
CROP RESIDUES FOR BEEF CATTLE

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Crop residues, especially those of corn, soybeans, and grain sorghum, are an important alternative feed in Tennessee which should be utilized as much as possible, particularly in a year when feed supplies are limited.

Potential Value & Use

Despite such limitations as seasonality, cost of harvest and low digestibility, the potential for using crop residues to increase efficient beef production is tremendous. The American Forage and Grassland Council estimates that 25 percent of the residues are used each year. This could provide the feed energy for 11.4 million beef cows. If 100 percent of crop residues could be fed, it would supply the energy requirements for 45.5 million cows, essentially the entire U.S. beef herd in the peak year of 1975.

The corn plant has 50 to 55 percent of its weight in stalks, leaves, husks and cobs, all of which are left in the field during combining. This amounts to two to three tons of dry matter per acre from 100 bushel yields. A dry cow's daily need for energy can be met with 16 to 18 pounds of this material. Over 300 cow feeding days per acre are potentially available. The Tennessee Department of Agriculture Crop Reporting Service estimates that 650,000 acres of corn will be harvested for grain in 2006. If these residues could be fully utilized, they would fulfill the energy requirement for 650,000 beef cows for 300 days.

Approximately the same potential per acre exists for grain sorghum. Sorghum stover is particularly well suited for salvage. After combining the heads, the stalks and leaves remain upright and retain their moisture for several weeks. Yields are similar to or greater than corn refuse, since practically all of the plant can be recovered.

Soybean straw is comparable to corn and grain sorghum residue in feed value. The following table compares residues for the three crops.

Approximate Feed Value and Yield of Refuse Crops

Material	Yield Tons/A	Dry Matter %	Crude Protein, %	TDN %
Corn Stover	2-3	87	5.0	50
Soybean Straw	-	90	5.0	40
Sorghum Stover	2-3	85	4.5	49

The lower TDN for soybean straw is probably due to larger losses of leaves and smaller salvage of grain.

Harvesting Methods

Grazing of the crop aftermath is usually the cheapest way to use residue. Disadvantages of this system include losses due to inclement weather and incomplete utilization. Also, while it is rare, cattle will occasionally founder due to rumen overload of starch when allowed free access to stalk fields. Using electric fences to control grazing will help prevent foundering and increase utilization. Young stock should have first access to stalk fields, and mature dry beef cows can clean up the remainder.

More crop aftermath material is now being harvested for winter feeding, since new forage harvesting equipment is available. The most popular piece of harvesting

equipment is the round baler. Mechanical stackers compress stalks and move the stack to storage sites so that field work can continue. The aftermath may contain over 30 percent moisture after grain harvest, so care should be taken to dry the residue properly to avoid mold and spoilage.

Sorghum stove is particularly well suited for ensiling. Ensiling can be done without moisture addition, and the material is easier to chop and pack than are corn stalks. Moisture must be added to corn stalks to aid in packing and to prevent spoilage losses.

Chemical Treatment

Chemical treatment of crop residues has been investigated and practiced for many years. However, more intensive research and application have developed in the last 15 years. Ammonia appears to have the greatest potential for immediate use in practical situations, anhydrous liquid ammonia is most widely used for this purpose. Ammonia has several advantages. It is a form of non-protein nitrogen (NPN) which can be utilized as an inexpensive source of protein by ruminants. Ammonia also improves digestibility by reducing the lignin content of the plant. Also, residues do not need to be ground and mixed for treatment with ammonia, treatment is relatively easy and a delivery system to the farm is readily available in areas where crop residues are plentiful. The primary disadvantages are the need for a gas tight system (plastic cover) and the slow rates of reaction at low temperatures.

Supplemental Feeding

Livestock grazing on green, actively growing forage generally obtain adequate levels of most nutrients. When they are forced to utilize mature or dormant forage, nutrient deficiencies may be expected.

Protein Supplementation - Dry cows allowed to graze an entire field of crop residue may select grain, leaves and husks early in the season and show little response to supplemental protein. As the grazing season progresses and quality of forage declines, the material consumed tends to be lower in protein. Soybean meal, cottonseed meal and non-protein nitrogen (ammonia, urea) are suitable sources of supplemental protein. Feeding trials have shown that natural proteins sources, such as soybean meal, often produce higher animal gains than non-protein nitrogen, particularly with immature animals, such as backgrounding calves.

In general, protein will need to be supplemented at the rate of 1/2 to 2 pounds of supplement per day, depending on the size of cattle and type of residue.

Energy Supplementation. Dry cows in good body condition will probably need no energy supplementation with crop residues, especially during the period immediately after turning in. Growing cattle or cows in late gestation will likely need two to five pounds of corn or other energy feed daily. If more than this is required, the residue quality is too low, and alternative feeds should probably be used.

Vitamin A and E - Vitamins A and E are the only vitamins commonly deficient in diets of livestock grazing mature forage. Body reserves may be adequate for 90 to 120 days. Most commercial mineral supplements contain vitamins A and E, and they also may be supplied by injection.

Sodium and Phosphorus - Sodium and phosphorus are the minerals which are most widely deficient; they can easily be supplied in mineral mixtures containing salt and phosphorus. Supplemental calcium may also be required under certain conditions.

Potassium - Recent research indicates that potassium may be deficient in diets of cattle grazing on dormant forage. Potassium is lost from mature forage by leaching. Therefore, wetter than normal fall weather may increase the need for this mineral. Potassium can be supplied in hay and commercial mineral mixtures.

Trace minerals – Copper, selenium and zinc are likely to be deficient. These are generally supplied in better (more expensive) commercial mineral mixtures.

Caution

Drought stressed corn and milo should be ensiled to reduce the nitrate-nitrogen content. If you are uncertain about the nitrate-nitrogen status of your crop, contact your county agent for advice about testing and using suspect forages. An area of particular concern for nitrate toxicity is when regrowth of milo is grazed or baled.