

Risks of Using Overwintered Crops as Livestock Feed

Using overwintered cereal crops for swath grazing in the spring or baling for use as greenfeed in the fall and winter are two options to utilize the 2016 crop for ruminants. It is also possible to thresh the crop and feed the grain to monogastrics and ruminants.

However, there are a number of concerns associated with feeding overwintered crops to both types of livestock.

Does the forage or grain meet nutritional requirements of the animals?

Crops become weather damaged when left out over winter. Typically, protein and energy contents are lower in the spring compared to the fall. Digestibility of the feeds can be reduced as well. In the case of greenfeed or swath grazing, digestibility could be up to 10 per cent lower.

This drop in digestibility further reduces the suitability of unthreshed crops or spring-threshed grain if these materials are to be the major component or sole ingredient in a ration. These components will need to be blended off with other feedstocks to make up for the loss in quality.

Animals in late pregnancy or in lactation have approximately 25 to 30 per cent higher nutrient requirements than animals in early or mid-pregnancy. While there are differences between species, this trend is true for all. As a result, spring swath grazing or cereal greenfeed harvested from

overwintered crops needs to be tested for quality, and rations need to be balanced to meet animal requirements.

Mycotoxins and overwintered crops

Mycotoxins can be found in many cereal grains (wheat, barley, rye, etc.) and corn. Mycotoxins are much less common in crops such as canola and legumes (peas, soybeans, faba beans etc.). The fungi that have the potential to produce mycotoxins predominantly infect the seedhead and not the stems or leaves of the plant.

Ergot is produced by the fungal species *Claviceps*. *Fusarium*, another fungus, also infects crops early in the growing season. Molds develop in the seedheads over the summer, and mycotoxins are formed in the developing crop.

If the weather is reasonably mild with high relative humidity, conditions are ideal for mycotoxin development. Ergot concentrations appear to reach maximum values by mid to late July. Levels remain stable for ergot. Levels of some of the *Fusarium* mycotoxins can increase when grain is in storage.

For crops that remain out in the field, such as for swath grazing or corn grazing, microbial activity stops when temperatures drop below 5°C, which locks existing mycotoxin levels into the crop over winter. The same microbial levels are present in the crop going into spring.

Because the concentration of mycotoxins in the spring is very similar to what was present in the fall, it is important to test for the presence of mycotoxins, not the type of microbes or populations present on the material.

Nutritional quality of the greenfeed or grain is a big concern. If feed test results indicate that there is sufficient nutritional quality to feed to livestock, then testing for mycotoxins is required before any of the material is actually fed to the livestock.

Spring-threshed crops

Spring-threshed cereal crops may contain ergot, fusarium, molds, dirt and fecal contamination. Any problem that was present in the crop last fall will still be there in the spring. Freezing temperatures during the winter only stopped further microbial development.

In the warmer fall temperatures of 2016, there was a risk that mycotoxins were produced by various molds and fungi, which could be harmful to all classes of livestock. Before feeding a salvaged spring-threshed cereal grain or greenfeed, it is advisable to have the feed tested for nutrient content and also screened for mycotoxins.

Silaging overwintered crops

Ensiling is the process of controlled fermentation to preserve wet forage material to a stable feed source. Salvaging overwintered feed by ensiling is **not** recommended.

There are two stages of fermentation during the fermentation process. Understanding the process helps explain why ensiling an overwintered crop is not an option:

1. The first stage involves aerobic respiration because oxygen is present. When plant material is first chopped and put in a pit, bag, pile or bale, oxygen is present. Bacteria use up available oxygen and plant sugars. Carbon dioxide and heat are produced. A shorter aerobic stage produces less heat and uses less soluble sugars resulting in higher quality silage.

2. The second stage follows in an anaerobic environment when all the oxygen is used up within the sealed pit, bag, pile or bale. Anaerobic bacteria use plant sugars to increase their populations to produce lactic acid, which lowers the pH of the silage allowing the preservation or “pickling” to occur. The entire process typically takes 3 to 4 weeks to complete and requires a minimum of 6 to 12 per cent plant sugars in the material to ensile effectively.

Overwintered cereal crops should not be chopped or baled to make pit, pile or bale silage because they may not ensile properly. The overwintered plant material would have been wetted and dried repeatedly, resulting in the leaching of soluble sugars and proteins out of the plant material. Without adequate amounts of sugars, microbe populations die off, and fermentation does not occur.

It is very unlikely that overwintered crops will have adequate moisture to create a good environment for proper fermentation. For proper fermentation with chopped silage, the recommended moisture content is 60 to 65 per cent and for bale silage, 45 to 50 per cent.

If moisture levels are lower than those for chopped or baled silage, it is very difficult to pack the material in a pit or pile, resulting in higher oxygen content, longer fermentation and possibly, lower quality silage. In bale silage, the drier material will not pack in the bale, and the desired fermentation may not occur.

There is no point in going to the expense of making silage only to find a marginal to poor quality product that may not be suitable for use.

Baling crops

Overwintered forage must be dry before baling. Bales with a moisture content more than 16 to 18 per cent have the potential to heat and lose quality. During the heating process, some of the sugars (or energy) will be used by the microbes thereby reducing the energy content in the feed. If temperatures within the bale get above 40° C, the bales will smell sweet or like tobacco.

The forage colour can change to dark brown or black. When this happens, a portion of the protein will be bound to the plant fibre and not be available to the animals. If this change occurs, request an Acid Detergent Insoluble Nitrogen (ADIN) or ADIP (protein) test in addition to the regular feed analysis. Use the adjusted lower protein value when formulating rations.

Raking or inverting overwintered crop windrows in low areas of the field or where the crop has dropped through the stubble helps with the drying process. These actions also help to get a more uniform moisture content in the material going into bales. The raking or inverting should be done at lower speeds to prevent grain heads from breaking off the stems. If dirt is kicked up into the crop material and moisture levels are higher than anticipated, white mold can form in the bales.

Molds can develop in greenfeed bales that have a higher moisture content. A loss of quality is possible, and feed refusal increases.

If mold is present, bales should be rolled out rather than fed in a bale feeder, which will allow the animals to sort through the feed and avoid the material contaminated with mold. For example, forcing cows to eat 5 per cent moldy feed can potentially reduce ration digestibility by 10 per cent.

Rolling out the greenfeed also reduces the amount of dust and spores the animal breathes in, reducing the risk for eye and respiratory problems.

Human health concerns when using overwintered crops

Operator health can be affected by harmful components that may be present in overwintered crops. Producers should take the necessary precautions to prevent health issues.

1. If mice are in the field, swaths can be contaminated by their manure and urine. Hanta virus is a concern to humans, but not to pets or livestock. Inhaling dust contaminated with rodent droppings, urine or saliva or infecting open wounds with the

dust can create serious health problems for the producer. These problems are more likely to arise when working with threshed grain in bins, but they can also occur with greenfeed bales.

2. Molds, dusts and spores found on the grain and forage components can be released into the air when bales are moved or handled. Respiratory problems and eye irritation are concerns.
3. Dust from ergot-contaminated grain can cause irritation in the upper respiratory tract.

Feeding considerations

When feeding ruminants mature cereal crop greenfeed, many problems can occur. Grain overload, acidosis and bloat may occur in cattle and sheep because the weight ratio of grain to straw in this material is approximately 1:1. The animals prefer to eat the grain rather than the straw.

Macro mineral imbalances of calcium, phosphorus, magnesium and potassium could cause downer cows or milk fever.

Sheep require very high quality forages in late pregnancy and after lambing. Lower quality forages such as overwintered cereal greenfeed or spring-threshed grain generally do not have the quality required to meet requirements. It is not recommended to use these types of feed.

Monogastric animals are very sensitive to mycotoxins, especially DON and zearalenone. Levels of vomitoxin (DON) at 1 ppb will cause feed refusal in pigs.

Spring-threshed grains could contain waterfowl manure. With the significant risk of Avian Influenza being spread, spring-threshed grain should not be used in any poultry diet.

Ergot-contaminated grain is a concern for all types of livestock. Any feed containing ergot must be tested for mycotoxin levels before being included in rations.

For additional information

Contact a nutritionist, government livestock extension specialist, veterinarian, feed salesmen or consultant that can provide assistance with feeding overwintered crops to livestock.

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