OFF THE HOOF

Cooperative Extension Service
University of Kentucky
Beef IRM Team

KENTUCKY BEEF CATTLE NEWSLETTER OCTOBER 1, 2025

Each article is peer-reviewed by UK Beef IRM Team and edited by Dr. Les Anderson, Beef Extension Specialist, Department of Animal & Food Science, University of Kentucky

This month's newsletter includes:
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Timely Tips

Dr. Les Anderson, Beef Extension Professor, University of Kentucky

Spring-calving herds

- Schedule a pregnancy examination of cows if not done previously. Winter feeding costs can be minimized by eliminating open cows prior to winterfeeding. Pregnancy status (pregnant versus open) can be determined using palpation, transrectal ultrasonography, or blood sampling. Stage of pregnancy can only be determined by palpation or ultrasonography (performed by your veterinarian). A new chute-side blood sampling kits (Alertys from IDEXX and Pregnostx from BioTracking) are available for use. These provides yes/no pregnancy data in 20 minutes for about $10 per cow. These tests are very accurate.
- Evaluate the body condition of your cows and improve their condition prior to winter. It takes about 75 pounds to increase body condition a full score.
- If you have already done a preweaning working, revaccinate (booster) calves as needed. Treat calves for internal and external parasites. If you vaccinate calves yourself, be sure to store, handle, and administer vaccines properly.
- Wean calves before cows lose body condition. Consider weaning early or creep feeding calves to take pressure of the cow herd and your pastures.
- Obtain weaning weights of your calves and remember weaning is the time to do your first round of culling and selecting breeding stock. You can eliminate obviously inferior calves, especially those with wild or nervous dispositions. Consider the number of heifers that you will need to save for your cow herd. Bulls that are old, unsound, roguish, etc. can be culled now. It is not too early to begin thinking about replacements.

Fall-calving herds

- The calving season should be in full swing for fall-calving cows. Check cows frequently. Identify calves and commercial males should be castrated and implanted.
- Take accurate records of calving and calving performance. Our new app (Stocket at Stocket.us) makes data collection and reporting simple, easy, and convenient.
- Put fall-calving cows on accumulated pasture before the breeding season. Be sure to save some grass in the breeding pastures.

- It is time to get everything ready for the fall-breeding season, too. Line-up semen, supplies, etc. now and get your bulls ready to go (don't forget their breeding soundness evaluation). Breeding soundness exams are a vital component to reducing the risk of reproductive performance and need to be conducted 30-45 days before EVERY breeding season. Contact your herd veterinarian to schedule the exams.
- Obtain yearling measurements (weight, hip height, scrotal circumference, etc.) on replacement animals - especially for registered ones.
- Contact your herd veterinarian and schedule pelvic area examinations and reproductive tract scores for your potential replacements. Use pelvic area to identify larger heifers with smaller than normal pelvic areas so you can remove them from the breeding pool. Reproductive tract scores can be used to identify immature heifers for culling. Typically, heifers with a reproductive tract score less than 3 have limited ability to conceive early in the breeding season.

Stockers

- If you are purchasing weaned/stressed calves, have your receiving/feeding program in place. Feed a stress ration which contains at least 13% protein and is fairly energy dense.
- Manage to keep newly weaned and/or purchased calves healthy. Calves should be penned in a small lot with adequate feed, water, and shade to reduce stress. Careful handling and comfortable, uncrowded conditions can decrease stress.
- When newly weaned calves are purchased in the fall, sickness and death loss can be a big problem. Work with your veterinarian on a health and receiving program. Consider purchasing CPH-45 feeder calves that are preweaned, vaccinated, bunk-adjusted and treated for parasites.
- Watch calves closely for a few weeks after their arrival. Calves will normally break (get sick) 5-7 days after arrival, but they can break up to 14 days after they arrive. Have a treatment program ready for any health problems. Early recognition of sick cattle improves their chance of recovery. Watch for drooped ears, hollow appearance, reluctance to rise, stiff gait, coughing and dull or sunken eyes. A good "receiving" program is essential to profitability.

General Reminders

- Avoid prussic acid poisoning that can happen when frost ruptures the plant cells in sorghums, sorghum-sudan hybrids, sudangrass, and johnsongrass releasing prussic (hydrocyanic) acid. Fields can be grazed after the plants have dried up after a frost. New growth that occurs in stalk fields is potentially dangerous whether frosted or not.
- Take soil samples for soil analysis to determine pasture fertility needs. Apply phosphate, potash, and lime accordingly.
- Test hay quality and make inventory of hay supplies and needs. Adjust now - buy feed before you run out in the winter.
- Do not harvest or graze alfalfa now so the alfalfa can replenish root reserves.
- Remove fly-control eartags from all animals, dispose of according to instructions on package. Treat for grubs/lice.

Drought-Stressed Forages and Nitrates – Should You Be Concerned?

Highlights from UK Extension Publication ID-217 Forage-Related Disorders in Cattle: Nitrate Poisoning
Michelle Arnold and Megan Romano (UK Veterinary Diagnostic Laboratory), Jeff Lehmkuhler (Department of Animal and Food Sciences), and Ray Smith (Department of Plant and Soil Sciences)

Nitrates are natural constituents of all plants. Under normal conditions, plants take up nitrate through their roots and transport it to the leaves for use in photosynthesis. However, under adverse environmental conditions (e.g., drought; leaf damage due to disease, hail, frost, insects, or herbicides; cool and cloudy weather; and other plant stressors), potentially toxic nitrate concentrations can accumulate in the lower stalks and stems and remain high until photosynthesis resumes with new leaf growth. In addition, heavy nitrogen fertilization provides large amounts of available nitrate for uptake. Plants with high stem-to-leaf ratios are more likely to be associated with nitrate intoxication. The classic forage situation in which plants develop an excessive amount of nitrate in the stalk is with drought-stressed *Sorghum* species and/or corn. These nitrate accumulators generally account for most of the forage-related cases of nitrate toxicity in livestock. Other common crops in Kentucky that may accumulate nitrates include sorghum-sudan hybrids, sudangrass, rye, wheat, pearl millet, soybeans, beets, *Brassica* spp. (rape, kale, turnips, swedes) and oats, although any heavily fertilized plant can be a culprit. Common nitrate-accumulating weeds include ragweed, pigweed, thistle, bindweed, dock, nightshades, jimsonweed, and johnsongrass. Note that these are not complete lists, but rather the weeds and forages that most often cause problems in Kentucky.

Nitrate/nitrite poisoning can occur in all animals, but cattle are considered most susceptible to nitrate. Rumen microorganisms rapidly convert non-toxic nitrate (NO_3^-) to the highly toxic nitrite (NO_2^-) and then to ammonia, which is eventually incorporated into microbial protein. However, when cattle consume high-nitrate plants, it overwhelms the microbes' ability to convert nitrates all the way to true protein. Instead, nitrite accumulates and is absorbed in large quantities into the bloodstream, leading to poisoning. The absorbed nitrites oxidize the hemoglobin of red blood cells, converting it to methemoglobin. Methemoglobin is incapable of transporting oxygen to the tissues, and as methemoglobin concentrations approach 80%, death occurs due to asphyxiation (lack of oxygen). The first sign of nitrate poisoning may be the sudden death of one or more animals. Other signs include weakness; rapid, labored breathing; rapid, weak heartbeat; staggering; frequent urination; muscle tremors; and recumbency (inability to stand). Affected animals typically show signs of poisoning within one to four hours after consumption of a toxic dose of nitrates. Examination of the mucous membranes, especially the vaginal mucous membranes, may reveal a brownish discoloration that occurs well before other clinical signs. Chocolate colored blood and a brownish cast to all tissues are hallmark signs of nitrate poisoning. Most deaths occur within 6-8 hours of onset of clinical signs and largely depend on the quantity and rate of absorption of nitrite and the amount of stress or exercise the animal is subjected to. Animals showing signs of nitrate poisoning should be removed from the source, and a veterinarian should be contacted immediately. Severely affected animals are subject to sudden death, so stress associated with handling must be minimized. Administration of a 2% solution of methylene blue intravenously by the veterinarian will aid in converting methemoglobin back to hemoglobin, but withdrawal guidelines for food animals must be followed and are subject to change. Mineral oil or other emollients may be given to protect the lining of the digestive tract. Vinegar given orally via stomach tube will lower rumen pH and help prevent further nitrate reduction in the rumen. Animals generally die or recover within 24 hours as the oxidation reaction is reversible, and methemoglobin will eventually

reduce back to hemoglobin. Abortions can occur in pregnant animals due to the combined effects of decreased oxygen to the fetus and the limited ability of the fetus to metabolize nitrite. Abortions typically occur within a week of exposure, but they can be delayed in some cases.

A real-world example of nitrate toxicosis was described in the June 2020 issue of the California Animal Health and Food Safety (CAHFS) newsletter. Six deaths occurred out of 50 dry dairy cows on pasture that were supplemented with oat hay. A new bale of oat hay was offered in the morning, and "four hours later three cows were dead, and three others showed signs of paresis [weakness/partial paralysis], urine dribbling, and staggering before falling, developing agonal breathing and dying. Field necropsies revealed brown blood. Eye fluid from four cows had toxic levels of nitrate (130-170ppm, toxic >25ppm). The hay also had toxic levels of nitrate (11,000-13,000ppm, toxic >10,000ppm)."

Several management strategies are available to reduce the risk of nitrate poisoning. These include:

1. Recognize the danger in warm season grasses fertilized with high amounts of nitrogen when growth ceases due to drought, cold damage, hail, or herbicide exposure. Warm season grass stands that have received multiple sources of nitrogen (such as nitrogen fertilizer, manure, previous legume crops) can occasionally show elevated nitrate levels even without environmental stress. Hay produced with high nitrate forages, which has been cut and cured, remains a toxic hazard; nitrate concentrations do not decrease during drying.
2. Test for nitrates before introducing cattle to the suspected forage. All suspected forages including silage and hay should be tested. Complete instructions are provided at https://vdl.uky.edu/nitrate-testing-guidelines . A field test is also available to give a quick indication if the forage is potentially dangerous. If the test strip reacts, a forage sample should be sent to a laboratory for an accurate analysis of nitrate and a feeding recommendation. Consult your County Extension Agent for Agriculture for information concerning sampling, sample preparation, field test, and location of a testing laboratory.
3. In addition to the forage, all potential sources of nitrate, including water and feed, should be analyzed to ensure that total nitrate in the diet does not exceed toxic levels. Surface water or water from shallow wells may contain nitrates, especially if there is run-off from fertilized land contaminating the water.
4. There is no assurance that the forage samples submitted for testing are representative, and some individual pastures or bales may test even higher than reported. Thus, err on the side of caution, especially when feeding pregnant cattle. Animals with reduced ruminal microbial activity or have ruminal digestive upset are also at greater risk. Newly purchased calves, water-deprived cattle, and sick cattle are examples of categories that may have a reduced ability to convert nitrite to microbial protein.
5. Ensiling high-nitrate forages crops may reduce nitrate concentrations by approximately 30-50%, however, proper fermentation for at least 30 days by microbes is essential to convert nitrate nitrogen into microbial protein. Corn forage should be properly ensiled at least 3 weeks and tested for nitrates before feeding. Do not green chop forages suspected to be high in nitrates.
6. Delay harvest of high-nitrate forages until nitrate levels are safe. If not feasible to delay harvest, raise the cutter bar to 18" to avoid the base of plants.

7. Nitrate poisoning in ruminants may also result from consumption of nitrate fertilizer. Salt-deprived cattle will seek out and ingest stored nitrate fertilizers and can consume toxic quantities very quickly. Nitrogen fertilizer should be stored where cattle do not have access to it and accidental spills should be cleaned up promptly. Animals should be provided with ample salt/mineral supplementation 24 hours per day, 7 days a week, and 365 days a year.
8. If high nitrate forages must be utilized, introduce the nitrate forages slowly. The risk of toxicity increases when unadapted, hungry animals consume large quantities of high-nitrate feeds in a short period of time. Cattle can increase their tolerance to dietary nitrates over time, as the rumen microbe population adapts to utilize the nitrates more efficiently.
    a. To begin, make sure cattle consume a significant quantity of a bulky, low-nitrate forage such as good-quality grass hay for the first few days. Then, introduce suspect high-nitrate feed *slowly* into their diet over the next seven to 10 days while keeping them full with low-nitrate feeds.
    b. Harvested high nitrate forages should be fed twice a day as compared to one large feeding. The diet should contain less than 5,000 ppm NO_3 to avoid reproductive impacts. Non-pregnant animals could be fed slightly higher levels after being acclimated.
    c. Forage with high nitrate levels can be mixed with forage known to be low in nitrate to reduce the risk from feeding. The best method is grinding and mixing them in a total mixed ration (TMR). This can help to minimize sorting, or the boss cows eating more of a low-nitrate hay and leaving other cows to eat greater amounts of high-nitrate forage.
    d. A gradual increase in the total energy content of the ration enhances metabolism in the rumen and helps cattle tolerate higher nitrate levels in their diet. Feeding three to four pounds of corn per head per day to mature cattle can help the rumen microbes convert nitrite to microbial protein faster. Low-energy diets increase an animal's susceptibility to nitrite poisoning.
9. There are propionibacterium products available in bolus or powder form that are reported to reduce nitrate and nitrite levels in the rumen by approximately 40 percent. These products must be established in the rumen for at least 10 days before allowing cattle to begin consuming high-nitrate feedstuffs.

Two veterinary diagnostic laboratories in Kentucky perform nitrate testing on forages, the University of Kentucky Veterinary Diagnostic Laboratory and the Murray State University Breathitt Veterinary Center. Both are accredited by American Association of Veterinary Laboratory Diagnosticians. Guidelines for interpretation of forage nitrate concentrations are provided below in Table 1.

Table 1. Nitrate Levels and Feeding Options for Cattle

Total Dietary Nitrate (NO_3) in dry matter	Feeding Guidelines
< 5,000 ppm (0.5%)	Generally safe for cattle. Be cautious with pregnant and young animals when nitrate concentrations approach 5,000 ppm and dilute with other feeds
>5,000 but <10,000 ppm (>0.5% but <1%)	Dilute with other feeds and introduce slowly. Consider options to reduce nitrate in fresh forage (ensiling, delayed harvest, other). Limit to a maximum of 50% of the total dry matter in pregnant animals
>10,000 ppm (1%)	Very dangerous; can cause acute nitrate poisoning and death in cattle. Do not feed.

Several commercial laboratories, such as Dairy One Forage Laboratory, conduct nitrate testing as well. However, be aware that nitrate levels can be reported a variety of ways, and the method of expression can differ between laboratories. Nitrate can be reported as nitrate (NO_3), nitrate-nitrogen (NO_3-N), or potassium nitrate (KNO_3). These numbers are NOT equivalent, as they represent different chemical structures. Make sure the feeding guidelines used for a particular result match the type of analysis performed. To convert between the different methods of reporting, use the conversions in Table 2.

Table 2. Conversion options for different reporting methods.

Method of expression	Chemical designation	To convert to NO_3, multiply by	To convert to NO_3-N, multiply by	To convert to KNO_3, multiply by
Nitrate	NO_3	1.00	0.23	1.63
Nitrate-nitrogen	NO_3-N	4.40	1.00	7.20
Potassium nitrate	KNO_3	0.61	0.14	1.00

Forage nitrate results can also be reported using a variety of units. The most common units of measurement are parts per million (ppm) or percentage (%). Results are usually reported on a dry matter basis. To convert from ppm to %, move the decimal point four places to the left (eg, 5,000 ppm = 0.50%)

Cattle Pest Survey

Dr. Hannah Tiffin, University of Kentucky, Department of Entomology

Are you dealing with pests like flies, ticks, and no-see-ums on your cattle? We want to hear from you. Researchers at the University of Kentucky are conducting a short survey to learn which pests are affecting Kentucky cattle and what control methods you've tried on your farm.

Your responses will guide the development of Extension resources that are useful to producers and help shape research on better pest management strategies. The survey only takes a few minutes, and your input will directly support UK's efforts to improve cattle health and productivity across the state.

To access the survey, please click on the QR code or use this link: https://uky.az1.qualtrics.com/jfe/form/SV_1G3v1QaTKqGhBcO.

Thank you for helping us better serve Kentucky cattle producers.