Considerations for Feeding Corn, Corn silage, and Corn Stalks for 2010

Amy E. Radunz (aradunz@wisc.edu)
UW Beef Cattle Extension Specialist, Dept. of Animal Science, UW-Madison

The unusually wet fall and late harvest in 2009 has provided some challenges to cattle producers feeding corn, corn silage, and corn stalks to cattle. One problem is the increased incidence of molds that produce mycotoxins, which are harmful to livestock. Another problem has been reduced test weights, which may affect animal performance. Unfortunately, these problems are not always visible and most producers find out they have a problem when it is too late. Feedlot operators, which are feeding corn and corn silage in their rations, are at a greater risk of experiencing problems due to this year's crop, however, cow-calf producers and backgrounders could also be at risk.

Molds and Mycotoxins

The molds and mycotoxins found in this year's corn crop can survive many processing (baking, fermentation, and distilling) procedures. Some products such as proprionic acid can stop the growth of the molds, but they will not kill or remove the spores already present. Therefore, dry corn, high-moisture corn, corn silage, corn stalks, and corn distillers grain can all be a source of mycotoxins. Mycotoxins and some molds are not visible to the human eye, and not all molds produce mycotoxins that are harmful to beef cattle. For these reasons, producers can find it challenging determining if they might have a problem before feeding the corn.

Generally, beef cattle are more tolerant of mycotoxins than dairy cattle or other livestock. Fusarium mold will typically be white or pink in color and produce common mycotoxins of DON (vomitoxin), T-2, Zeralenone, and Fumonisins (Table 1). Ruminants can break down some of the Fusarium mycotoxins in the rumen and exhibit few clinical problems; however toxic levels of the mycotoxins can have negative effects on the animal. There have not been reports of high incidences of Aspergillus mold, which produces aflatoxins, because this mold requires a very warm growing season to flourish, which Wisconsin did not have in 2009. Aflatoxins can be toxic to humans and are closely monitored in milk.

Some clinical symptoms of high levels of mycotoxins include reduced feed intake, weight loss, skin or muzzle irritations/ ulcers, diarrhea, poor response to antibiotic treatment, and bloody diarrhea. In pregnant females, high levels of exposure to Zeralenone can also result in abortions. Therefore, producers should avoid feeding moldy feeds to more susceptible animals, such as recently weaned calves and pregnant females. Molds can also release mold spores that can cause lung irritation. Cattle fed and/or bedded on moldy vegetation potentially are susceptible to mold infections that can result in mycotic abortions.

If mold is evident, beef cattle producers should closely monitor cattle for these clinical signs and unusual behavior. If any unusual behavior is evident, the producer should remove the moldy feed and test the feed. Producers finishing cattle on rations with greater than 50% corn, should avoid moldy feed or dilute the ration with non-moldy corn or feed. Dilution is the best solution to the problem of moldy feeds, which can produce mycotoxins. Some dairy operations will feed binders, which can bind aflatoxin to reduce absorption of aflatoxins by the animal. Some

concerns in using binders include: the binder will not only bind the mycotoxins but minerals, therefore additional mineral may need to be provided to animal; these binders were mainly developed to bind aflatoxin, so may not be effective in binding other mycotoxins, and when mycotoxins are present at levels that are toxic to the animal, the amount of binder that must be consumed by the animal to bind the mycotoxins is not recommended.

Table 1. Maximum levels and effects of mycotoxins in beef cattle

	Aflatoxin	Fumonisins	DON, T-2	Zearalenone
		Maximum level		
Breeding cattle	1000 ppb	30 ppm*	10 ppm*	12 ppm, heifers, 50 ppm for cows
Feeder cattle	700 ppb	60 ppm*	10 ppm*	
		Effects		
	Reduced growth rate, reduced feed intake, diarrhea, loss of appetite,			Infertility, abortions

*Not to exceed 50% of the diet

Feed can be tested for mycotoxins, especially those mycotoxins, which could negatively impact animal health. Mold within a field of corn can vary with certain locations having higher concentrations of mold than other another location, therefore a representative feed sample should be taken. A directory of some laboratories is listed below. Labs may offer qualitative and/or quantitative analysis of different mycotoxins. It is recommend that individuals contact laboratories directly to find out how best to prepare a sample for submission, prices and services offered, and other additional details that may be required to conduct a proper test.

- **Covance Laboratories**, 3305 Kinsman Boulevard, Madison, WI 53707 (608) 241-4471
- **Midwest Laboratories**, 13611 B Street, Omaha, NE 68144 (402) 334-7770
- **Veterinary Diagnostic Labs, Iowa State University**, 1600 South 16th Street, Ames, IA 50011 (5150 294-1950.
- **Dairyland Laboratories**, 217 East Main Street, Arcadia, WI 54612, (608) 323-2123.
- **Veterinary Diagnostic Laboratory, North Dakota State University**, 174 Van ES Hall, Fargo, ND 58105, (701) 231-8307.

Low Test Weight Corn

The major concern feeding low-test corn is the lower energy content. This situation may provide an opportunity for beef cattle producers to salvage the low-test corn and reduce production costs as described later in this document. The standard test weight for USDA No. 2 corn in the US is 54 lbs/bu, and test-weight lower than No 2 corn can result in lower starch, lower dry matter, higher NDF, and higher crude protein content.

Few studies have been published regarding low-test weight corn and performance of growing and finishing cattle. Research published from the University of Nebraska comparing light-test weight (46 to 48 lbs/bu) to normal test-weight (56 lbs/bu) corn in growing and finishing cattle finishing diets, reported no difference in net energy values based on feedlot performance between the two test weights. In Table 2, results from North Dakota State University, indicate that net energy value decreases with lower corn test weights. Average daily gain of the cattle was not affected by test weight, but the cattle consumed more feed, which reduced feed to gain

in cattle consuming lower test weight corn.

When feeding low-test corn in between 45 to 50 lbs/bu this may result in a 95% reduction in energy content, whereas corn with less than 45 lbs/bu this may result in a 90% reduction in energy content. Protein content can be extremely variable with test-weight. Therefore, submitting the corn for a nutrient analysis would be recommended in order to balance the ration for protein. Furthermore, low-test corn has a greater volume per unit of weight, therefore a scale should be used to determine feed amounts.

Blending corn with different test weights may reduce the negative impacts of performance. If low-test weight corn is fed at less than 50% of diet, it may improve the net energy of the corn by improving fiber digestibility of the diet, therefore using low-test weight in backgrounding or grower rations may be an economical use of low-test weight corn.

Table 2. Effect of corn density on feedlot performance

	High density 53.7 lbs/bu	**Medium density 46.9 lbs/bu**	**Low density 39.1 lbs/bu**
Final wt., lbs	1344	1351	1345
ADG, lbs/d	4.74	4.74	4.72
DMI, lbs	25.3	26.3	27.4
Dietary NEg, Mcal/cwt	71.2	68.5	65.3
F:G	5.35	5.55	5.83

*Diet was 81% dry-rolled corn, 5% beet pulp, 5% hay, 9% supp
**NSDU Beef Feedlot Research Report, 2006

RESOURCES:

2009-2010 Dairy Cattle Feeding Issues with High-Moisture Corn, Snaplage, and Dry Shelled Corn. 2009. P. Esker, R. Shaver, J. Leverick, M. Ballweg, Pat Hoffman, and M. Rakin. http://www.uwex.edu/ces/cty/columbia/ag/documents/09-10cornfordairycattleeskeretal.v10-28-2009.pdf

Effects of corn density on finishing-steer intake, performance, and carcass characteristics. 2006. G. P. Lardy and D. M. Larson. NDSU Beef Feedlot Research Report.

Moldy Grains, Mycotoxins, and Feeding Problems. http://www.oardc.ohio-state.edu/ohiofieldcropdisease/Mycotoxins/mycopagedefault.htm.

Understanding Corn Test Weight. M. Rankin. UW Extension-Fond du Lac County. Oct. 2009 http://www.uwex.edu/ces/cty/columbia/ag/documents/CornTW09.pdf

Wisconsin Beef Information Center: http://fyi.uwex.edu/wbic/