OFF THE HOOF

Martin-Gatton College of Agriculture, Food and Environment

Cooperative Extension Service
University of Kentucky
Beef IRM Team

KENTUCKY BEEF CATTLE NEWSLETTER SEPTEMBER 3, 2024

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

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

Spring-Calving Cows

- Bulls should have been removed from the cow herd by now! They should be pastured away from the cow herd with a good fence and allowed to regain lost weight and condition. It is a good time to evaluate physical condition, especially feet and legs. Bulls can be given medical attention and still have plenty of time to recover, e.g., corns, abscesses, split hooves, etc. Don't keep trying to get open spring cows bred – move them to fall calving or sell them when they wean this year's calf. If you don't have a bull pen and want to tighten up the calving season, remove the bull and sell him. Plan on purchasing a new bull next spring. If that is not feasible, then schedule your veterinarian to pregnancy diagnose the herd and cull cows that will calve late.
- Repair and improve corrals for fall working and weaning. Consider having an area to wean calves and retain ownership for postweaning feeding rather than selling "green", lightweight calves. Plan to participate in CPH-45 feeder calf sales in your area.
- Limited creep feeding can prepare calves for the weaning process since they can become accustomed to eating dry feed. This will especially benefit those calves which you are going to keep for a short postweaning period – like the CPH-45 program. It's time to start planning the marketing of this year's calf crop.
- Begin evaluating heifer calves for herd replacements – or culling. Each time you put them through the chute you can evaluate them for several traits, especially disposition. Consider keeping the older, heavier heifers. They will reach puberty before the onset of the breeding season and have higher conception rates.
- This has generally been a reasonably good year for pastures, but many parts of the state have experienced some drought. Evaluate moisture condition and consider stockpiling some fescue pastures. It's not too late to apply nitrogen for stockpiling fescue if moisture conditions are suitable.
- Stresses associated with weaning can be minimized by spreading-out other activities commonly associated with weaning – like vaccinations, deworming and, perhaps, castration and dehorning (which should have already been done!). Therefore, this month is a good time to do a "preweaning" working of cows and calves.
- When planning the preweaning working, consult with your veterinarian for advice on animal health products and procedures. One procedure that can be done now is pregnancy checking cows. Early pregnancy diagnosis will allow time to make culling decisions prior to weaning time. Feeding non-productive cows through the winter is a costly venture so pregnancy diagnosis is a business decision for most producers.

Fall-Calving Cows

- Fall-calving should start this month. Get your eartags ready. Cows should be moved to a clean,

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accessible pasture and be watched closely. Tag calves soon after they are born and record dam ID and calf birthdate, etc. Castration is less stressful when performed on young animals and calves which are intended for feeders can be implanted now, too.

- If you haven't started calving quite yet, then it's time to get ready. Be sure you have the following:
    - record book
    - eartags for identification
    - iodine solution for newborn calf's navel
    - calf puller
    - castration equipment
- Watch for those calves which may come early and be prepared to care for them.
- Be on guard for predators – especially black vultures.
- Move cows to best quality fall pasture after calving. Stockpiled fescue should be available to these cows in November-December to meet their nutritional needs for milking and rebreeding.
- Start planning now for the breeding season. If using AI, order supplies, plan matings and order semen now.

Stockers

- Calves to be backgrounded through the winter can be purchased soon. A good source is Kentucky preconditioned (CPH-45) calves which are immunized and have been preweaned and "boostered".
- Plan your receiving program. Weanling calves undergo a great deal of stress associated with weaning, hauling, marketing, and wide fluctuations in environmental temperature at this time of year. Plan a program which avoids stale cattle, get calves consuming water and high-quality feed rapidly. Guard against respiratory diseases and other health problems.

General

- Keep a good mineral mix available at all times. The UK Beef IRM Basic Cow-Calf mineral is a good choice.
- Do not give up on fly control in late summer, especially if fly numbers are greater than about 50 flies per animal. You can use a different "type" of spray or pour-on to kill any resistant flies at the end of fly season.
- Avoid working cattle when temperatures are extremely high – especially those grazing high-endophyte fescue. If cattle must be handled, do so in the early morning.
- Provide shade and water! Cattle will need shade during the hot part of the day. Check water supply frequently – as much as 20 gallons may be required by high producing cows in very hot weather.
- Plan the winter-feeding program. Take forage samples of hay you will feed this winter. Request protein and TDN analysis so that supplemental feed needs may be estimated. Don't wait until you run out of feed in February to purchase extra feed. Plan to minimize hay storage and feeding losses because feed is too expensive to waste.
- If you have adequate moisture, stockpiling fescue might be a viable option. Nitrogen application to fescue pastures can be made now and allow them to grow and accumulate until November, or when other sources of grazing have been used up. To make best use of this pasture, put fall-calvers, thin spring-calvers, or stockers on this pasture and strip graze.
- Don't graze sorghum or sudan pastures between the first frost and a definite killing frost because of the danger of prussic acid poisoning. Johnsongrass in stalk fields can also be a problem after a light frost. Grazing can resume after the sorghum-type grasses have undergone a killing frost and dried up.

Variable Rate Frost Seeding Evaluated at UK Research and Education Center

Dr. Chris D. Teutsch, Caroline Roper, & Brittany Hendrix, UKREC at Princeton

Clover and other pasture legumes are important parts of sustainable grassland ecosystems. Legumes form a symbiotic relationship with Rhizobium bacteria. The Rhizobium bacteria fix nitrogen from the air into a plant available form and share it with the legume. In return the legume plant provides the bacteria with a place to live (nodules on the root system) and an energy source (sugar from photosynthesis). Nitrogen fixation is the second most important biochemical process on earth following photosynthesis. In addition to nitrogen fixation, legumes improve pasture quality and animal performance, and new research from our USDA Ag Research Unit in Lexington shows that a compound found in red clover may help to alleviate tall fescue toxicosis.

Figure 1. Pastures often contain rough and undulating terrain that makes maintaining a constant speed difficult.

Frost seeding is the process of broadcasting clover or other legume seed onto existing pastures or hayfields in late winter and allowing freezing and thawing cycles to incorporate the seed into the soil (Teutsch et al., 2021). This method is most commonly used with red and white clover as well as annual lespedeza, all of which are legumes and an essential part of sustainable grassland ecosystems (Whitehead, 2000).

Variable rate seeding (VRS) technology allows seeding rate to be adjusted in real time as field conditions or ground speed changes (Šarauskis et al., 2022). This could be especially useful in pastures where rough terrain makes maintaining a consistent speed difficult (Figure 1). This technology could improve the uniformity of seed dispersal resulting in more uniform stands of clover. The objective of this study was to evaluate the impact of variable seeding technology on actual seeding rate as ground speed was varied.

Figure 2. A UTV with the APV seeder mounted in the bed was driven on a paved course that was 1,000 ft in length.

Variable Rate Seeder Evaluation

This evaluation was conducted at the University of Kentucky Research and Education in Princeton, KY. The experimental design was a random complete block with four replications. An UTV (Kawasaki Mule, 4010) was driven on a paved course that was 1,000 ft in length (Figure 2). An APV broadcast seeder, model MDD 100 M1 (APV America Inc., Pottsboro, TX), was mounted in the bed of the UTV. The seeder was calibrated for a seeding rate of 10 lb/A at 6 mph. The treatments consisted of driving the course at 3, 6, and 9 miles per hour (mph) with either variable or constant seeding rates. A Raven CR7 GPS unit (Raven Applied Technology, Sioux Falls, SD) was used to monitor speed. The actual speed was also calculated by timing each run & converting into mph. At the beginning of each treatment, 15 pounds of wheat seed was weighed and added to the seeder. Variable or constant seeding rate was then selected based on the treatment. The course was then driven at the speed designated for that treatment. At the end of the course the seed metering mechanism was disengaged, and the remaining seed was removed with a shop vacuum and weighed (Figures 3 and 4). Data were analyzed for statistical differences.

Figure 3. Sweeping remaining seed out to determine the seeding rate by difference.

Figure 4. Weighing remaining seed to determine the seeding rate by difference.

Results

Actual speeds were not different for the constant and variable seeding rate treatments for a given speed treatment (Figure 5). In addition, actual speeds for the variable or constant seeding rates were very close to the target speeds of 3, 6, and 9 mph (Figure 5). This indicates that the UTV operators were driving both accurately and consistently in terms of speed.

As expected, when the seeding rate remained constant and the speed was varied, actual seeding rates were different (Figure 6). Increasing speed from 6 to 9 mph resulted in a 30% reduction in the seeding rate. In contrast, slowing ground speed from 6 to 3 mph doubled the seeding rate. When the variable seeding rate option was used, the seeding rate remained relatively constant (<10% variation) regardless of changes in ground speed (Figure 6).

Summary and Implications

Using variable rate seeding technology in low input pastoral systems could have a measurable impact on pounds of seed applied per acre, especially in uneven terrain where a constant speed is difficult to maintain. Overall, using variable seeding rate technology could reduce seeding costs for livestock producers and result in more uniform stands of clover. However, the cost of this technology may limit adoption. The price of the seeder used in the study was $5,800. This is a substantial increase when compared to less automated seeders that cost $500 to $1,000. One potential path to adoption is for Extension offices and Soil and Water Conservations Districts to purchase seeders and make them available as part of already existing equipment share/rental programs. More research is needed on-farms to better document the economic impact of utilizing variable seeding rate technology in low input pastoral systems.

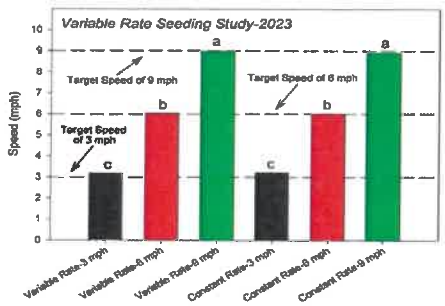

Figure 5. Actual speed in miles per hour for the 3, 6, and 9 mph treatments

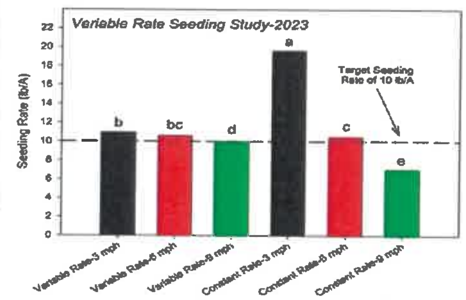

Figure 6. Actual seeding rate in pounds per acre as impacted by speed and the use of variable seeding rate option.

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US Hay Production Expected to Increase Again in 2024

Dr. Kenny Burdine, University of Kentucky

While row crop estimates get the most attention, USDA's August Crop Production report also provides an initial estimate of US hay production and includes projections for individual states. Hay production and stocks have major implications for winter feed supply and winter feed costs for cattle operations. Widespread drought in 2022 led to low hay production levels and left very limited hay supplies coming into 2023. This can be seen in the May 1 Hay Stocks figure below. Note that hay stocks in the US on May 1 of last year were at their lowest levels since 2013. A sharp increase can also be seen in 2024 as the larger 2023 crop helped to replenish hay supplies.

Last week's report suggested increases in production were likely at the national level for both "Alfalfa and Alfalfa Mixes", as well as "All Other Hay" in 2024. These are the only two categories of hay for which estimates are made by USDA-NASS. In this article, I will focus on the All Other Hay (non-Alfalfa) category as that is typically more reflective of hay that is fed to beef cows over the winter. At the national level, non-Alfalfa hay production was estimated to be up by 8.1% from 2023, largely due to higher expected yields across the country. While this is encouraging for hay supply in aggregate, hay markets are very localized since transportation costs tend to be very high. This is especially true for large roll bales, which are most often fed by cow-calf operators.

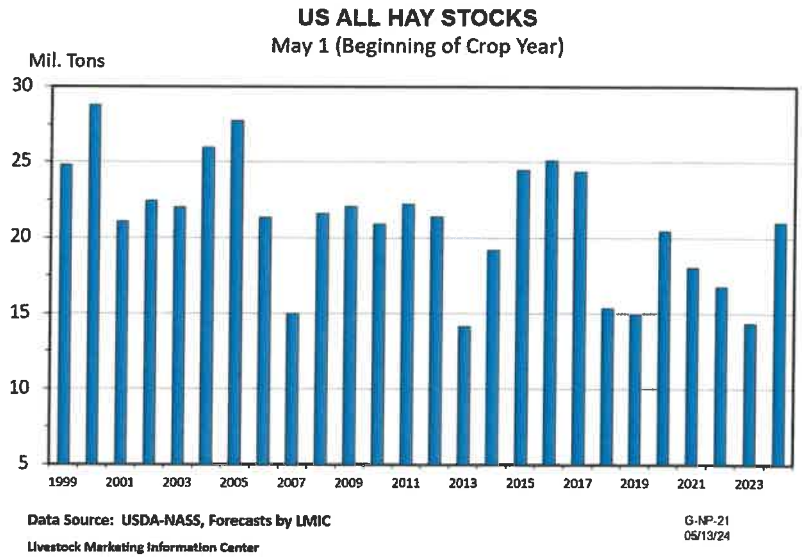
As I have done the last few years, I selected some state estimates from the August report to provide some regional perspective on likely hay production levels. As can be seen in the table below, non-Alfalfa hay production is expected to be higher in most states. Texas and Missouri especially stand out and it is worth noting that they are projected to be the two states with the highest production levels nationwide. Oklahoma stands out to the downside, but that decrease is driven by a sizeable drop in expected harvested acres. Hay production was projected higher in Kentucky, Arkansas, and Mississippi, with Tennessee (down 10.2%) being the outlier in the Southeast.

While a lot can still change with respect to hay production this fall, the August Crop Production report does paint a picture of increased hay supplies in many areas. In addition to hay production, fall grazing prospects will also impact how much hay will be needed in the upcoming winter. It is also important to understand that these production estimates say nothing about hay quality, which is another important element of the discussion. I like to examine hay production estimates and do think it provides some general perspective, but I would also reiterate how different hay availability can be across the country. It's never too early to think about winter hay needs and make plans to source additional hay, if needed.

Non-Alfalfa Hay Production Estimates in Selected States and US (2023 and 2024)

State	2023 Production (1,000 tons)	Est. 2024 Production (1,000 tons)	Change from 2023 to 2024
Arkansas	2,204	2,684	+21.8%
Kansas	2,781	3,028	+8.9%
Kentucky	4,158	4,466	+7.4%
Mississippi*	1,102	1,276	+15.8%
Missouri	4,380	5,805	+32.5%
Oklahoma	6,630	5,270	-20.5%
Tennessee	3,740	3,360	-10.2%
Texas	8,280	10,780	+30.2%
United States	68,853	74,450	+8.1%

*Mississippi Estimates include Alfalfa and Alfalfa Mixtures
Source: USDA-NASS August 2024 Crop Production Report



Should you be Concerned about Smut in your Corn?

Dr. Jeff Lehmkuhler, PhD, PAS, Extension Professor University of Kentucky

As the silage harvest season has started some concerns about smut have come in from the counties. Corn infected with *Ustilago maydis* or common smut can be unsightly for certain. The level of infection varies dramatically both on individual ears as well as across fields. It has been reported that smut may affect 5-40% of the ear, reducing grain yields. Timing of infection can influence the severity of infection and development of the ears on a plant. Therefore, the combination of a high plant infection rate combined with a large degree of grain loss on ears can result in significant grain reductions.

The smut or galls themselves are not known to produce toxins harmful to cattle. However, the development of the galls on the ears may loosen or open the husks allowing the growth of other mycotoxin forming organisms. A 4-year study reported that corn kernels from ears infected with smut, on average, had 45-fold higher aflatoxin levels than kernels from ears not having smut. When looking at the galls from smut infected ears, the kernels had a 99-fold higher aflatoxin level than the gall itself suggesting that the gall itself was relatively free of aflatoxin. The study also found a 5.2-fold higher level of fumonisin in kernels from smutted ears compared to kernels from ears with no smut. Thus, smut itself poses little concern directly towards animal health, but the fact that infection can result in secondary infections by mycotoxin forming organisms poses increased risk and testing for mycotoxins in silage is recommended.

Nutritionally, smut infection will reduce the grain component of corn silage. The loss of grain will reduce the digestibility, starch content and overall energy available to cattle. The reduced grain content will result in reduced passage rates potentially reducing intakes and performance. Be sure to adjust the diets for the reduced grain content by testing silage for starch content and adding corn or other energy sources back into the diet to maintain target performance.

Lungworms and Acute Respiratory Distress Syndrome in Cattle

Dr. Michelle Arnold, DVM, MPH UK Ruminant Extension Veterinarian

"Acute Respiratory Distress Syndrome" or "ARDS" is a rapid and dramatic onset of severe breathing difficulty due to lack of oxygen transfer across the air sacs (alveoli) in the lungs to the bloodstream. Affected cattle exhibit open-mouth breathing with the head and neck extended, nostrils dilated, a sway-back appearance, foam coming from the mouth, an open-shouldered stance, and sometimes become aggressive (see Figure 1). Breathing is shallow and rapid (35-75 breaths per minute) and may have a loud grunt associated with exhalation. Temperature is typically normal or mildly elevated depending on severity of the condition. In extreme cases, air pockets can be felt under the skin on the upper portions of the neck, shoulders and back (subcutaneous crepitation). Mild exercise is enough to cause the animal to collapse and die. Generally, there is no coughing nor signs of infection such as fever or depression. Severely affected animals frequently die within 2-3 days after initial onset of clinical signs.


Figure 1: Adult cow displaying signs of Acute Respiratory Distress Syndrome (ARDS) due to lungworm larvae migration. Photo courtesy of Thompson Farms.

There are a variety of "agents" that will directly or indirectly damage the linings of the alveoli and blood vessels in the lungs of cattle, preventing gas exchange and initiating acute respiratory distress. The most common triggers include: 1) 3-methyl indole (3-MI), a toxin produced when cattle are moved from dry to lush pastures containing increased L-tryptophan levels; 2) the ketones from consuming the weed perilla mint; 3) certain respiratory viruses, especially bovine respiratory syncytial virus (BRSV); 4) lungworm infections; and 5) sepsis from bacterial infection. Although most producers recognize the symptoms of respiratory disease in cattle, lungworms are usually left off the list of possible causes. This is because respiratory disease due to lungworms is both uncommon and unpredictable, yet it can be devastating in a herd. Lungworm disease outbreaks are most often seen in grazing calves and yearlings exposed to the parasite for the first time and are therefore completely unprotected. But occasionally outbreaks are seen in adult cattle if their immunity to lungworms has waned from lack of exposure or pasture infectivity is high. The lungworm life cycle (Figure 2) begins when cattle consume infective L_3 larvae in the pasture, typically during wet summers or when grazing in swampy areas. After ingestion, larvae penetrate through the intestine, mature to the L_4 stage in the mesenteric lymph nodes, then migrate to the lungs and break into the alveoli, all within a week. These larvae continue to migrate to the airways and mature into adult worms inside the bronchi and trachea (Figure 3). From day 26-60 after infection (called the "patent phase"), the mature worms deposit eggs in the airways, where they hatch and the L_1 larvae ascend the trachea by causing the animal to cough, called "parasitic bronchitis". The larvae are then swallowed followed by excretion in the feces. On pasture, the L_1 larvae mature to L_2 then L_3 in the fecal pat, spread to grass and are ingested to begin the cycle anew. The severity and duration of clinical signs depend on the number of larvae and how quickly they are consumed. ARDS develops from a hypersensitivity (allergic reaction) to the larvae migrating through the lungs that causes an overreaction by the immune system that damages the lung tissues. Proteases and enzymes are also released by the larvae that directly damage lung tissue as they travel. Within an affected group of cattle, symptoms of lungworm infection may range from a mild, intermittent

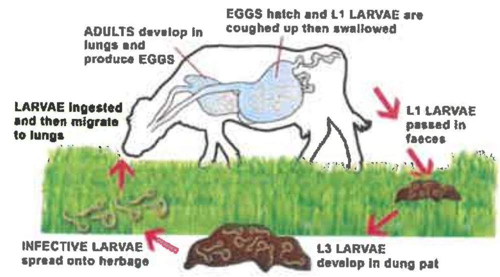


Figure 2: Lungworm life cycle. Accessed from "COWS – www.cattleparasites.org.uk"


Figure 3: Adult lungworms within the trachea, found on necropsy. Photo Courtesy of UKVDL Photo Archive

cough and weight loss up to severe difficulty breathing and death. Most animals gradually recover although it may take weeks to months. At the cellular level (visible through a microscope), this very distinct pattern of lung injury is called "diffuse alveolar damage" or "DAD" and is the most frequent microscopic finding in animals exhibiting acute respiratory distress. The old name of "Atypical Interstitial Pneumonia" or "AIP" has fallen out of favor due to confusion arising from a similar human disease with the same acronym.

Diagnosis of this type of pneumonia resulting from DAD, known as "interstitial pneumonia", is easily performed at necropsy because it is a very different pattern from the typical shipping fever pneumonia. "Shipping Fever" or "Bovine Respiratory Disease (BRD)" causes a "bronchopneumonia" that occurs at the junction of the air sacs and the airways leading to them. On postmortem examination, damaged areas of shipping fever lungs are firm, red-tan, and mostly present in the cranioventral lung lobe. With interstitial pneumonia, on the other hand, damage is to the "interstitium" or supporting structures of the lungs including the lining of the air sacs, the lining of the blood vessels and the septa (divisions) between the lung lobes. These structures become filled with fluid and white blood cells, making the lungs feel wet, heavy, and meaty with a firm, rubbery texture and they do not collapse when the chest cavity is opened. The lungs themselves are often emphysematous or over-inflated. The entire lung may be diffusely involved or affected areas are dark red to purple and may be interspersed with normal looking lobules, creating a "patchwork" or "checkerboard" appearance. Cattle often develop secondary bacterial bronchopneumonia after the initial lung injury. Treatment decisions by the veterinarian will depend upon determining the etiology of the clinical signs but, if treatment is attempted, must be handled very cautiously. A dart gun can be used to avoid having to move the animal to a treatment facility as these animals die quickly when exercised. Treatment recommendations typically include diuretics and anti-inflammatory medications to facilitate breathing and antibiotics to prevent secondary bacterial infections.

The take-home message to remember is not all pneumonia cases in cattle are truly "shipping fever" that should be treated with antibiotics. As mentioned previously, lung damage can be from ingesting certain toxins such as when grazing cattle are moved from dry to lush pasture and develop "fog fever", one of the first respiratory diseases known to cause ARDS. Lush pasture contains the amino acid L-tryptophan that can be metabolized by the rumen microbes to 3-methyl indole (3-MI). The 3-MI is absorbed into the bloodstream, transported to the lungs and metabolized to a new compound 3-methyleneindolenine (3MEIN) that causes widespread cellular damage to the lung. Recent studies have questioned the finding that tryptophan levels in pastures associated with fog fever are exceptionally higher than unaffected pastures. Instead, it could be the abrupt change from grazing the poor-quality dry forage to lush pasture that increases the number of rumen microflora capable of metabolizing tryptophan to 3-MI. *Brassicas* including kale, rape, and green turnip tops are rich sources of tryptophan that can be converted in the rumen to 3-MI and potentially cause ARDS. Cattle mildly affected with fog fever show dramatic improvement within a few days with recovery spanning approximately 10 days. Severely affected animals often die but survivors can have long-term consequences of chronic emphysema or heart failure. Feeding an ionophore such as monensin or lasalocid has been shown to reduce the conversion of tryptophan to 3-MI in the rumen by as much as 90% but the ionophore must be present in the rumen at the time of exposure. Other potential causes of lung damage in animals due to ingested toxins include 4-ipomeanol from consuming *Fusarium solani*-contaminated moldy sweet potatoes, perilla ketone from grazing the weed purple mint, ingestion of the herbicide Paraquat, and ingestion of stinkwood (*Zieria arborescens*). Early involvement with your veterinarian is key to a proper diagnosis and appropriate treatment of any respiratory disorder in cattle. Establish a "daylight relationship" with your veterinarian now so he/she will know who you are when you call with an emergency.