is non-toxic and easy to clean.

The goal is to milk your sheep quickly and expose them to as little stress as possible. Having milking equipment that works well is crucial to a smooth, problem-free milking process. If milking systems are improperly installed, incorrectly used, or not maintained, they can result in harm to the animal. Milking equipment should be tested regularly, about once a year, to ensure it is working properly. Vacuum levels, pulsation, and milking units are all related and influence milk ejection. These factors should be properly balanced for optimal milking and to promote the welfare of your dairy ewes.

Milk House

Your milk house contains your bulk tank. A bulk tank should be large enough to store the amount of milk produced during peak production, plus one additional milking. Provide a pressurized, cold, potable water and wash-up hose for rinsing the bulk tank and milk house floors. The milk house should have good drainage to ensure any potential contamination flows away from the milk house and parlour. The walls and floors of the milk house should be smooth, impermeable, and easy to sanitize. Other equipment you should have in your milking parlour or milk house includes:

- strip cup
- teat dip cups
- separate drop pail/unit for fresh and treated ewes
- shovels for cleaning up manure
- dipper for sampling milk from the bulk tank
- pressure washer, hose, and brushes for cleaning the milk house
- water heater with high temperature thermostats to provide hot washing water
- backup generator to power equipment

Milking

After lambing, a ewe will begin her lactation and produce milk. Colostrum is produced during the first two days of the lactation. After this, the milk will change to regular milk and it will continue to be produced as long as the lamb is nursing or the farmer is milking the sheep

Cleaning and Sanitizing Milking Utensils

Milking utensils must be thoroughly cleaned before and after each milking to prevent bacterial contamination. It is important to follow the instructions on the labels of all chemical solutions.

1. Rinse all the pails, buckets, and other utensils with warm water immediately after use.
2. Soak utensils in hot water and detergent for about five minutes to remove soil.
3. Scrub the utensils and all surfaces. An acid cleaner should be used instead of an alkaline detergent, as these prevent mineral deposits from forming on the equipment.
4. Rinse each piece of the equipment with hot water.
5. Drain all pieces of equipment and utensils by placing them on a non-rusting rack and allow time for them to air dry.

The Correct Milking Procedure

Good milking practices are a must for your dairy sheep flock. Have a clean, separate milking area. Stay calm and quiet in the milking area and be patient.

Ewes are milked at least twice a day. When milking, you should follow the same order in which groups are milked for all milkings.

Start by clipping any long wool from the ewe's udder, flank, belly, and tail, then follow these steps:

1. Ensure that all milking equipment is cleaned and sanitized before each use.
2. Thoroughly wash your hands before milking and consider wearing disposable gloves.
3. Allow each group to enter the milking parlour and position for milking.
4. Gently massage and wash the udder with udder wash to encourage milk let down.
5. Dry udders with individual paper towels before milking.
6. Milk the first two streams of milk from each half of the udder into a strip cup. Check for flaky or clotted milk. Discard this milk and do not allow it in your bulk tank as it may contain bacteria.
7. Milk out smoothly and quickly, until the automatic stop triggers or until the milk flow stops.
8. Massage udder to make sure all the milk is out.

9. Dip each teat in a commercial teat dip. This prevents bacteria from entering the teat canal and causing a mastitis infection inside the udder.
10. Allow sheep to exit the parlour and return to their pens. Provide fresh feed and water to your flock

You must carefully identify any sheep that have been treated with antibiotics or have udder health issues. They should be milked last with the milk line removed from the bulk tank. All milk from treated sheep should be discarded until their milk has been cleared. Lambs should not be fed treated milk either. Discard the milk from animals treated with antibiotics or any abnormal milk (colostrum, watery, flakey or bloody milk).

Meat

Like any form of production, you need to ensure there is a market for your product, whether it be lambs, mutton, breeding stock, milk, and/or wool. The sheep industry in Nova Scotia has experienced significant growth in recent years as immigration has increased and more people in the province are seeking lamb and mutton.

Nova Scotia is an ideal location for raising sheep and the required investment in infrastructure and equipment is relatively low. Sheep farmers in Nova Scotia sell lamb to either the federally inspected abattoir in the province or one of the two provincially inspected abattoirs that market lamb and mutton. There are also producers marketing directly to consumers at farm gate or at one of the province's many farmers' markets.

Sheep producers have been experiencing relatively stable pricing for their lambs, largely due to the well-established marketing system that has been developed over the past 30 years. Based on market production trends, and the rising increased demand for lamb, it is anticipated the market will remain stable for the foreseeable future.

Meat Slaughtering and Processing

Any meat sold in retail stores in Nova Scotia must be slaughtered at a provincially or federally inspected abattoir. Meat slaughter in a provincially inspected abattoir can only be sold within Nova Scotia. In order for Nova Scotia-produced meat to be sold outside of the province, it has to be slaughtered at a federally inspected facility. More than 20 abattoirs are licensed to operate in Nova Scotia and inspection services are provided by the government.

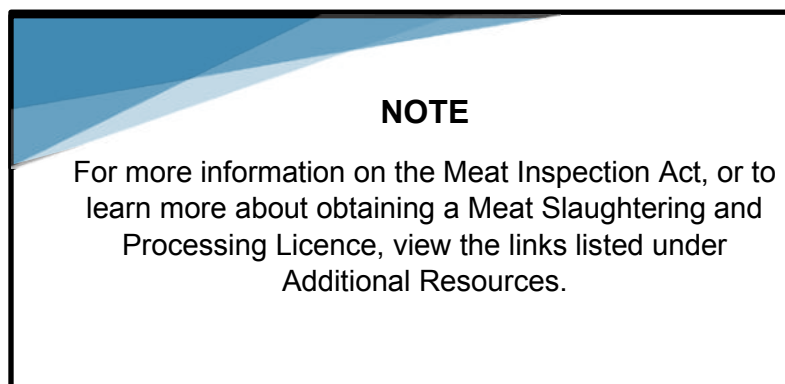
To ensure meat is safe for consumers, all animals, slaughter processes, and carcasses at provincially permitted abattoirs are inspected by trained primary product inspectors appointed under Nova Scotia's Meat Inspection Act and Regulations.

Further processing of meat or meat products is inspected and enforced by Nova Scotia Environment public health inspectors under the Health Protection Act and Food Safety Regulations. Provincial inspection contributes to the general surveillance of key food safety, animal health, and animal welfare issues in provincial livestock and poultry populations.

If you are interested in operating a meat-processing establishment (abattoir, slaughterhouse, meat shop, or retail outlets, including mobile retail truck), you will require a permit from the Nova Scotia Department of Environment.

Note: On-farm slaughter and farm-gate sales are only allowed where consumers do not sell or intend to sell the meat or meat product or use the meat or meat product for other commercial purposes. Any farm gate willing to sell processed meat or meat products through a retail shop on their farm requires a permit from the department and can only sell inspected meat. It is illegal to operate farm gate for commercial purposes without inspection in Nova Scotia. Failure to comply with provincial regulations could result in enforcement action.

For more information or questions about the provincial meat inspection program, contact your local district Nova Scotia Environment office. <https://novascotia.ca/sns/paal/agric/paal011.asp>



Wool

Wool prices are variable, but there is considerable interest in value-added wool production and processing. There are two commercial mills in the Maritimes that buy raw wool, one in PEI and the other in New Brunswick. There are also some smaller mills owned by individuals who prepare yarn for spinning, fibre art and textiles. You can also prepare your own fleece and sell your own products at farmers' markets or stores. Some sheep farmers learn to shear their own sheep, but there are also custom sheep shearers available for hire across the province.

Record Keeping

Records keep track of a herd's performance, health, daily management, and ancestry. Records of expenses and receipts are important and can help in determining the productivity and profitability of your herd. Be sure to keep your records in a convenient place and keep them up to date. You may wish to include some of the following information in your records.

Types of Records

Pedigrees—These records show the family tree of each individual animal. It lists the sires, dams, grand sires, grand dams, and great-grand sires and dams. It also includes the colour and senior weight of each animal. Pedigrees are important because they can establish that your animal is purebred and show ancestry, so you can avoid accidentally inbreeding.

Herd records—This record lists the sex, sire, dam, date of birth, weight, and the date the animal leaves your farm for every individual animal. Comments such as buyers' names or show winnings can be added and help keep track of each animal.

Breeding record—Each breeding is recorded on this record. It will help you keep track of hatching dates and helps you decide which animals are productive and are worth breeding.

Show record—A show record includes the dates and places of shows entered plus information on classes and awards received.

Health records—Health records should include any symptoms or possible signs of disease and the date they were observed in each animal. If the animal receives any medication, the amount and the date must be recorded. Health records can help keep track of the withdrawal period for medication that must be adhered to before an animal can go to market.

Feeding records—These records should include the type and amount of feed given to each animal. The record can also track the overall feed costs of your operation. Feeding records can also help you to design and implement feeding programs according to the life stage of your animals.

Additional Resources:

- Alberta Sheep Predator Control:
<http://www.ablamb.ca/images/documents/factsheets/Predator-Control.pdf>
- Canadian Sheep Breeder's Association – Conformation Booklet:
<https://www.sheepbreeders.ca/conformation-booklet.html>
- Canadian Sheep Breeder's Association – Scorecard:
<https://www.sheepbreeders.ca/breed-information---informations-sur-les-races-1.html>
- Canadian Sheep Breeder's Association – Sheep Breeds:
<https://www.sheepbreeders.ca/breeds---races-1.html>
- Canadian Sheep Identification Program: <https://www.cansheep.ca/csip.html>
- Fencing Guidelines: <https://novascotia.ca/thinkfarm/documents/fencing-guidelines-2013.pdf>
- Getting Started in Small Scale Dairy in Nova Scotia:
<https://novascotia.ca/thinkfarm/documents/getting-started-in-small-scale-dairy-production.pdf>
- Guide for Beginning Farmers in Nova Scotia:
<https://novascotia.ca/thinkfarm/documents/beginning-farmers-guide.pdf>
- Meat Inspection Act: <http://laws-lois.justice.gc.ca/eng/acts/M-3.2/page-1.html#h-1>
- Meat Slaughtering and Processing Licence:
<https://novascotia.ca/sns/paal/agric/paal011.asp>
- National Farm Animal Care Council Code of Practice for the Care and Handling of Sheep: <http://www.nfacc.ca/codes-of-practice/sheep>
- National Farm Animal Care Council Transportation: <http://www.nfacc.ca/codes-of-practice/transportation>
- Nova Scotia Premises Identification Program (PID): <https://novascotia.ca/agri/programs-and-services/industry-protection/>
- Pasture Management: <http://nsnewfarmer.ca/home/livestock/>
- Sheep Scorecard: <http://www.4-hontario.ca/uploads/userfiles/files/4.5.9%20sheep%20and%20fleece.pdf>

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Appendix A: Traceability in Nova Scotia

The Canadian Food Inspection Agency is proposing changes to the national livestock identification and traceability program that will affect cattle, sheep, goats, pigs, bison, and deer. Currently cattle, sheep, and pigs require tags, and only pigs require movements to be reported. Moving forward all listed species will require both tags and their movements to be reported.

Traceability has three major components:

- 1. Animal identification**—All animals will be required to be identified with individual animal ID tags. Most of these tags can be purchased at local feed stores or online directly from the Canadian Cattle Identification agency <http://canadaid.com/>
- 2. Premises identification**—All sites where livestock are housed or assembled will require a Nova Scotia PID number issued to them.

Any livestock producer in Nova Scotia can apply for a Nova Scotia Premises ID number at no charge to them. This is a one-time application and the issued number stays with the farm property regardless of changes in ownership, species, or animals, etc. The same number is used when ordering tags and reporting movements for all animals regardless of species.

A premises ID number can be used in trace back of animals for emergency measure such as food recalls or animal disease out breaks. Producers can apply for a premises ID number at www.novascotia.ca/agri/pid/, by phoning 902-890-3377, or by emailing NSPID@novascotia.ca.

- 3. Animal movements**—All movements of regulated species between premises will need to be reported to the responsible administrator for that species.
 - Canadian Cattle Identification Agency for cattle, sheep, goats, bison, or deer
 - PigTrace for hogs

The following information needs to be reported:

- Premises ID of departure and arrival sites
- Time and date
- Individual animal ID number
- Licence plate of livestock trailer

No reporting will be necessary for movements within a farm unit including:

- On-site pastures (pastures that are part of your farm unit)
- Other barn locations (heifer barns or other locations where animals are kept)
- Off-site pastures owned or leased (property where you are pasturing your animals only, not comingling with other producer's animals)

Appendix B: Biosecurity



Biosecurity for Small Scale Livestock Production

Biosecurity is the protection of people, animals, and the environment from infectious disease, pests, and other biological threats. It refers to the proactive measures taken to exclude threats from farms that are disease free, and preventing spread of pathogens to other herds or flocks if/when a disease does occur. The ultimate goal of a good biosecurity plan is to implement easily attainable protocols that reduce problems to inexpensive and manageable occasions. The following are the key components of any biosecurity plan.

1. **Fences:** Good fences keep livestock in and wildlife out. Inspect boundary fences regularly and repair as needed. Stray stock may spread disease and feral animals introduce new pathogens to your farm.

2. **Housing, Equipment, and Yard Maintenance:**
 - Pens should be completely emptied, cleaned, and disinfected at least annually.
 - All equipment that comes into direct contact with livestock or poultry should be cleaned and disinfected periodically, including feeders and waterers.
 - If sharing equipment with other farms, be sure to disinfect the equipment before using on your farm. Use your best judgement and weigh the risks carefully.
 - Prevent pests and rodents by:
 - Keeping area around pens free of debris
 - Cutting the grass short around pens and enclosures
 - Keeping feed in tightly closed containers and cleaning up spilled feed
 - Using traps and bait as necessary
 - Standing water should be drained.

For organic production, a robust biosecurity program can prevent the need for antibiotics and parasiticides, and can reduce the potential of GMO contamination or loss of certification.

3. **Introducing New Stock:**

- Don't bring new stock to your property if they appear unhealthy.
- Avoid purchasing stock from markets and auctions.
- Obtain a health certificate if possible.
- Birds, eggs, and livestock should be sourced from farms with a solid herd or flock health program.

4. **Quarantine:**

- Have a quarantine area available for animals new to the farm and for sick or injured animals.
- This should be a separate area or building to prevent bird-to-bird or animal-to-animal contact.
- Three weeks will allow time for a proper assessment of health, condition, and recuperation from transport or illness.
- Observe animals or birds for any abnormal behaviour and signs/symptoms of disease. Presence of unusual behaviour or symptoms calls for veterinary inspection or tests.

5. **Water and Feed:**

- Water should be tested at source to ensure its suitability for livestock production at least annually.
- Design and position water bowls, troughs, and waterers to prevent fecal contamination.
- Feed or ingredients should be purchased from sources that verify its safe origin.
- Keep feed pest-free and dry, cover feed bins and feed systems to reduce the chance of contamination.

6. **Work Flow:**

- Farm owners and workers should have separate clothing and footwear for working around various animal species. These should be kept at the barn entrance.
- Use hand sanitizer or wash hands with soap and warm water before entering and after leaving livestock areas.
- Work with the youngest and most susceptible animals first.

7. **Manure:**

- Manure should be removed from the production area regularly.
- Farms, even hobby farms and small stables, should have a manure management plan that includes collection, storage, moving, and disposing of manure to minimize chance of spreading disease.
- Tools and equipment used for manure handling should not be used for feed or bedding.

8. **Herd or Flock Health:**

- Contact your herd health veterinarian when livestock appear sick, mortalities are high, or production drops off without apparent reason. Low numbers of mortality should be examined by a vet if the cause of death is unknown.
- Mortality should be disposed of in a timely manner to prevent contamination of the farm environment, reduce risk of spreading disease to other livestock and humans, and prevent attraction of pests.
- When animals are stressed from parasites, weather extremes, etc., natural treatments may be less effective. Monitor carefully and resort to other options as necessary. As well, remember that sick animals benefit from remedial care.
- Vaccinate as required (keeping the necessary records).
- Pay attention to parasites. Fecal egg counts are useful in determining if treatment is necessary.
- Keep records of treatments and veterinary care.

9. **Visitors/WWOOFers/Contractors:**

- Discourage unannounced visitors.
- All visitors must follow biosecurity protocol.
- Designate a parking area for visitors.
- Visitors should be accompanied by farm staff.
- A visitor log is recommended.
- Post “Biosecurity” and “No Entry without Permission” signs on entrance doors.
- Keep extra footwear and outerwear (coveralls, smocks, etc.) for visitors.

Biosecurity is not limited to large-scale farms. Regardless of size or production philosophy, all farms, even hobby farms, have a responsibility to prevent an outbreak or spread of animal (or plant) disease or pests. Stay on top of industry association news. Be aware of local conditions or issues as they arise. **If there is a serious disease outbreak don't be the last to know!**

There are national biosecurity standards for most livestock commodities.

These guidelines are a good place to start when developing a biosecurity plan for your farm.

<http://www.inspection.gc.ca/animals/terrestrial-animals/biosecurity/eng/1299868055616/1320534707863>

**For more information, contact:
Heather McLean,
Non-Ruminant Livestock Specialist,
Perennia**

(902) 678-7722

www.perennia.ca

Appendix C: Record Keeping

Herd Record							
Name	Tattoo	Sex	Sire: Dam:	DOB	Colour	Date Sold	Comments

Inventory Record							
Animal ID (Name/#)	Registration # /Tattoo	Description (Breed, colour, marking, etc)	DOB	Sex	Ownership Information	Purchase Price	Value
					<input type="radio"/> Raised <input type="radio"/> Purchased _____Date if purchased		
					<input type="radio"/> Raised <input type="radio"/> Purchased _____Date if purchased		
					<input type="radio"/> Raised <input type="radio"/> Purchased _____Date if purchased		

Breeding Record						
Dam	Sire	Date Bred	Date Birthed	No. Born Alive	No. Dead at Birth	Comments

Show Record						
Name of Show	Location	Date Entered	Identification Number	Classes Entered	Number in Class	Comments

Health Record								
Name/#	Breed	Sex	Age	Illness/ Symptoms	Treatment	Date Treated	Cost of Treatment	Recovered from illness/successful treatment

Death Record					
Name/#	Breed	Sex	Age	Date of Death	Cause

Feed Record		
Situation Description	Method of Feeding	Amount of Feed

				Nutritional Value of Feed		
Name of Feed	Type of Feed	Cost of Feed	Amount fed per day	Protein %	Fat %	Fiber %

Appendix D: Activities for a 4-H meeting

Each chapter in this manual can serve as information and act as a guide to help you plan a 4-H meeting. This manual is meant to act as a starting point for providing you with knowledge to teach your members. As a leader, you are encouraged to tailor your meetings to your groups' interests and abilities.

The table below outlines a typical 4-H meeting and gives suggestions for the length of time.

Welcome, call to order, and pledge		10 min
Roll call		5 min
Parliamentary procedure	Minutes and business	10 min
Topic information discussion	Use the manual as a guide to present information on the meeting's topic.	20 min
Activity	Time to apply the newly learned information. See the list of suggested activities below.	30 min
Handle the animals	If possible, members may use this time to practice handling their animals.	20 min
Wrap up and adjournment		10 min

The following tables have different topic suggestions, information to discuss, as well as some possible activities based on each section of this manual.

Ideally, one or two topics should be selected to discuss during each meeting. Try to select topics from different sections for each meeting so members are exposed to a wide variety of knowledge.

As a leader, feel free to be creative and use a variety of activities to help your members learn. There are many worksheets available on various websites for members to fill out. You can also invite experts and guest speakers to come in to talk to your members, or you can arrange day trips to visit new locations.

Section 1: Selecting an Animal

Topic	Information	Activity
Parts of the animal	Show members a labeled diagram of the animal. For younger or newer members, begin with basic parts of the body. For older or more experienced members, you can discuss more advanced topics such as skeletal or muscular structure.	Have members label the parts of the animal. This can be done by using a worksheet or by having members take turns placing labels on an actual animal.
Animal breeds	Teach your members about different breeds. Possible information to include is <ul style="list-style-type: none"> • Distinct breed characteristics • Differences among the breeds • History of a breed 	Some suggested activities: <ul style="list-style-type: none"> • Have members match a picture of the animal to its breed. • Have members research and present the ideal characteristics of their chosen breed.
Choosing an animal	Discuss particular features a member might want to look for in an animal. Make sure to include information on correct conformation and conformation faults.	Have members practice judging. The members should place the animals and give reasons for their placings using the correct judging format.
Purchasing stock	Outline your members' options for where they might purchase an animal. Discuss the pros and cons of purchasing from a private sale, a large breeding operation, an auction or breeding their own.	Organize a trip for the members to visit a breeding operation or an auction.

Section 2: Care and Management

Topic	Information	Activity
Housing	Discuss with your members the different options for housing their animals. Make sure to include information on the National Farm Animal Care Council Code of Practice.	Have members design their own farm using whatever materials they like, such as modeling clay, popsicle sticks, paper etc. Have members present their farms and discuss their farms with the group.
Handling	Inform members about proper animal handling and demonstrate how to properly handle the animal. This activity meeting can include information on animal behaviour, proper handling techniques, and safety tips.	Have members practice handling an animal while you observe.
Grooming	Teach members how to properly groom their animals. You can discuss basic grooming techniques as well as how to groom an animal for show.	Have members assemble a grooming kit and take turns grooming an animal. They could bathe, clip/shear, trim nails/hooves etc.
Identification	Discuss the importance of proper identification and tagging/tattooing animals.	Have members observe an animal being tagged/tattooed.

Section 3: Nutrition

Topic	Information	Activity
Digestive system	Teach your members about their animal's digestive system.	Have members label an image of the animal's digestive system and include brief descriptions on the functions of each part.
Essential nutrients	Inform your members about what the essential nutrients are and why they are important to their animal's diet.	Have members complete a worksheet where they match essential nutrients to their function.
Classes of feed	Discuss the different types of feed available for the members to feed their animals. Describe each feed and its pros/cons.	Have an animal nutritionist, feed salesperson, veterinarian etc. come in and give a talk on animal nutrition.
Feeding programs	Teach your members about their animal's nutritional requirements for their different developmental and life stages.	Instruct members to design a feed program for the different stages of their animal's life. Compare and contrast how a newborn is fed compared to the diet of a mature animal.
Body condition scoring	Inform members how to score an animal's body condition, when to score, how often, and why. Include some basic information on how a member could adjust the animal's diet to raise or lower a body condition score.	Have members practice palpating and scoring the body condition of an animal. Provide images of animals in different conditions so members have a visual.

Section 4: Health

Topic	Information	Activity
Recognizing a healthy animal	Teach members how to recognize a healthy animal and what normal vital signs are.	Have members practice taking an animal's vitals.
Biosecurity	Inform members on the importance of biosecurity.	Have members discuss proper biosecurity practices and ways they can implement them into their own program.
Common diseases	Discuss some common diseases, their cause, prevention, and treatment.	Have a veterinarian in, or visit a vet clinic, to talk about common diseases and what members can do about them.
Parasites/ vaccinations	Inform your members about the importance of routine vaccinations as well as deworming.	Have your members design a deworming and vaccination schedule. If members are older and more experienced, they may want to learn how to properly administer vaccines.

Section 5: Breeding

Topic	Information	Activity
Reproductive cycle	Teach members about the animal's reproductive cycle.	Have members label diagrams of the animal's reproductive system.
Signs of heat and breeding	Inform your members about the signs of an animal in heat. Proper breeding practices, as well as natural vs artificial insemination, may also be discussed.	Have members record some signs of an animal in heat. Then, have members discuss the advantages/disadvantages of natural service or artificial insemination. Also, you could arrange to have the members observe animals being checked for pregnancy.
Giving birth	Discuss the stages of labour and some signs of issues with the birthing process.	Have members fill out a timeline on the stages of labour with a description of each stage.
After-birth care	Teach your members about what to do following the birth of an animal. Care for the newborn as well as the mother should be discussed.	Have members create an after-birth care kit complete with towels, disposable gloves, buckets etc.

Section 6: Business and Production

Topic	Information	Activity
Marketing	Discuss with members the importance of marketing and some marketing ideas/tips.	Have members research potential markets for products from their animals. Alternatively, you could organize a trip to a dairy farm, specialty meat market, farmers market etc.
Record keeping	Talk to members about why records are kept, how to keep them, and what members should keep track of.	Have members fill out a record booklet throughout the year. You may use the record templates provided in this manual or use your own.