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UNIVERSITY OF KENTUCKY COLLEGE OF AGRICULTURE, FOOD AND ENVIRONMENT, LEXINGTON, KY 40546

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OFF THE HOOF

Kentucky Beef Newsletter June 2018

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

Contents

This month's newsletter includes:

Timely Tips

Dr. Roy Burris, Beef Extension Professor, University of Kentucky

Spring-Calving Cow Herd

- Cows should be on good pasture with clover and preferably low endophyte levels in fescue for the spring breeding season. Keep pastures vegetative by clipping or making hay. They should have abundant shade and water. Our goal is to have cows become pregnant before July when temperatures and heat stress can ruin the "spring" breeding season.
- Observe the cows and bulls as the breeding season continues. Watch bulls for injury or lameness and change bulls if a high percentage of cows are returning to heat. Record cow breeding dates to determine next year's calving dates and keep records of cows and bulls in each breeding group.
- Keep a good pasture mineral mix, which contains adequate levels of phosphorus, vitamin A, selenium and copper, available at all times.
- Consider a special area for creep grazing calves, or practice "forward grazing" this summer, allowing calves to graze fresh pasture ahead of the cows. This can be accomplished by raising an electric wire or building a creep gate.

Fall-Calving Herd

- Pregnancy test cows if not done previously.
- Cull cows at weaning time
  - Smooth-mouthed cows
  - Cows weaning light weight and/or poor-quality calves
  - Open cows
  - "Problem cows" with bad feet, teats, udders, etc.
- Select replacement heifers on the basis of:
  - temperament
  - conformation
  - weaning weight

- dam and sire records
- Select more than needed to allow for culling after a short breeding season

General

- Finish harvesting excess pasture as hay soon! It should be cut before it becomes too mature. Be sure and replenish your reserves. Try to put up more than you think you will need in case of a late summer drought.
- Pasture should supply adequate energy, protein and vitamins at this time. However, be prepared for drought situations. Don't overgraze pastures so that recovery time will be faster. Overgrazed pastures will recover very slowly during July/August.
- Keep pastures small for rotational grazing so that nutritive quality can be maintained. They should be small enough so cattle do not graze longer than a week. As the season progresses, you need several paddocks to give each properly stocked pasture about 4 weeks' rest.
- Maintain a clean water supply and check it routinely. Water is extremely important in hot weather.
- Control flies. Consider changing insecticides and/or methods of control this year, because insecticide resistant flies may have developed if you have used the same chemical year after year. Consider pour-on and sprays that allow you to put cattle in the corral or through the chute with little stress on them. It will make subsequent trips through the "chute" less stressful.
- Prevent/Control pinkeye
  - consider vaccinating,
  - control flies,
  - clip tall, mature grass,
  - treat problems quickly.
- Clip grazed-over pastures for weed control and so that seed heads do not irritate eyes. Pastures should be kept in a vegetative state for best quality.

Legends of Agriculture in Western Kentucky

Dr. Roy Burris, Beef Extension Professor, University of Kentucky

When I returned to Kentucky in 1981, one of the first projects that I got involved in was performance testing of the Broadbent cow herd in Trigg County. The Broadbent twins – Smith III and Robert K. (Buddy and Bobby to their friends in Trigg Co.) were farming a few thousand acres there as had their father and grandfather before them. I always enjoyed getting a call from Smith III. He is a man of action and doesn't waste your time. Things happen when he gets involved.

Their family – for which Broadbent Arena is named – has been leaders in agriculture for a long time. They produced hybrid seed corn, became famous for Broadbent County Hams from their hog operation and, as I recall, had over a thousand beef cows between them.

Smith III and Robert K. were also pioneers in the use of crossbreeding - using the European breeds of cattle and artificial insemination in beef cattle. Recently I was cleaning my office up (and out) when I ran across some pictures of their cattle in the '70's and also a copy of a presentation that Robert K. had presented to a beef cattle meeting in 1971.

> "In 1970, approximately 350 cows were bred artificially. Cows that calved late in the calving season were not included in the A.I. breeding groups. Otherwise the cows to be bred artificially were not selected on performance or other factors. The cows were divided equally into two herds and managed similarly. Both herds were treated the same. These herds were kept in relatively small fields for close observation, which was made twice daily; before sunrise in the morning and at or after sunset in the afternoon. he time required for these checks was approximately one

and one-half hours respectively. The cows found in standing heat in the afternoon and the next morning checks were placed in holding pens for breeding the following afternoon. Due to time and shortage of labor we only bred one time per day. The bred cows then were returned to the breeding herd and their calves.

The cows were artificially inseminated by Robert and Smith Broadbent, III and by Mr. Paul Ferrell, K.A.B.A. technician, who works out of Hopkinsville, Kentucky. The majority of the cows in the herd were Hereford and Angus, with some Charolais or Holstein crosses. They were bred to sires of the following breeds: Brown Swiss, Charolais, Holstein, Maine Anjou, Milking Shorthorn and Simmental. As you probably know, we have our cow herd on performance testing and keep detailed records. In order to obtain the maximum growth of our calves we are concerned with the need of increasing the amount of milk in our dams and in producing calves with the greatest growth potential. The above mentioned breeds of bulls were used in order to give us breed comparison between the newest breeds and those generally use in order to determine the more profitable crosses to use in the future.

We begin our artificial breeding period around the 15th of May and continue it for 45 days, which time gives us the opportunity of detecting each cow through two heat periods. In this way the repeat cows can be rebred and recorded as such. Following this 45-day period, "clean up" bulls are turned in with our cows for another 45 days, giving us an overall 90 day total breeding period. Clean up bulls were performance tested, Angus, Charolais, and Hereford bulls. Our cows were pregnancy tested in the fall and open cows were sold for slaughter.

Our artificial breeding program in 1971 was the same as in 1970, except that we reduced the breeds being used to Simmental, Maine Anjou and Limousin. After our first years' experience and observation we felt that these breeds would help give us the characteristics that we need in our program.

This spring we bred 449 artificially. The increased number of cows required us to break them up into three herds and the breeding procedures were the same as last year. We used Angus, Charolais, Hereford and Brown Swiss bulls in our clean-up program. We feel that the Brown Swiss will add milk and size to our replacement cows. We will again pregnancy test this fall and sell those which are unbred.

We believe that we have made considerable improvement in our cow herd these past few years because of our performance records and the use of breeds and bloodlines by artificial insemination, which otherwise we could not have obtained."

The Broadbent's of Kentucky have always been innovators in the field of Agriculture. This early work led others to change their cattle, use good record keeping and adopt technology like artificial insemination. This month I want to salute Smith Broadbent III for all that he and the Broadbent family have meant to Kentucky Agriculture.

Preparing for Pinkeye 2018

Michelle Arnold, DVM (Ruminant Extension Veterinarian, UKVDL), University of Kentucky

Infectious Bovine Keratoconjunctivitis (IBK) or "Pinkeye" is a costly and exasperating disease for the beef producer and industry. A field trial published in 2009 found an average weaning weight difference of 18 pounds less (range 9-27 lbs) in calves that experienced pinkeye versus those that did not. Calves with corneal scars are often discounted at sale, further increasing the economic cost of IBK to producers. A recent study found continued impact in the beef industry from pinkeye on production traits. Yearlings that had pinkeye as young calves pre-weaning had less 12th rib fat depth, ribeye area, and body weight than did yearlings without evidence of pinkeye. Despite the well-known economic impact of disease, adequate and timely treatment of cases is challenging because cattle are grazed far away from facilities during peak occurrence in summer months. Preventing the disease has proven difficult because so many factors contribute to the development of pinkeye including environment, management, season of the year, concurrent diseases, and the animal's genetic makeup and immune system. The bacterium *Moraxella bovis* is considered the primary cause of pinkeye but a newly isolated strain "*Moraxella bovoculi*" is now believed to play an important role. Vaccines, whether commercial or homemade, have not been found consistently effective in clinical trials. Once pinkeye begins in a herd, it is highly contagious and can spread rapidly. Careful attention to control of contributing factors, especially fly control, and prompt, effective treatment of cases are necessary to reduce the spread and limit the damaging effects of the disease.

The known cause of pinkeye is the bacteria *Moraxella bovis* (*M. bovis*) which is located in the eyes and nasal cavities of infected cattle although it is not often found on bacterial culture in the lab. *Moraxella bovoculi (M. bovoculi)*, on the other hand, is the recently described bacterium that is most frequently isolated from pinkeye cases, including cases of "winter pinkeye". In a study published in 2014 by the University of Nebraska-Lincoln, over 600 of the 1,042 pinkeye samples tested were *M. bovoculi*. In nearly half (102/282) of the herds tested, both *M. bovoculi* and *M. bovis* were isolated from 1 or more animals in those herds. Because these bacteria are often found together, *M. bovoculi* may be an opportunist that invades and grows in eyes in conjunction with *M. bovis*. Both species of *Moraxella* bacteria have two known factors that are important for causing pinkeye: pili and cytotoxin. "Pili" are hairlike projections that enable the bacteria to stick to a damaged or injured surface of the eyeball (on the cornea). There are 7 different serogroups of pili (A through G) and vaccines are specifically formulated against these groups. "Cytotoxin" is a "poison" released by the bacteria that kills the surface cells of the cornea, creating an ulcer (Figure 1). Cytotoxin also kills the white blood cells needed to fight infection in the eye. The death of these white blood cells releases enzymes that further break down the cornea, making the ulcer even worse. Much of the current research on pinkeye is at the molecular level, analyzing

Figure 1: Corneal ulceration in the early stages of pinkeye. Photo from Veterinary Clinics of North America, Food Animal Practice 26 (2010), page 489.

the DNA of *M. bovoculi* to get a better understanding of how it contributes to disease and why it has proven so difficult to treat. The latest studies have found the DNA (genetic makeup) of *M. bovoculi* from pinkeye cases to be profoundly different from those from normal eyes, suggesting there are genetically distinct strains of *M. bovoculi* that may not play a role in IBK. *Moraxella bovoculi* also shows a reduced level of susceptibility to the tetracycline class of drugs and some samples exhibit reduced response to tulathromycin (Draxxin®). The presence of "genomic islands" within *M. bovoculi* that may account for drug resistance is of clinical interest since oxytetracycline and tulathromycin are the only FDA approved antibiotics for treatment of IBK. Cattle are the only known reservoir of *Moraxella bovis* and infected carrier animals may harbor this organism year round without showing any signs of eye problems. Once pinkeye begins in a herd, it is highly contagious and can spread rapidly by direct contact through nasal and ocular discharges and by vectors, especially face flies.

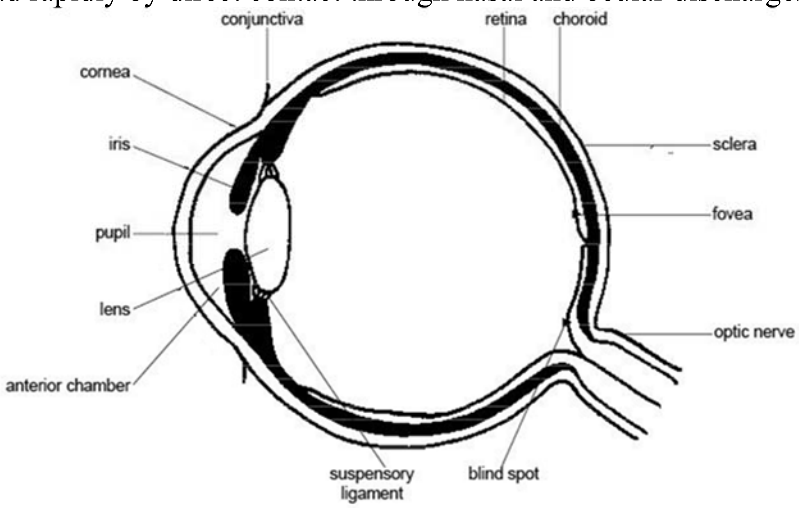


Figure 2: "Pili" are hairlike projections that enable the *Moraxella* bacteria to attach to a damaged or injured surface of the cornea

Prevention of pinkeye is difficult because it is a complicated, multifaceted disease. The best plan is to reduce or remove as many risk factors as possible that can result in damage to the corneal surface. Any damage will allow the bacteria to cling to the corneal surface and grow. Many different combinations of contributing factors such as ultraviolet rays from the sun, face flies, excessive eye irritation, nutritional deficiencies, and stress may work together within a herd at one time. Prevention is based on maximizing herd immune status, controlling face flies, minimizing exposure to the bacteria, and maintaining as irritant-free environment as possible.

Steps to Preparing for Pinkeye Season:

1. Maximize Herd Immune Status - An overall good level of nutrition, adequate vitamin and trace mineral intake, a comprehensive vaccination program including the respiratory viral diseases IBR, BVD, PI_3 and BRSV, parasite control, and basic biosecurity practices are all exceptionally important in improving the cow's or calf's ability to fight off any disease process (not just pinkeye). There is no scientific evidence to support feeding *excessive* levels of any vitamin or mineral, including Vitamin A, will prevent diseases of the eye. However, if trace mineral levels (especially selenium and copper) are very low in an animal, immune function is severely impaired. In these instances, an injectable mineral (Multimin®) may be necessary to bring these minerals back within a normal range so vaccines and antibiotics can work. Biosecurity measures such as quarantine of new arrivals to the farm (including show animals) for at least 2 weeks before commingling with the herd are important in case any of these animals is carrying the disease.
2. Control Face Flies - Face flies can play an important role in the spread of pinkeye. Their abrasive blotting mouthparts irritate the animal's eyes, stimulating tears and mucus that feed the insects. Bacteria in the secretions of infected cattle can survive on or in face flies for 2 to 3 days and infect other animals when the flies feed again. Face flies may move as far as four miles during their life so they can easily transfer pinkeye from herd-to-herd and farm-to-farm. Face fly control is challenging. The flies spend

only a few minutes at a time on or around the head, which is a difficult area to protect. Application methods that regularly place insecticide around the face and eyes provide the best means of protecting cattle. Insecticide impregnated ear tags or force used dust bags provide the most consistent reductions in fly numbers. Insecticide feed throughs, such as IGRs (insect growth regulators), can reduce the number of fly maggots developing in manure of animals that receive a sufficient daily dose. However, supplemental adult control is often needed to control flies moving in from nearby herds. Read feed through product labels carefully to see if it is labeled for face fly control since some are only formulated for horn fly control. See UK Extension Publication ENT-11: Insect Control on Beef Cattle for control recommendations.

3. Maintain an irritant free environment - Any irritation to the eye allows *Moraxella* organisms to invade and cause pinkeye. Prevent eye irritation with good face fly control, mow tall grass with seed heads, provide shade and ample clean, cool water, and reduce sources of stress (such as overcrowding) if possible. Provide shade to protect from the harmful UV rays of the sun. Cool, clean drinking water (instead of stagnant pond water) is critical because intake is greater with clean water and this helps provide plenty of fluid to the corneal surface, especially important in dry, dusty, and/or windy conditions. Tears are essential in eye defense mechanisms as tears wash away pathogens and tear proteins are an important component of protection. Do not forget to regularly check and clean automatic waterers.
4. Minimize exposure to *M. bovis* and *M. bovoculi* - Early detection of animals with the first clinical signs (tearing, squinting, and blinking) and then prompt, effective treatment are essential to reducing spread to herd mates and limiting damage to the eye. Long-acting antibiotics such as long-acting tetracycline (LA-200®) or the prescription antibiotic tulathromycin (Draxxin®) are labeled for treatment of pinkeye. A veterinarian may prescribe the antibiotics florfenicol (Nuflor®), ceftiofur (Excede®), or others to be used in an off-label manner for treatment as well. Injectable antibiotics are generally the best option because of their long duration of activity and effectiveness in eliminating bacteria. Topical sprays only remain in the eye a few minutes before tears wash them away so application is generally required 3-4 times daily to be effective. When severe ulceration exists, the eyeball may need extra protection with either a patch or the eyelids may need to be sutured (stitched) together. Remember, preventing spread by treating affected animals is the single most important factor in controlling a disease outbreak. Active cases of pinkeye with excessive tearing attract flies that widely spread the bacteria. Topical application of a fly repellant to the face will also help reduce spread.
5. Does vaccination work? Immune responses to pili have been shown to be protective in some studies where animals are vaccinated with pili of a certain type and then challenged with a similar strain. A high degree of diversity among pilin genes is likely responsible for why some herds might see a benefit from vaccination while other herds do not; if the vaccine strain stimulates immunity to a pilus type that is also present in the herd, there should be good protection. In clinical trials, approximately half reported significant protection from commercial pinkeye vaccines. A recently published study in August of 2017 involving 214 spring-born calves, half of them vaccinated according to label directions with a commercial pinkeye vaccine and half left unvaccinated, had dismal results. At the end of the trial, pinkeye had been detected in 65 (59.1%) vaccinated calves and 62 (59.6%) unvaccinated calves during the study period and there was no difference in weaning weights for vaccinated versus unvaccinated calves. Clearly, vaccination is not the solution to all pinkeye problems although it may reduce the number of calves affected and lessen the severity of clinical signs. When commercial vaccines are not effective, an "autogenous" or homemade vaccine can be made from bacteria cultured from pinkeye cases from one particular farm or farms within a certain area. All bacterial cultures must be taken early in the course of disease; preferably when the eye is just beginning to tear excessively and before any medications are used. These specialty vaccines can be effective if the "correct" antigens are selected and used by the vaccine manufacturer. While autogenous (homemade) vaccine formulations, especially those that include *M. bovoculi* antigens, often are beneficial in the field, experimentally these vaccines have not demonstrated consistent results. Autogenous vaccines do lose effectiveness within one to two years as the bacteria mutate and a new batch of vaccine needs to be made from new cultures.

In summary, pinkeye is one of the most common diseases of cattle and is of major economic importance to Kentucky cattle producers. Although much research is ongoing to understand this complex disease, the keys to prevention and control of pinkeye still rely on the basics of maximizing the herd's immune status, minimizing exposure to *Moraxella* bacteria, face fly control and maintaining as irritant-free environment as possible. Treatment decisions are influenced by numerous factors such as effectiveness and cost of the antibiotic, labor availability, withholding times, facilities, and availability of a veterinary prescription. Vaccines are not consistently effective in disease prevention and cannot be completely relied upon to prevent pinkeye. The best strategy of treatment, prevention and control of pinkeye for a particular herd is best accomplished with the help of the local veterinarian.

Spring Breeding on Fescue Pastures

Dr. Roy Burris, Beef Extension Specialist, University of Kentucky

Most Kentucky beef producers have spring-calving cow herds that graze fescue pastures which have high endophyte levels. Getting a high percentage of cows bred in May, June, and July to calve in March, April, and May can be a challenge. I personally prefer fall-calving for that reason, but I also believe that we can have successful breeding performance in the spring.

There are some keys to getting a high percentage of cows pregnant for a spring calving season. The most general problem, in my opinion, is that the winter feeding program isn't adequate to support required body condition for early rebreeding. Cows should enter the breeding season in good body condition (Body Condition Score 5) which doesn't always follow our winter feeding programs. It seems that we sometimes try to "rough 'em" through the winter and hope that spring grass will "straighten them out". That is a sure formula for delayed breeding or open cows. Spring-calving cows need to conceive early in the breeding season (before late June) for best results. We conducted a trial at the UKREC (Western Kentucky) several years ago in which similar cows were separated into three breeding periods of 45-days each on high-endophyte fescue – see Table 1. Cows which were exposed to bulls from June 19 to August 4 had a pregnancy rate of only 59%. At this location, the average maximum daily temperature reaches 90°F by about June 20. This elevated temperature, coupled with the endophyte that is present in most fescue pastures, likely contributed to that decreased performance.

Table 1. Effect of time of breeding on beef cows grazing high-endophyte fescue 1992, 1993 (UKREC).

Item	Timing of breeding		
	4/21 – 6/5	5/21 – 7/6	6/19 – 8/4
Pregnancy rate	33/37[a]	29/37[a,b]	16/27[b]
(%)	89.2	78.4	59.3

[a,b] Means on the same line with different superscripts are different ($P < .05$).

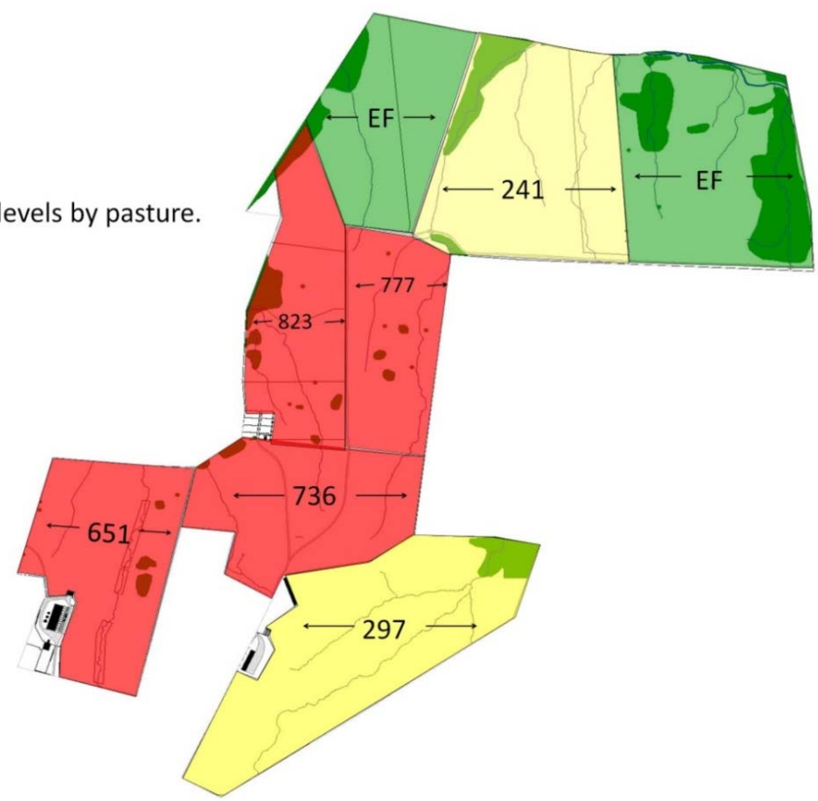
We have also measured the alkaloid levels in high-endophyte fescue at this location. Since the primary culprit in toxicity of high endophyte pastures seems to be ergovaline, let's look at ergovaline levels (Figure 1) across the growing season. After our July (about July 10) measurement, the ergovaline levels increased dramatically. So this toxicity, coupled with high temperatures, appears to mean that breeding will not occur at acceptable rates in July, August and September. Therefore, cows need to be pregnant by the end of June for best results.

Ergovaline levels differed greatly by pasture, too (see figure 2). That information could make it possible to avoid the "hot" pastures during the summer months. The trial in Table 1 was conducted in the "hot" pasture (unbeknown to us). The two yellow pastures are high endophyte but always gave better than expected results in past years. The ergovaline levels can explain a lot. Armed with this information, we would prefer to be in the yellow areas during heat stress and breeding.

Figure 1.
Ergovaline Levels by Month(UKREC 2011)

There are several other keys to a successful breeding season. Obviously, fertile bulls are extremely important and breeding soundness evaluations (BSE) are essential. Think fertile bulls and cycling cows! A complete mineral supplement needs to be available on a year-round basis. If artificial insemination (AI) is used, that brings on the need for managing the details of AI and estrous synchronization protocols.

Figure 2.
Average ergovaline levels by pasture.
(UKREC) 2011



In the short run, don't let cows lose condition as the breeding season nears. Lush, watery grass might not support regaining condition after calving, peak milk production and rapid re-breeding. Do whatever it takes to get 'em bred and bred early!

Fed Heifer Marketings Surge over Last 6 Weeks

David P. Anderson, Professor and Extension Economist, Texas A&M AgriLife Extension Service

Cattle slaughter surged over the last 6 weeks with weekly slaughter over 650,000 head every week since the first of May, except the Memorial Day shortened week. Total cattle slaughter is up about 9 percent compared to the same period a year ago. Much of the year-over-year increase in slaughter is from heifers.

Fed heifer slaughter is up about 17 percent over the last six weeks, using the daily slaughter data and estimating the first two weeks of June. Going back to the first of April fed heifer slaughter is up about 16 percent compared to a year ago. Weekly slaughter levels were the largest since May 2013.

Steer, heifer, beef cow, and dairy cow slaughter tend to have their own different seasonal pattern. These depend, in large part, on seasonal production patterns. Beef cow culling tends to climb in late Spring-early Summer then peaks in Fall. Dairy cow culling bottoms out in summer. Looking at the last few years, heifer slaughter tended to be at it's seasonal low from about May-July at the same time steer slaughter hit it's seasonal high.

Summer seasonal lows in heifer slaughter over the last few years reflects cow herd expansion. Fewer heifer calves were sent to feedlots as they were kept to enter the herd. The seasonality of heifer slaughter is likely changing as the herd size has recovered from the drought and expansion is slowing. More heifer calves and feeders are available to go to feedlots because more were born and fewer are needed for herd replacement.
The Cattle on Feed report each quarter includes a breakout estimate of the number of steers and heifers on feed. The April Cattle on Feed report indicated that there were 14 percent more heifers on feed than the year before. That estimate is not far off the growth in heifer slaughter, year-over-year in the April-early June period. While the number of heifers on feed has been very large compared to the last few years, it is about the same as the number on feed, on average, over the 2007-2012 period before the drought and during the herd adjustments to ethanol fueled feed costs. The July Cattle on Feed report will provide the next estimate of the number of heifers in feedlots.

In the face of surging heifer and all cattle slaughter, fed cattle prices rebounded last week, up from about $110 to about $114 per cwt. Exports continue to boom while some market refueling from the Memorial Day holiday weekend is moving beef in the domestic market.