Ontario

MINISTRY OF AGRICULTURE, FOOD AND RURAL AFFAIRS

Feeding Corn Silage to Sheep

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Table of Contents

Introduction

Corn silage is a fermented feed made from the whole corn plant, harvested at 45%-35% dry matter (55%-65% moisture). It is a highly palatable feed with a high sugar content, allowing for good fermentation and packing. With proper equipment, management and ration formulation, corn silage can be effectively fed to both the ewe flock and market lambs.

Figure 1 shows corn silage harvested and ensiled at higher moisture (lower dry matter or DM) than desirable, resulting in a saturated appearance and fermentation problems. By waiting to ensile at ideal moisture - dryer than 35% DM, producers can increase energy content and typically achieve more favourable fermentation.

Corn silage is quickly becoming an economical and viable feedstuff for sheep as grain prices continue to rise and sheep flocks are becoming larger and more mechanized. Corn silage is unique due to rapid harvesting ability, low-cost storage and high yields of forage per hectare. It is a high-energy feed with a grain content of 40% or more.

A typical nutrient analysis of corn silage grown in Ontario, measured on a dry matter basis:

- Dry Matter: 37%
- Total Digestible Nutrient: 72%
- Crude Protein: 8.2%
- ADF: 23%
- NDF: 42%
- Lignin: 2.4%
- Ca: 0.20%
- Mg: 0.15%
- P: 0.21%
- Cu (ppm): 3.78

Listeriosis

The risk of contracting listeriosis is one reason corn silage has not gained as much popularity with sheep producers as it has with dairy and beef cattle producers. Sheep are more susceptible to *Listeria monocytogenes*, the bacteria that causes listeriosis or "circling disease."

Common signs of listeriosis include abortions and encephalitis (swelling of the brain). Encephalitis will cause clinical signs such as difficulty walking, head pressing, circling and the tongue hanging outside of the mouth. Encephalitis has a high case fatality rate.

L. monocytogenes is widespread in the environment, particularly in soil, and can grow and reproduce over a wide range of temperatures. To prevent *L. monocytogenes* contamination and/or growth in silage, employ these key steps:

- keep silage pH below 4.5
- create an anaerobic environment by properly packing and storing silage
- keep silage free from soil/fecal contamination
- feed fresh silage to sheep (not mouldy or spoiled silage)

It is important to remember that many animals can ingest the listeria bacteria and show no clinical signs, easily fight off the infection and continue to gain normally. The most susceptible animals are those not in optimal health. As a result, it is important to keep your flock in good nutritional status, free of stress and in good overall health with up-to-date vaccinations.

A good feed manager can easily overcome the listeria risk associated with feeding fermented feeds and successfully feed their flock with corn silage.

Proper Corn Silage Management

To ensure high-quality silage, observe these management strategies.

- Plant corn silage hybrids with appropriate heat units for your area. This ensures adequate grain content and appropriate maturity for harvesting.
- Harvest corn silage between 55% and 65% moisture, depending on the type of storage (Figure 2). Harvest the whole plant, leaving several inches at the bottom to ensure the silage has a lower risk of soil contamination.
- Choose the corn silage storage system that most fits your management style and current operation. There are three main types of storage for corn silage; bunker silos, upright silos and plastic bags. Each type has its own advantages and disadvantages. No matter what type of storage you use, properly pack corn silage and keep it in an anaerobic environment to prevent spoilage and bacterial growth!

Feeding Corn Silage to Ewes

Corn silage fed to ewes can be incorporated into a total mixed ration (TMR) to ensure consistent intakes or it can be fed as a part of a component style ration. Both options are viable and the choice depends on farm set-up and individual producer preference. Table 1 contains several rations designed on a daily, as-fed intake basis that could be fed using either approach. One rule of thumb first popularized by commercial Quebec producers and used with success in Ontario is the idea of a 50:50 ration for late-gestation and lactating ewes. This ration was made up of equal parts of corn silage and hay or haylage as the main component, plus minerals, supplements and free-choice water access.

It is imperative that fresh corn silage be fed to ewes at all times. Do not feed mouldy or heating feed as it increases the chance of listeriosis. Manage feed bunks in a "slick-bunk" system or clean them once daily so that day-old, spoiled feed will not be eaten.

Figure 3 shows a 50:50 corn silage and haylage TMR ration that is ideal for late-gestation and early-lactation ewes. This forage combination plus a vitamin/mineral premix is often sufficient in all nutrient parameters (energy, protein, etc.) for these classes of sheep.

Table 1 provides sample rations for bred ewe lambs and mature ewes in various stages of production. The vitamin/mineral premixes or additives are yet to be added. With minor adjustment, rations #1, #2 and #3 are suited to component or alternating day feeding.

Table 1. Sample rations for bred ewe lambs and mature ewes

Feedstuffs	**kg (lb)/head/day (as-fed basis)**
Ration #1. Bred ewe lambs - 1st 15 weeks of gestation	
Corn silage	1.77 (3.90)
Legume hay	0.91 (2.00)
Total kg (lb)/day (as-fed basis)	2.68 (5.90)
Ration #2. Mature ewes - maintenance	
Corn silage	0.68 (1.50)

Legume hay	0.95 (2.10)
Total kg (lb)/day (as-fed basis)	1.63 (3.60)
Ration #3. Mature ewes - non-lactating: 1st 15 weeks of gestation	
Corn silage	1.91 (4.20)
Legume hay	0.86 (1.90)
Total kg (lb)/day (as-fed basis)	2.77 (6.10)
Ration #4. Mature Rideau ewes - last 3 weeks gestation scanned for triplets Note: This level of energy (extra corn grain) must not be used for twin bearing ewes.	
Corn silage	4.31 (9.50)
Legume hay/haylage	0.64 (1.40)
Corn grain	0.07 (0.15)
Soybean meal (48%)	0.29 (0.65)
Total kg (lb)/day (as-fed basis)	5.31 (11.70)
Ration #5. Mature ewes - lactation with triplets Note: This level of energy (extra corn grain) is likely not required in most production systems where body condition score (BCS) can be sacrificed to meet lactation demands.	
Corn silage	5.08 (11.20)
Legume hay/haylage	1.00 (2.20)
Corn grain	0.25 (0.55)
Soybean meal (48%)	0.32 (0.70)
Total kg (lb)/day (as-fed basis)	6.65 (14.65)

Source: Originally developed for producers first implementing corn silage by OMAFRA staff using the OMAFRA Sheep Ration Formulation Program.

Table 2. A sample lamb finishing ration

Feedstuffs	**kg (lb)/head/day (as fed basis)**
Corn silage	0.93 (2.04)
Corn grain	0.32 (0.70)
Mixed grain (50% barley, 50% oats)	0.53 (1.16)
38% CP protein supplement	0.30 (0.66)
Total lb/day (as fed basis)	2.08 (4.56)

Feeding Corn Silage to Lambs

Many of the same concepts and rules for feeding ewes corn silage also apply to feeding lambs. Corn silage can be incorporated into a TMR or fed as part of a component-based system.

It is even more important when feeding lambs corn silage to have proper silage and bunk management. Feed only fresh silage. Do not feed spoiled or mouldy feed to lambs. Manage bunks as "slick-bunks" or clean them out daily. Poor bunk management and storage can easily lead to a listeriosis outbreak.

A recent study lead by Paul Luimes at Ridgetown College looked into corn silage inclusion rates in market lamb rations, the effect of corn silage on carcass composition and gain, and the costs associated with feeding corn silage. In this study, lambs were divided into groups and fed diets containing 0%, 25% or 50% corn silage on a dry-matter basis, and all rations were balanced for crude protein. It was found that feeding corn silage at 25% compared quite closely to the traditional all-grain diet in terms of feed intake, growth performance and cost. There was no difference in dressing percentage, back fat and loin measurements when comparing the 0% corn silage ration and the 25% corn silage ration. The lambs on the 50% corn silage ration could not maintain dry matter intakes, and it took longer and cost more to raise them to market weight. Keeping corn silage at a level less than 50% of a ration on a dry-matter basis does not affect growth rates, intakes or carcass composition, and may offer potential cost savings. A 25% corn silage ration similar to the one at

Ridgetown is detailed in Table 2.

The choice to feed lambs corn silage is dependent on a number of factors. The four key factors to consider are price, farm set-up, bunk management and market timing. If grain prices are high, corn silage may be more economical to feed compared to a straight grain ration. Proper bunk management, as outlined above, and proper silage handling and storage are imperative to prevent listeriosis. Corn silage can be used to advantage when it comes to market timing. For example, feeding a high corn-silage diet (i.e., 50%) can slow the growth of lambs, allowing a producer to better meet market demands, such as festival or holiday markets, thus receiving better market prices. This is similar to the concept of backgrounding in the beef sector.

Table 2 provides a sample lamb finishing ration for which vitamin/mineral premixes or additives are yet to be added - 25% corn silage on a DM basis.

Key Points to Remember

Like anything new, there is a learning curve associated with feeding corn silage to sheep. Proper background information and diligence will help ensure a successful transition to corn silage feeding:

- When harvesting corn silage, the best practice is to minimize soil contamination, harvest at an appropriate moisture level and ensure the silage is stored in anaerobic conditions.
- When feeding corn silage, it is important to feed fresh, non-spoiled feed with no mould. Ensure the bunk space is cleaned regularly and keep the silo face fresh.
- To ensure proper ration formulation, consult a nutritionist and submit feed samples for nutrient analysis to ensure a balanced and economical sheep ration.
- Feeding corn silage as part of a balanced ration to ewes is a potentially profitable way to get energy into a ewe's rations and is a viable alternative to the traditional grain and dry hay-based ewe diet.
- With proper management, feeding some corn silage to lambs is a viable feeding alternative to the traditional all-grain feedlot lamb diet and may be an economical feedstuff when grain prices are high.

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