Beef Management Practices for Coping With A Short Forage Supply

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When environmental conditions are less than ideal, forage production can fall. The most common cause of low forage yield is less than average rainfall in the late spring and summer. Harsh winter conditions or early spring freezes can also result in less than optimum forage supplies.

Unfortunately, there are no cheap, easy fixes for beef producers who have both short pastures and limited hay supplies. Good management means beef producers should develop and implement a strategy that specifies what to do with pastured animals and where winter feed supplies will come from long before the last blade of grass or bale of hay disappears. If not properly managed, a drought year can affect the bottom line for three years: in the first year, feed costs increase and calf weaning weights are decreased; in the second year calf vigor, colostrum quality, milk production, calf weaning weight, cow reproductive performance, and forage production all suffer; and in the third year the calf crop weaned and forage production are still impacted.

This publication reviews 14 management practices that can be used in various combinations to help reduce the negative consequences of low forage supplies. When forage supplies are low, producers should consider the following:

1. Monitor the body condition of their cows as a barometer of nutritional status.
2. Avoid overgrazing and employ rotational grazing.
3. Creep feed calves to create near normal weaning weights.
4. Early wean calves to take pressure off both cows and pastures.
5. Identify and manage poisonous plants in pastures and hay fields.
6. Establish summer annuals to increase late season forage production.
7. Pregnancy check and market cull cows earlier than normal to reduce feed needs.
8. Inventory hay and other feed resources.
9. Analyze feeds for nutrient profiles to help determine supplemental feed needs.
10. Use alternative feeds to supplement and stretch forage supplies.
11. Limit hay access time to stretch forage supplies.
12. Limit feed a high-concentrate diet to stretch forage supplies.
13. Graze crop residues and stockpiled forages to reduce harvested feed needs.
14. Use drought-stressed corn for grazing, green chop, or silage.

Monitor Body Condition

Use body condition scores (BCS) as a composite management tool to determine if the cow's environment is in balance. BCS is an easy, economical way to evaluate the body energy reserves of the cow herd, and it is a better indicator of nutritional status and reproductive performance than weight. Cows should be maintained near a body condition score of 5 (1-9 scale). A "how to" video is available at the Purdue www.thebeefcenter.com.

Condition scoring allows a producer to manage feed resources by sorting cows into groups and then feeding them according to their nutritional needs. In order of importance, beef cattle use nutrients for: body maintenance, fetal development, lactation, growth, and conception. As an animal satisfies each requirement, any excess nutrients are available to the next priority. When nutrients are limited, reproductive performance, growth and milk production (calf weaning weight), respectively, will be compromised.

Avoid Overgrazing and Employ Rotational Grazing

Forage plants need a rest period between grazing cycles to replenish carbohydrate reserves in their storage organs. Without rest, plants will weaken and take longer to grow back. Pastures that are continuously over-grazed typically lose many desirable high-yielding forage species. During a drought, this result will be magnified.

The old grazier's recommendation to "graze half and leave half" is still good advice. The problem during droughty periods is that regrowth is limited in pastures, even when they have been rested for 30 to 45 days between grazing cycles. Ideally, cattle should be removed from pasture when plants are grazed to about a 4-inch stubble height. This will allow enough leaf material for photosynthesis to occur, which will allow the plant to regrow more rapidly when environmental conditions improve.

If all pastures have been grazed to a 4-inch stubble height and no regrowth has occurred, then drylot cows or designate a sacrifice area within a pasture with temporary fence and provide alternative feeds. This will minimize long-term damage to the whole pasture. The area that isn't sacrificed will need less time to recover when environmental conditions improve.

Creep Feed Calves

When nursing calves are provided supplemental feed, it takes some pressure off the cows and can boost calf weaning weights. Purdue data suggests that creep feeding calves can increase calf weights by 30 to 50 pounds (variation of 0-125 pounds) and cow weights by 30 to 50 pounds (variation of 0-200 pounds) at the time of normal calf weaning.

The response to creep feeding depends on forage quality, forage availability, and location of the creep feeder. In years when forage quality or quantity are limited, the response to creep feeding is higher than when forage quality or quantity are high. The location of the creep feeder can affect calf use and feed intake. Locate creep feeders where cows congregate such as near water, mineral feeder, and shade.

Table 1 provides sample creep rations that should support gains of more than 2.5 pounds/day. Vaccinate calves for over-eating disease (clostridia type C&D antitoxin) preferably at least 2 weeks prior to creep feed initiation. Once you start creep feeding, make sure the creep feeders do not run empty. If feeders run empty and then feed is reintroduced, calves can suffer from over-eating and digestive upsets such as bloat or acidosis.

Table 1. Sample creep rations (%, as-fed basis).

Ingredient[1]	Ration 1	Ration 2	Ration 3	Ration 4
Corn, cracked	40.0	32.7	—	—
Oats, crimped	40.0	32.7	—	—
Soybean meal, 48%	18.0	—	—	—
Dry corn gluten feed, pelleted	—	—	39.3	59.0
Soybean hulls, pelleted	—	—	59.0	39.3
Dry distiller's grains + solubles	—	32.7	—	—
Limestone, feed grade	2.0	1.9	1.7	1.7

[1]To be fed with free-choice forage and high-quality cow mineral, fortified with vitamins A and E.

Early Wean Calves

Early weaning calves is a viable option for conserving short forage supplies. Early weaning not only lowers forage intake of cows by removing the lactation requirement, it also eliminates the forage intake and trampling losses associated with the calves. Based on Purdue data, early weaned, mid-gestation cows consume approximately 25 percent less dry matter than cows nursing calves. When all factors are considered collectively, it is possible to conserve more than 30 percent of a pasture resource by early weaning calves.

When forage resources are limiting, nonlactating cows in the late first trimester to early second trimester of pregnancy (the period of low nutrient requirements) can maintain or gain body weight and condition much more easily than lactating cows. In a normal year, it is not uncommon for cows with early weaned calves to enter the winter with a 0.5 to 1.0 body condition (40 to 80 pounds) advantage over cows that have normal weaned calves. More would be expected in a dry year. In addition, early weaned calves are much more efficient in converting feed to gain (~4:1) than feeding cows to support lactation and calf gain.

Based on Purdue research, it is recommended that individual calves need to be at least 70 days old when weaned. Calves weaned at younger ages tend to have stunted growth and look like pot-bellied, orphaned calves. Ideally, calves should be vaccinated for IBR, PI_3, BVD, BRSV, and clostridia prior to weaning, and then receive booster vaccinations before or at weaning, and again when calves are about 7 months of age to prevent sickness.

Table 2 provides sample early wean rations that should support gains of more than 2 pounds/day when fed to appetite with free choice hay, vitamin-mineral mix, and water. Adding an ionophore (Rumensin® or Bovatec®) to the early wean ration will help stabilize intake, minimize coccidiosis, and improve feed efficiency. If calves were not creep-fed before weaning, begin feeding the grain mix at 0.5 percent of body weight per day (for example, 300-lb calf x 0.005 = 1.5 pound/head daily). Increase grain mix gradually over the next 10 to 14 days to equal approximately 1.5 percent of body weight (for example, 300-lb calf x 0.015 = 4.5 pound/head daily) — a rule of thumb for adding the grain mix is to add approximately 0.5 pound/head every other day. If calves were creep-fed prior to weaning, begin feeding grain mix at 1 percent of body weight.

Table 2. Sample early wean rations (%, as-fed basis)[1].

Ingredient	Ration 1	Ration 2	Ration 3	Ration 4
Corn	46	43.5	21	32.75
Oats	35	—	—	—
Soybean meal, 48%	14.5	—	—	—
Dry corn gluten feed, pelleted	—	52	44	—
Soybean hulls, pelleted	—	—	32	32
Dry distiller's grains	—	—	—	33
Limestone	1.5	3	1.5	.75
Dicalcium phosphate	1.5	—	—	—
TM salt	1.5	1.5	1.5	1.5

[1]Add an ionophore such as Rumensin® or Bovatec® to the early wean ration when using a mixed feed. These products are often packaged in a concentrate form . For example, Rumensin 80 refers to a feed additive concentration of 80 grams per pound. Adding 0.5 pound of Rumensin 80 per ton of early wean ration will provide 20 mg of Rumensin per pound of ration.
To be fed with free-choice, high-quality mineral fortified with vitamins A and E.
To be fed with free-choice, high-quality grass or grass-legume hay.

Identify and Manage Poisonous Plants

Animals typically avoid consuming poisonous plants when forage quantity and quality are adequate. However, poisonous plants can become a concern if they are included in harvested forage, or when pastures are overgrazed. Avoid overgrazing pastures that contain poisonous plants. For more information about managing poisonous forage plants, see *Guide to Toxic Plants in Forages* (Purdue Extension publication WS-37) and *Indiana Plants Poisonous to Livestock and Pets* (WS-9), available from the Purdue Extension Education Store, www.the-education-store.com.

Establish Summer Annuals

Annual warm-season grasses (such as sudangrass, sorghum-sudangrass, and pearl millet) are popular choices for picking up the summer slump and adding late season grazing, but soil moisture is required for germination and growth. Other warm-season grasses to consider include foxtail millet and teff grass.

If seeding annuals are part of a strategy to stretch available forage, seed should be purchased early since supplies can be quickly exhausted. If these forage grasses are not sown before late July, it is unlikely that the resulting value of the growth will exceed the costs of production. Another option would be to seed spring oat in mid-August. If the forage is to be grazed, adding forage turnip with the oat could be an alternative.

Wheat acreage harvested for grain provides an opportunity for establishing these crops. Pearl millet typically yields somewhat less tonnage than sudangrass or sorghum-sudangrass. However, if there is an extreme drought or killing freeze, pearl millet does not carry the same risk of prussic acid poisoning that sudangrass or sorghum-sudangrass pose.

Pregnancy Check and Market Cull Cows

In most years, feeding nonproductive and less productive cows will increase costs and decrease profitability. Most large-animal veterinarians, or newer blood tests that are commercially available, can accurately determine pregnancy in cows that are 35 days pregnant. If the calving/breeding season was longer than desired, consider selling the late-calving cows (regardless of pregnancy status, with or without calf at side) and pregnancy checking only those cows that calved early. For example, if a 60- to 75-day calving season is desirable next year, one could consider a pregnancy check 95 to 110 days after the breeding season started and cull all open cows and any cows conceiving late in the breeding season.

Consider culling cows that have lost their calves, open cows, old cows, unsound cows (arthritic, stifled, blind in one or both eyes, etc.), cows with cancer eye, and tail-end performing cows that have a history of weaning lightweight calves. Historically, cull cow prices dip in October and November when the cow market is flooded by many herds following weaning of their late winter and spring-born calves. Identifying and selling cull cows earlier in a drought year (before the market is flooded) will typically net more money than waiting until there is a serious forage shortage.

Inventory Hay and Other Feed Resources

For planning purposes, we can assume that a cow will consume about 2.5 percent of her body weight of average-quality hay per day on a dry matter (DM) basis. Hay stored outside will have about a 20 percent waste factor; hay stored inside will have about a 7 percent waste factor. For example, forage needs for a herd of 30 cows with an average cow weight of 1,300-pounds consuming average-quality hay stored outside for a 150 day feeding period would be calculated as follows:

> (2.5% of cow body weight x waste factor of 1.2 x 1,300 pound cow) ÷ 100 = 39 pounds of hay DM disappearance per day

If the hay feeding period is from December 1 to May 1 (150 days), then each cow will need:

> 39 pounds of hay DM per day x 150 days = 5,850 pounds of hay DM/cow for the feeding period

Bales stored inside will typically contain 88 percent DM, while bales stored outside will typically contain about 80 percent DM. If bales stored outside weigh 1,200 pounds, then the bale DM weight in this example would be:

> 1,200 pounds per bale x .80 DM = 960 pounds of hay DM/bale

The cow in this example would need:

> 5,850 pounds of hay DM ÷ 960 pounds of hay DM per bale = 6.1 bales for the feeding period

If there are 30 cows, then:

> 6.1 bales per cow x 30 cows = 183 bales would be the estimate of hay needed for the winter feeding period

Analyze Nutrient Profile of Feeds

Obtain representative forage samples from each field and harvest date, and then have a certified forage testing laboratory analyze them for their nutrient profile (testing laboratories can be found on the National Forage Testing Association website, www.foragetesting.org**.** A basic nutrient analysis should contain the amount of dry matter (DM), energy (TDN or NE), crude protein (adjusted for heat damage), neutral detergent fiber (NDF), calcium, phosphorus, potassium, and magnesium. From this nutrient profile, a diet can be formulated to meet the animals' requirements in a cost-effective manner to optimize performance.

Utilize Alternative Feeds

In severe situations, Indiana counties may release Conservation Reserve Program (CRP) acres for making hay. Typically, the quality of forage coming off of these acres is low, but it is a resource that can be considered.

When forage supplies are short, crop residues such as wheat straw and corn stover should also be considered. Crop residues are not a direct substitute for high-quality pasture or hay, but when properly supplemented, these resources can satisfy cow requirements. There are two crop residue feeding strategies to be considered.

The first feeding strategy is to use crop residues as a roughage resource that can be supplemented with byproducts. Since crop residues and other low-quality, mature forages are characteristically low in protein [typically 4 to 5 percent crude protein (CP)] and energy [45 to 50 percent total digestible nutrients (TDN)], corn byproducts (such as corn gluten feed and distiller's grains) become attractive sources of both energy and protein.

The CP requirement of beef cows is about 8 percent during mid-gestation and 12 percent during early lactation; the TDN requirement is about 53 percent during mid-gestation and 63 percent during early lactation. On a DM basis, corn gluten feed contains about 22 percent CP and 80 percent TDN. Distiller's grains plus solubles contain about 30 percent CP and 90 percent TDN.

Corn byproducts need to be fed to cows with caution. Overfeeding these byproducts can result in excessive amounts of fat (which can affect rumen fermentation), sulfur (which can bind with copper and reduce reproductive performance), and nitrogen (which has the potential to lower fertility and reduce embryo survival). Table 3 provides sample rations that can be used safely with cows.

Table 3. Sample dry, mid-gestation cow rations (pounds/day as-fed basis)[1].

Ingredient	Ration 1	Ration 2	Ration 3	Ration 4
Wheat straw	free choice	free choice	—	—
Corn stover	—	—	free choice	free choice
Dry corn gluten feed	9	—	6	—
Dry distiller's grains	—	7.5	—	5
Limestone	0.30	0.20	0.20	.10
TM salt	0.20	0.20	0.20	.20
Magnesium oxide	—	—	0.05	.05
Vitamin A	30,000 IU/d	30,000 IU/d	30,000 IU/d	30,000 IU/d

[1]Assumes a 1,250-pound nonlactating, crossbred cow, 4-6 months pregnant, gaining 0.4-0.5 pound/day.

A second feeding strategy is to treat crop residues with anhydrous ammonia to increase their protein content, improve forage digestibility, increase forage intake, and improve cow performance. This strategy is less attractive than the first because of the costs of anhydrous ammonia and the risks associated with its application.

Purdue research has shown that adding anhydrous ammonia to large round bales of crop residues at the rate of 3 percent of the forage dry matter will increase the crude protein content (6 to 8 percentage points) and dry matter digestibility (more than 10 percent in corn stover and more than 25 percent in wheat straw). In essence, they become the quality of moderate quality hay. In those studies, supplements were formulated to meet cow requirements for protein, vitamins, and minerals for 90-day feeding trials during late gestation. Cows that received the anhydrous ammonia-treated residues (plus a corn supplement) consumed 23 to 30 percent more dry matter and were more than 60 pounds heavier than cows fed non-treated residues (plus soybean meal supplement). The condition score changes followed the same pattern as weight changes

Limit Hay Access Time

Results from several Purdue studies with dry, gestating beef cows suggest that beef producers can stretch their supplies of moderate-quality orchardgrass-alfalfa hay by limiting cow access time to large round bales. In 90-day studies, late-gestation cows were allowed 4-, 8-, 12-, and 24-hour access per day to large round bales fed in a hay feeder. Feeder space was adequate to allow all cows in each treatment simultaneous access to hay. Cow weight change and body condition score change were not significantly affected by length of access time and all cows gained weight.

However, limiting access time significantly affected how much total hay disappeared. Total hay dry matter disappearance was reduced by 37.2 percent when cows had access to hay for only four hours per day compared to cows that had 24-hour per day access). Limiting cow access time to eight hours per day reduced hay disappearance by17.6%, while limiting access time to 12 hours/day reduced hay disappearance by 4.4 percent.

These studies suggest that limiting cow access time (4 to 12 hours per day) to moderate-quality, large round bales of hay can reduce total hay needs (4.4 to 37.2%) without adversely affecting late-gestation cow performance. A conclusion drawn from studies conducted at Purdue suggests that 8 hours of access time to large round bales of hay per day will maximize daily dry matter intake, but will reduce hay sorting and waste by almost 18%.

Limit Feed a High-concentrate Diet

Purdue research suggests that limiting daily hay intake (or access times of less than four hours per day) can also meet cow requirements when fed a properly formulated supplement. In essence, a limit-fed, high-concentrate ration (similar to a feedlot finishing diet) can be utilized.

This strategy requires careful management and 30 inches of bunk space per cow to provide all animals equal access to limited amounts of feed. Cows should be separated into at least two feeding groups: the first contains young, subordinate, and old cows, while the second contains mature cows. It is important to observe the dominant - subordinate relationships between cows when they are fed and it may be necessary to reassign some animals to another feeding group. Similar to starting feedlot cattle on feed, cows need to be started slowly on the concentrate mix and the amount delivered per cow must be increased gradually over time. A good rule of thumb is to begin by feeding hay free-choice with concentrate feed at 4 pounds per cow. Increase the concentrate amount by 1 pound/head on an every other day basis. When cows reach the desired

level of concentrate feeding, begin to gradually reduce the amount of hay fed to the designated level. When limit-feeding is initiated cows will bawl and think they need to be fed more, but they will adapt to not having a full rumen in several days.

Sample rations for a 1,250-pound crossbred cow that is four months pregnant, gaining 0.25 pound/day are shown in tables 4 (dry cow) and 5 (lactating cow). Note that free-choice trace mineralized salt will not meet the cows' mineral or vitamin requirements. Magnesium and Vitamin A are deficient in all of these limit-fed diets, therefore a high-quality mineral mix that contains Vitamin A and higher levels of magnesium needs to be available free-choice. When corn-based byproducts are in the diet, it is important to supply a mineral mix that contains additional calcium (limestone or calcium carbonate) to balance the calcium:phosphorus ratio. In contrast, when corn-based byproducts are not included in the diet, more phosphorus is often needed in the mineral mix.

When cows are limit-fed a diet, it is important to realize that free-choice consumption of a vitamin-mineral mix can exceed the desired level of 3 to 4 ounces (about one fourth pound) per day and it may be necessary to add additional salt as an intake limiter to achieve the desired level of mineral intake.

Table 4. Sample limit-fed, dry, mid-gestation cow rations (pounds/day, as-fed basis)[1].

Ingredient	Ration 1	Ration 2	Ration 3	Ration 4
Grass hay	5	5	5	5
Corn, cracked	8.70	—	4.25	5
Soybean meal, 48%	0.90	—	—	—
Dry corn gluten feed	—	—	6	—
Soybean hulls	—	10.75	—	—
Dry distiller's grains	—	—	—	4.60
Limestone	—	—	0.30	0.20
Dicalcium phosphate	0.05	0.05	—	—
TM salt	0.25	0.10	0.10	0.10
Magnesium oxide	0.05	0.02	0.02	0.05
Vitamin A	30,000 IU/day	30,000 IU/day	30,000 IU/day	30,000 IU/day

[1]Assumes: (A) a 1,250-pound nonlactating, crossbred cow that is 4 months pregnant and gaining 0.25 pound/day, and (B) cows are fed a moderate-quality grass hay stored inside with 88% dry matter.

Table 5. Sample limit-fed, lactating cow rations (pounds/day, as-fed basis)[1].

Ingredient	Ration 1	Ration 2	Ration 3	Ration 4
Grass hay	7	8	6	7
Corn	14.50	4.25	9.10	9.50
Soybean meal, 48%	2.10	0.90		
Dry corn gluten feed			9.10	
Soybean hulls		12		
Dry distiller's grains				7
Limestone	0.20		0.50	0.30
Dicalcium phosphate	0.10	0.20		
TM salt	0.20	0.20	0.20	0.20
Magnesium oxide	0.10	0.05	0.05	0.05
Vitamin A	40,000 IU/day	40,000 IU/day	40,000 IU/day	40,000 IU/day

[1]Assumes: (A) a 1,250-pound lactating, crossbred cow that is 4 months pregnant and gaining 0.25 lb/day and (B) cows are fed a moderate-quality grass hay.

Graze Crop Residues and Stockpiled Forages

As previously discussed, harvesting wheat straw and corn stover, when available, can be used to extend limited forage resources. There is no question, however, that grazing corn stover in the field is more economical than mechanically harvesting it.

A strategy of how corn stover grazing might fit into a winter feeding program needs to be developed for each beef operation. Grazing corn stover should be done in areas that meet state law requirements for a perimeter fence and that has water available. A single "hot" wire may be an adequate internal, or division fence if cows have been trained to respect an electric fence. Ideally, corn fields should be strip grazed using "hot" wire division fences to maximize the use of the stover and to minimize trampling of the shucks and leaves.

Corn plant residues are highest in nutrient value immediately after grain harvest, and the earlier in the season the grain is harvested, the higher the nutrient profile of the residue. During the first 30 days of corn stover grazing that follows the combine, a mid-gestation, spring-calving beef cow can probably come close to meeting her nutrient requirements if provided free-choice access to a high-quality mineral mix and water. Thirty days after grain harvest, residue quality will decrease due to weathering and a protein supplement is usually needed. When grazing or feeding low-quality forages, make a concerted effort to watch cow body condition. If cows start losing condition, supplemental energy and protein will be needed.

When harvesting grain, consider disengaging the chopper to allow shucks and cobs to fall directly behind the combine in two or three rows. Since shucks and leaves have more nutrient value than the stalks, this will help minimize their deterioration. If corn residues are to be mechanically harvested, consider baling only those two or three rows directly behind the combine where the shucks and leaves were dropped. This will provide a higher quality forage resource compared to harvesting all residue material in the field.

If rains return late in a droughty year, fall regrowth of cool-season grasses can be increased by applying 50 pounds of nitrogen per acre before late August. In normal years, this practice works

well for stockpiling a forage resource that can be used in late fall to extend the grazing season. If urea is the nitrogen fertilizer of choice, it should be applied when rain is predicted since urea volatizes to the atmosphere in hot, dry weather.

Use Drought-stressed Corn for Grazing, Green Chop or Silage

Drought-stressed corn, forage sorghum, sudangrass, sorghum-sudangrass, millets, and weeds, such as pigweed, common lambsquarters, and Johnsongrass, can contain high levels of nitrate. Nitrate levels in plants can go up and down rapidly, but nitrates tend to accumulate in the lowest parts of the stalks, not in the seed. Cool-season grasses such as tall fescue, orchardgrass, and timothy typically do not accumulate significant amounts of nitrate, and legumes are seldom a problem. Drought stressed oat harvested as hay from land that received a heavy nitrogen fertilizer application and rain just prior to harvest (which encourages nitrogen uptake) has caused a few cases of nitrate poisoning. Green chop made from these drought-stressed crops and grown on highly fertile soils pose the greatest risk of elevated nitrates. Nitrate accumulation is usually not excessive in green chop unless it is harvested following a dry period. Drought-stressed crops that receive a rain five to seven days before harvest can accumulate significant levels of nitrate.

Ensiling typically reduces nitrate levels by 40 to 60 percent — and in some cases by 80 to 90 percent. During the ensiling process, toxic gasses — such as nitrogen dioxide ($N0_2$) and nitrogen tetroxide (N_20_4) — are produced, which may form a brown gas on top of the silo. This gas, which is heavier than air, has killed livestock and people. It can float down a silo chute and into a barn or confined area. Extremely dry crops that are ensiled may lose only 20 percent of the nitrate they contain. Whenever toxic gasses are a possibility, care must be taken to protect both humans and animals. Make sure that enclosed areas around the feed storage area (feed rooms, silos, animal pens, etc.) are well ventilated and safe before entry. Doors and windows to enclosed areas should be opened, and silo blowers should be run before any attempt is made to enter a silo. If there is any doubt about toxic gasses being present, an oxygen mask should be used in and around the feed storage area. Oxygen masks and respirators may be available through the local fire department.

The symptoms of acute nitrate poisoning are related to the lack of oxygen in tissues. Symptoms include muscular weakness, incoordination, accelerated heart rate, difficult or rapid breathing, cyanosis, coma, and death. Less severely affected animals may be listless and only show rapid respiration when exercised. In chronic cases, a drop in milk production, abortion due to lack of oxygen getting to the fetus, poor performance, and feed conversion has been reported.

If there is concern about nitrate levels in feeds, consider the following:

1. If drought-stressed green-chopped corn or sorghum from high-fertility soils is to be fed, it should be tested for nitrates — especially if the crop experienced a short period of rapid growth just prior to harvest.
2. Remember that thin cattle in poor health and cattle suffering from respiratory disease are more susceptible to nitrate poisoning.
3. Do not allow hungry cattle access to suspect feeds. Take time (one to three days) to make sure cattle are full and consuming a significant quantity of a bulky forage (such as good-quality grass hay), and then introduce suspect feed slowly into their diet.
4. Gradually introduce cattle to suspect forages over several days. The objective is to give the rumen microbes an opportunity to adapt to the higher nitrate intake.

5. Dilute suspected high-nitrate feeds with low-nitrate feeds. Dilution is one method that can help rumen microbes adapt to high-nitrate feeds. Suspect feeds can be blended with low-nitrate feeds such as grass hay or concentrates. Grain feeding has the additional benefit of providing ruminal energy to stimulate the conversion of nitrate to nontoxic nitrogen compounds in the rumen.
6. When using green-chopped suspect forages, harvest each day only the amount to be fed that day. Storing green chopped forages on wagons for later use can result in feeds that are more dangerous because of the conversion of nitrate to nitrite which is significantly more toxic.
7. When grazing high-nitrate forages, provide a palatable, low-nitrate hay or concentrates to dilute the nitrate. In addition, consider limiting the grazing time of suspect forages for the first six to eight days, increasing the grazing time a little each day. For example, allow cattle to fill their rumens with hay and then graze high-nitrate forage for two hours on the first day. On day two, increase their grazing time to four hours and then increase by 2 hours each subsequent day for the next five to six days. Once cattle reach 12 to 14 hours per day, it is safe to assume the rumens are adapted and they can remain on the high nitrate containing forage all day. Remember, nitrate levels are highest during the first 5 to 7 days after a drought-ending rain.
8. When grazing suspect forages, stock lightly so animals can choose lower nitrate leaves over higher nitrate stems.
9. Provide large quantities of fresh drinking water. Water dilutes nitrate concentrations in the rumen and helps to reduce the potential of toxicity.

Summary

When faced with a limited forage supply, there are a number of feeding and management strategies to consider, both individually and in combination. Each operation should develop a strategy that helps control costs, maintains optimal performance, and remains profitable into the future.