University of Missouri Extension

G2057, Reviewed October 1, 1993

Wheat for Beef Cattle Rations

Homer B. Sewell
Department of Animal Sciences, University of Missouri-Columbia

Wheat often is a cheaper source of nutrients for beef rations than corn or other grains. Wheat is equal to corn on a weight basis for beef rations if you follow certain precautions in its use. The extra weight in a bushel of wheat (60 pounds vs. 56 pounds) makes it worth 7 percent more than corn on a bushel basis. Wheat is probably worth 8 to 10 percent more than grain sorghum on a weight basis for beef cattle.

Wheat is more variable than corn in feed value. Protein and other nutritive values of wheat are affected by climate, variety, soil and cultural practices. The level of wheat that can be safely included in high-grain rations depends on the variety used.

Variety appears to affect energy value of wheat more than type or whether wheat is hard or soft. Hard red winter wheats had higher net energy values than soft red winter varieties in some studies. But in other trials, certain soft wheat varieties were superior to hard wheats as feed for beef cattle. Even though hard and soft wheats are given equal energy in Table 1, keep in mind that energy level is affected more by variety than by wheat type. Strong gluten wheats tend to be superior to weak gluten wheats for cattle, and cattle seem to consume strong and weak gluten wheats in the same amounts, though some feeders think gluten may be responsible for cattle reducing intake on wheat rations.

Table 1. Nutrient composition (dry matter basis).

	Dry matter %	Crude protein %	Total digestible nutrients %	Net Energy$_{main}$ (megacalories/100 lbs.)	Net Energy$_{gain}$ (megacalories/100 lbs.)	Calcium %	Phosphorus %
Wheat, hard (rw)	89.1	14.6	88.0	98.2	64.5	0.06	0.57
Wheat, soft (rw)	89.1	12.3	88.0	98.2	64.5	0.10	0.33
Corn	86.0	10.1	91.0	103.6	67.3	0.02	0.29
Milo	89.0	12.5	83.0	89.1	59.5	0.05	0.35
National Research Council, 1976.							

Wheat is higher in protein

The nutrient composition on a dry matter basis for corn, wheat and milo are given in Table 1.

Notice the higher protein but slightly lower energy level of wheat compared to corn. Wheat is credited with more protein and energy than milo.

Wheat ranges from 9 to 17 percent protein. In Table 1, hard red winter wheats have a higher protein content than soft red winter wheats. But this isn't always true; some tests show some soft wheat varieties have higher protein content than some hard wheats.

Full value can be given to the protein in wheat in ration formulation. Thus, wheat used for cattle feed should be analyzed for protein so the amount of supplemental protein needed can be determined. Since cattle can use nonprotein nitrogen to meet their protein needs, beef feeders probably should not pay much premium for high protein wheats.

Feeding wheat

Limit wheat to 40 to 60 percent of the total grain. Wheat produces higher lactic acid levels and lower rumen pH values than corn in rumen fermentation. Often the incidence of lactic acidosis and liver abscesses increases when high levels of wheat are fed to cattle.

A major problem in feeding wheat as the principal grain to cattle is reduced feed intake, which results in slower gains.

Limiting wheat to 40 to 60 percent of the grain portion of the ration improves its value for cattle and reduces the problems often encountered with wheat feeding. Cattle fed half wheat and half corn perform as well as cattle fed corn alone in rations containing 90 percent concentrate.

Trials have shown rations with half wheat and half milo are superior to wheat or milo as the only grain in rations with 90 percent grain, 5 percent alfalfa hay and 5 percent cottonseed hulls.

Take longer to bring to full feed. Careful management cannot be overemphasized when wheat is fed to cattle. Wheat should be incorporated gradually into rations and cattle should be brought up to a full feed in a longer period (25 to 30 days) than is used with corn. Also, once the cattle are on a full feed, keep feed before them to prevent overeating.

Keep fiber in rations above 6 percent. Rations high in wheat should have a minimum of 6 percent fiber. Wheat rations that have 6 to 10 percent fiber work well for beef cattle. Alfalfa hay, corn silage, wheat straw and beet pip give comparable results when included at 10 to 20 percent of the whole ration if fiber levels are kept in the 6 to 10 percent range. However, when wheat straw is raised to 20 percent, fiber in the ration exceeds 10 percent of the ration and cattle performance decreases.

Studies show the feeding value of wheat in relation to milo is higher in high-silage growing rations than in high-grain finishing rations. One pound of wheat for each 100 pounds of body weight was fed in these growing rations.

Dry roll vs. coarse grind. Dry rolling is the best way to process wheat; however, cracking or coarse grinding gives similar results. Dry rolled or ground wheat usually is equal or superior to wheat processed by more elaborate methods. Little advantage is gained by high moisture storage, steam flaking, micronizing (heating with microwaves) or extruding (pressing through a specially designed opening) of wheat fed to beef cattle. Avoid excess fines for good results with any processing method.

Whole wheat can be fed, but it is inefficiently used. Feed conversions are as much as 12 to 20 percent less for cattle fed whole than those fed rolled wheat in high-concentrate rations. Large quantities of whole wheat pass in the feces.

Buffers may be needed. Buffering agents have been added in an attempt to overcome the major problem of reduced feed intake and depressed gains when high-wheat rations are fed to cattle. Adding 3.5 ounces of sodium bicarbonate (baking soda) per head daily gives a slight improvement in performance of steers on wheat rations.

A finely ground, reactive limestone will serve as a buffer in the small intestine and may increase starch digestion in ruminants fed high-grain rations. Thus, adding an additional 1.0 to 1.3 percent (dry matter basis) finely ground limestone to wheat rations may give a slight improvement in performance for cattle. Don't increase the calcium level of the ration above 0.90 (DM). Rumensin® seems to curtail overeating of wheat rations and may inhibit some of the acidosis-producing microorganisms in the rumen. Thus, keeping feed in front of cattle at all times and rising a buffer along with Rumensin will help minimize problems with wheat rations.

Wheat-salt mixes

Mixing salt with wheat is a good way to control intake for cattle fed grain on summer pasture. Adding 7 percent salt to ground wheat causes yearling cattle to consume 0.6 to 0.8 pounds of wheat per 100 pounds of body weight daily. It usually takes 10 to 12 percent salt in a mixture to reduce the intake of ground corn to 1 percent of body weight of cattle fed on summer pastures. Lesser amounts of salt may be needed with wheat to keep intake at a certain amount.

Adding salt reduces the amount of grain needed for gains. Cattle grazing on grass-ladino clover pasture require 3.37 pounds of wheat for a pound of gain when salt is added, in contrast to 4.37 pounds of wheat for a pound of gain when wheat is fed free-choice without salt.

Since daily gains are the same with or without salt, salt may cause cattle to eat more of a succulent forage to help meet the higher water requirement that results from a high salt ration.

Wheat silage

In one study, hard and soft red winter wheat silage supported 73 and 77 percent, respectively, of corn silage gains in high sage rations fed calves and yearlings. Five years of research showed yearlings gain from 1.5 to 2.1 pounds per head daily from hard wheat silage and 1.5 to 2.3 pounds from soft wheat silage supplemented with needed protein, minerals and vitamins. Wheat silage was worth 90 to 93 percent the value of corn silage when it composed 13 percent of the dry matter in a finishing ration.

Optimum harvest stage

The ideal time to harvest wheat silage for beef cattle is when grain is in the early dough stage. When a large acreage is to be cut, it may be necessary to start when the grain is in the milk stage to finish before the plant becomes too mature and low in moisture.

Crude protein levels are higher when the wheat plant is cut in the boot stage, but there is a 25 to 50 percent reduction in dry matter tonnage per acre when the crop is cut in the boot as compared to the dough stage.

Wheat cut in the boot, milk and dough stages gives a two-year average yield of 60 percent moisture silage of 7, 12.3 and 12.9 tons per acre, respectively. Wheat sage made in the dough stage will normally have 10 to 13 percent crude protein on a dry matter basis, which meets or exceeds the protein needs of yearling cattle.

Optimum moisture

The ideal moisture level of wheat silage is 60 to 65 percent. Silage in the milk or dough stage should have this level of moisture if direct chopped. If the silage is drier, water should be added to bring the moisture to the 60 to 65 percent range. Cutting the silage too dry will cause poor packing and air trapping, which gives undesirable fermentation and poor quality silage.

University of Missouri. Published by University Extension, University of Missouri-Columbia. Issued in furtherance of Cooperative Extension Work Acts of May 8 and June 30, 1914, in cooperation with the United States Department of Agriculture. Ronald J. Turner, Director, Cooperative Extension Service, University of Missouri and Lincoln University, Columbia, Missouri 65211. • University Extension does not discriminate on the basis of race, color, national origin, sex, religion, age, disability or status as a Vietnam-era veteran in employment or programs. If you have special needs as addressed by the Americans with Disabilities Act and need this publication in an alternative format, write ADA Officer, Extension and Agricultural Information, 1-98 Agriculture Building, Columbia, MO 65211, or call (573) 882-7216. Reasonable efforts will be made to accommodate your special needs.