Managing the Mature Beef Cow
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Part 1
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Nutrition

The most important thing you will ever learn about beef cattle nutrition is that there is no solid cookbook answer to what to feed, when to feed, or how much to feed. The objective of any nutritional program is to provide nutrition in sufficient amounts and types that will result in a desired change. Keep in mind that if you achieve your objective, then the animal’s weight has changed, or body condition has changed which in turn necessitates a change in nutrition to maintain the course set by your objective. Keep in mind that weather also affects the type and amount of nutrients needed to maintain production. So, does this mean that you can’t learn about nutrition? Absolutely not!, it simply means that you must first learn the basics and then apply common sense to increase or decrease amounts according to many factors. Tools that will help you make informed decisions will include body condition scoring to measure and evaluate the body condition of cows so that you can decide if extra energy is necessary to increase condition. At the same time, if animals are excessive in body condition, then money can be saved by reducing the amount of energy in the diet. Since more than 65% of the land in Tennessee is more suitable for forage production than row crop production, you can easily see that providing nutrients to the cow herd by forages is much more economical than concentrates. On the same note, forages harvested by the animal are much more economical than harvested feeds. So, any method that matches the cow nutrient need to the available forage makes sound economic sense. As reproductive status and milking status greatly influence nutritive needs, these two items will influence nutrition decisions greatly. The following section will address how each of the tools or items affect nutrition in great detail.

Nutrients Needed by the Mature Cow

As we try to identify the nutrient needs of the mature beef cow, let us not forget that one of the primary objectives of a nutrition program is to provide the needs of the animal at the lowest possible cost. The challenge in this is that production must not be compromised by our feeding practices. There are several things that directly affect the nutritive needs of the beef cow. They are:

- Body Size (Weight)
- Age
- Production Status (Pregnancy, etc.)
- Level of Production
- Level of Milk Production
- Environment (Temperature, Wind, etc.)

Younger cows in the herd are normally smaller and will have a need for higher energy and protein than older animals due to the need for nutrients used for growth and development of bone and muscle tissue and deposition of fat during a time of greater stress during production. Also, as lactation or milking initiates and the calf requires greater amounts of nutrition through milk, the need for energy and protein will also escalate. In comparison, pregnant cows that are no longer lactating will have a need for nutrients to be used for fetal growth, but those will be much less than the needs for lactation. Cows that have a greater genetic potential for milk production will also have an increased need for nutrients that parallel the curve for lactation. Environmental conditions such as temperature and wind chill also affect the amount of nutrients needed as more nutrients are used for keeping the animal warm. Keep in mind that protein above the maintenance level generally goes to bone and muscle growth and lactation while energy levels above the maintenance level goes toward regaining body condition (fat) and maintaining lactation. Minerals and vitamins are mainly involved in bone formation, hair growth, and other cellular activities involved in Milk production and others. Water is the most limiting nutrient in that it is essential for life and digestion. Nutrition can be boiled down to five basic nutrients used by animals for production, growth, maintenance, and reproduction. They are:
• Protein (Bone and Muscle)
• Energy (Body Condition)
• Minerals
• Vitamins
• Water

There are many forages available to producers that will allow adequate intake of nutrients to sustain desired levels of production. The most limiting factor of forages to do so is the stage of maturity at harvest. This will be discussed later in the forages section. The second most limiting factor in the ability of forages to meet nutrient needs of animals is the storage and feeding practices associated with the forage. Hence the argument for letting the animals harvest as much of the forage as possible by grazing. Since forage is the least expensive nutritive input in most herds, it should be maximized as much as possible in the nutrition plan. The amount of forage that cattle can consume is dictated to a large degree by the factors that influence nutrient needs as listed above. Intake is often measured in pounds of dry matter. This is simply a way to compare all feed stuffs on an equal basis as the moisture content of many feeds vary greatly. For instance a hay may be 85% dry matter, while silage or grass being grazed may only 20-50% dry matter. Referring to and comparing feeds on a dry matter basis merely takes the water out of the equation so that we can measure pounds of material carrying essential nutrients. For instance 10 pounds of hay at 85% dry matter contains 8.5# of nutrient carrying dry matter. 10 pounds of grass containing 20% dry matter contains only 2 pounds of dry matter. Mature animals with average production may consume 2.5% of their body weight in dry matter daily. For a 1,000# cow, this means that the amount of dry matter consumed daily would be 25 pounds. With 85% dry matter hay it would take 29.5# (25#/ .85). The same cow grazing pasture with 20% dry matter would require 125# of fresh grass (25#/ .20). So, as you can see the type of forage has a great deal of influence on intake. As the quality of the feed stuff declines, so will the intake due to a lack of palatability (what a cow likes to eat). The biggest contributor to lowered palatability is age of the forage at harvest. Keep in mind that the greatest concentration of nutrients will be in the leaves of any forage. The larger the percentage of leaves, the larger percentage of nutrients. This translates to younger forages with minimum intervention of machinery.

Requirements for Beef Cattle

Water
• 0.5 gal. per lb. dry matter
• Increase with temperature
• Increase with dry matter intake

Protein is a nutrient that is often overused. When a mature animal (one that has achieved full growth) has lost body condition due to production demands, many producers look toward the block or tub protein supplements. In many cases, limited amounts of additional protein are needed. In most cases, energy becomes the limiting factor and is the nutrient that can most economically improve body condition. Where possible, this should be supplied with high quality, early harvested forages. This can be done with hay or grazing by grouping the animals based on nutrient needs. Protein, however for high producing lactating cows and younger cows is essential and may be supplied by the same forage sources. When it is necessary to supply protein from purchased sources be sure to supply this nutrient with a “natural” source such as cottonseed or soybean meal, certain by-product feeds, or a natural tub or block product.

Fiber is a component of all feeds that can have a profound impact on intake or the amount of feedstuff eaten by the animal. As the fiber content of a feedstuff increases, the palatability or the amount eaten by the animal decreases. While fiber is essential for digestion in the ruminant animal, care should be taken to harvest forages early enough in life to keep fiber levels manageable and levels of protein and energy optimal. Fiber normally increases with maturity of the plant.

Energy in feedstuffs can be likened to the power source such as gasoline is to a car. It is the fuel source for the animal and contributes to warming the animal and regaining lost body condition. Energy will commonly be reported as TDN (Total Digestible Nutrients) in a forage sample. This again, is related
to the age of the feedstuff at harvest with the amount declining with age. As the number associated with 
TDN increases, so does it’s value as a source of energy for the animal. TDN is normally antagonistic with 
fiber, meaning that as fiber increases, TDN generally decreases. Several energy sources are available to 
producers, they are:

- Forages high in starches and sugars
- Fats and oils
- Concentrates
  - Corn
  - Wheat
  - Milo or sorghums
  - Oats
  - Others

Minerals and vitamins can be a complex study within themselves. To present practical 
information that is usable on the farm, the discussion here will be limited to a few pertinent topics. Major 
minerals used by the mature beef cow are:

- Calcium
- Phosphorous
- Sodium Chloride (Salt)
- Magnesium
- Potassium
- Sulfur

When using a high quality, recommended mineral, a producer has to worry only about a couple of 
items. What is the Calcium:Phosphorous ratio of the mineral? In most cases, a 2:1 ratio is the maximum a 
producer needs. For instance, the mineral should contain no more than twice as much calcium as 
phosphorous. Most minerals with a 1.5:1 ratio are ideal. Particular attention is required when feeding by-
product feeds to animals, as in many cases the mineral content is not known or the ratio is greatly inflated 
to one side or the other. When high quality forages are fed, little problems will occur as long as animals 
have access to a free choice mineral within accepted range of the Calcium Phosphorous ratio. The next 
mineral that is of concern is magnesium. Lowered levels of magnesium in the forage caused by lower pH 
or excessive aluminum in the soil can cause a problem called grass tetany. As pH becomes lower, 
magnesium is not as available to the plant and levels within the plant decline. As aluminum increases in 
the soil, magnesium is tied up in the soil and uptake by the plant is limited. In either case, the animal 
receives less magnesium in the diet when consuming these forages. While salt is a required major mineral, 
it is normally not a limiting factor where animals have free access to it. A few don’ts for mineral feeding 
include, don’t mix salt with the mineral to reduce intake. Reduced intake can result in less than required 
amounts being consumed and problems may occur. Don’t rely on trace mineral salt for all mineral needs. 
Trace mineral salt is just what the name implies, it contains trace amounts of some minerals. While it 
certainly does not harm the animal to get the salt requirement from this source, rarely will this mineral 
source supply adequate mineralization to support desired performance. Animals that have an excessive 
length of calving interval, fail to rebreed, suffer metabolic disorders such as grass tetany and milk fever are 
likely not receiving adequate amounts of certain minerals. Just think, how many bags of minerals can you 
buy for one lost sale of a calf because the cow bred late or failed to breed?

There are some trace minerals that producers should know are required, but do not be unduly 
alarmed about whether they supplied if you are feeding a recommended mineral mix. Most high quality 
minerals will supply these in adequate amounts. These trace minerals are:

- Selenium
- Copper
- Zinc
- Molybdenum
- Iron
- Cobalt
- Manganese
If severe problems occur in hair coat, cracking of hooves, and some other problems, then additional supplementation of some of these may be in order. Usually, this occurs only in areas where deficiencies exist. Check with your Extension Service, Veterinarian, or nutritionist to see if this is a problem to address.

Since ruminant animals have the ability to manufacture water-soluble vitamins in the gut, they are rarely necessary to supplement. Fat-soluble vitamins are generally adequate in the diet when the diet consists of high quality forage. There is really only one vitamin that is likely to be deficient in the diet of the mature beef cow. That is vitamin A. While vitamin A is likely to be sufficient in high quality grazed forages, it is likely to be deficient in dried forages such as hays. Again, a high quality mineral mix fed free choice eliminates this from the list of concerns for the producer.

Matching Cows to the Environment

Keep in mind that when we refer to environment, we are referring to the available forage supply including quality of the forage as well as type of forage. For instance, consider if we had a forage that was a late harvested fescue hay. The forage was harvested in mid May which resulted in a protein content of 9% and energy value of 45% TDN (average for this time frame). If we have mature cows that have superior milking ability, and are large framed animals, will this forage alone support them during lactation? Probably not. We will most likely find out that the mature animal of this age, size, and stage of lactation will require slightly more protein than the forage supplies and much more TDN or energy than the forage can supply. In this situation there are several options:

- Change calving season so that lactation occurs when grazing is an option and forage quality is highest i.e. spring time.
- Change the time of forage harvest to increase quality. Sometimes difficult due to weather concerns but can be done. Remember that everything we do to forage in harvesting, storage and feeding makes it worse. Try to improve quality protection in these areas.
- Buy energy supplements. Costly even when feed is cheap. Reduces profit margin.
- Change the type of animal so that milking ability is sufficient, but not excessive. Calves can only express growth to the limit of genetics. Milk production above that amount by the cow becomes a liability.
- Do nothing. In this situation, the following things will likely occur:
  - Cows will become thin and unthriftly
  - Cows will fail to produce sufficient milk for their calves to wean at 50% of the cow’s body weight.
  - Cows will not rebreed to calve on a 12-month calving interval.
  - Costs of production may rise to levels that exceed returns.

It is imperative to the future of any forage based beef operation to carefully consider what forage resources are available and what might be available in the future. Once we know what forages are available it is possible to predict what qualities might exist under best management practices. Most often, we find that the most important action taken is simply grouping the cows based upon their nutrient needs, i.e. first calf heifers, mature cows, virgin heifers, stage of lactation etc. Changing management practices such as calving season can make big strides in allowing forages to meet the bulk of the nutrient needs of the cow herd. When all animals in the herd are at the same stage of production (90 day calving season), and the greatest nutrient need coincides with the highest quality and quantity of forage (spring or possibly fall), it is possible to meet the nutrient needs of the herd at the lowest possible cost. All these factors play a big part in matching forage bases and cows together.

Feeding for Reproduction

Keep in mind that there are several things that place nutritive demands on the cow herd that were mentioned earlier. In addition to age, environment, lactation, there are big demands on the cow nutritionally to support reproduction. Keep in mind that there are several things that the cow cannot
survive without. The cow must continue to breathe, pump blood and other bodily functions. However, the cow can shut down her reproductive cycle with no ill effects to her body when nutrition is limited. Hence, it becomes essential to provide adequate nutrition just before, during, and after the breeding season to support reproduction. Nutrition may be the most limiting factor in breeding programs and the success and failure of those programs.

We can basically divide a 365-day cow year into 4 periods as it relates to reproduction and describe the nutrient needs of each. The four periods are:

- **Period 1** – Calving to 80 days post-calving
- **Period 2** – From the end of period 1 for a length of 140 days (Pregnancy and Lactation)
- **Period 3** – From the end of period 2 for a length of 95 days (mid gestation)
- **Period 4** – From the end of period 3 for a length of 50 days (up to calving)

Period one contains 80 days because to maintain a 365 day calving interval, the cow has approximately 80 days to become pregnant. Since mature cows typically take 40 to 80 days to cycle and rebreed and heifers take 60 to 100 days, this period becomes the most critical in terms of nutrition to maintain the proper calving interval. The astute manager will calve the heifers at least 3 to 4 weeks before the cow herd to allow them proper time to recycle. The nutrient requirements are the highest during this period with the amount of TDN required for an average cow being 13.5 pounds per day and protein requirements of 2.3 pounds per day.

Period two contains 140 days and takes the cow from rebreeding to weaning of the calf. The main nutrient need during this period is to maintain lactation. With a proper calving season, this can occur when forages are plentiful and high quality. This will also be time when some body condition may be regained. The TDN requirement for the average cow is 11 pounds per day and protein requirements are 1.9 pounds per day.

Period three contains 95 days and takes the cow from weaning up to 50 days before calving. This period is when the cow’s nutrient needs are the lowest. In planning your calving and feeding schedule, plan for this period to be when available forage is at the lowest or when the quality of feeds are lowest. While this is not always possible, it does not make sense for this period to occur when forage is plentiful and cows tend regain too much body condition and become too fat to perform in the next lactation. While this period is one of little extra nutritional needs, it is important to remember that there will be individuals which score low on body condition and they will need this time to regain body condition before calving. The same average cow will require 11.5 pounds of TDN and 1.5 pounds of protein.

Period four contains the last 50 days of gestation and is probably the most overlooked in the business. Cows have been dry and out on a maintenance ration for a period of time and it is easy to forget that this is the time when the majority of fetal growth occurs. Cows that are of sufficient body condition score at the beginning of this period need minimal attention to TDN levels, but those individuals that are still low on condition scores will need extra help during this time. The average cow will require 9.5 pounds of TDN and 1.7 pounds of protein. Many producers have subscribed to a myth that lower levels of nutrition during this period will reduce fetal weight to avoid calving difficulty. That is just myth, in reality the cow is weaker as she funnels more of her body resources to fetal growth and the end results are a weak cow having difficulty delivering a calf that is the same weight as if the cow had been fed correctly.

### Figure 1 Nutrient requirements for each of the 4 periods of the cow’s year.

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Period 1</th>
<th>Period 2</th>
<th>Period 3</th>
<th>Period 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>TDN (lb./day)</td>
<td>13.3</td>
<td>11.2</td>
<td>11.5</td>
<td>9.5</td>
</tr>
<tr>
<td>Protein (lb./day)</td>
<td>2.3</td>
<td>1.9</td>
<td>1.5</td>
<td>1.7</td>
</tr>
<tr>
<td>Calcium (grams/day)</td>
<td>33</td>
<td>27</td>
<td>17</td>
<td>25</td>
</tr>
<tr>
<td>Phosphorus (grams/day)</td>
<td>25</td>
<td>22</td>
<td>17</td>
<td>20</td>
</tr>
<tr>
<td>Vitamin A (IU/day)</td>
<td>30,000</td>
<td>36,000</td>
<td>25,000</td>
<td>27,000</td>
</tr>
</tbody>
</table>

Remember that we have been referring to an average cow in the examples above. When milking ability increases by 50%, TDN requirements increase by approximately 10%. When milk production doubles from the average cow, TDN increases as much as 25%. Average milk production is considered to be 10# per day. Imagine what the TDN amounts would be for dairy crosses and would your forage base support them? Protein requirements follow the same trend as TDN.

What effect does environment have on nutrient requirements? For a 1,200 pound cow with a wet hair coat, TDN increases by 2% for every degree in temperature drop below 59 degrees F. Imagine what an increase at 20 degrees with wind and snow! Is this when you should be expecting cows to lactate and return to heat to rebreed?

**Body Condition Scoring**

Body condition scoring may be a new term to some producers but the concept is something that all producers have used for years. Body condition scoring refers to evaluating the body condition of an animal by looking for fat deposition in the following areas:

- Brisket
- Shoulder
- Ribs
- Spine
- Tailhead
- Vertebrae
- Hip Bones
- Pin Bones

Most people use a numerical system that runs from 1 to 5 or 1 to 9. Sometimes you can have a real argument with yourself whether a cow is a 5 or a 6 or a 3 or a 4. The most important thing that body condition scoring does for a producer is, it divides the cow herd into 3 distinct groups. One is those cows that are too thin, one is the cows that are just right, and one is the cows that are too fat. This in itself tells the producer that nutrition or environment is not suiting the cows that are too thin. Things are just right for those cows that are OK and the cows that are too fat may not be working as hard as the rest of the cows. If the majority of the cows fall in the “just right” group, then one can assume that nutrition is sufficient for the herd and there are two groups of cows that do not “fit” the environment or production expectations. The main lesson is don’t get hung up on which number fits, instead is the cow just right, too thin, or too fat?

Another important consideration is when do you score these cows and what is acceptable at that time. Consider the following times to make notes about body condition, while you may monitor it informally on a constant schedule:

- Weaning (could be borderline thin at this time as time remains to regain lost condition)
- 75 days before calving (should be in that just right or the upper end of that group. Heifers should be in slightly better condition than mature cows)
- Calving (Those animals that were too thin at weaning or 75 days pre-calving, should be in the just right group at this time)
- Breeding Season ( cows should be in an increasing body condition situation)
- When grouping cows to allocate forages where they are best used.
Indications To Look For On The Body Condition Score 1-9 Scale

1. Bone structure of shoulder, ribs, back, hooks, and pins sharp to touch and easily visible. Little evidence of fat deposits or muscling. Cow is severely emaciated and physically weak. There is muscle breakdown and the cow is likely to go down when stressed by hauling, cold weather, etc.

2. Little evidence of fat deposits, yet some muscling in the hindquarters but severely depleted. The spinous processes feel sharp to the touch and are easily seen with space between them. Still, the cow is not weak.

3. Beginning of fat cover over the loin, back, and foreribs. Backbone still highly visible. Processes of the spine can be identified individually by touch and may still be visible. Spaces between the processes are less pronounced.

4. Foreribs not noticeable; 12th and 13th ribs still noticeable to the eye, particularly in cattle with a big spring of rib and ribs wide apart. The transverse spinous processes can be identified only by palpation (with slight pressure) to feel rounded rather than sharp. Full but straightness of muscling in the hindquarters.
5. Twelfth and 13th ribs not visible to the eye unless the animal has been shrunken. The transverse spinous processes can be felt only with firm pressure and feel rounded—not noticeable to the eye. Spaces between the processes not visible and only distinguishable with firm pressure. Areas on each side of the tailhead are fairly well-filled but not mounded. The cow may be described as thin to moderate.

6. Ribs fully covered, not noticeable to the eye. Hindquarters plump and full. Noticeable sponginess to the covering of foreribs and on each side of the tailhead. Firm pressure is now required to feel the transverse processes. The cow appears smooth throughout.

7. Ends of the spinous processes can only be felt with very firm pressure. Spaces between processes can barely be distinguished at all. There is abundant fat cover on either side of tailhead with some patchiness evident. The cow appears in very good flesh.

8. Animal taking on a smooth, blocky appearance; bone structure disappearing from sight. The fat cover is thick and spongy with patchiness likely. The cow is obese.

9. Bone structure not seen or easily felt. Tailhead buried in fat. Animal’s mobility may actually be impaired by excess fat.
Forage Production Basics

While an entire lifetime can be devoted to learning about forage production, I will attempt to put forth some of the basics to consider when using a forage plan to complement beef production and enhance profitability. Forage is the best suited crop for nearly 65% of the acreage in Tennessee. It is also one of the most economically feasible feeds for beef cattle operations. In fact, it can be said that beef farmers are marketing forage and the cattle are merely a tool to market the product through. There are some basic management tools for forage production that are often overlooked.

Soil testing is one of the cheapest management tools available. There is no one that can simply look at a field and tell what the pH value is, what the phosphorous needs are, or what levels of potash exist in the soil. Soil testing can give you exact values and recommendations based upon the sample submitted. Therefore, it is imperative that the sample be representative of the field tested. We may look at a field and see sage growing and think that pH is low and lime is needed. The truth is, that sage will grow in high pH soils equally well as low pH soils. In essence, sage is an indication that the soil environment is not quite right for the forage grown and sage has taken the opportunity to grow instead. Even though the field may not have been limed in years, some soils lose pH value much slower than others. So if we guess right and the soil is low in pH, how much lime do we apply? If we apply two tons and three are what it takes, not much result is achieved and the money does not return the desired result. If we put three tons, and only 1.5 are recommended, then we have spent money that produces no return. In either case, money was spent that has no possibility to return profit to the operation. In terms of fertilizer materials, when they are applied in the absence of low pH, much of the material (up to 50%) is unavailable to the plant. Phosphorous is essential during the sprouting and seedling stage of development. Without adequate phosphorous, plants sprout and live a short time and then die. If you want to maintain clover stands in your fields, potassium becomes a critical nutrient. Without adequate potash, clovers decline allowing open areas for weeds and sage to grow. The money spent on a soil test will always return many fold when the sample is representative of the field and the recommendations are followed.

Once the soil test is taken and the proper soil environment exists for the crop grown, the producer must manage the forage through grazing techniques and harvesting techniques that favor the growth habits of the forage. Remember that successful forage growth is the union of soil, plant, water, fertility, and sunlight. When trying to maintain clovers, that are shorter in height than grass, try to manage the forage in a manner that allows sunlight penetration to the clover plants. For example a grazing program that removes material evenly across a field to a height of 3” then allows regrowth with no animal pressure before removal again will favor clover. Think how hard it is to maintain clover in grass hay where the grass is allowed to grow tall before harvest. Even grasses deserve much needed rest between harvests. In periods of cooler temperatures and adequate moisture, grasses will recover in 21 days or so. During hotter, less moist conditions, grasses may take up to 45 days to recover from grazing or hay harvest. Your managed grazing system can allow these rest periods with no animal intervention. Consider breaking fields into smaller areas with temporary fencing to extend stand life and help manage weeds.

Weed control is another tool that will increase the usefulness of your forage. Refer to the weed publications available through your Agricultural Extension Service for the correct chemical control. Remember! The chemicals commonly used for broadleaf weed control are toxic to most ornamentals, garden plants, and tobacco. Also observe all label restrictions regarding grazing and hay harvest.

Introduction of clovers into pastures can be easily accomplished by a practice called “frost seeding”. This is accomplished by using a coated seed and scattering the seed on a closely grazed field in mid February to let mother nature cover with soil for spring germination. Freezing, thawing, rain, or snow will usually provide adequate seed to soil contact for germination. When utilizing this practice, use two pounds of ladino clover plus four pounds of red clover. Where it is possible to let reseeding occur in the fall, eight pounds of annual lespedeza may be added to this list.
Once you have produced this feedstuff, you must have an idea of its feed value in order to plan how to allocate the forage and supplement if necessary. Forage testing is an inexpensive way to ensure that you utilize the forages that you have to their best use. Basic forage analysis is usually done on stored forages such as hay, haylage, or silage. The best time to test these forages is not when you start to feed them, but rather when you put them into storage. Try to store all bales under some type of temporary or permanent cover such as barns, tarps, sheds, etc. When storing bales use survey flagging to mark where one type of hay or cutting ends in the stack. When these markers coincide with your testing procedures, you can then adjust any necessary supplementation for the best use of economic resources. Your Agricultural Extension Service can assist you in sampling and testing your forages.

**By-Product Feeds**

There are a multitude of by-product feeds available for use in the beef industry. With the attractive pricing of these products, it is tempting for them to become a major part of the feeding program. First of all let us not lose sight of the fact that forage will continue to be the most cost effective method of supplying nutrients to the cow. As for supplementation of energy and protein beyond that, by-products do serve a useful purpose. Keep in mind that these products are what they are called; by-products. There is no feed tag that guarantees protein or TDN amounts. They may vary widely from batch to batch. The most common by-product in our area is corn gluten. Corn gluten protein levels have been documented from 11% to more than 32%. Palatability varies widely from batch to batch. Does this necessarily limit it’s value as a supplement? No, it simply means that we should not rely on it alone as a means of supplementation. For instance, the calcium phosphorous ratios are variable so smaller amounts should be used on smaller younger animals; while up to 50 percent of the ration may be ok for older animals.

Another by product feed used in our area is chicken litter. There is some concern among the public in using any animal origin supplement in the feeding industry. While this material is generally considered safe when properly prepared and fed, some buyers are asking if this product is used. To properly prepare the litter for feeding, it must be stacked in a deep stack and allowed to heat until the odor becomes negligible and the appearance is that of coffee grounds. The litter once it comes out of the deep stack, can then be fed as a urea based protein supplement with other grains at a maximum of 35% of the ration. Keep in mind that as a urea type supplement, it takes rumen action and energy to break this protein into a useable form. Therefore, if an energy deficient situation exists, this mixture may aggravate the problem rather than help it. Younger calves whose rumen may not yet be functional also cannot use this ration.