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Grazing Corn Stalks

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It has been known for years that one of the largest expenses in a beef cattle production system is feed, more specifically, winter feed. Consequently, a great deal of research has focused on ways—shifting the production system to better fit the forage resource base, feeding cheaper alternative feeds and forages, extending the grazing season—to reduce winter feed cost.

In the upper Midwest with its short growing season for grasses and significant amount of snowfall received in a typical year, crop residue is the most cost-effective method to extend grazing. Extending the grazing season without adding additional forage acres or substantial cost offers beef cattle production systems a competitive advantage.

Producers in the Upper Midwest are blessed with an abundance of crop residues that can be effectively utilized by beef cattle. Most farm business management and Cooperative Extension personnel consider grazed crop residues to be among the lowest cost feed resources. This advantage is a result of the agronomic cost of production being borne by the crop enterprise.

The major expenses associated with grazing corn residue include rent (for residue grazing only), fencing, water development, freight, and labor. These costs must be included in the beef production enterprise, but even with these added costs it may be possible to significantly reduce winter feed cost for the cow herd.

Forage quality and quantity

Corn residue is one of the most commonly harvested and highest quality residue forages. Iowa State University scientists have developed guidelines for estimating residue yield (Table 1). Under most conditions, one acre of

residue from a combined field can provide 30 to 45 days of grazing for a 1,200-lb pregnant cow; however, this can be quite variable.

Strip-grazing can extend grazing time and make the quality of the diet more uniform over the grazing period. By limiting access to only a small portion of the field, the cattle are forced to consume residual corn and the high- and low-quality forage components of the residue. Generally, a single strand of electric fence is sufficient to control grazing.

When determining the appropriate stocking rate and grazing time, it is important to consider the amount of residue that will be trampled and wasted in the grazing process. Research indicates that cattle grazing a whole field will utilize only 20% of the residue. This percentage can be substantially higher when fields are strip-grazed.

Table 1. Estimated corn stalk residue yield.

Corn yield (bu/acre)	Residue yield (tons/acre)
≥ 120	4.0 to 5.0
90 to 120	3.5 to 4.5
60 to 90	2.5 to 3.5
30 to 60	2.0 to 3.0
≤ 30	2.0 to 2.5

The nutritional quality of grazed corn residue is quite high early in the grazing period: approximately 70% TDN and 8% crude protein. It then gradually decreases over time to approximately 40% TDN and 5% crude protein. This is a result of the cattle selecting the highest quality feeds first and a weathering, or leaching of nutrients, from the residue over time. Cattle will first consume any grain that remains in the field. Then they will shift their preference to leaves and husks and finally cobs and stalks.

Protein supplementation

As the nutritional quality of the corn residue decreases, producers will need to provide supplemental protein. Without supplemental protein, the digestibility, or the percentage of the forage that can be digested, will decrease and the forage will not be able to meet the nutritional requirements of the animal. Protein supplementation will help the cow's rumen microbial population digest the forage and provide nutrients to the animal.

A cow's microbial population requires rumen degradable protein sources, commonly found in plant proteins, to effectively digest fiber. Non-protein nitrogen sources, such as urea and biuret, should be avoided. These nitrogen sources require the presence of readily fermentable carbohydrates to be utilized effectively. Unfortunately, once the grain has been consumed, the residue is essentially devoid of readily fermentable carbohydrates.

To determine when supplementation is necessary, watch the manure from the cows. As the corn in the manure begins to disappear, it is time to begin protein supplementation.

Generally, mature, pregnant beef cows should receive 0.5 to 1 lb of supplemental protein from a natural source. Common protein sources include alfalfa, oilseed meals, and various alternative feeds. Commercial protein supplements are also acceptable.

Vitamin and mineral supplementation

Corn residue is quite low in most minerals, especially calcium, phosphorus, and vitamin A. As a result, a well balanced vitamin and mineral mix should be provided free-choice.

Many of the feeds used as protein supplements will provide significant amounts of calcium and(or) phosphorus and may reduce the need for additional supplementation. However, vitamin A and white salt should be provided at all times.

Genetically modified corn

Some producers have raised questions regarding the grazing of genetically modified (GMO) corn—Bt and Round-up Ready hybrids. The majority of the research that has been conducted suggests that there is no difference in the nutritional quality of GMO hybrids compared to their non-GMO counterparts. Also, there appears to be no difference in the preference of cattle for GMO versus non-GMO hybrids.

However, while there appears to be no difference in the forage quality, there may be a difference in the amount of corn that is available. Under good harvest conditions, there will likely be less corn remaining in a field planted with a Bt hybrid than in a field of non-Bt corn. This is not a problem for grazing. It simply means that protein supplementation may need to begin sooner on the fields where Bt hybrids were planted.

Management challenges

Producers who elect to graze corn residue may be faced with two significant challenges, fencing and water.

Many crop fields in the upper Midwest do not have perimeter fencing; however, it is relatively easy and inexpensive to purchase and erect temporary fencing. As long as there are some grain, leaves, and husks remaining in the field, a single strand of electric fence attached to temporary posts will be sufficient.

Once the cattle are forced to consume stalks and cobs, they will likely begin to challenge the fences.

For most producers, hauling water is the only option for getting water to cattle grazing corn residue. However, if grazing residue is to become a normal part of the production system, it may be cost effective to develop water supplies nearer to the corn fields. This is a decision that will have to be weighed out on an individual basis.

Concerns

Grazing corn residue brings a slight risk for digestive disturbances in the cattle. Nutritional disorders such as bloat, acidosis, and founder can occur. The risk for these conditions varies greatly with the amount of grain in the field.

Providing the cattle with increasing amounts of grain for 10 to 14 days prior to turning them out on the residue will help alleviate this problem. This practice will help the rumen microbial population adapt to a higher grain diet.

Another potential health concern is nitrate toxicity, a potentially deadly disorder in beef cattle. It is generally accepted that the highest nitrate concentrations in a corn plant are in the lowest 18 to 24 inches of the stalk. However, the stalk is near the bottom of the list of preferred feeds for cattle grazing corn residue. Thus, unless the fields are grazed extremely heavily, nitrate toxicity under grazing conditions is unlikely. The risk for nitrate toxicity is greater in drought conditions.

Soil compaction is also a concern when grazing crop residues. Recent research from Iowa State University suggests that compaction is not an issue once the soil is frozen. Prior to freezing, there is potential for a small reduction in subsequent soybean yield in a no-till system, but there was no difference in yield in conventional tillage systems.

Summary

Grazing corn stalks offers beef cattle producers an opportunity to extend the grazing season and reduce winter feed

costs. With a small amount of management and labor, one acre of corn stalks can provide a mature, gestating beef cow 30 to 45 days of feed and forage. All expenses related to corn production are borne by the corn enterprise, so the cost of grazing residue is minimal. Beef cattle producers who do not raise crops should investigate rental arrangements with neighboring crop producers.

Considering the many advantages that grazing corn residue has for beef producers and the removal of corn and residue for crop producers, it appears that grazing corn residue can be a win-win situation.



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