

# OFF THE HOOF



Cooperative Extension Service  
University of Kentucky  
**Beef IRM Team**

**KENTUCKY BEEF CATTLE NEWSLETTER JULY 1, 2024**

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This month's newsletter includes:

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## **Timely Tips**

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

### **Spring Calving Cow Herd**

- Consider removing bulls from the cow herd by the end of the month and keep them away from the cows. A short calving season can concentrate labor during the calving season; group calves by age so that it is easier to find a convenient time to vaccinate, castrate, dehorn, etc.; and provide a more uniform group of calves at market time.
- Mid-July is a good time to deworm cattle, use a product that is effective against inhibited ostertagia. Re-implant calves which were implanted at birth if the type of implant and amount of time indicate. Calves which haven't been vaccinated for blackleg should be. Spraying or using a pour-on for flies while cattle are gathered can supplement other fly control methods. Remember to work cattle early in the morning when it is cool and handle them gently to minimize stress.
- Watch for pinkeye and treat if necessary. Minimize problems by clipping pastures, controlling face flies and providing shade. Monitor the bulls' activity and physical condition as the breeding season winds down.
- Fescue pastures tend to go dormant in July and August, so look for alternatives like warm season grasses during this period of time. Try to keep the young calves gaining weight. Go to pastures which have been cut for hay to have higher quality re-growth when it is available.
- Consider cutting warm season grass pastures for hay if reserves have not been restored yet.
- Heat stress can lead to low conception rates, low libido in bulls, and embryonic loss (abortion) between days 6 and 45 of pregnancy. Keep a close eye on your herd. Plan to diagnose your herd for pregnancy early this fall to identify open cows for future planning. Supplementation with red clover helps alleviate some of the issues with heat stress due to fescue toxicosis.

### **Fall-Calving Cow Herd**

- De-worm calves in mid-July with a product that is effective against inhibited ostertagia.
- Fall-calving cows should be dry and pregnant now. Their nutrient needs are minimal, and they can be maintained on poor pasture to avoid over fattening. Keep a good free-choice mineral mix

available at all times. You can use a lower phosphorus mineral supplement now, if you want to save a little money. These cows are regaining body condition after a long winter-feeding period.

- Get ready for fall calving and plan to have good pasture available at calving and through the breeding season.

### **Stockers**

- Sell heavier grazing cattle before rate of gain decreases or they get into a heavyweight category. This will also relieve grazing pressure as pasture growth diminishes. They can be replaced with lightweight calves after pastures recover.
- Lighter cattle which are kept on pasture need to be rotated to grass-legume or warm-season grass pastures to maintain a desirable level of performance. Re-implant these calves and deworm with a product that is effective against inhibited ostertagia.

### **General**

- Check pastures for downed wild cherry trees after storms (wilted wild cherry leaves are toxic to cattle).
- Be sure that clean water is always available, especially in hot weather. Make routine checks of the water supply. Cattle need 13 to 20 gallons of clean water in hot weather. Cattle should have access to shade.
- Maintain a weed control program in permanent pastures and continue to “spot-spray” thistle, honey locust, etc.
- Have forage analyses conducted on spring-cut hay and have large, round bales covered. Begin planning the winter feeding program now. Most of the hay was cut late due to a wet spring.
- Start soil testing pastures to determine fertilization needs for this fall.
- July is typically dry in Kentucky. Begin planning now for reduced rainfall and forage growth. If the weather dries up, you may need to begin feeding hay/supplement August-October to allow for fall stock piling of fescue.

## **Managing Nitrates and Prussic Acid in Forages**

*Dr. Chris D. Teutsch, University of Kentucky Research and Education Center at Princeton*

Nitrates can accumulate to toxic levels in commonly grown forages. This most often occurs when heavy nitrogen fertilization is followed by drought. Nitrates are taken up by the plant, but not utilized since plant growth is restricted by the drought. Any factor that slows plant growth in combination with heavy nitrogen fertilization can result in nitrate accumulation. Some plants tend to accumulate nitrates at greater rate; these include, but are not limited to commonly used summer annual grasses, corn, crabgrass, small grains, annual ryegrass, bermudagrass, Johnsongrass, tall fescue, and some annual and perennial weeds commonly found in pastures and hayfields.

In contrast to nitrates, prussic acid or hydrogen cyanide can be formed in commonly used sorghum species such as forage sorghum, sorghum-sudangrass hybrids, sudangrass, and Johnsongrass. Under normal conditions these forages contain little free cyanide. However, when freezing, drought stress, wilting, or mechanical injury damages plant tissue, an enzymatic reaction occurs and free cyanide is produced. Being aware of the factors that can result in accumulation of nitrates or the formation of

prussic acid and using alternative forages during these periods will reduce chances of livestock losses.

## Nitrates

In cattle, nitrate is converted to nitrite in the rumen, and the nitrite is absorbed into the blood stream. Nitrite interferes with the blood's ability to carry oxygen. Symptoms of nitrate poisoning include trembling, staggering, rapid and labored breathing, rapid pulse, frequent urination followed by collapse, coma, and death. The onset of symptoms and death is rapid and usually occurs within one to two hours. Most often, animals are simply found dead. In animals affected by nitrate poisoning, the blood will take on a brownish chocolate color, giving the non-pigmented skin and mucus membranes a muddy brown color.

The following practices can help to reduce nitrate accumulation in forages and manage the risk associated with feeding high nitrate forages:

- ***Split nitrogen applications.*** Applying smaller applications of nitrogen throughout the growing season will reduce the risk of nitrate accumulation in forages.
- ***Delay harvest or grazing after a drought ending rain.*** Nitrates are often the highest just after plant growth resumes. Grazing or harvesting should be delayed for 7 days after a drought ending rain.
- ***Raise cutting or grazing height.*** Nitrates tend to accumulate at higher concentrations near the base of the plant. Raising your cutting or grazing height from 2-4 inches to 6-8 inches can significantly reduce nitrate concentrations in the forage tissue that is being conserved or ingested. For corn silage and forage sorghum, raising the cutting height even more (12-16 inches) can help avoid high levels of nitrates.
- ***Test all suspect forages.*** All forages that may contain high levels of nitrates should be tested at a qualified lab. Several labs are listed at end of this article.
- ***Segregate all forages high in nitrates.*** Once identified, forages high in nitrates should be clearly marked and separated from low nitrate forages if possible.
- ***Harvest forage as silage if possible.*** Ensiling high nitrate forage can reduce nitrates by 40 to 60%. Silage should be tested before feeding to confirm nitrate levels.
- ***Nitrates are stable in hay.*** Nitrates do NOT decrease over time in dry hay. This means that you can kill livestock months or even years later. If you suspect nitrates in your hay, make sure to test it.
- ***Avoid feeding high nitrate forage to susceptible animals.*** Feeding high nitrate forage to animals that are in poor condition and under stress, or are pregnant, lactating, or sick is especially risky and should be avoided.
- ***Limit the intake of high nitrate forages.*** Guidelines for feeding high nitrate forages can be found in Table 1. The best way to feed high nitrate forages is in a total mixed ration. This reduces the animal's ability to select individual components. If feeding a total mixed ration is not possible, then limit access to the high nitrate hay in a manner that allows livestock to consume 50% or less of their total daily dry matter requirement. A high energy supplement that is balanced for the ration should be fed PRIOR to hay feeding. Simply unrolling one bale of low nitrate hay and one bale of high nitrate hay is NOT an adequate way to feed high nitrate hay.
- ***Supply free access to clean, nitrate-free water.*** In addition to clean water, make sure to provide access to high quality mineral and vitamin supplement.

Nitrate Concentration <sup>b</sup>		Forage Status	Comments
----%----	---ppm---		
0-0.25	0-2,500	SAFE	Generally considered safe.
0.25-0.5	2,500-5,000	CAUTION	Generally safe for cattle. Be cautious with pregnant and young animals when nitrate concentrations approach 5,000 ppm and dilute with other feeds.
0.5-1.0	5,000-10,000	DANGER	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.
Over 1.0	Over 10,000	TOXIC	Very dangerous; can cause acute nitrate poisoning and death in cattle. Do not feed.

<sup>a</sup>Adapted from ID-217, Forage-related Disorders in Cattle: Nitrate Poisoning.  
<sup>b</sup>Nitrate concentration is expressed as NO<sub>3</sub>. To convert these values to NO<sub>3</sub>-N multiply by 0.23.

## Prussic Acid

A potential problem with sorghum, sudangrass, sorghum-sudangrass hybrids, and naturally occurring Johnsongrass is prussic acid or cyanide poisoning. Under normal conditions these forages contain little free cyanide. However, when plant tissue is damaged by freezing, drought or mechanical injury, an enzymatic reaction occurs, and free cyanide is produced. If forage is ingested during this period, cyanide is readily absorbed into the bloodstream where it interferes with normal cellular respiration. Symptoms of cyanide poisoning are like nitrate poisoning and include labored breathing, excitement, gasping, convulsions, weakness, prostration and death. The onset of symptoms and death is very rapid, occurring in minutes to several hours. In contrast to nitrate poisoning, the blood of animals affected by cyanide poisoning is fully oxygenated and bright cherry red in color.

*Note: Pearl millet, corn, crabgrass and most other commonly used forages DO NOT form prussic acid.*

In most situations, *Sorghum* species (including Johnsongrass) pose little danger to grazing animals when properly managed. The following guidelines will help to reduce the risk of prussic acid poisoning:

- ***Avoid grazing young plants and new growth.*** Young plants or regrowth after grazing contain higher concentrations of prussic acid and should not be grazed until plants have reached a height of 20-30 inches.
- ***Avoid grazing drought stressed plants.*** Drought stressed plants should not be grazed until growth has resumed after a drought breaking rainfall (usually 7 days).
- ***Avoid grazing frosted plants.*** Plants that have been frosted should not be grazed for 7-14 days or until the leaves are dead and dried out. Early frost may only affect certain portions of field, so additional frosts may result in toxic forage in other areas of the field.
- ***Make sure hay is properly cured before baling.*** Cyanide does escape from plant tissue; therefore hay that has been properly cured is safe to feed. Properly ensiled forage is also safe to feed.
- ***Feed green chop in timely manner.*** If the green chop is allowed to wilt or heat, cyanide is released, and the forage becomes toxic.
- ***Feed good quality hay or silage BEFORE grazing questionable forages.*** Never turn hungry animals into questionable forage. Filling animals up with a good quality dry hay or silage before giving them free access to questionable forage can reduce rapid consumption of large quantities of potentially toxic forage.
- ***Use tester animals to evaluate questionable forages.*** It may be advisable to allow several lower

value animals to graze or consume questionable forage before allowing the entire herd to graze potentially toxic forage.

For more information on managing nitrates and prussic acid in forages contact your local extension office or veterinarian. Additional information about nitrate and prussic acid poisoning can be found in the following references:

Arnold, M. and M. Romano. 2022. ID-217, Forage-related Disorders in Cattle: Nitrate Poisoning. UK Cooperative Extension Service, Lexington.

Michelle Arnold and Cynthia Gaskill. 2022. ID-220, Cyanide Poisoning in Ruminants. UK Cooperative Extension Service, Lexington.

## **Animal Disease Traceability Rule Part 2: Eartags**

*Dr. Michelle Arnold, Ruminant Extension Veterinarian, University of Kentucky*

The new Animal Disease Traceability (ADT) rule, entitled “Use of Electronic Identification (EID) Eartags as Official Identification in Cattle and Bison”, was published in the Federal Register on 5/9/2024 and will be effective on 11/5/2024. This final rule, available at <https://www.regulations.gov/document/APHIS-2021-0020-2011> is an amendment to the animal disease traceability regulations already in place as of January 2013. One stipulation in the new rule requires eartags to be both visually and electronically readable to be recognized as official eartags for interstate travel for cattle and bison covered under the regulations. This final rule does not require exclusive use of eartags; the regulations continue to list eartags as one of several forms of authorized official identification, which also include tattoos and brands when accepted by State officials in the sending and receiving States. This article will address questions about eartag differences with regards to the new rule. For more in-depth information, there is a new guidance document entitled “OFFICIAL ANIMAL IDENTIFICATION NUMBER (AIN) DEVICES WITH THE “840” PREFIX”, published 5/14/2024, available at <https://www.aphis.usda.gov/media/document/64512/file> .

### **What does it mean that an official tag must be “visually and electronically readable” for interstate travel? Are the RFID “button tags” considered visually readable or will flop tags/panel tags be required?**

All tags must be readable in cattle, but USDA now has device readability standards, both electronic and visual standards, that must be met by tag manufacturers to obtain approval for official identification purposes that meet interstate travel requirements. In Version 3.0 of the ADT Device Standards, released 9/21/2023, the specifications are described in detail regarding readability:

- Electronic ID eartags are required to be visually readable for a person with 20/20 vision (arm’s length) viewing from two-and-a-half feet (30 inches). RFID button tags meet this standard, so a panel tag is not required in order to be “visual”.
- All official identification numbers must be imprinted at a minimum height of 5 mm (0.2 inches) on a bright, contrasting background. An exception may be made for small EID ear tags that do not allow the imprinting of the official identification number at 5 mm but are clearly read at the required distance.
- For 840 tags, a space must be inserted after each third digit of the animal identification number (AIN) imprinted on the tag (for example, 840 003 123 456 789).

- The font for all characters for required information imprinted on the tag must be Arial. APHIS must approve any different font.

Electronic ID eartags can also be read using an RFID reader. This reader sends a radio signal of a specific frequency to the eartag and records the number that comes back from the eartag. Once a signal is received from the reader, the eartag transmits the identity of an animal in the form of a unique 15-digit sequence of numbers. The 15-digit sequence begins with the country code (e.g., 840 for US born animals), followed by 003, then 9 unique digits. Official USDA-APHIS electronic eartags have no batteries or active transmission of information but are often categorized by the radio frequency range they use to communicate, either low (LF) or ultrahigh frequency (UHF). Low frequency tags have a shorter read range and only one tag can be read at a time. The transponders must be reliably machine read at a rate of 95 percent as cattle move by in a single file passage at 4 mph. UHF has an extended read range of up to 30 feet, faster data transfer, and is better suited to capturing load lots of cattle. UHF transponders must be reliably machine read at a rate of 95 percent at the read distance designated by the device manufacturer.

### **Why the push for both visually and electronically readable official tags?**

Reading eartags electronically does not require restraint of animals because animal identification information is captured almost instantaneously by scanning the eartag with a reader. Once the tag is scanned, the tag number may be rapidly and accurately transmitted to a connected database. Electronic databases store only data associated with an eartag number that is necessary to perform traceability of animals; no business practices or other financial or competitive information is obtained or stored. Electronic eartags help animal health officials more quickly locate the records associated with an animal during a disease trace to identify the origin of the animal. If the animal was tagged with an electronic eartag, the tag distribution records are stored in APHIS' Animal Identification Number Management System database (AIMS), which is easily accessible to animal health officials and provides the starting point for the trace. However, if visual only tags have been used, the animal usually must be restrained to allow the eartag number to be read and recorded. Often, the eartag must be cleaned before the number can be read. The eartag number is then recorded on paper or manually entered in a database and errors can occur while reading, transcribing, or entering the ear tag numbers. If the animal was tagged with a visual (non-electronic) eartag, there is no centralized tag distribution database and obtaining records often requires a lengthier search and further verification.

This final rule does not require producers or livestock markets to have electronic reading equipment or additional data management systems, because the official electronic ID tags must be readable visually as well as electronically. It is important to remember that producers should not sell, loan, or give tags they have purchased to other producers, because all 840 ID tags they have purchased are recorded as being distributed to them using the location identification system (Premise ID) used by their State. APHIS maintains an Animal Disease Traceability webpage with direct access to the Final Rule, FAQs, how to obtain free electronic ID tags, and other resources at <https://www.aphis.usda.gov/livestock-poultry-disease/traceability> .

**RFID tags were previously categorized as either “Low Frequency” (LF) or “Ultra-High Frequency” (UHF). This final rule now uses the acronym “EID” instead of “RFID” and refers to EID tags as “HDX” or “FDX”. What happened?**

The new rule refers to electronic identification (EID) tags rather than radio frequency identification (RFID) tags to recognize the possibility of other electronically readable technology that may become available in the future. Electronic eartag technology can be categorized by the way information is transferred between the tag and reader, either “Half Duplex” (HDX) or “Full Duplex” (FDX). HDX tags are heavier, they transmit information one way at a time, they are better able to transmit through interference such as metal objects, they have the strongest read range, and are slightly more expensive than FDX. FDX eartags are lighter in weight, they transmit information continuously but are more

	Half Duplex (HDX)	Full Duplex (FDX)
<b>Type</b>	Global (982) and USDA (840)	Global (982) and USDA (840)
<b>Size</b>	HDX Tag weight: 8.9 grams	FDX Tag weight: 5.6 grams
<b>Color</b>	White	Yellow
<b>Tamperproof Cap</b>	Yes - Tamperproof Ultra Cap provides ultimate security and retention	Yes - Tamperproof Ultra Cap provides ultimate security and retention
<b>Button Back Included</b>	Yes - Extended Male Button Back	Yes - Extended Male Button Back
<b>Read Range</b>	15" - 18" - HDX technology optimizes signal transmission and provides greatest possible read distance	13" - 16" - FDX technology is sufficient for capturing data, if read range is not an issue
<b>ISO Compliant</b>	Yes	Yes
<b>Matched Pair Option</b>	Yes	Yes
<b>RFID Reader</b>	All ISO compliant readers including Allflex AWR300, RS420, LPR, and Tri-Test RFID Readers	All ISO compliant readers including Allflex AWR300, RS420, LPR, and Tri-Test RFID Readers
<b>Allflex Applicator(s)</b>	Universal Tagger, UTT35, Total Tagger Plus and EID Ultra Retractable	Universal Tagger, UTT35, Total Tagger Plus and EID Ultra Retractable
<b>Comments</b>	Works well in all operations. Best and strongest read range	Works well for most operations. FDX tags are more susceptible to interference from metal and steel objects such as head gates, panels, and squeeze chutes as well as fluorescent lights.

Figure 1: A comparison of HDX and FDX tags, courtesy of Allflex. Accessed 6/6/2024 at <https://www.livestocktags.com/blogs/learning-center/allflex-electronic-id-tag-comparison>

susceptible to interference from metal objects and fluorescent lights, and they have a shorter read range. Both technologies work well and have similar qualities but have different strengths and capabilities so the choice depends on where and how it will be used (see Figure 1). Regardless of type, all electronic ID tags must be approved by USDA and meet standards for quality and performance, be tamper proof, contain a unique ID, the words “Unlawful to Remove” and display the U.S. official eartag shield. Both HDX and FDX tags follow the ISO standard and can be read by the same readers.

HDX tags talk to the reader like a 2-way radio; the reader sends out a signal then the tag replies. A half-duplex RFID reader generates short magnetic pulses that wirelessly charge a capacitor inside an HDX tag. When the charge field turns off, the tag uses the stored power to send the tag number back to the reader without interference from the reader. HDX uses Frequency Shift Keying (FM) which has better noise immunity and allows larger, simpler antennas. Since the charge field is

pulsed, HDX readers require less power. Half Duplex (HDX) tags are (generally) white in color. They are better suited to transmit through metal interference such as metal and steel objects. Typical read range on HDX tags ranges from 15" - 18".

FDX is like a phone conversation: as soon as the tag receives the reader signal both tag and reader talk simultaneously. A full duplex RFID reader generates a continuous magnetic field which powers the tag to respond immediately. Tags repeat their message while powered by the field, up to 30 times per second. FDX tags can be made very small and thin due to their simple construction of a coil, ferrite rod and a chip. Very small tags have a short read range and so are primarily used for hand scanning. FDX uses Amplitude Shift Keying (AM) and is susceptible to atmospheric noise which limits antenna sizes. Full Duplex (FDX) are (generally) yellow in color and are good when the read range is short (13" - 16"). FDX tags are more susceptible to interference from metal and steel objects such as head gates, panels, and squeeze chutes as well as fluorescent lights.

### What is the difference in cost between HDX and FDX tags?

The cost of EID official identification tags varies by tag type and quantity purchased. USDA performed a market analysis in 2022 and found the cost per FDX tag ranged from \$2.00 for large quantities (5,000 more) to \$3.45 for smaller quantities (20 tags). The advertised retail price per HDX tag in August 2022 ranged from \$2.32 for large quantities (5,000 or more) to \$3.65 for small quantities (20 tags).

Depending on the tag type, many vendors that handle official ID tags offer volume discounts and free shipping for large orders.

**When shopping for USDA-approved tags, manufacturers offer “visual tags”, “RFID tags” (FDX and HDX), and “RFID with visual matched (paired) sets”. Are “visual” tags with no electronic or RFID component still official?**

The minimum identification standard in cattle is the visual 840 tag. For visual-only tags, the entire official identification number must be imprinted on the portion of the tag inside the animal’s ear. This will suffice *if the cattle never leave the state of origin within their lifetime*, however, interstate travel requires a tag with electronic capabilities. For electronic ID tags, the entire 15-digit official identification number beginning with 840 must be imprinted on the portion of the tag containing the transponder (see Figure 2). Be aware that manufacturers still sell tags beginning with 900 numbers used for in-herd data use only and cannot be used as Official ID.

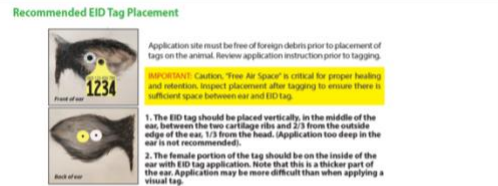


Figure 2: Commerce Compliant ADT (Allflex). Accessed 6/6/2024 at [https://www.allflex.global/na/wp-content/uploads/sites/7/2022/04/Commerce-Compliant-ADT\\_ADP003\\_R6.pdf](https://www.allflex.global/na/wp-content/uploads/sites/7/2022/04/Commerce-Compliant-ADT_ADP003_R6.pdf)

**Many of the new tags display a data matrix; what comes up when scanned with a cell phone?**

The 2D Data Matrix that conforms with the ECC200 Data Matrix protocol must be imprinted on the portion of the tag that contains the transponder in a square approximately 5mm x 5mm and should be a two-dimensional representation of the official animal number imprinted on the tag. Readability (percent of data matrix read) on new tags being shipped from the manufacturing plant must be at 100 percent when read with a camera-based image reader (bar code reader).

**Where should official electronic ID tags be placed?**



Accurate records of tags received and applied are required to be kept for a **minimum of 5 years** from the time the animal moves off farm, changes ownership, or dies. This record should include:

- Date and listing of tag numbers received
- Date tag was applied with description of animal (sex, breed, other ID, distinguishing marks, color)
- Date the animal moved off farm with movement documents if needed
- Date animal sold along with name, address, and contact information of the buyer

Figure 3: Recommended Application Instructions for Allflex RFID Tags. Accessed 6/6/2024 at <https://www.cattletags.com/blogs/learning-center/how-to-apply-allflex-eid-ear-tags>

The EID tag may be placed in either ear although the left ear is preferred. The tag should be placed in the middle of the ear, approximately 1/4 to 1/3 the distance from the head to the outside tip of the ear and between the two cartilage ribs (see Figure 3). Make sure and record the date the tag was applied and a description of the animal. Accurate records of tags received and applied are required to be kept for a minimum of 5 years after the animal has been sold or dies.

**Has anything changed with this new rule regarding which cattle are required to have “official identification” when moving interstate?**

No changes have been made with this new rule. For cattle, the following animal classes must be identified with official ID eartags, both visually and electronically readable, beginning November 5, 2024, when moving interstate:

- All sexually intact cattle and bison 18 months of age or over.



Figure 4: For those producers nostalgic for metal tags, Shearwell Data Ltd is the first company in the world to offer an official metal EID tag for cattle, that combines the durability of a metal tag with the reliability and RFID capabilities of an EID tag. <https://shearwell.com/met-tag-metal-cattle-rfid-tag-official>



- Cattle and bison of any age used for rodeo, shows, exhibition, and recreational events.
- All dairy cattle, regardless of age or sex or current use.
- All offspring of dairy cattle, including Beef on Dairy cross bred cattle.

**The requirement for individual identification does not include beef feeder cattle,** nor any cattle or bison moving directly to slaughter.