University of Kentucky
College of Agriculture, Food and Environment
Cooperative Extension Service

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University of Kentucky

Beef IRM Team

OFF THE HOOF

KENTUCKY BEEF CATTLE NEWSLETTER JANUARY 12, 2024

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:

Timely Tips

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

Spring Calving Cow Herd

- Study the performance of last year's calf crop and plan for improvement. Plan your breeding program and consider a better herd sire(s). Select herd sires which will allow you to meet your goals and be willing to pay for superior animals.
- Consider vaccinating the cows to help prevent calf scours.
- Keep replacement heifers gaining to increase the probability of puberty occurring before the start of the spring breeding season.
- Start cows on the high magnesium mineral supplement soon. Consider protein supplementation if hay is less than 10% crude protein. If cows are thin, begin energy (grain) supplementation now. Cows must reach a body condition score of 5 before calving to maximize their opportunity for reproductive success. Supplementation now allows adequate time for cows to calving in adequate body condition score.
- Get ready for the calving season! See that all equipment and materials are ready, including obstetrical equipment, record forms or booklets, eartags, scales for obtaining birthweights, etc. Prepare a calving area where assistance can be provided easily if needed. Purchase ear tags for calves and number them ahead of time if possible. Plan for enough labor to watch/assist during the calving period.
- Move early calving heifers and cows to pastures that are relatively small and easily accessible to facilities in case calving assistance is needed. Keep them in good condition but don't overfeed them at this time. Increase their nutrient intake after they calve.

Fall Calving Cow Herd

- Provide clean windbreaks and shelter for young calves.
- Breeding season continues. Keep fall calving cows on accumulated pasture as long as possible, then start feeding hay/grain/supplement. Don't let these cows lose body condition!
- Catch up on castrating, dehorning and implanting.

General

- Feed hay in areas where mud is less of a problem. Consider preparing a feeding area with gravel over geotextile fabric or maybe a concrete feeding pad. Bale grazing is an option for producers to help control mud while spreading nutrients across pastures.
- Increase feed as the temperature drops, especially when the weather is extremely cold and damp. When temperature drops to 15°F, cattle need access to windbreaks.
- Provide water at all times. Cattle need 5 to 15 gallons per head daily even in the coldest weather. Be aware of frozen pond hazards. Keep ice "broken" so that cattle won't walk out on the pond trying to get water. Automatic waterers, even the “frost-free” or “energy-free” waterers can freeze up in extremely cold weather. Watch closely.
- Consider renovating and improving pastures with legumes, especially if they have poor stands of grass or if they contain high levels of the fescue endophyte. Purchase seed and get equipment ready this month.

Buying Feeders? How “Histophilus somni” or “Somnus” is Changing the Game.

Dr. Michelle Arnold, UK Veterinary Diagnostic Laboratory

Most KY-born calves leave the farm and enter marketing channels, usually through auction markets, into stocker and backgrounding operations. Not surprisingly, late fall and winter are difficult seasons to keep feeder calves alive in KY due to major health challenges. Weather is just one of many risk factors that play a role in Bovine Respiratory Disease (BRD) or “Shipping Fever” development. Most auction market calves are sold as “high risk calves”, meaning they are lightweight (≤ 500#), young (estimated 6-8 months), unweaned (or abruptly weaned on the trailer on the way to the yards), unknown health history, never or poorly vaccinated and most are trace mineral (copper and selenium) deficient. At the auction barn, they are mixed or “commingled” with similar weight calves from multiple farms then sold, allowing respiratory “bugs” to spread prior to delivery to the stocker/backgrounder facility or feedlot. After arrival and a brief rest period, these calves are usually processed through the chute and receive multiple vaccines, deworming, are implanted and the bulls are castrated. These calves will typically break with respiratory disease within the first 2 weeks after arrival and require at least one antibiotic treatment. It is estimated that 60-70% of calves marketed through sale barns are considered at high risk for disease.

Over the last few years, the bacterium *Histophilus somni (*formerly known as *Haemophilus somnus)* has emerged as the major bacterial pathogen responsible for the rapid development of disease and death in feeder operations. While *Mannheimia haemolytica*, often referred to as “Pasteurella”, has traditionally been the most important bacterial species in “shipping fever” bronchopneumonia, *Histophilus somni* (HS) can cause similar disease symptoms but is proving very difficult to treat and control with traditional methods. Unlike typical BRD outbreaks that peak at 14 days after arrival to the stocker or backgrounding facility, “histophilosis” cases start at 3-4 weeks on feed. “Somnus” is normal flora in the upper respiratory tract and survives on mucosal surfaces in “biofilms”, a jelly-like matrix that serves as protection from antibiotics and the host immune system. Viruses and stress can trigger bacteria to leave the biofilm and enter the lungs. From there it can travel via the bloodstream to joints, other organs (especially the heart), and to the brain. The disease can happen anytime in any season, but most clinical cases occur between October and January. Previously, disease due to “Somnus” was found primarily in

Northwestern and Midwestern states in the USA and Canada but cases are now being diagnosed throughout the US, including Kentucky. Most comprehensive studies have been conducted in Canada where histophilosis accounts for an estimated 40% of the death loss in feedlots.

The *Histophilus somni* Disease Complex (HSDC) is a term used to describe the disease when "Somnus" reaches the lungs and extends systemically to the brain, heart and joints. Components of the HSDC include:

1. Rapidly Fatal Pneumonia: Some animals with "Somnus" pneumonia are simply found dead due to lung damage called "severe fibrinous pleuritis". This is a common finding in western Canadian feedlots and is seen 30-90 days after arrival. The lungs are usually the only organ affected and are found covered in a thick sheet of fibrin, a tough protein substance composed of long fibrous threads, while the lungs themselves are collapsed underneath.

2. Bronchopneumonia: Some calves with "Somnus" develop typical signs of BRD including depression, off feed, cough, excessive nasal discharge and difficult or rapid breathing. Respiratory signs with fever of 104°F or above confirms the diagnosis of BRD but detection of the bacteria and/or viruses involved must be done at a diagnostic laboratory. Treatment is often very difficult and unrewarding in the field when "Somnus" is involved because it can hide within neutrophils and macrophages that normally destroy bacteria. In the laboratory, the "Somnus" bacterium is usually susceptible to many antibiotics.

3. Heart Muscle damage: "Somnus" can cause a "necrotizing myocarditis" when it localizes in the muscles of the left ventricle of the heart. Death can be rapid with no previous signs (similar to a heart attack) or chronic heart failure leads to "poor doers".

4. Thrombotic meningoencephalitis-myelitis or "TME": This is a disease of older calves and yearlings that affects the brain. During an outbreak, individual cases occur sporadically in separate pens in a feed yard. Signs include depression, fever, blindness, down and death; this can look like signs seen with polioencephalomalacia or "brainers". Treatment with antibiotics is most often ineffective.

5. Other Manifestations: Arthritis with joint swelling, laryngitis and middle ear infections with drainage from the ear canals may also be seen, similar to *Mycoplasma bovis* infections.

Diagnosis of *Histophilus somni* disease in a live calf is challenging because it is present in the upper airways of both healthy and diseased calves so swabs taken from deep in the nose will not necessarily tell the story of what is causing disease in the lungs and elsewhere. "Somnus" is difficult to grow in the laboratory, especially if the calf was treated with antibiotics, so the PCR assay is strongly recommended in addition to culture for detection. Mixed lung infections with other disease- causing bacteria such as *Mannheimia haemolytica* and *Pasteurella multocida* can easily overgrow *Histophilus somni* on a culture plate so the identification may be missed when relying on traditional bacterial culture methods alone. Culture is still necessary to identify which antibiotics should be effective. Unfortunately, the transfer of genetic elements that causes multi-drug antimicrobial resistance to develop in *Mannheimia haemolytica* is also now found to be operating in *Histophilus somni*.

As a buyer, what can you do when it seems like the odds are stacked against good health? First and foremost, remember that respiratory disease is no longer concentrated within the first two weeks on feed but outbreaks may develop throughout the first month or more. "Metaphylaxis", the practice of mass-medicating all individual calves in a group with a long-acting antibiotic on arrival, is highly effective for reducing *early* BRD morbidity and mortality in high-risk calves by up to 50%. After one antibiotic is used up front for metaphylaxis, treatment protocols typically consist of a 2nd antibiotic for first pulls, a 3rd antibiotic for the next treatment and possibly a 4th antibiotic for a final treatment before calling the calf a "chronic" and treatment is stopped. Research has shown that at each retreatment, the BRD bacteria become more resistant to multiple antibiotics and response rates decline. To make these antibiotics effectively last throughout the first month on feed, it is important to understand and observe the antibiotic's "post-treatment interval" or PTI. This interval is the time when an effective antibiotic is already in the calf and the treated animals are not eligible for retreatment until the end of the interval. All the upper tier antibiotics, including Draxxin®, Excede®, Baytril®, Zactran®, Zuprevo®, Micotil®, Advocin® and Nuflor®, easily have a 5 to 7-day PTI. During the PTI, the antibiotic suppresses and delays disease onset while the calves are acclimating to their new environment. Instead of focusing on BRD detection and pulling new cases during the PTI, the focus is shifted to adapting the cattle to their new environment, feed, social structure, and daily activity. Conversely, by shortening the treatment interval and becoming overly aggressive with retreatments, the antibiotics are essentially used up by the time *Histophilus somni* shows up.

Prevention of histophilosis is difficult. This is not a disease complex managed through a needle. There are older "Somnus" vaccines available but they are not considered effective under field conditions except they may help lessen the severity of the brain form of disease. Biosecurity and biocontainment practices must be followed. Stress plays a major role in disease through immunosuppression so excellent nutrition and management are critical. Control should begin with minimizing well-recognized factors predisposing to BRD:

1. Make your arrival pens comfortable. In an article by Chad Engle from the US Meat Animal Research Center about transitioning calves to the feed yard, he wrote, "I like to think of our feed yards as five-star hotels. Once these calves step into our "hotel", they should be greeted by knowledgeable handlers, fresh feed, clean waterers and clean pens. We never put new calves into pens that do not have fresh hay and ration in the feed bunks. It is our job in the feed yard to show those calves that the feed yard is the best place on earth for them to be." Keep the feeding area clean and free of standing liquid manure. Good sanitation, especially regularly cleaning and sanitizing waterers, feed bunks and working chutes is imperative not only at arrival but throughout the backgrounding period
2. Give them some bunk space! Transitioning to confinement and learning to eat from a bunk means smaller calves don't get as much access to feed. Extra bunk space is often overlooked but incredibly important. In some studies, simply providing plenty of space for all calves to eat without having to fight for a position at the bunk has proved as effective as treatment with antibiotics for prevention of disease. Furthermore, don't make calves clean the bunk before you offer additional feed. Moldy, musty, hot, wet, manure- or urine-contaminated feed is not going to be eaten and should be promptly removed. Water contaminated with manure will not be consumed, either. Calves that don't eat and drink will get sick, guaranteed.

3. Don’t push calves on feed too fast. These calves are transitioning from a diet of predominately grass or forage to a new diet of grain offered in a bunk and hay. Too much grain too quickly results in subacute acidosis which throws them off feed. Once again, calves that don’t eat will get sick, guaranteed.
4. Get trace minerals in them. Cattle with extremely low blood concentrations of the trace elements selenium and copper have difficulty fighting any disease challenge. An injectable trace mineral supplement (such as Multimin 90®) is a short-term solution to boost the copper and selenium levels during the initial arrival period. However, it is very important to quickly get calves consuming an energy and protein dense diet with vitamins and minerals added to meet their high nutritional needs.
5. PI test calves as soon as possible. A BVD-PI calf is born with the BVD virus and sheds virus everywhere it goes for its entire life. Identification and removal of PI calves is critical to stop the spread of BVD virus to other calves and avoid a BRD wreck. The BVD virus attacks the immune system where it destroys the production of disease-fighting white blood cells causing severe immunosuppression. Secondly, the virus works cooperatively with other respiratory viruses to make them more aggressive and deadly. This combination attack results in substantial respiratory disease and death loss in the stocker/backgrounder industry.
6. Do not pen new arrivals next to calves that were purchased last week! That load purchased last week is likely rapidly spreading bacteria and viruses from calf to calf and these bugs can easily transfer across the fence into the noses of new arrivals. Try to load your farm with calves as quickly as possible rather than buy a load every week for 4 weeks and combine them in same area. This is a sure-fire recipe for disaster.
7. Keep feed bunks and watering troughs clean. Feed bunks and watering troughs are known areas for disease transmission. Keep sick cattle, especially chronic pneumonia calves that haven’t responded to treatment, away from healthy calves and manage their feed and water separately. Do not allow nose-to-nose contact between sick pens and healthy pens. Calves with swollen joints should be placed in pens with deep bedding, plenty of room and easy access to feed and water.
8. Consider delaying or minimizing vaccination for respiratory disease and delaying castration of bulls until through the transition period. Vaccination is probably the most misunderstood practice utilized in feeder calf management. Antibodies need to be in place before exposure to disease-causing organisms, similar to car insurance must be purchased before a car wreck to be of any use. Many producers have unrealistic expectations that full protection from respiratory disease is in place once a vaccine is given on arrival. Mounting an immune response (making antibodies) is not “free” but takes energy and protein resources at a time when calves have limited feed intake. If you have concerns that newly purchased calves are at high risk to get sick, it has been proven that delaying vaccination with a modified live (MLV) 5-way respiratory virus vaccine for 1-2 or even 3 weeks can be done without affecting the morbidity and mortality rate. In other words, waiting until they are stronger will not result in more sickness and death than you would have had anyway. As a matter of fact, it may help keep them eating and drinking better without the

vaccine-induced fever. Same with castration; delaying until through the transition along with using pain medication at the time of castration (such as Banamine Pour-On®) will lessen the negative immune system effects.

9. Buy preconditioned calves when possible. Buying preconditioned calves that have been weaned for at least 45 days and vaccinated for respiratory diseases prior to weaning (especially BVD) and dewormed will help decrease, but does not eliminate, the potential for sickness and death loss.

   In summary, incoming high-risk feeder calves require extra vigilance to avoid excessive sickness and death loss. Excellent nutrition and management are critical to reducing the stress in new arrivals. Due to *Histophilus somni* emerging as a primary pathogen in BRD, there is a need to preserve antibiotic efficacy throughout a longer arrival period of 30 days instead of 14. By observing a 5-7 day post-treatment interval after administration of an antibiotic, less resistance will develop and this allows the immune system to do its job most effectively. Consult your veterinarian for treatment protocols best suited for your operation.

Can we Compete?

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

Do you know what it costs per pound of beef produced from your farm? How much does it cost to maintain a cow annually? How has the increase in inputs impacted your beef operations profitability? The old saying of you can only manage what you measure still holds. One cannot control the market price. The commodity markets have trends in which prices ebb and flow. Most of us are familiar with the cattle cycle. The cattle cycle historically was a 10-year period between the peaks or valleys of cattle inventory and subsequent prices as a function of macroeconomics. This cycle can be seen in Figure 1 from USDA ERS. The impact of continued drought, land prices, aging farmers, and other factors have resulted in the US Beef Cow inventory being at levels similar to those of the mid 1960's. This bodes well for market prices over the next couple of years as demand for beef holds steady.

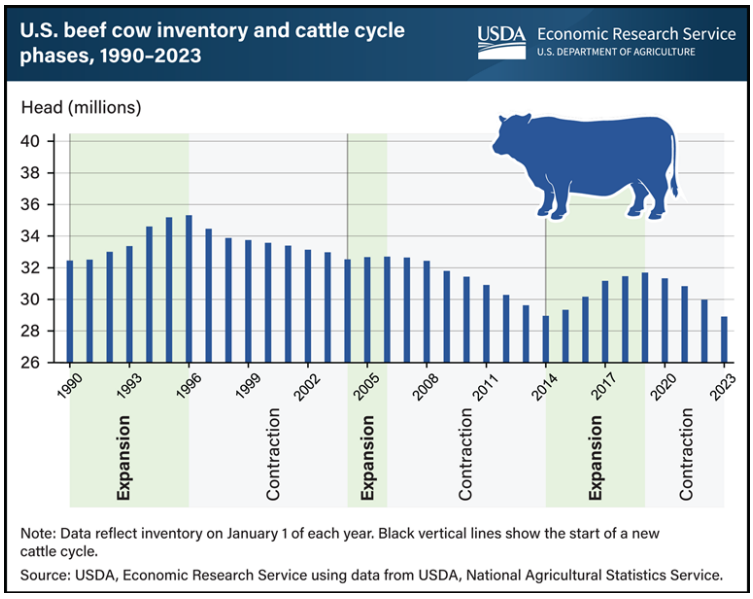
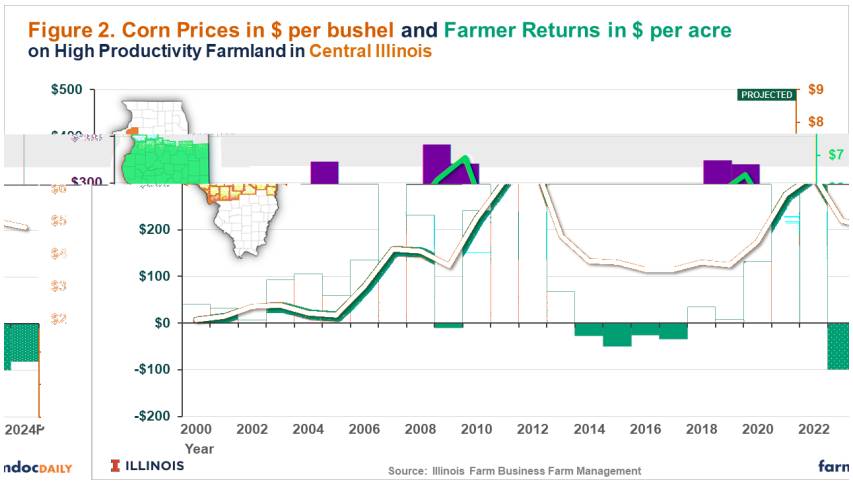


Figure 1. U.S. beef cow inventory and cattle cycle as reported by USDA ERS.

I started my professional career during the early 2000's. At this time, I was pondering in my mind whether beef cattle systems could compete with grain production. Corn prices were $2.05 to $2.46 per bushel. Figure 2 illustrates the price per bushel and return per acre from corn production for central Illinois as an example. The corn belt area had corn yields that averaged 120-165 bushels per acre for state averages. A gross value of production of 160 bushels at $2.25/bushel would be about $350/acre. I



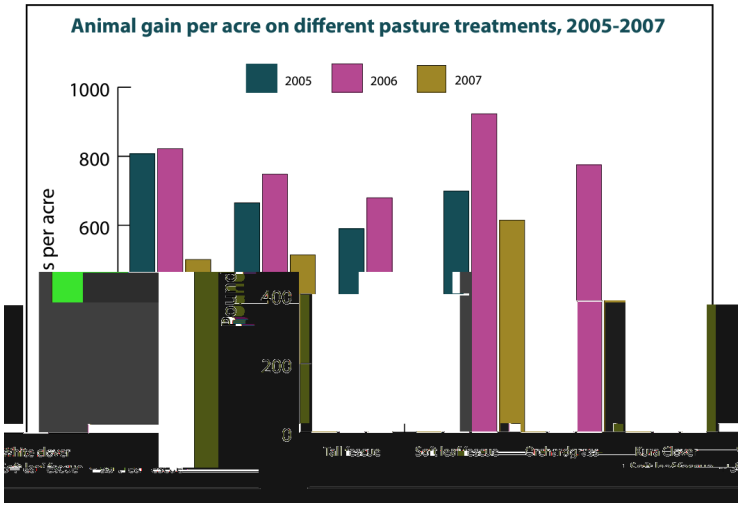
wondered if converting cropland to pasture would be economically viable; the return per acre was less than $50/acre from grain. Look at the chart closely for recent years and ponder if marginal land is profitable for grain. I had deduced that if beef production per acre could be near 1,000 pounds, the beef system could compete economically with grain production. Much of this was based on the economic conditions. Heavy feeder cattle were selling for $70-$80/cwt while light weights were near $110/cwt. Value of gain was near $0.50 so 700 pounds of gain per acre would gross $350 per acre. I was accounting for a bit of market fluctuations plus 1,000 pounds of beef gain per acre was a lofty goal to shoot for in a northern grazing season of about 180 days.

Some quick math means one would need just over 5 pounds of gain daily per acre to achieve the **1,000 pounds of gain per acre** mark. This would require a stocking density of roughly two animals per acre that would gain 2.5 pounds/day grazing along with no grain inputs. Putting 450-pound calves out in the spring and pulling them ~ 200 days later weighing 950. An average weight of 700 pounds from start of the grazing season to the end could be used to estimate forage production required. Assuming a dry matter intake of 2.5% of body weight, 1400 pounds of animal weight per acre, recall two animals per acre, would be 3.5 tons of forage consumed. If one assumes a 60% forage utilization in a managed grazing system, then forage production would need to be roughly 11,700 pounds or just under six tons of dry matter per acre.

This is where reality began to challenge theory. I knew that we had alfalfa yields that were in the 6-7 tons per acre range. I also knew that forage production would not be linear over the growing season with more grass production coming in the spring and fall. From a scientific perspective, we used a put-and-take system to adjust stocking density based on available forage. We used endophyte-free tall fescue or orchardgrass as the cool-season grass with or without either white or kura clover. We also were studying gains of Holstein steers in comparison to beef steers and heifers back at this time.

Can we compete with corn production on high quality soil and achieve the gain per acre needed to financially compete? With regards to forage production, I would argue that soil moisture or rather precipitation received combined with temperature has more of an impact on grass growth than our corn hybrids today. In other words, researchers through breeding and selection have developed corn hybrids that are quite productive under marginal precipitation. Corn handles higher temperatures better than the cool-season perennial grass species that dominate the pastures in our region. In addition, animals subjected to heat stress are not going to achieve maximal performance. Internal parasites also can pose a greater detrimental impact on gains when stocking rates are higher and must be managed.

So how did we fair? It took us a couple seasons to convert the fields and get decent stands for grazing. Our results are shown in Figure 3. This three-year study began in 2005 and we never quite achieved the



1,000-pound target for any of the forage systems we were studying. My colleague, Dr. Ken Albrecht, had achieved 1,000 pound/acre at the Lancaster station grazing kura clover-grass mixture. They removed heavy animals and replaced them with lighter animals while we kept the same animals the full season. However, we did hit the 700+ pound per acre mark in several systems over a few years. The effect of drought can be seen in 2007 and the reason for such gain per acre. Do you know what your beef production per acre is in your stocker or cow-calf system? If we assume three acres to support a cow-calf pair and have an adjusted weaning weight of 450 pounds, then it is 150 pounds per acre. If a steer is grazing 0.75 acres for the season and gaining 1.5 pounds per day over 240 days (8 months), the gain per acre is 480 pounds. I also want to note that our beef cattle systems are also not going to be utilizing the most fertile soils either and there will be limits of production that can be achieved.

So, what's the point? I was unsuccessful at reaching 1,000 pounds of beef gain per acre, but land availability is decreasing while land prices are increasing. How many of us think as grain producers in product production per unit of land mass like bushels per acre or pounds of beef produced per acre? As the beef industry continues to be berated about greenhouse gas emissions, we can chase a lot of technology. However, let's not overlook the tools we currently have available to us for reducing inefficiencies in the production system. For cow-calf production, pounds of calf weaned per cow exposed is a key factor in profitability but also system efficiency. Changes in forage systems or slight improvements in forage systems can yield improvements in production. Yet, we don't even have to make changes in the forage system, just improving our management of the forages currently in the fields can have a positive impact. I have mentioned this before and will reiterate that managed grazing is recognized as a climate smart agricultural practice. Use of growth promoting implants can increase daily gains by 0.1-0.2 of a pound per day. Use of vaccines to keep cattle healthy and reducing abortion losses is a simple technology to improve efficiency. Spend the next few weeks before spring thinking about what small changes in your production system can be made to improve your production efficiency and profitability.

Tips to Stretch Short Hay Supplies

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

Below are a few tips to consider stretching limited hay supplies. For additional information contact your local Extension agent. It is recommended to consult with your feed nutritionist or County ANR Agent before making drastic changes in your feeding program.

1) Inventory hay – know how much hay you available; weigh a few bales to get an average weight or estimate the weights based on available information from Extension publications.

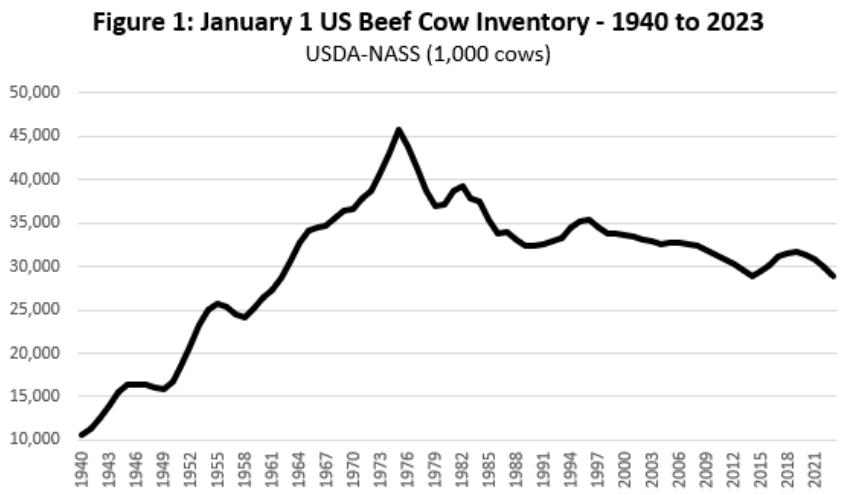
2) Minimize storage losses – keep hay off the ground on a surface that will allow water to drain away; keep bales covered or stored inside a barn; if bale grazing limit the number of bales placed in the field to provide 2-4 weeks of feeding to reduce weathering losses.
3) Reduce feeding loss – consider minimizing feeding losses; using hay rings with skirts / metal on the bottom, tapered ring designs, chains to suspend bales, or cone inserts to keep hay inside the feeder has been proven to reduce hay feeding losses compared to hay rings with openings at the bottom; using an electrified temporary poly-wire placed down the center of unrolled hay will reduce losses from cows laying on the hay, trampling it into the mud, and defecating on the hay; feeding processed hay into a bunk or large industrial tire reduces waste compared to feeding processed hay on the ground.
4) Cull – consider selling less productive females, open cows, and cows with structural/functional issues to reduce the number you must over winter; consider selling the bull as the market may provide the opportunity to sell a mature bull and replace him with a younger bull next spring.
5) Limit time access to hay – research has shown dry cows in mid-gestation can be maintained on good quality hay when they have restricted access time to only 6-8 hours a day; the hay savings comes from less waste as feeding behavior is altered; all cows must be able to access hay at any given time; this is not recommended young or thin cows, lactating cows or growing animals.
6) Substitute hay with grain – calories and protein can be provided from supplements; grain/commodity mixes can be used to replace hay; cows can be maintained on a low hay diet by using grain supplementation that balances the nutrient supply and animal requirements; consult a nutritionist before making extreme feeding changes.
7) Deworm young animals – animals with an internal parasite burden will have reduced efficiency.
8) Feed an ionophore – if grain supplementation will be used, consider adding an ionophore to increase the energy efficiency of the feed consumed. Consult your nutritionist to discuss inclusion rates and developing a supplement program. Previous work has shown that feeding 200 mg of monensin allowed cows to maintain body condition on 10-15% less hay.

Reviewing 2023 and Looking Ahead to 2024

Dr. Kenny Burdine, Extension Professor, Livestock Marketing, University of Kentucky and Dr. James Mitchell, Assistant Professor, University of Arkansas

The U.S. cowherd reached a 60-year low in 2023. Some of this decline is driven by efficiency in the beef industry. We produce more with less. As such, it would be misleading to compare today to 60 years ago. It still does speak to how significant the recent declines in beef cow numbers have been. For a more recent comparison, the 2023 cowherd is slightly smaller than in 2014, a year fondly remembered by most in the cattle business. Expansion resulting from those 2014 / 2015 price levels continued until 2019, and the cowherd has been getting smaller since then. Figure 1 below shows beef cow inventories from 1940 to 2023.

2020 was set to be the high-water mark for U.S. beef production. While production increased slightly in 2020, COVID backlogs pushed some of that production into 2021. Then, widespread drought led to significant increases in female slaughter in 2022, which resulted in another year-over-year increase. That brought us to 2023, which ended up being the first year-over-year decrease in beef production in eight years.



Data on cow slaughter and the share of heifers on feed both imply another year of declining inventories. Nationally, there is no doubt this cowherd got even smaller during 2023. Weather and hay supply has been an issue in some areas, but we also think we have to consider the impact that input costs and high interest rates have on the cost of expanding one's cowherd. At some point, expansion will occur, but farmers are not at that point yet. All this is to say that the 2024 calf crop will be smaller than the 2023 calf crop, and the feeder cattle supply will continue to shrink. Certainly, numerous things impact markets, but we expect calf prices to be stronger in the spring of 2024 than in the summer of 2023.

It is hard to see beef cow numbers increasing until 2025 at the earliest. So, cow-calf operators should get relatively strong calf prices for a few years. Some may choose to expand during this time, but we always like to point out that there are other ways to capitalize on a solid calf market. Investing in facilities, genetics, grazing systems, etc. has the potential to lower costs and/or increase efficiency. At the same time, paying down debt and/or building up working capital can put a farm in a better financial position for the future. The point is that each cow-calf operation should take a long-term view when they make decisions and know that what makes sense for one operation may not make sense for another.