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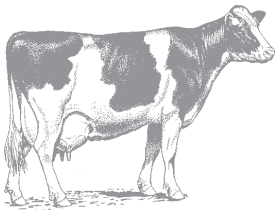

Dairy Digest

Your Herd Management Resource

Drought Management on Louisiana Dairy Farms

This series of articles was prepared by LSU AgCenter extension and research personnel to address some of the most important topics affecting Louisiana dairy producers during a severe drought. Those topics include:

- Feeding Drought-stressed Hay and Silage Crops
- Weed and Chemical Toxins in Drought-stressed Forages
- Pasture Options for Dairy Producers
- Winter Annual Pasture Management and Costs
- Coping With Forage Shortages From Drought Conditions: Purchased Forages and By-Products

Feeding Drought-stressed Hay and Silage Crops

Vinicius Moreira and Mike McCormick, Southeast Research Station, LSU AgCenter

It has been a tough year following Hurricane Katrina. As 2006 nears its end southeastern Louisiana is still nearly 20 inches below normal rainfall for the previous 12-months. Of course, dairy producers realize that the most important aspect of a dry growing season is the shortage of forage. The United States has multiple years of regulatory grain storage for most grain feeds used in animal production. Those regulatory stocks are used to cope with low-production events like drought. On the other hand, forages need to be produced locally and annually. Most forage crops and pastures have exhibited some growth. The extent of this growth has been extremely variable, depending on the amount of rain a producer was lucky enough to have fall on his/her land. In this article we discuss a few aspects of using drought-stressed forages that will help producers optimize animal performance until more plentiful high-quality forages become available.

Drought-stressed hay assessment. Short-term to moderate drought stress has been shown to have a positive effect on the quality of some hay crops. Plant growth is reduced and, as a result, sugars accumulate, stem elongation slows and fiber concentrations are reduced. These summer hay crops are often low in tonnage and in many cases may barely justify harvesting. But, lower fiber concentrations signal higher energy content and superior quality. If you were one of the lucky few able to harvest such a crop and you have not been forced to feed it to stale, late lactation cows, animal performance of cows receiving this forage should be reasonable. Unfortunately, in more instances than not, drought causes delayed harvesting, which often leads to hay crops that are overly mature and heavily contaminated with weeds. Research has shown that well-managed 4- to 6-week old Bermuda-grass hay usually contains 12%-16% protein and 35%-37% fiber, but at 12 weeks of age, protein content will likely be reduced to 7%-9%, and the fiber concentrations may increase to 42%-44% of dry matter, thereby lowering hay energy content and overall feeding value.

Drought-stressed corn assessment. In some instances, moderate rainfall shortfalls may generate high-quality corn silage. This occurs when plant height (tonnage) is reduced, but timely late-season rains provide for good ear production. This year, however, in many parts of southeastern Louisiana and southwestern Mississippi, severe droughts have limited both plant height and ear development. A preliminary assessment of corn silage/greenchop samples entering the Southeast Research Station Forage Quality Lab indicates that 2006 corn silage crops for many producers will be 6-8 units higher in fiber than recorded in 2005. Protein concentrations appear little affected by the drought though some crops may actually have slightly elevated protein concentrations. Caution should be exercised when feeding drought-stressed corn and sorghum crops since drought conditions may result in high plant nitrate levels. Ensiling will lower, but not totally eliminate high nitrate concentrations in forage crops. Another possible danger associated with feeding drought-stressed corn comes from aflatoxins, which are toxins formed by molds, primarily *Aspergillus flavus*, on the corn grain. Aflatoxins are not tolerated in milk (< 0.5 ppb), and high feed levels may cause liver damage, abortion and other health problems in milk cows. Samples of severely drought stressed corn silage should be tested to quantify levels of these dangerous toxins.

Feeding options:

1) **Low-quality, drought-stressed hay or corn silage – no dietary adjustments.** Since energy and protein concentrations will be lower, the first observable consequence from feeding poor quality hay will be lower milk yield, and peak milk production in fresh cows. Changes in quality for the hay described above would be expected to lower milk yield of fresh cows at least 5-6 pounds per cow daily. No immediate depression in milk yield may occur in late-lactation cows, but all cows will exhibit varying degrees of condition loss as feeding periods are extended. If severe, this condition loss may adversely affect fertility and cows that are pregnant may become sufficiently thin to impair performance in the subsequent lactation. Since corn silage protein levels do not decline substantially, feeding these silages without ration adjustment will present similar energy shortage effects as feeding low quality hay, but perhaps not as severe. Feeding these low-grain-content corn silages will be nutritionally comparable to feeding sorghum silage where we often observe high milk fat concentrations, but reduced milk volume.
2) **Poor quality hay/corn silage – adjust concentrate feeding.** To achieve optimum production from low-quality forages, protein and energy concentrates must be modified (usually increased) to make up for forage shortfalls. Simply feeding more grain, however, may lead to a starch overload and rumen acidosis; therefore, in some situations it may be more desirable to feed soyhulls, citrus pulp or other digestible fiber sources in lieu of corn grain. Ration energy content may be improved by feeding products such as whole cottonseed or rumen-protected fats. Although concentrate adjustment will likely overcome some of the deficiencies associated with low-quality forages, animal performance seldom equals that achieved with high-quality forages such as ryegrass pasture, alfalfa hay or high-energy corn silage.
3) **Limited poor quality hay/corn silage.** If feasible, restricting low-quality hay/silage consumption while supplementing early lactation cows with a high quality forage will minimize the ill effects of these hay crops. In situations where the primary forage is lush winter pasture, low-fiber bale silage crops or high-energy corn silage crops, addition of mature hay or high-fiber corn silage in limited quantities may actually enhance animal performance by slowing feed rate of passage and improving overall diet digestibility. Usually, addition of high-fiber hays to diets containing lush forages improves rumen health and may increase milk volume and milk fat content.
4) **Drought-stressed hay for non-lactating cows or older heifers**. This is probably one of the best options for use of low-quality forage of any kind. Although requirements of these animals are considerably lower than those of lactating cows, some concentrate supplementation will likely be necessary.

Final remarks:

When feeding lactating dairy cows, it is paramount to keep in perspective the entire production cycle. Young stock can support underfeeding for short periods and may completely recover through compensatory gain after normal feeding is restored. On the other hand, underfeeding lactating dairy cows will result in mostly irreversible short-term and long-term economic losses in the form of low milk production and diminished reproductive performance. It is critical that dairy producers seek the aid of experienced dairy nutritionists to help them choose the best feeding program for their cows.

Weed and Chemical Toxins in Drought-stressed Forages

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With droughts come increased weed infestations in pastures, hay and croplands. Some weeds can be toxic if grazed but also can remain toxic if baled or ensiled. Dairy producers should be familiar with the weeds that can cause problems, and avoid them.

Drought-stressed plants more readily accumulate nitrates and prussic acid (cyanide). Plants that have accumulated nitrates often remain toxic after baling or ensiling. Although ensiling may reduce nitrate concentrations, the degree of reduction varies from crop to crop. But forages can be tested for nitrates to prevent poisoning (LSU AgCenter Agricultural Chemistry Lab, Baton Rouge). Prussic acid accumulates most often in sorghums, sudans and johnsongrass. Prussic acid dissipates when baled or ensiled, so harvested forages are generally safe. Cattle grazing in pastures high in nitrates or prussic acid are usually found dead, so prevention of these toxicities is critical. Factors contributing to high forage nitrate and prussic acid concentrations are high N fertilization, cloudy weather, droughts and frost damage. Immature sorghum regrowth is particularly susceptible to prussic acid accumulation. Nitrate and prussic acid both interfere with oxygen-carrying capacity in the blood, so pregnant cattle surviving these poisonings often abort.

Two of the most toxic plants found in croplands are coffeeweed and sicklepod. Cattle generally will not graze the green plant unless other feedstuffs are scarce. They will, however, readily eat the seed pods that are dry after a frost. The plant remains toxic when harvested in hay/baleage/silage. Coffeeweed and Sicklepod are toxic to muscles and cause weakness, diarrhea, dark urine and inability to rise. There is no specific treatment or antedote, and once animals are down, they rarely recover.

Pigweed or careless weed is most common in areas where cattle congregate. Cattle will readily eat the young plants, but avoid the older plants unless forced to eat them. A common pigweed poisoning happens when cattle are penned where pigweed is the predominant plant and no alternative hay or feed is provided. Red root pigweed is more toxic than spiny root pigweed, but is less common. Pigweed accumulates nitrates, so sudden death is the most common outcome.

Black nightshade is common in croplands and, like pigweed, it occurs in high-traffic areas. The species of nightshade most common in our area is not as highly toxic as other species, but poisoning can occur. The green fruit is most toxic, so cattle should not have access to nightshade during this stage. Nightshade remains toxic in harvested forages. It is toxic to the nervous and gastrointestinal systems of animals, and causes weakness, depression, diarrhea and muscle trembling among other signs. Bull nettle and horse nettle are in the same plant family as nightshade. They are also toxic, although less so, and are usually avoided by livestock unless other forages are not available.

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Generally, when harvesting crops for hay, baleage or silage, small quantities of undesirable weeds may be acceptable since the toxins are diluted over many tons of nutritious, nontoxic forage. However, when toxic weeds such as coffeeweed, nightshade, etc. make up a high percentage of the standing crop, the difficult but prudent course of action is to sacrifice the crop.

Blue-green algae blooms in ponds also can occur in hot weather. They are most common in ponds with high organic matter, such as ponds where cattle are allowed to wade or where fertilizer runoff occurs. Blue-green algae can accumulate along pond edges and expose cattle when they drink. Both the live and dead algae are toxic. The toxins can affect the neurological system causing convulsions and death, sometimes right next to the source. They also can affect the liver, causing a delayed syndrome of weight loss, and photosensitization (skin peeling in sparsely haired or white-haired areas).

Pasture Options for Dairy Producers

Ed Twidwell, Agronomy Department, LSU AgCenter

Dairy producers need to be thinking about ways of efficiently using their warm-season perennial forage resources from now through October. Some management strategies can be employed by producers to use their perennial forage grasses while minimizing damage to their stands for 2007 and beyond.

Typically, warm-season perennial grasses such as bahiagrass and bermudagrass support above-ground growth for eight to nine months out of the year. The plant must support its root system and its bud tissue, which will produce next year's growth. To survive during this period, the plant must draw on carbohydrates or food reserves that were produced the previous growing season and stored in the roots or crown of the plant. About 20% or more of the year's growth will occur using these stored reserves before the plant stops using reserves and maintains itself on mature leaves produced that season.

In a drought, the plant has to rely on the stored reserves for a longer period of time, thus reducing stored nutrients for future use and increasing the plant's susceptibility to damage in extended periods of drought and grazing uses. A healthy root system is of paramount importance to the growth of a pasture plant when we realize that 50% to 80% of the plant exists below the soil surface.

A good fertility program reduces the impact of drought stress on plants. If phosphorus, potassium and lime are recommended by a soil test, producers are encouraged to apply needed nutrients. Nitrogen fertilizer will stimulate grass growth when soil moisture is sufficient for its uptake. At this late-summer date, no more than 30-40 pounds of actual nitrogen per acre should be applied. Lack of proper fertility will impair the recovery of drought-stressed pastures. Producers can investigate the possibility of using alternative fertilizer sources, such as broiler litter, to reduce fertilizer input costs.

Another strategy that producers should consider is to use some type of a controlled grazing program. These programs can be very simple, such as allowing cattle access to a pasture area for only several hours per day. They also can be much more complex, such as dividing a large pasture area up into 4, 8, 12, 16 or more smaller paddocks and rotating the cattle from paddock to paddock. The main idea here is to use your forage resource efficiently and not let good grazing areas go to waste. Producers cannot afford to lose forage to improper grazing practices such as trampling.

Temporary electric fencing can help increase grazing efficiency on pastures. In fact, Mississippi researchers found that stocking rate could be increased 20%-25% on rotationally grazed ryegrass pastures compared to continuously grazed pastures without lowering milk yield.

Producers also may want to consider grazing hay fields. The re-growth on many hay fields has been limited by the drought and might be best used as pasture if the field is fenced or can be easily fenced and water provided without too much difficulty.

In addition to managing their perennial warm-season forages, dairy producers also need to consider planting some winter annual forages this fall. Winter annual forages include the small grains (rye, wheat, oats and barley), annual Ryegrass and various legumes such as Crimson clover, White clover and Arrowleaf clover.

The small grain that appears to be best suited to the Florida parishes is oats. Oats are more heat and drought tolerant than annual ryegrass and can be planted, grown and grazed earlier than ryegrass. They do not, however, tolerate cold weather nor have as long a growing season as ryegrass. When planted around September 1, oats can provide grazing by late October. Most dairy producers should plan on planting one-fourth or more of their winter pasture acreage to oats, primarily because of the early grazing advantage it offers over other winter annuals.

Annual ryegrass is the backbone of most dairy forage systems in this region. Ryegrass offers high production, high quality, cold tolerance, disease resistance and late maturity. It does not, however, tolerate heat and drought conditions very well. Also, early plantings of ryegrass are prone to armyworm infestations. It is not recommended to plant ryegrass before September 20 in South Louisiana.

With the high prices of commercial nitrogen fertilizers, planting an annual clover with your winter annual grasses may be a consideration. Clovers improve forage quality and animal performance, they fix nitrogen (which can reduce fertilizer costs) and they can increase total forage production and extend the grazing season further into the spring.

Crimson clover is one of the easiest clovers to grow and is normally quite dependable in the Florida parishes. It makes more fall, winter and early spring growth than any other winter annual clover. It makes most of its growth from mid-February to mid-April and thus is best suited for use in fields where grazing will be terminated early. Crimson clover is best suited to well-drained soils having a pH of 5.8 to 6.5. Clover alternatives are Arrowleaf clover and White clover.

Winter Annual Pasture Management and Costs

Ronnie Bardwell, Southeast Research Station, LSU AgCenter

Managing your risk with forages, especially planting cereal grain and ryegrass in September, does have its rewards. The recommended oat varieties are Horizon 321, Horizon 314 and Horizon 474. Mean production from three varieties was 6,847 pounds of dry matter per acre from 2003-2006 at Franklinton, La. Sod planting can be accomplished earlier than the October 15 recommended planting date by spraying summer pastures with 1% glyphosate before planting. If moisture is available, drilling oats during the first week of September can pay dividends. Seeding rate for planting oats alone is 100 pounds per acre and 60 pounds per acre when planted with annual ryegrass (25 pounds per acre). Another oat variety that has done well in field demonstrations is Plot Spike. In 2003-2004, LA 9339 (Plot Spike) was harvested in Franklinton in April with 3,686 pounds dry matter per acre. Horizon 314 yielded 2,546 pounds per acre.

Rye is another choice for dairy producers to consider for early fall grazing. Recommended varieties include Noble Foundation NF 65, Oklon, Maton, Wintergrazer 70 and Bates. The three-year mean for these five varieties in Franklinton from 2003-2006 was 6,948 pounds of dry matter per acre. Rye will mature earlier than ryegrass and other small grains. Seeding rate is 90 pounds per acre when planted alone and 30 pounds per acre when planted in a mixture. Cereal rye is also more tolerant of low soil pH.

Annual ryegrass is the main workhorse of winter forages in southern Louisiana and Mississippi. This cool-season grass has many advantages over cereal grains and also works well in a mixture. Its high-yielding ability, ease of establishment and tendency to form a denser sod than small grains, make it attractive. To access the 2006 cool-season pastures and forage varieties publications, go to the LSU AgCenter Web site: www.lsuagcenter.com, click on publications, and then click the Crops and Livestock link.

During 2003-2006, 18 varieties of ryegrass were planted at four trial locations in Louisiana, including Franklinton. The mean dry matter per acre of all varieties in Franklinton was more than a ton higher than the state mean (8,930 compared to 6,920). In all varieties, production of dry matter per acre was higher in Franklinton than the other three trial locations. If your want to hedge on what to plant for grazing, hay production and/or baleage, diversify your forages and plant the majority in ryegrass. The recommended planting date for ryegrass on a prepared seedbed in southeast Louisiana is September 20. Ryegrass can be planted with a drill in sod successfully if the summer grass is sprayed with 1% glyphosate before planting.

Many options with winter forages will provide opportunities to meet drought-related forage shortfalls. When you look at the prices to plant winter pastures, the most significant increases have been with fuel. Farm diesel is currently being sold at $2.35 +/- per gallon. Seedbed preparation will be another major input cost this year. Timing seedbed preparation can save you fuel when moisture is sufficient. Fertilizer prices for ammonium nitrate ($325-$350); DAP, 18-46-0 ($320 - $350); and Potash ($275 - $290) are common costs. Look at discounts and spreading charges. To be sure of what your soil needs to grow a crop, spend $7 for a routine soil sample. It takes about 10 days to get the results from the LSU AgCenter Soil Testing Laboratory. Without soil sample results, everything is a guess and with about a 20% increase in planting costs in the last two years, you need to hang on to some dollars.

Lime from $34-$40 per ton is the cheapest way to increase your pH and get better use of fertilizer by your crop. Applying pre-plant fertilizer also offers some risk management. Should you apply all of your nitrogen, phosphorus and potash at planting? It's probably not wise to apply all fertilizer at the beginning of the planting season. According to average rainfall, September and October can be quite dry. Applying a small amount of nitrogen per acre (100 pounds of 18-46-0 for example) will give you enough nitrogen for winter forage growth if you have enough moisture to germinate the seeds. Top-dress with nitrogen at the rate of 1 pound of actual nitrogen per day of growth; that is, 100 pounds of ammonia nitrate per month of growth. All of the required phosphorus and potash can be applied at planting.

Ryegrass seed costs will be increased by about 5% this year because of freight. Prices have not been firmed up at this time but vary depending on the variety: Gulf (middle $40 per hundred weight) up to Jackson (high $40 to low $50) and Prine ($50 plus).

If all of this is not enough of decision making, another three areas of concern are:

1. Research has shown that blast is more damaging to early planted ryegrass or to ryegrass when higher rates of nitrogen (60 units or greater) are applied at planting. Remember the young plant only uses nitrogen when there are leaves. Beware of using more than 2 tons of broiler litter applied pre-planting.

2. Blast is more damaging on the Gulf variety. According to Florida research, there were varietal differences from blast damage in ryegrass planting, with the tetraploid varieties being more tolerant. Reports from Alabama in October, 2004 were that blast was minimal on ryegrass planted in 12-inch drills.

3. Fall armyworms are present, but can be controlled by Sevin, Confirm 2F or Tracer (natural product). Confirm at 6 ounces per acre costs approximately $15 (21-day residual effectiveness), or Tracer at 1 ounce per acre cost will be close to $7 plus will give a residual control of seven days according to the label.

Coping with Forage Shortages in Drought Conditions: Purchased Forages and By-Products

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Most producers find themselves with not enough stored forage going into the late summer and early fall. Forages are the cornerstone in building diets for dairy cattle. The quality of these forages greatly affects profitability and performance, especially of the milking herd. Many producers have a lot of cows and heifers that will start calving in the coming weeks and months. It is imperative that they receive adequate amounts of not only forage, but high-quality forage.

If forages are in short supply the first order of business would be to take a close assessment of the entire herd. Evaluate the milking herd for potential culls such as cows that have been open a long time and are not pregnant, cows with high cell counts and/or the lowest producers. Calculate the breakeven level of milk production for your herd. Your local county agent has a Microsoft Excel spreadsheet available that will calculate the breakeven level of milk production based on current milk price and your herd inputs for ration cost and overhead cost on a per-head per-day basis. The spreadsheet called "Culling Guide" is also available on the LSU AgCenter Web site www.lsuagcenter.com in the dairy section.

Go ahead and cull the unproductive cows in the herd that fall below the breakeven level of milk production. Next, look at the pregnant cows with low milk production that will have an extended dry period if you decide to keep them. The cows you decide to keep should be either A- or B-rated. The aforementioned spreadsheet will also calculate the level of milk production when the cows should be dried off. The heifer herd should be evaluated to determine if you might have extra bred heifers that could be sold to free up forage and provide revenue to purchase additional forage. Another possibility would be to outsource some of your heifers to a contract grower. Several options are available, such as selling the heifers to the grower with an option to buy them back or retain ownership and pay the grower on a monthly basis for raising the heifers. If you have some heifers that are not growing off because of earlier health problems, and they appear very stunted compared to herd mates, you should probably sell these heifers since they likely will never be very productive in your herd. Once you have assessed the herd, you can do an assessment of the forage needs for the entire herd. Your local county agent has a Microsoft Excel spreadsheet that can help you determine the forage needs. The spreadsheet also can be found on the LSU AgCenter's Web site.

The next item on the agenda would be to take an inventory of the forages that you have on the farm. You will also need to get a nutrient analysis on all the forages on the farm. The forage laboratory at the Southeast Research Station can provide the nutrient analysis on all your forages for a fee of $10 per sample for a standard analysis without minerals or $15 per sample with mineral analysis as of September 1, 2006. Energy is the first limiting nutritional entity in dairy cattle diets. Therefore, the most important numbers on a forage analysis are acid detergent fiber (ADF) and/or neutral detergent fiber (NDF) content. These numbers will ultimately reflect the amount of energy available to support milk production, growth and reproduction. The ADF content is an indicator of the digestibility and amount of energy dairy cows can obtain from the forage. The NDF content reflects the intake potential of forage. **As the fiber content increases (both ADF and NDF), the digestibility, energy content and potential forage intake decreases.** These changes ultimately affect performance and profitability. Protein content is a distant second in importance to fiber content on a forage analysis.

On ensiled forages, such as corn silage, ryegrass haylage, ryegrass baleage and other grass baleages, a sample should be sent to obtain a fermentation analysis of the forage (Cumberland Valley Analytical Services, Mauganville, Md.). Analyses commonly included in silage fermentation reports are pH, lactic, acetic, propionic and butyric acids, ammonia and ethanol. Results of a fermentation analysis can tell you whether an excellent, average or poor fermentation has occurred. In some cases, fermentation analyses can help explain poor silage nutritive values or low intakes, but they cannot be used to balance diets for cattle. Thus, fermentation analysis should always be used in conjunction with the other standard analyses such as ADF, NDF, CP (crude protein), RDP/RUP (rumen degradable protein/rumen undegradable protein), NFC (non-fiber carbohydrates), NEL (net energy of lactation) and TDN (total digestible nutrients).

Once you have incorporated the inventory of forages already on the farm with the forage needs of the herd along with the nutrient analyses of the forages on hand, you can make an assessment of how much more forage you need to supply and the quality of the forage needed to meet the needs of the herd. Several options are available to help meet the forage needs of the herd.

1. Use standing forage. Does your neighbor have some land available that has enough forage to harvest for hay or graze some heifers if it is fenced?

2. Purchase silage or baleage. Because of drought conditions, this purchase is probably not an option, but you never know until you check. If you find some silage or baleage, get a nutrient analysis before purchasing, and pay attention to dry matter levels in negotiating a price. Also, consider hauling cost, time and labor into total cost of forage on a per-ton basis before making a purchase. Remember, forage quality decreases rapidly with exposure to air and high temperatures. Handle individually wrapped bales of baleage carefully to avoid tears in plastic, and cover all tears promptly to avoid additional spoilage.

3. Purchase alfalfa hay. Purchasing alfalfa hay is an option to look at if you have a short supply of high-quality forages as well as a shortage of total forage. High demand and tight supplies along with increased transportation charges have resulted in prices for dairy quality alfalfa hay running between $195 and $220 per ton, but remember that numerous cows will be in early lactation in the near future, and for every pound that we can increase the peak of lactation is an additional 200 to 250 pounds for the total lactation. Incorporating alfalfa in the diet can be especially beneficial if you have the ability to group cows to allocate forages that will bring you the most return on your investment. Alfalfa is a forage crop that is an excellent source of energy, protein, fiber and minerals for dairy cattle. Intake potential is increased for alfalfa hay over grass hay at the same stage of maturity. Also, alfalfa contains more energy than grass hay. In addition, alfalfa contains a highly digestible source of sugars, starches and pectins (25% to 30% non-fiber carbohydrates), which the rumen bacteria can use as an energy source. Alfalfa also provides more buffering capacity in the rumen. This capacity can help buffer the pH changes in the rumen and helps decrease the incidence of health problems, such as ruminal acidosis. An index is often used with alfalfa hay called relative feed value (RFV) that compares the nutritive quality of a hay to full bloom alfalfa hay that has been assigned a value of 100. Only the ADF and NDF content of the hay are used in the calculation of RFV. The RFV attempts to combine the digestibility and intake potential of the forage into one number. When comparing the same type of hay, the higher the RFV, the greater the quality of the forage. Dairy quality alfalfa hay should have an RFV of 160 to 180.

4. Purchase grass hay. A producer may be able to supply some forage short fall by purchasing extra grass hay. A few online sources to check are at the Louisiana Department of Agriculture & Forestry Market Bulletin at www.ldaf.state.la.us/divisions/marketing/marketbulletin/on-line-issues.asp, the Mississippi Hay Directory at http://msucares.com/livestock/beef/mshay.html, the Mississippi Market Bulletin at www.msmarketbulletin.org/, the Alabama Farmers Bulletin at http://www.agi.alabama.gov/market_news and the Arkansas Hay Producer's Database at http://www.hayproducers.uaex.edu/. Grass hay, whether it is large round bales or small square bales, is usually sold by the bale instead of by weight and/or nutrient composition. Before purchasing additional grass hay, try to get a nutrient analysis of the hay to help you and your nutritionist determine how this hay might fit into your forage needs and how you can allocate this forage to get the best return on your investment. Also, pay attention to the weight of the bales and the storage conditions of the hay prior to purchasing. For example, a hay producer has small square bales for sale at $2.75 per bale picked up behind the baler or has large round bales stored outside on the ground for the past four to five months for $35 per bale. The square bales weigh 65 pounds per bale and cost $84.60 per ton; whereas, the round bales weigh only 800 pounds per bale cost $87.50 per ton.

5. Purchase by-products. If forages are in short supply, simply feeding more of the grain mix or concentrate to meet the nutrient needs of the cow can lead to problems. Some of the common problems associated with too much grain and not enough fiber in the ration are: low butterfat test; rumen acidosis, which can lead to laminitis and lame cows; more displaced abomasums; chronic feed intake and milk production fluctuations; and loss of body condition and milk production. To combat some of these problems certain by-product feeds can be added to the diet or grain mix to reduce the amount of non-fiber carbohydrates, mainly starch, being consumed by the cow. These by-products tend to be higher in fiber and lower in starches and sugars compared to rations staples such as corn and soybean meal. These by-products in most cases are not forage substitutes but can act as forage extenders on a limited basis. The diet would still need enough effective fiber to promote rumination for good rumen health and proper digestion. The following is a list of feed ingredients and their nutrient composition used in dairy cattle diets.

6. Feed a BIR mix. A built-in roughage mix, sometimes referred to in this area as a pit mix, is typically a blend of whole cottonseeds, cottonseed hulls, soy hulls and other grains and by-products. The BIR mix is designed to be fed straight (about 40 to 45 pounds) with 6 to 8 pounds of fair- to average-quality grass hay. Normally, an additional grain mix is not fed in the parlor, and the BIR mix is fed outside in troughs. If you have to feed some grain mix in the parlor, be sure to let your nutritionist know so that the formulation of the grain mix and/or BIR mix can be adjusted properly.

Composition Expressed on a 100% Dry-matter Basis

Feed Ingredient[1,2]	DM%	CP%	UIP-CP%	TDN%	NE-l Mcal/lb	ADF%	NDF%	NFC%	Ca%	P%	Mg%	K%	EE%
Brewers Grains, Dehy.	92	25.4	50	71	0.74	24	46	17.3	0.33	0.55	0.16	0.09	6.5
Brewers Grains, Wet	21	25.4	45	78	0.81	23	42	21.3	0.33	0.55	0.16	0.09	6.5
Cottonseed Hulls	91	4.1	35	45	0.45	73	90	1.4	0.15	0.09	0.14	0.87	1.7
Soybean Hulls	91	12.1	30	77	0.80	50	67	13.7	0.49	0.21	0.28	1.27	2.1
Rice Bran	91	14.1	27	70	0.73	18	33	25	0.08	1.70	1.04	1.92	15.1
Wheat Middlings	89	18.4	25	78	0.80	10	37	34.5	0.13	0.99	0.40	1.13	4.9
Hominy Feed	90	11.5	55	87	0.91	13	25	53.0	0.05	0.57	0.26	0.65	7.7
Corn Germ Meal, (SEM)	91	22.3	—	74	0.77	—	—	—	0.04	0.47	0.34	0.31	4.1
Corn Gluten Feed	90	25.6	30	83	0.87	12	45	19.5	0.36	0.82	0.36	0.64	2.4
Distillers Dried Grains	93	25.0	55	88	0.93	18	44	15.9	0.15	0.71	0.18	0.44	10.3
Corn, cracked	89	10.0	50	80	0.84	3	9	75.1	0.03	0.30	0.14	0.37	4.3
Corn, ground	88	10.0	50	85	0.89	3	9	75.1	0.03	0.30	0.14	0.37	4.3
Rice, ground rough	89	8.9	—	79	0.83	—	—	—	0.07	0.32	0.15	0.36	1.9
Rice, polished & broken	89	8.6	—	89	0.94	1	16	73.8	0.03	0.30	0.12	0.15	0.8
Molasses, Cane	78	5.8	—	72	0.75	—	—	86.0	1.00	0.11	0.43	3.84	0.1
Cottonseed, w/Lint	92	23.0	35	96	1.01	34	44	8.2	0.21	0.64	0.46	1.00	20.0
Soybeans, Raw	90	42.8	25	91	0.96	10	15	17.9	0.28	0.66	0.29	1.82	18.8
Soybeans, Heated	92	42.2	50	94	0.99	10	15	17.7	0.28	0.66	0.23	1.89	20.0
Fat	99	—	—	177	2.65	—	—	—	---	---	—	—	99
Soybean Meal, 48% CP Solv.	90	55.1	35	87	0.91	6	8	29.4	0.29	0.70	0.32	2.30	1.0
Soybean Meal, 44% CP Solv.	89	49.9	35	84	0.88	10	15	26.3	0.30	0.68	0.30	1.98	1.5
Soybean Meal, 44% CP Exp.	90	47.7	55	85	0.89	10	15	25.3	0.29	0.69	0.28	1.98	5.3
Cottonseed Meal, 41% CP	91	45.6	43	76	0.79	19	26	20.1	0.22	1.21	0.55	1.39	1.3
Canola Meal	92	44.0	28	75	0.78	18	36	11.0	0.73	1.13	0.58	1.36	1.2
Feather Meal, Hydrolyzed	93	90.0	70	69	0.70	2	—	2.0	0.22	0.80	0.22	0.30	3.8
Fish Meal, Menhaden	92	66.7	65	73	0.76	1	—	2.0	5.65	3.16	0.16	0.76	10.5
Blood Meal	92	87.2	80	66	0.68	1	—	4.0	0.32	0.26	0.24	0.10	1.4
Alfalfa, Dehy. 17% CP	92	18.9	55	61	0.63	35	45	22.5	1.52	0.25	0.32	2.60	3.0
Beet Pulp, w/Molasses	92	10.1	40	78	0.81	25	44	39.2	0.61	0.10	0.16	1.78	0.6
Citrus Pulp, dried	91	6.7	—	77	0.80	22	23	60	1.84	0.12	0.17	0.79	3.7
Peanut Hulls	91	7.8	25	22	0.19	65	74	12.0	0.26	0.07	0.17	0.95	2.0
Oats	89	13.3	20	77	0.80	16	32	45.9	0.07	0.38	0.14	0.44	5.4

[1]Adapted from 1989 NRC Dairy. DM = dry matter, CP = crude protein, UIP-CP = undegradable protein as % of CP, TDN = total digestible nutrients, NEL = net energy of lactation, ADF = acid detergent fiber, NDF = neutral detergent fiber, NFC = non-fiber carbohydrate, Ca = calcium, P = phosphorus, Mg = magnesium, K= potassium, S = sulfur, EE = ether extract (fat).

[2]Nutrient values presented are intended as a general guide to nutrient qualities of feedstuffs. Significant variation in nutrient values exists among different feed sources.

Comments on a Few of the Feed Ingredients

Cottonseed hulls are a by-product that can be considered a forage or roughage substitute. However, 5 to 6 pounds of long-stem forage should still be included in the ration. At the present time cottonseed hulls are selling for about $75 per ton FOB Jonestown, Mss. or about $110 per ton delivered in the Florida parishes if you can find the hulls. This price is too high as a forage substitute, especially if you consider the hulls on a price per unit of nutrient supplied, such as protein or energy. The price is high for several reasons. Normally, demand is high for hulls during droughts due to their forage replacement value, and the cotton ginning season has not started yet. Cottonseed hulls are usually the most plentiful once the ginning season gets into full swing until a couple of months after ginning season. Once ginning season starts this year, hulls still not may be plentiful, and the price may still be high because of other factors. According to reports, the cotton crop has been affected negatively because of the drought. The oil drilling industry is using cottonseed hulls in part of their drilling process. Since cottonseed hulls are a by-product of the crushing process to produce cottonseed oil and the profit margin is low on cottonseed oil, crushers have not contracted very much cottonseed so far. This will help the supply of whole cottonseed, but will hurt the supply of cottonseed hulls.

Whole cottonseed is a by-product that can supply some protein, good energy and fiber. Whole cottonseed works best when mixed with other ingredients in a polymyalgia rheumatica (PMR) or total mixed rations (TMR) diet instead of offering the whole cottonseed alone. Whole cottonseed does not flow well in auger systems or grain bins. The inclusion rate of whole cottonseed in a grain mix is a maximum of 15% or 300 pounds. Cows are normally fed 5 to 7 pounds of whole cottonseed. This rate may have to be reduced if other by-products such as dried distillers grain, rice bran or hominy are used in the diet that contributes extra fat to the diet. The price on whole cottonseed is usually the lowest during ginning season and is the highest just prior to the ginning season. Supplies could be tight on cottonseed this year, so it might be wise to book a few loads if possible.

Soy hulls are a feedstuff that contain a lot of highly digestible fiber (not effective fiber), are low in nonfiber carbohydrates and are a fairly good energy source compared to some of the other high fiber by-products. Soy hulls can be purchased pelleted or not pelleted with no differences in nutritional value. Soy hull pellets will flow better in auger systems, and there is less shrinkage from the product being blown away by the wind.

Dried distillers grain (DDG) with or without solubles is a by-product of the ethanol industry that contains a medium level of protein, a good source of undegradable protein and is high in energy. The crude protein is typically higher than 25%, some going up into the low 30% range. Pay attention to the color and smell of the DDG. If the color is a dark brown and smells like coffee or tobacco, it has been heated too much, and some of the protein has been denatured. As more ethanol plants go on line closer to our area, the price of DDG should become lower because of reduced transportation cost and greater supply.

If you are considering purchasing some of these by-products to include into your ration, work closely with your nutritional adviser to formulate a ration that is properly balanced and will support the level of milk production needed to remain profitable. Pay close attention to the mineral levels in the by-products being used and adjust the formulation on your mineral mix if needed. Also, when purchasing individual by-products, try to take a whole load (about 24 tons) to spread out the transportation cost on a per-ton basis. If you cannot handle a whole load, work with your neighbor on splitting a load. Some good sources to get prices on some of these by-products are your nutritional adviser, feed company or cooperative representative, local commodity broker and the Missouri By-Product Feed Price Listings at http://agebb.missouri.edu/dairy/byprod/AllProducts.asp. For more information concerning by-products and feeding by-products the following Web site has links to several articles and publications on by-products at http://agebb.missouri.edu/dairy/byprod/index.htm.

Another option would be to work with your nutritionist on putting together a mix of some of these by-products that would work as a forage extender and getting your local feed company or cooperative to mix it for you. Some commercially available forage extenders are available that can be incorporated into the diet for your herd. Most of the time, feed 10 to 12 pounds of the forage extender along with a grain mix and the forages available.

Planning for Fall and Winter

The six items listed and discussed above can help you to start making a plan now on how you will feed the herd this fall and winter. By starting early you may be able to buy some by-products and forages at reasonable prices and spread the cost out over several months. If you need assistance or more information, contact your local extension agent or state extension specialist.

Future Options to Minimize Ill-Effects of Drought

1. **Match herd forage demand and forage inventory.** Estimate the forage demand for the herd over the entire year. Determine forage production capacity (forage inventory) for the different seasons. Make sure to leave an extra-cushion for eventual shortage periods.

2. **Increase storage capacity.** Consider increasing forage storage capacity to withstand longer drought periods.

3. **Contract forage supplies (ex. alfalfa hay).** A long-term contract stipulating forage quality, quantity and prices will help protect against price rises in event of feed shortage.

4. **Choose drought-resistant forages.** If your initial silage crop was lost because of drought, be prepared to timely replant part or all with drought-resistant forages, such as sorghum-sudan and pearl millet.

5. **Purchase an irrigation system.** Eonomics may be favorable under some circumstances.

Take-home Message

* Perform a total herd assessment and cull unproductive and unprofitable animals.
* Test your forages, purchased forages and by-products for their nutrient content.
* Determine if you will need extra feed and/or forages to replace the forages you usually grow.
* Allocate the available forage resources and dollars to purchase feed for those cows that make the most money per dollar invested.
* Work with your nutritionist to determine the most economical and profitable way to feed your cows this fall and winter.

Web Sites for Additional Information

Dairy Information: lsuagcenter.com/en/crops_livestock/livestock/dairy/.

Forage Variety Test Results: lsuagcenter.com/en/crops_livestock/pasture_forage (LSU AgCenter); msucares.com/pubs/crops3.html.

Forage Quality Analyses: lsuagcenter.com/en/our_offices/research_station/Southeast/Feature/forages_lab (Southeast Research Station Forage Quality Lab).

Soil Analyses: lsuagcenter.com/en/our_offices/departments/agronomy_environmental_management/soil_testing_lab (LSU AgCenter Soils Lab).

Aflatoxin/Nitrate Analyses: lsuagcenter.com/en/our_offices/departments/Ag_chemistry (LDAF & LSU AgCenter Ag Chemistry Lab).

Forage and Toxin Analyses: foragelab.com/services.html (Cumberland Valley Analytical Services).

Nitrate Toxicity in Plants: wvu.edu/~agext/forglvst/nitrate/.htm.

Weed Identification: csdl.tamu.edu/FLORA/gallery.htm (Texas A & M University).

By-product Feeding Value and Costs: agebb.missouri.edu/dairy/byprod/index.htm (University of Missouri).

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