

# Agriculture Extension News

(270) 259-3492 | grayson.ext@uky.edu | 64 Quarry Road, Leitchfield, KY



Is there a program or topic  
that you would like to  
learn more about?

Contact us today to request programs!

?

## Popular Seasonal Information

[AGR 1- Fertilizer & Lime Recommendations](#)

[Using Drought-Stressed Soybeans for Forage](#)

[Renovating Hay and Pasture Fields](#)

[Renovating Your Home Lawn](#)

[KY Grain Crops Website](#)

[KY Bull Assessment Tool \(CAIP\)](#)

[KY Pest News](#)



*Whitney Carman*

Whitney Carman,  
Grayson County Agent for  
Agriculture and Natural Resources

## save the dates

- Sept 16 | BQCA
- Sept 20 | Beef Bash
- Sept 30 | Fencing School
- Oct 2 & 16 | Measure to Manage,  
Leitchfield, KY
- Oct 30 | Grazing Conference  
West, Leitchfield, KY

## loan items

castration banders & bands  
cattle chute\*  
cattle scales  
freeze branding materials  
grain moisture tester  
hay moisture probe  
hay probe  
pH meter  
sheep shears  
soil penetrometer  
soil probe  
windrow moisture tester

## monthly meetings

Grayson County  
Beekeeper's Association:  
last Thursday of each month

Grayson County  
Cattlemen's Association:  
second Thursday of each month

Master Gardener Association  
of Grayson County:  
third Monday of each month

### Cooperative Extension Service

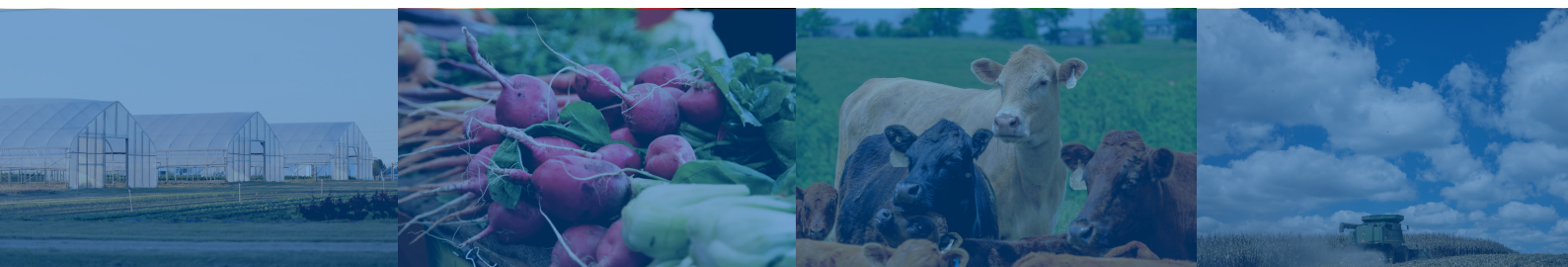
Agriculture and Natural Resources  
Family and Consumer Sciences  
4-H Youth Development  
Community and Economic Development

### MARTIN-GATTON COLLEGE OF AGRICULTURE, FOOD AND ENVIRONMENT

Educational programs of Kentucky Cooperative Extension serve all people regardless of economic or social status and will not discriminate on the basis of race, color, ethnic origin, national origin, creed, religion, political belief, sex, sexual orientation, gender identity, gender expression, pregnancy, marital status, genetic information, age, veteran status, physical or mental disability or reprisal or retaliation for prior civil rights activity. Reasonable accommodation of disability may be available with prior notice. Program information may be made available in languages other than English. University of Kentucky, Kentucky State University, U.S. Department of Agriculture, and Kentucky Counties, Cooperating. Lexington, KY 40506



Disabilities  
accommodated  
with prior notification.



**September 16, 2025**

**9 am, 11 am, & 1pm**

**or**

**September 17, 2025**

**5pm**

**Grayson Co. Ext. Office**

**64 Quarry Rd**

**Leitchfield KY 42754**

## Beef Quality & Care Assurance Training

SEPTEMBER 16<sup>TH</sup> AT 9AM, 11 AM, & 1 PM - ROOM A

SEPTEMBER 17<sup>TH</sup> AT 5PM - ROOM B

The Kentucky Beef Quality & Care Assurance (BQCA) Program enables beef and dairy producers to enhance their product, maximize marketability and strengthen consumer confidence by providing the best management practices for handling cattle and promoting their well-being.

Upon completion, participants receive a BQCA training card valid for three years and the option of purchasing a BQCA farm gate sign.

This course fulfills a CAIP Educational Requirement



To register, call the Extension Office at 270-259-3492, use the QR Code, or [register online here](#) by Friday, September 12<sup>th</sup>



**Register online at <https://grayson.ca.uky.edu/events/beef-quality-care-assurance-training-bqca>**



**Saturday, September 20, 2025**

**9 am to 3:30 pm EDT**

**C. Oran Little Research Center**

**1171 Midway Rd**

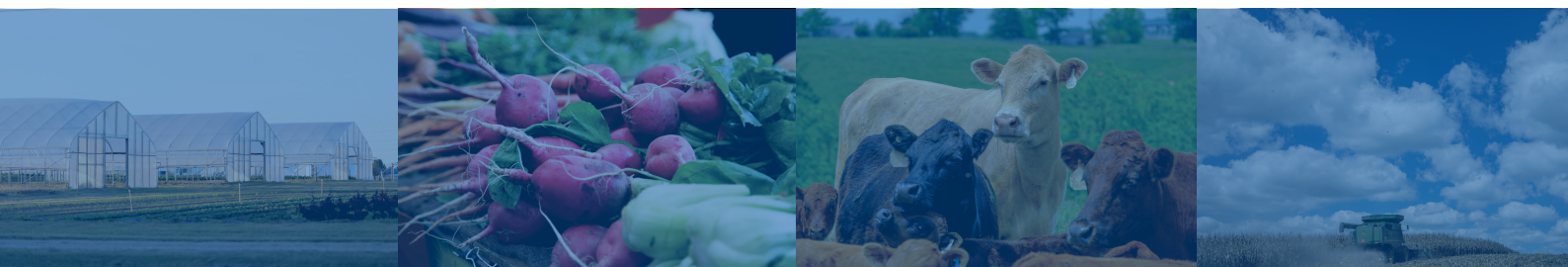
**Versailles, KY 40383**

**Register at**

**[www.eventbrite.com/e/beef-bash-2025-registration-tickets](http://www.eventbrite.com/e/beef-bash-2025-registration-tickets)**

The University of Kentucky is hosting its annual Beef Bash! There will be live cattle demonstrations, research presentations, commercial and educational exhibits. Visitors may also take various tours or can simply sit on a bale of straw and visit with university or industry leaders, commercial representatives and fellow cattle producers.





## Fall Fencing School

**Tuesday, September 30, 2025**

**7:30 a.m. – 4:00 p.m. CDT**

**Hardin County Cooperative Extension  
111 Opportunity Way Elizabethtown, KY**

COST: \$35/participant -- includes notebook, refreshments, safety glasses, hearing protection, and lunch

**Register at**

**<https://forages.ca.uky.edu/events/2025-uky-fall-fencing-schools-elizabethtown>**



## Measure to Manage: Better samples. Better data. Better decisions.

To Register: 270-259-3492 | [grayson.ca.uky.edu/events/measure-manage](http://grayson.ca.uky.edu/events/measure-manage)  
Grayson County Extension Office 64 Quarry Rd, Leitchfield KY 42754



**THURSDAY, OCTOBER 2, 5:30 PM**

Learn To

- Take a soil sample
- Take a forage sample
- Take samples for diagnostic testing

**THURSDAY, OCT 16, 5:30 PM**

Learn To

- Take a manure sample
- Use the Beef Systems Analyzer Tool
- Use the KY Bull Assessment Tool
- Use the UK Forage Supplement Tool

**...and apply them to your operation**

**Cooperative  
Extension Service**

Agriculture and Natural Resources  
Family and Consumer Sciences  
4-H Youth Development  
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University of Kentucky, Kentucky State University, U.S. Department of Agriculture, and Kentucky Counties, Cooperating.  
Lexington, KY 40506



**Cooperative  
Extension Service**





## 2025 KY Grazing Conference

Grayson County Extension  
Office October 30th, 2025  
7:30 am to 4:00 pm CDT.  
270-259-3492

Register at  
<https://www.eventbrite.com/e/2025-ky-grazing-conference-leitchfield-tickets-1278199893289>

2025 KY Grazing Conference West  
October 30, 2025 - Leitchfield, KY



Kentucky Master Grazer  
Educational Program



### KNOW BEFORE YOU GO!

Market days are heavily dependent on weather and produce availability. While we do our best to inform the public- please call 270-259-3492 or check the Farmers' Market Facebook page to confirm.

### OUTDOOR MARKET DATES

May 17th – October 25th  
Every Wednesday – 8AM-12PM/sellout  
Every Saturday – 8AM-12PM/sellout

### SPECIALITY DATES\*

Farmer's Market Pop Up's  
November 22, & December 20  
8 AM-12 PM





## 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, photosynthesis decreases 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). When photosynthesis is reduced, nitrate transportation to the leaves slows also. Potentially toxic nitrate concentrations can remain in the lower stalks and stems. 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. Nitrate remains high until photosynthesis resumes with new leaf growth. Resumption of normal photosynthetic rate provides the ability to utilize nitrates being translocated in the plant. However, hay, which has been cut and cured, remains a toxic hazard; nitrate concentrations do not decrease during drying. 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. Common crops in Kentucky that may accumulate nitrates include corn, wheat, sorghum-sudan hybrids, sudangrass, rye, 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 ( $\text{NO}_3^-$ ) to the highly toxic nitrite ( $\text{NO}_2^-$ ). Normally, dietary nitrate is reduced by rumen microbes from nitrate to nitrite to ammonia, which is eventually incorporated into microbial protein. Cattle consuming high-nitrate plants overwhelm the ability of the microbes to convert nitrates to true protein. Nitrite accumulates and is absorbed in large quantities, leading to poisoning. 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. The amount of nitrate that can be safely consumed in forages is approximately 45 grams of nitrate per 100 pounds of body weight. All potential sources of nitrate, including water and feed, must be considered. Surface water or water from shallow wells may contain nitrates, especially if there is run-off from fertilized land contaminating the water. Both water and forage should be analyzed to ensure that total nitrate does not exceed toxic levels. 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.

**Cause:** Nitrates, when consumed more rapidly than they can be converted in the rumen to protein, enter the bloodstream as nitrite. The absorbed nitrites oxidize the hemoglobin of red blood cells, converting it to methemoglobin. Methemoglobin is incapable of transporting oxygen, and as methemoglobin concentrations approach 80%, death occurs due to asphyxiation.



**Signs:** 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; 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. The oxidation reaction is reversible, and methemoglobin will eventually reduce back to hemoglobin. Animals generally die or recover within 24 hours. Abortions can occur in pregnant animals at any stage of gestation 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.

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

1. Animals with reduced ruminal microbial activity or have ruminal digestive upset are at a 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.
2. Nitrate fertilizer should be stored where cattle do not have access to it and accidental spills should be cleaned up promptly.
3. Animals should be provided with ample salt/mineral supplementation to prevent salt-deprived animals from seeking out nitrate fertilizers.
4. Avoid grazing 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 without environmental stress. When in doubt, test samples for nitrate before introducing cattle to the pasture.
5. Cool season grasses and small grain pastures that have been heavily fertilized with nitrogen may be high in nitrates during early spring when cool, overcast days retard plant growth. Test before grazing.
6. 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.
7. All suspected forages including silage and hay should be tested for nitrate levels. Instructions are provided in this publication – see “Sampling and Shipping of Forage Samples for Nitrate Testing”. 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.
8. 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.





If high nitrate forages must be utilized, the following suggestions will reduce the risk of poisoning:

1. Split forage feeding to twice a day. The diet should contain less than 5,000 ppm  $\text{NO}_3$  to avoid reproductive impacts. Non-pregnant animals could be fed slightly higher levels after being acclimated. Feeding low nitrate forage or hay before turning cattle on to high nitrate forages will also reduce the amount of nitrate consumed.
2. Forage with high nitrate levels can be mixed with forage known to be low in nitrate to reduce the risk from feeding.
3. Introduce the nitrate forage slowly. Give half the final amount of high-nitrate forage for the first two to three weeks. Cattle can increase their tolerance to dietary nitrates over time, as the rumen microbe population adapts to utilize the nitrates more efficiently. To aid in increasing this tolerance, the diet should be sufficient in vitamin A and trace minerals.
4. 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.
5. The best method to feed high-nitrate forage is grinding and mixing it 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.
6. Offer excessive amounts of hay, so cattle will eat leafy portions and leave the high-nitrate stems behind.
7. There is no assurance that the forage samples submitted for testing are representative, and some bales may test even higher than reported. Thus, err on the side of caution, especially when feeding pregnant cattle.
8. 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 consume high-nitrate feedstuffs.

**Treatment:** 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.

### Testing Laboratories in Kentucky

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.