COOPERATIVE EXTENSION SERVICE
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OFF THE HOOF

Kentucky Beef Newsletter December 2018

Published Monthly by Dr. Les Anderson, Beef Extension Specialist, Department of Animal & Food Science, University of Kentucky

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Time to Roll Up the Sleeves

Dr. Les Anderson, Extension Professor, University of Kentucky

Unfortunately, the beef industry sits in the middle of a downturn in the market. When the market is low and margins get slimmer, pressure is on cattlemen to get more efficient in their production. Efficiency is a word that is thrown around in the beef industry but what does efficient production look like?

The Merriam-Webster dictionary defines efficient operation as "effective operation as measured by a comparison of production with costs (as in energy, time, and money)". Interesting. Unfortunately, in the commercial beef cow-calf industry, we don't spend enough time discussing or thinking about being an efficient operation.

Efficient beef cow-calf operations control the calving season. Having a short calving season establishes the base for efficient production allowing producers to implement their health, nutrition, and marketing programs more easily. Research from Oklahoma State University and Texas A&M University (Parker et al., 2004) has shown that longer calving seasons are associated with lower production (pounds of calf weaned per cow) and higher costs of production (4.7 cents higher per cwt of calf per day). These data were collected on 394 ranches from the Southwest and indicated that year-round calving systems weaned 45.82 fewer pounds of calf per cow per year at an additional cost of $13.63 per hundredweight.

Tom Troxel at the University of Arkansas described several factors impacting the productivity and profitability of uncontrolled versus controlled calving. First, more weight is weaned. Pregnancy rates are the same but calf death loss is much less when calving is controlled. Also, weaning weight increases because calves are older at weaning on average so weaning weight per cow exposed (reproductive efficiency) is also higher. Calves were healthier when born from a controlled calving season most likely because sound health programs are easier to implement. Also, it costs less to feed a cow in a controlled calving season likely because more effectively meet cow nutrient requirements. Finally, market value was higher because more calves could be marketed in larger lots.

So, let's roll up our sleeves and figure out how to convert from a year-round to a 75-day controlled calving season. Decide when is most profitable for you to calve; spring or fall. Work with your veterinarian to assess the reproductive status of your herd. When did they calve? Are they currently pregnant and when will then

calve next? Once you know the current status of your herd, you can plan. Most plans start with either building a pen for the bull or selling the bull. If you don't want to manage a bull separately, consider purchasing and then reselling a bull when the breeding season is concluded. This sounds ridiculous but the costs of pregnancy aren't much different. Next figure out what you are going to do with each cow. Some may need to be culled and some will need held open for a while. All cows need to be subjected to estrous synchronization before exposing them to a bull.

Getting the calving in your herd under control can be a little tough at first. An increase in productivity and profitability will follow. So, if your calving season is out of hand, roll up your sleeves, evaluate your cow herd, make a plan, and get started toward higher margins.

Timely Tips

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

Spring Calving Herd

- Be sure that weaned heifer calves are on a feeding program which will enable them be at about 65% of their mature weight before the start of the breeding season. Rations should be balanced to achieve gains sufficient to get heifers from their current weight to that "target" weight.
- Body condition is important, plan an adequate winter program for cows to be at least body condition score 5 (carrying enough flesh to cover the ribs) before the calving and breeding season. This will help them to breed early in the spring. Thin cows should be fed to regain body condition prior to winter. Don't let cows lose weight/condition. Supplementation will most likely be needed. Find low cost supplemental feeds to meet the nutrient needs of cattle.
- Divide the herd into groups for winter feeding --
  - -weaned heifer calves
  - -first-calf heifers, second-calvers and thin mature cows
  - -the remainder of the dry cows which are in good body condition
  - -herd sires
- Begin feeding the lowest quality forage to dry cows which are in good condition during early winter and save the best hay for calving time or for weaned calves.
- Order and number ear tags for next year's calf crop this winter. It is also a good time to catch up on freeze branding and replacing lost ear tags.

Fall Calving Herd

- Get breeding supplies together, if using estrous synchronization and/or A.I.
- Have Breeding Soundness Evaluation (BSE) performed on bulls (even if you used them this spring).
- The fall breeding season starts. Breeding can best be accomplished on stockpiled fescue pasture; otherwise, cows with calves should be fed 25-30 pounds of good quality hay or its equivalent. Supplement with grain, if needed, and minimize hay waste. DON'T ALLOW THESE COWS TO LOSE BODY CONDITION PRIOR TO OR DURING THE BREEDING SEASON. It is easy to wait too long to start winter feeding. Don't do it unless you have stockpiled fescue.
- Nutrition level of cows during the first 30 days after conception is critical. Pay attention.
- Observe performance of bulls during breeding season. Watch cows for return to estrus, if you see several in heat, try to determine the cause and consider changing bulls.

General

- Complete soil testing pasture to check for fertility and pH.
- Consider putting down geotextile fabric and covering with gravel in feeding areas before you begin hay

feeding to minimize waste of expensive hay. Or, perhaps, construct concrete feeding pads for winter feeding areas.

- Monitor body condition and increase feed, if needed, for all classes of cattle.

Moldy Feed and the Potential Effects on Cattle

Michelle Arnold, DVM (Ruminant Extension Veterinarian, UKVDL)

Record-setting rainfall in 2018 has resulted in moldy hay and feed throughout the Commonwealth. Many questions regarding the safety of these feedstuffs and how to test them have come to the UK Veterinary Diagnostic Laboratory (UKVDL) as producers begin to feed these moldy products. While mycotoxins (mold poisons) are the main concern, molds themselves can adversely affect health and productivity of cattle. Ingestion of moldy feed or hay can potentially cause mycotic (fungal) abortion, respiratory effects, decreased feed consumption and rate of gain, and digestive problems. Additionally, molds can have effects on humans that handle the moldy feed. A wide variety of mycotoxins, not all of which can be tested for, can be produced in moldy feeds and hay under the right conditions, and ingestion of sufficient amounts of various mycotoxins can result in a large array of clinical effects. Testing is recommended but proper sample collection is crucial as samples must be representative of the whole field, cutting or batch. Although there is no foolproof approach to avoiding health effects, a practical approach involves testing suspect feeds in the ration, avoiding moldy feed if possible, and dilute with clean feed to minimize effects.

The presence of considerable mold in hay is a fairly common occurrence but when is too much mold a problem? Several laboratories have the ability to run mold spore counts (reported in mold spore count per gram) to help quantify the extent of mold present. Recommendations from Penn State Extension (https://extension.psu.edu/mold-and-mycotoxin-problems-in-livestock-feeding) regarding feed risks with various mold counts are presented in Table 1. Generally, moldy hay is less palatable and digestible, resulting in less intake and lower performance. More serious health effects include the potential for fungal abortions and respiratory problems. Fungal or mycotic abortions usually occur in the last trimester of gestation and are directly related to consumption of molds which enter the blood stream and infect the placenta and fetus. An allergic respiratory disease known as "hypersensitivity pneumonitis" or "bovine farmer's lung" is caused by exposure to the dust of moldy hay and grain. The disease is characterized by groups of cattle exhibiting coughing, rapid or difficult breathing, and weight loss but there are very mild or no fevers present and no response to antibiotic therapy. Humans who handle exceptionally moldy hay may also develop a type of allergic reaction called "farmer's lung".

Table 1. Feeding Risks[a] at Various Mold Spore Counts[b].

Mold Spore Count per Gram	Feeding Risks and Cautions
Air-dried[c]	
Under 500,000	Relatively low count
1/2 to 1 million	Relatively safe
1 to 2 million	Discount energy (x 0.95) Feed with caution
2 to 3 million	Closely observe animals and performance Discount energy (x 0.95)
3 to 5 million	Dilute with other feeds Discount energy (x 0.95) Observe closely
Over 5 million	Discontinue feeding

[a]Risks refer primarily to effects of mold per se without regard to possible mycotoxin content. Depressed digestibility, feed intakes, and performance may occur from a high mold content without mycotoxins present. Harmful mycotoxins may be present even when there is little or no obvious mold content.
[b]Mold spore counts sometimes may underestimate degree of mold present, especially in feeds that have been ensiled for some weeks. Observe and record relative amounts of mold present.
[c]Dry feeds such as grains, concentrates, and hay at a usual 85 to 93% dry matter content. Know the dry matter content before submitting samples and find out on what basis counts are reported. Adjust as received counts to a 90% dry matter or air-dried basis, as follows: 90% DM count = As received count ÷ (% DM as decimal ÷ 0.90) Example for corn with 70% DM and a spore count of 1.1 million as received: 90% DM count = 1,100,000 ÷ (0.7 ÷ 0.9) = 1,100,000 ÷ 0.778 = 1,413,882.

Although molds are present in the environment virtually at all times, when they grow in the correct temperature and humidity on the right substrate, they can grow and produce a "toxin" or poison. Mycotoxins are naturally occurring compounds produced by fungi growing on plants in the field or during storage periods. While drought conditions generally lead to an increased risk of aflatoxin in grains, wet conditions tend to favor the production of fumonisin. In the right environment, mycotoxins can be generated fairly rapidly in the field or in storage but suspect molds do not always produce them. Most mycotoxins can remain stable for years in feeds, and many survive ensiling and food processing. They can be concentrated in cereal by-products including distillers coproducts.

Aflatoxins can occur before harvest on starchy cereal crops (corn, cottonseed, and peanuts) or after harvest while in storage. Strains of *Aspergillus flavus* mainly produce aflatoxin B1, which is considered the most toxic and cancer-causing of the aflatoxins. Many governments regulate the allowable concentrations of aflatoxins in animal feeds, human foods, and fluid milk. The FDA limits the amount of aflatoxin that can be found in lactating dairy cow feed to 20 ppb, for non-lactating, breeding beef cattle is 100 ppb while feed for feedlot cattle may contain up to 300 ppb. Aflatoxin M_1 is the major excretion product in urine and milk and is the one most often monitored for exposure. Aflatoxin M1 is legally limited to 0.5 ppb in milk.

The clinical signs of aflatoxicosis are somewhat vague and become more pronounced at higher dietary levels (>500 ppb) and/or prolonged periods of time exposed to the contaminated feed. All animals are susceptible to aflatoxins, but the sensitivity varies between species. Young animals and monogastrics (pigs, horses) are at higher risk for problems. Signs in cattle include:

1. Decreased performance-
    a. Reduced appetite, reduced feed efficiency, reduced weight gain
    b. Reduced milk production and potential for illegal milk residues in dairy
2. Signs of Liver Damage-
    a. Increased hepatic (liver) enzymes and bilirubin on serum chemistries
    b. Prolonged clotting times (hemorrhage/epistaxis or nose bleeds)
    c. Icterus (yellowing of mucous membranes)
    d. Neurologic signs including depression, lethargy, staggering, circling, recumbency (down)
3. Reduced immune competence-
    a. Vaccine failure or poor antibiotic response
    b. Decreased cell-mediated immunity
4. Abortion
    a. May cross the placenta and cause damage to fetal tissue
5. Death
    a. Extremely high levels of aflatoxin B1 (>1000 ppb) may cause sudden or acute neurologic signs such as circling, depression, staggering, recumbency and death due to severe liver and brain damage.

Veterinarians and nutritionists must consider all sources of aflatoxins in rations and evaluate commodity storage conditions on the farm. It is important to sample the final as-fed ration to determine the total level of aflatoxin the animal is consuming. Sampling is best performed when feed is moving (for example, from the grain bin to feeding) to allow multiple samples to be taken along the line. No specific treatment is available for aflatoxicosis beyond quickly removing the contaminated ration and replacing with an uncontaminated feed. Providing optimum dietary protein, vitamins, and trace elements may aid recovery, although some affected animals may not recover. Numerous products such as bentonite are marketed to sequester or bind mycotoxins and reduce absorption from an animal's gastrointestinal tract, although in the United States these agents can only be sold as anticaking or free-flow agents. The FDA has not licensed any product for use as a mycotoxin binder in animal feeds and extra-label use of feed additives is prohibited.

Other mycotoxins of concern in cattle are those produced by the *Fusarium* species of mold and include

deoxynivalenol (DON or vomitoxin), zearalanone, and fumonisins. Ruminants are generally resistant to many of the negative effects of these mycotoxins because of their ability to degrade these compounds with the bacteria and protozoa found within the rumen. However, in large enough quantities, serious effects may occur. DON is restricted by the FDA to 5 ppm or less in the final ration of dairy cattle over 4 months of age, and 10 ppm in the final feed for beef cattle over 4 months of age. The primary clinical sign with DON is feed refusal but a drop in milk production, diarrhea, and immune system alterations may be noted. Zearalanone is associated with hyperestrogenism, enlarged genitalia and infertility although the effects in cattle are not fully understood. No FDA guidelines have been established for tolerable zearalenone concentrations in finished feed for ruminants. The University of Missouri at Columbia and North Dakota State University suggest limiting the level of zearalenone to <2-4 ppm in dairy cows and <5-10 ppm in beef cattle. Fumonisin B1 and B2 are mycotoxins cattle are more tolerant of than many other species. The FDA does have established tolerance levels of total fumonisin levels in finished feeds of 30 ppm for ruminants over 3 months old and fed for slaughter, 15 ppm in ruminant breeding stock including lactating dairy cows, and 5 ppm for ruminants less than 3 months of age. Feeding large quantities has resulted in decreased feed intake, decreased milk production, and some mild liver lesions. FDA regulations concerning the various mycotoxins are rather inconsistent, with some tolerances established only for grains and grain by-products but not for the final feed, and others established for the final total feed. Also, some tolerances are reported on an 88% dry matter basis, while others on a full dry matter basis.

Bear in mind when sampling feeds that human exposure to high levels of mycotoxins - aflatoxin in particular – in grains and other crops can result in serious health problems. Any potentially contaminated grains or feeds should be handled with protective gear such as gloves, dust masks, and coveralls. Once the feed is tested, producers are advised to:

1. Keep the mycotoxin level as low as possible;
2. Keep the mycotoxin level under the regulatory action level for the given species and stage of production as aflatoxin residues can occur in multiple animal products from animals exposed to excessive amounts. Residues are especially important in milk and organ tissues, but can also be present in meat.
3. Remember if multiple mycotoxins are present in a feed, their adverse effects may be additive.

Aflatoxin B1, ppb	ND	ND
Aflatoxin B2, ppb	ND	ND
Aflatoxin G1, ppb	ND	ND
Aflatoxin G2, ppb	ND	ND
3-Acetyl DON, ppm	ND	ND
15-Acetyl DON, ppm	ND	ND
Vomitoxin, ppm	ND	ND
T-2, ppm	ND	ND
Zearalenone, ppm	ND	ND
Horse DE, Mcal/Lb	.75	.83
Mold count, cfu/g	5300000	
MORE ->		

Figure 2: Example of laboratory result on grass hay analyzed for mold and mycotoxins. "ND" is not detected.

Proper sample collection is crucial for proper interpretation of results. Collect a number of smaller samples to form a large composite sample that is representative of the field, cutting, or batch. If different regions of the field were treated differently, then separate composite samples should be submitted for each of the different regions. At least a pound of total composite sample should be submitted. The sample represents a large amount of feed so it is critical that the sample is representative of the whole. More sample is always better than too

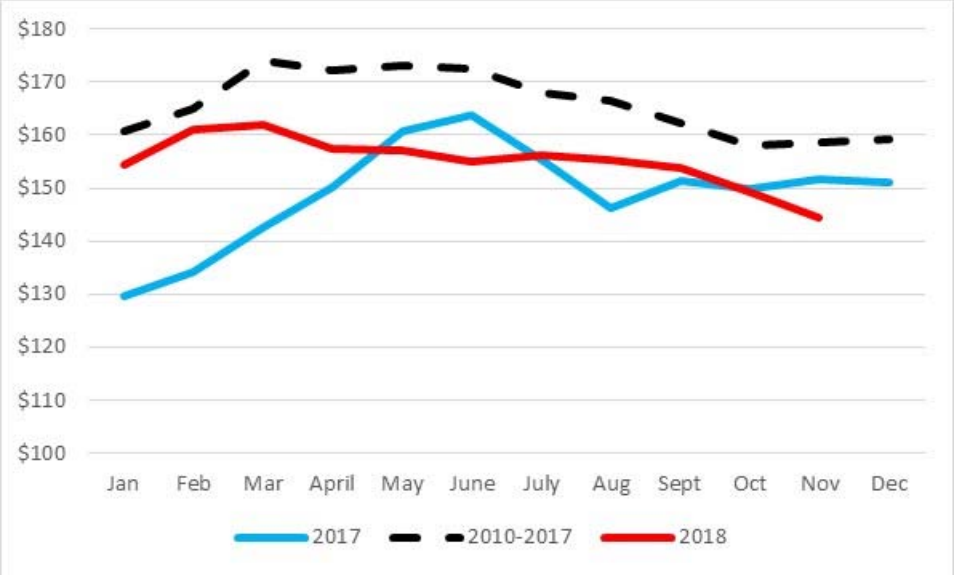
little, so when in doubt, collect more. Fungal growth could continue during storage increasing mycotoxin levels over time so retesting may be necessary. Be sure to mark each bag legibly with forage/sample type and identification information. See http://vdl.uky.edu/LaboratoryServices/Sections/Toxicology/Feedsandforagesspecimencollectionguidelines.aspx for more information on proper sample collection of feeds and forages.

Kentucky Beef Cattle Market Update

Dr. Kenny Burdine, Livestock Marketing Specialist, University of Kentucky

After holding pretty well through the early part of the fall, Kentucky calf markets finally made their seasonal drop in October and November. As can be seen in figure 1, prices for a 550 lb steer fell by roughly $10 per cwt from September to November. This may have been slightly more decline than usual due to delayed marketings from fall forage growth and cold / wet conditions in November. Regardless, we are at our typical seasonal lows for the calf markets and prices tend to increase from now until spring. Heavy feeder cattle prices have decreased as well with large groups of 850 lb steers largely in the $140's. Many of these groups were in the $150's a month ago.

Figure 1. 550# Medium & Large Frame #1-2 Steers
KY Auction Prices ($ per cwt)



Source: USDA-AMS, Livestock Marketing Information Center, Author Calculations

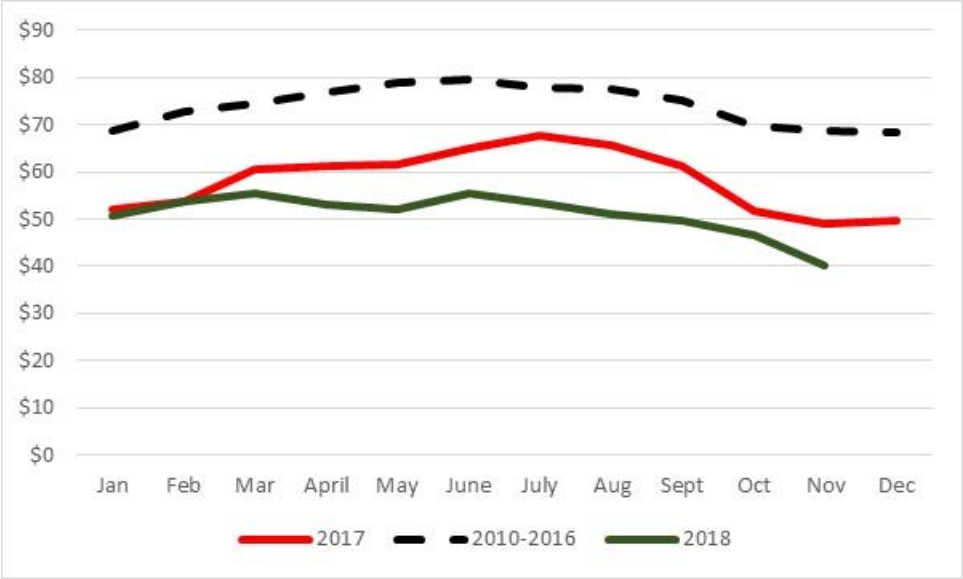
I have gotten a lot of questions about cull cow prices over the last several weeks. Put simply, this cull cow market has gotten ugly. Figure 2 shows 80-85% boning cow prices through November, which have moved to around $40 per cwt on a state average basis. I'm also hearing some stories of cull cows bringing much lower than this or not being sold at all. It's always difficult in my roll to sort out how wide-spread these instances are. The Kentucky Livestock and Grain Market Report from the Kentucky Department of Agriculture for the week ending December 1, 2018 showed a range on average boning cows of $29 to $52 per cwt. Regardless, cull cow prices have dropped a lot since summer and this is impacting cash flows for cow-calf operations.

As is often the case, I think it's a combination of factors that are impacting our cull cow prices. First, cull cow markets typically have one of our more predicable seasonal patterns and we are right at our typical seasonal lows. We tend to sell more culls this time of year, which explains this pattern from the supply side. And, the impending winter makes them less attractive to buyers that might consider keeping them for a period of time. Secondly, I think there are some additional factors that are making the seasonal drop even worse in 2018. Beef production continues to increase and boxed beef prices have moved lower in response. Beef cow slaughter has also been higher this year and given the challenging dairy margins, dairy cow slaughter is up as well. Don't

ever underestimate the impact of dairy cows on the cull cow market. Although dairy cow inventory is much smaller than beef cow inventory, the productive life of a dairy cow is much shorter.

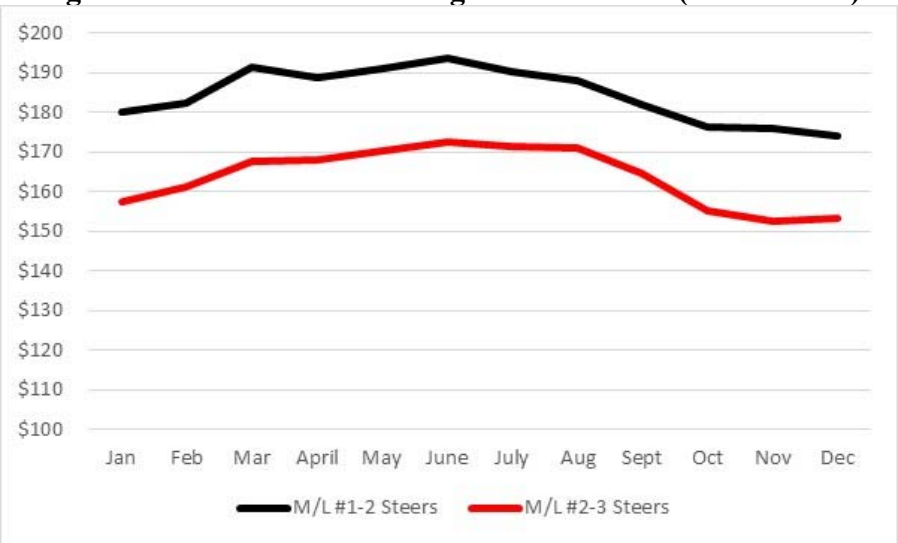
Third, I have talked a lot recently about increased competition in the meat case from higher pork and poultry production levels. My colleague in Oklahoma, Dr. Darrell Peel, made a point in Oklahoma State's Cow/Calf Corner newsletter that I think is worth sharing. He suggested that increased pork and poultry supplies, may be having a larger impact on ground beef, than on middle meats. Given that retail prices for most pork and poultry products are more comparable to ground beef, than to steak prices, I think there is some logic in this notion. And, since cull cows tend to be a largely ground beef market, the impact on cull cow prices would be significant.

Figure 2. Cull Cow Prices – Boning 80-85%
KY Auctions ($ per cwt)



Source: USDA-AMS, Livestock Marketing Information Center, Author Calculations

Figure 2. 550# Medium & Large Frame Steers (#1-2 vs #2-3)



KY Auction Prices 2013-2017 ($ per cwt)

Source: USDA-AMS, Livestock Marketing Information Center, Author Calculations