Driven by drought, harvesting crop residues such as cornstalks has increased. But experience with alternative feed sources may be

Changing the Way We Feed Cows

by ***Troy Smith***

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The experience of coping with short feed supplies has become all too familiar to producers who have struggled through recent years of drought. Those fortunate enough to harvest or buy some hay of relatively good quality have scrambled to secure enough cheaper, low-quality forage with which to stretch the better and more expensive kind. In many grain-producing areas, crop residues, including cornstalks, have been cut, baled and transported to those parts of cow country where forage supplies are tight.

However, some areas have seen only a small increase in this kind of activity, mainly because the baling of corn stover or stalks has long been a common practice. For example, Iowa producers were processing corn residue 30 years ago into the "bread-loaf" stacks that were popular at the time. Today, of course, big round and square bales are the most common package. And they lend flexibility to the formulation of cow rations.

But Daryl Strohbehn, Iowa State University (ISU) Extension beef specialist, says allowing cows to glean the "goodie" from fields is the most efficient method for utilizing cornstalks when grazing is an option. Obviously, there are no processing costs. In heavy corn-producing areas of Iowa, some farmers even allow cattlemen to utilize stalk fields free of charge to get the fields cleaned of downed ears and other residue. More common are very affordable rental rates of up to 15¢ per day, per cow, although rates may run as high as 25¢ per day in some areas.

Sometimes available stalk fields are not located in close proximity to the cows. Producers have to determine if it's more cost-effective to take the cows to the fields, or vice versa. Taking feed from the fields and hauling it to the cows means costs associated with harvest, transportation and routinely feeding the cattle must be considered.

"You need to push a pencil pretty hard if you're looking at a long transportation situation. Consider the cost per unit of nutrient. When long-haul trucking bills are factored in, it might be hard to justify putting a lot of money in low-quality forage," Strohbehn warns.

Nutritional value

Baled cornstalks generally are of low quality, but considerable variation in nutrient value exists. Crude protein (CP) levels of only 4%-5% are common, and total digestible nutrient (TDN) values can range from less than 40% to a top end of 55%. Additional ingredients used in a cow ration are important, particularly from the standpoint of protein, but supplemental energy may be needed because of marginal TDN levels in cornstalks.

Strohbehn says the quality of corn residue as feed seems to have drifted lower with the development of corn hybrids with improved standability. Today's varieties dry down better, which probably enhances baled residue storage. But increased amounts of

CONTINUED ON PAGE 130

►**Above:** Allowing cows to glean the "goodie" from fields is the most efficient method for utilizing cornstalks when grazing is an option.

Changing the Way We Feed Cows CONTINUED FROM PAGE 128

lignin that make stalks stand better also make them less palatable. Bales containing more leaf and husk relative to the stalk will have greater nutrient value and be more palatable.

"Most of the producers using baled cornstalks use them to stretch their better quality forage — mostly hay that is 13% protein or higher," Strohbehn offers. "They'll feed mature cows a mix of two-thirds cornstalks and one-third hay, or go half and half if more protein is needed. When it's cold and additional energy is needed, corn grain can be added to the ration, or grain co-products. Grinding forages (to a uniform particle size) and blending all ingredients in a total mixed ration (TMR) significantly reduces waste."

University of Nebraska (NU) Extension beef specialist Rick Rasby says the drought brought plenty of producer inquiries regarding the use of baled cornstalks. He calls them a good forage alternative when prairie hay and alfalfa are in short supply. However, it is easier to use this low-quality alternative in rations for mature cows than for still-growing first-calf heifers whose nutrient requirements are greater.

Rasby sees huge differences in quality. On the high end, some baled cornstalks may contain up to 6% protein, with TDN at 50% or a little higher. With nutrient content at those levels, and barring extreme weather, Rasby says cornstalks may be the only feed needed by mature cows until about 30 days prior to calving.

"Even mature cows need more protein and energy just before calving and afterward, during lactation," Rasby explains. "Grain, for added energy, and protein supplement can be added to the ration. Grain byproducts, like corn gluten feed, work nicely to add extra protein and energy."

Rasby says producers often ask how baled cornstalks can be used to stretch alfalfa hay. For 1,200-pound (lb.) cows, he recommends feeding a precalving forage mixture consisting of one-third alfalfa and two-thirds cornstalks. A 50:50 blend is recommended postcalving. Depending on the milking ability of the cows, producers may consider an additional 3-4 lb. of corn per head per day to the postcalving ration.

Rasby's suggested precalving daily ration calls for 8 lb. of alfalfa plus 20 lb. of cornstalks per cow. After calving, the daily ration would include 14 lb. of alfalfa, 14 lb. of cornstalks and 4 lb. of whole corn.

"First-calf heifers definitely need the extra energy that 3 to 4 pounds of corn will provide, starting 60 days before they calve, and continuing after calving," Rasby adds.

Being resourceful

Drought-stricken ranchers can become quite resourceful when faced with limited

CONTINUED ON PAGE 132

Nitrates a concern in drought-stricken corn

Drought-stricken corn that won't make a grain crop can be used for cattle forage, but caution must be taken to avoid poisonous levels of nitrates that may accumulate in cornstalks, say University of Missouri (MU) Extension forage specialists Rob Kallenbach and Craig Roberts.

"When pastures run short, farmers turn to the grain fields for feed," Roberts says. "But corn that has stopped growing because of lack of water may accumulate nitrates in the stalks."

The only way to know if the feed is safe is to have a quantitative test for nitrate content made by a certified forage-testing lab, the specialists advise. Nitrates can be converted into nitrites in the cattle rumen, or stomach. Nitrites block the oxygen-carrying capacity of the blood, which can be fatal.

Nitrates at levels of more than 15,000 parts per million (ppm) in feeds are considered toxic. Levels as low as 2,500 ppm must be fed with caution. Test results returned from the lab will contain safety levels and feeding instructions, the specialists note.

Forage with nitrate should be diluted with other feeds. Grain supplements with added vitamin A also help.

The problem occurs when water from rain or subsoil moisture is restricted in actively growing corn plants. In normal weather, corn plants extract nitrogen from the soil and convert it into energy to store in the kernels on the cobs. When the process slows, nitrates concentrate in the plants, particularly the stalks, before it reaches the ears.

The bottoms of cornstalks are most likely to contain the highest concentrations of nitrates, Kallenbach says. Any feeding system should avoid the lower stalks in particular, he adds.

"Danger of nitrate accumulation occurs in almost every drought," Roberts says.

When cornstalks are harvested as green chop, a process similar to cutting corn for silage, the high-nitrate stalks are mixed with the leaves that have low levels of nitrate.

Kallenbach says grazing the cornfields offers a safer alternative than making green chop. "Given a choice, the cows will eat the leaves and ears, which are less likely to have high nitrate levels. They will eat the stalks only when no other feed is available."

Farmers grazing corn should introduce the drought-stressed corn to the cattle slowly during the course of a week to 10 days. "Cattle can acclimate to withstand higher nitrate levels if feed is introduced over time," Kallenbach says. Calves and pregnant cows are most susceptible to poisoning.

Farmers in Nebraska, who have years of drought experience, perfected the corn-grazing technique. A strip of the cornfield is separated off with a portable electric fence to provide about three days of grazing, Kallenbach says. Farmers should watch grazing closely, and the fence should be moved forward in the field when the leaves and ears have been grazed, but before cows begin eating the stalks.

"A lot of feed can be set off with about $200 worth of fencing supplies," Kallenbach says. The grazing system works best on fields with a permanent perimeter fence. A water source must be provided.

Other crops, such as milo and sorghum-Sudan grass, can accumulate nitrates in drought also.

For more information on nitrate toxicity, view the MU Guide G4661, *Warm-Season Annual Forage Crops,* available for purchase (by credit card) at *http://muextension.missouri.edu /explore/* or at 1-800-292-0969.

— Duane Dailey, *MU Extension & Ag Information*

Changing the Way We Feed Cows CONTINUED FROM PAGE 130

winter range and meager hay crops. Dennis Bauer, an NU Extension educator for north central Nebraska, says some Sandhills producers resorted to harvesting the cattails that fringe the region's many small lakes.

"Unable to afford $90- to $100-a-ton hay, they were baling up just about anything they could find. And when put up early, those cattails tested at up to 6.5% crude protein, with TDN nearing 50%," Bauer says.

"But a lot of ranchers bought baled cornstalks. Certainly a lot of corn residue was baled in the area — far more than usual — and not just the combine tailings. Most of the fields were cut and then baled to get more tonnage. With higher stalk content (as compared to husks and leaves) the feed quality is lower — maybe only 3.5% to 4% protein and 45% to 46% TDN," Bauer explains. "Here, prices ranged from $35 to $50 per ton. If the (baled) cornstalks were going to cost more than $50, I usually advised producers to look for something else."

Bauer says ranchers fortunate enough to have some meadow hay often fed a ration consisting of about 10 lb. of cornstalks and 15 lb. of hay, plus range cubes for supplemental protein. A few producers used corn steep liquor, spraying it on residue feed and other low-quality forage as it was fed to improve palatability.

Becoming more common last winter was the pairing of cornstalks and other grain-processing-industry byproducts to create hay-saving cow rations.

Recognizing the market potential, most manufacturers prefer the term "co-products,"

with pelleted corn gluten feed being one of the more popular in Bauer's area. Generally, nutrient values of 20% protein and 80% TDN make corn gluten feed comparable to shell corn. However, the co-product doesn't contain as much starch as corn — an advantage for co-products, since corn's starch can compromise the efficiency of ruminant forage digestion.

Costs vary with location, but producers in Bauer's area found it economical to complement baled cornstalks with corn gluten pellets. The average cost of the pellets was $90 per ton, delivered from an Iowa manufacturer.

"They (corn gluten pellets) were fed along with baled cornstalks by ranchers who wanted to save their better quality hay until just before, and after calving," Bauer offers. "We saw quite a few 1,200-pound cows wintered on 20 pounds of cornstalks, plus 6 pounds of corn gluten pellets, per day. A cow's protein and energy requirements were met for a cost of about 80¢ per day, which was pretty cheap."

When producers inquire about how to best use low-quality forages, like baled cornstalks, Bauer advises them to consider how the forages will be fed.

"I tell them right up front that to avoid waste and make the most efficient use of that kind of feed, it should be processed. At least run them through a bale processor, instead of rolling them out or using ring feeders, but cows will eat cornstalk bales best when they are ground and mixed in a ration," Bauer explains.

"Drought forced us to look at ways to use alternative feed resources, like crop residues and grain co-products," he says. "And I think it will change the way we look at feeding cows — maybe even in the good years, but especially when hay prices are high."