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Beef IRM Team

KENTUCKY BEEF CATTLE NEWSLETTER AUGUST 2, 2023

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This month's newsletter includes:

Timely Tips

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

Spring-Calving Cow Herd

- Fescue pastures don't generally produce much this month. Many of us have had some rain (some of us a bit too much) but the heat has waited until late summer to become an issue. Most of you may have some forage going into the usually dry months. Keep rotating pastures to permit calves to continue gaining weight. Always keep minerals available.
- Bulls should have been removed from the cow herd by the end of the month. 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. If removing the bull is not practical for you then call your herd veterinarian and schedule a pregnancy diagnosis. Market your "late-bred" cows and keep those that conceived early in the breeding season.
- 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.

Fall-Calving Cow Herd

- Dry cows should be moved to better pastures as calving time approaches. Cows should start calving next month. Yearling heifers may begin "headstart" calving later this month. Plan to move cows to stockpiled fescue for the breeding season, so it will soon be time to apply nitrogen fertilizer.

- Prepare for the fall-calving season (usually September). Get ready, be sure you have the following:
    - record book
    - ear tags for identification
    - calf puller
    - castration equipment

General

- Perhaps the most tedious aspect of agriculture is keeping records, generating reports, and using data to make management decisions. Consider using one of the many electronic data collection and management systems available on the market.
- 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.
- Select pastures for stockpiling. Remove cattle and apply nitrogen when moisture conditions are favorable. Stockpiled fescue can be especially beneficial for fall-calving cows after calving. Reproductive rates are highest in fall-calving cows grazing stockpiled fescue.
- 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.
- 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.
- Keep a good mineral mix available at all times. The UK Beef IRM Basic Cow-Calf mineral is a good choice.
- Cattle may also be more prone to eat poisonous plants during periods of extreme temperature stress. They will stay in "wooded" areas and browse on plants that they would not normally consume. Consider putting a roll of hay in these areas and/or spraying plants like purple (perilla) mint that can be toxic.
- Take soil samples to determine pasture fertility needs. Fertilize as needed, this fall.

Beef Bash 2023

Dr. Les Anderson, Extension Professor and Tyler Purvis, Beef Extension Associate, University of Kentucky

Dr. Roy Burris started Beef Bash at the UKREC almost two decades ago. His vision was to create an event to encourage fellowship among producers, the industry, and the entities that serve the beef industry. A goal was to unite and empower the beef industry for the future.

The theme of Beef Bash 2023 is "Vision of the Future". Our goal is to create an event illustrating the tremendous work done in the beef industry in Kentucky creating a vision of the future of the beef industry. We are redesigning the format to accentuate all the work being done in Kentucky to improve the sustainability of the beef industry. We will have rotations featuring current research from UK and the USDA ARS group, educational opportunities sponsored by UK and Kentucky Beef Network and we

will have several demonstrations by the UK Foods group and by the Kentucky Beef Council. In addition to these rotations, we will have an update on new facilities being designed and developed for the new Beef Extension Education Facility in Princeton, the new Livestock Education Center in Versailles, and the new USDA ARS research facility located on campus. We should have something for everyone at this years Beef Bash.

Beef Bash 2023 will be held Thursday, September 21st from 1-8 PM at the C. Oran Little Research Center. Registration will begin at 1 PM and the event will begin 2 PM. We will have the educational components from 2-4 PM and again from 6-8 PM. We will use 4-5 PM for participants to visit the tradeshow and interact with our vendors. We will rotate participants through the stations again from 6-8 PM. We extended the rotations into the evening for those who want to attend but cannot get off work.

Dinner will be provided by the Woodford County Cattleman's Association at 5 PM. Pre-registration for attendees will be $15 and includes a meal ticket. Come out to see a "Vision for the Future" provided by the University of Kentucky, the Kentucky Cattlemen's Association, and the USDA ARS.

For more information, please contact your local ANR Agent. We hope to see you there!

Information for Seedstock Symposium

Tyler Purvis, Beef Extension Associate, University of Kentucky

In conjunction with the University of Tennessee, the University of Kentucky will be hosting a Beef Cattle Seedstock Symposium October 17th, 18th, and 19th. The symposium will target beef cattle seedstock producers (bull providers) and will be held in three locations with the intention of making travel more convenient for those attending. On October 17th, the Fayette County Kentucky Extension Office will be hosting, the October 18th session will be held at the Barren County Kentucky Extension Office and the October 19th session will be held in Spring Hill, TN. The sessions will begin at 8:30 a.m. and wrap up around 4:30 p.m. Lunch will be provided at 12:30 p.m. University of Kentucky and University of Tennessee specialists will cover topics such as genetics, nutrition, reproduction, health, and marketing along with special guest speaker Dr. Matt Spangler from the University of Nebraska. Funding for this program was provided by the Kentucky Ag Development Fund and a small registration fee will be collected to help offset the cost of the meal. To receive information as it becomes available, please email Maggie Ginn at mmgi241@uky.edu and indicate your interest and contact information.

Swinging for the Fences, Small Ball, and Water Issues

Kevin Laurent, Extension Specialist, Department of Animal and Food Sciences, University of Kentucky

My alma mater recently won the College Baseball World Series. All season long this team was ranked in the top five for home runs and total runs scored. Their approach was to "swing for the fences" or as it's known in South Louisiana, "Geauxrilla Ball". As impressive as their offensive stats were during the regular season, two areas of huge concern going into the World Series was their inability to play "small ball" (laying down bunts to advance the runner) and the inconsistent play of their bullpen. The College World Series for many years was played at historic Rosenblatt Stadium in Omaha, Nebraska and it was known as a hitter's ballpark. Several years ago, a new stadium was built and is oriented so that batters are hitting into the prevailing winds, therefore home run production dropped dramatically. So, if you

can't knock it out the park, pitching and "small ball" becomes more important. Although my alma mater struggled in these areas of the game throughout the season, fortunately during the World Series, pitching improved and for the most part, the weather conditions and wind direction were in their favor. So, was LSU just lucky? Not necessarily, but they did get a few lucky breaks as any championship team needs to win it all.

So how does any of this relate to water issues and producing beef? I think we can all agree that the subject of rainfall has been uppermost on our minds this spring and summer. At one point in late spring conditions seemed eerily similar to the drought of 2012. As I write this in early July, most areas of the state have received timely rains and hopefully this will continue. Mother Nature has a way of exposing the weak areas of production systems and the last several months are a prime example. Ask yourself a few questions. During the recent dry spell: Did you feel like you were overstocked? Were stock water ponds getting low and overused, resulting in poor water quality? Did you have any areas of the farm with ample grass but no access to stock water? Do you have a backup plan when rain doesn't come? In our area of Western KY several of the crop farmers have installed irrigation pivots and this year the pivots have been in full use. But what about the years when we get ample moisture, were the pivots a waste of money? Farmers will tell you that even in wet years the pivots pay, because it allows them to "swing for the fences" in terms of plant population, genetics and fertilization strategies knowing that if the rains don't come, the pivots can be turned on.

So, if farming under pivots allows for "swinging for the fences", what is the right strategy for pasture systems? Since most pasture systems do not have the access to irrigation, maybe a combination of stock water development along with a "small ball" approach might be more appropriate. Having water within 800 feet of grazing animals during the summer grazing season is a good goal. Missouri research shows that water within 800 feet results in improved forage utilization and more even nutrient distribution. Fencing and developing water access to the "back forty" or that field that has only been historically used for hay could also be considered. Water development will allow for rotational grazing and rotational grazing will enable you to better withstand dry periods and grow more forage. How you use that extra forage is the next decision. Do we increase stocking rates or do we summer stockpile for drought insurance or winter stockpile to reduce feeding days? Deciding what to do with extra forage is a great problem to have.

A quote from a presentation by John Genho, of Eldon Farms in Virginia at the 2019 Forages at KCA Symposium comes to mind.

"The economic optimum is always under the biological optimum when it comes to stocking rates. We should always run a few less cows than a field can actually carry to make the most money."

The proceedings of his talk can be found on the UK Forages webpage at the following link: Profitability at Eldon Farms: Guiding Principles (uky.edu)

We are currently experiencing "World Series Championship Prices" for our cattle. These prices only come along every 8-10 years. Hopefully these prices result in added income that can be used to improve infrastructure in our grazing programs. These improvements when coupled with "small ball" stocking rate strategies, will help ensure economic survival over the long haul to make it to the next

"Championship" price year. Or we could simply sit around hoping that every year the wind blows in our favor.

Pinkeye Prevention begins Long Before the First Bad Eye of the Season

Dr. Michelle Arnold, DVM (Ruminant Extension Veterinarian, UKVDL)

Infectious Bovine Keratoconjunctivitis (IBK) or "Pinkeye" is a costly and exasperating disease for the beef producer and industry. For the producer, the economic costs of pinkeye include lower average weaning weights, pinkeye treatment and labor costs, and discounts received for calves with corneal scars. Despite ongoing research to combat this disease, prevention has proven difficult because of the complicated interaction of pathogens (bacteria), host (cow/calf), and environmental factors that result in pinkeye's development and its fast spread. Frequent observation of the herd allows early recognition and prompt treatment of affected eyes, resulting in better healing and less transmission to herd mates. However, preventing a pinkeye outbreak does not start with the first bad eye of the season. Once pinkeye cases begin, it is highly contagious and the bacterial pathogens spread rapidly by direct contact and by mechanical vectors, especially face flies. In an outbreak, on average 10% of calves and 3% of cows in a herd are affected in 30 days or less. Although knowledge gaps exist in our understanding of immunity in the bovine eye, prevention starts early by maximizing the herd's ability to fight disease, and through reduction of sources of eye irritation, injury, and transmission. Pinkeye prevention for individual herds is best accomplished with the help of your local veterinarian because there is no "one size fits all" approach to control.

Recent research is changing much of what we thought we knew about the bacterial cause of pinkeye (the "pathogen"). Previously, the cause was thought to be invasion of the bacterium *Moraxella bovis* (*M. bovis*) because, in research trials, it was the only bacterium recovered from diseased eyes that resulted in pinkeye when placed in healthy calves' eyes. However, we now know *M. bovis* colonizes the eyes at a young age and is part of the normal flora (the "microbiome") of the eye. Cattle are the only known reservoir of *M. bovis* and adult cows harbor this organism year-round without problems. However, *Moraxella* bacteria have two known virulence factors, pili and cytotoxin, that change this organism from a harmless inhabitant to an aggressive pathogen. "Pili" are hairlike projections on the bacterial surface that enable attachment to a damaged or injured cornea. After attachment, "cytotoxin" is the poison released by the bacterium that kills corneal surface cells and the white blood cells recruited to fight infection in the eye, resulting in erosions that coalesce to form a corneal ulcer. After these virulence factors are triggered, these "hot" bugs spread within the herd and can cause a full-blown pinkeye case within 24 hours of infection. New molecular diagnostic techniques including PCR and next generation sequencing (NGS) are now being used to analyze the DNA of other organisms present in normal and diseased eyes to get a better understanding of how each contributes to disease and to aid in vaccine development. Studies reveal that two more organisms, *Moraxella bovoculi* and *Mycoplasma bovoculi*, are found in over 90% of pinkeye cases. *Moraxella bovoculi* is an extremely diverse bacterium that also has pili and cytotoxin, and it carries multiple genes that code for antibiotic resistance. To make the picture even more complicated, there are genetically distinct strains of *Moraxella bovoculi* that do not play any role in pinkeye. *Mycoplasma bovoculi* causes low level corneal irritation and damage but does

not have pili or toxin. Because of this complex mixture of organisms, it is difficult to make an effective, protective vaccine against the pathogens associated with pinkeye.

"Host" factors that contribute to pinkeye development include immune deficiencies due to poor nutrition, lack of trace minerals, inadequate hydration, and sub-par vaccination status. Meeting nutritional requirements, providing vitamins and trace minerals, establishing a comprehensive vaccination program including the respiratory viral disease infectious bovine rhinotracheitis (IBR), and parasite control are all exceptionally important in improving the cow's or calf's innate ability to fight pinkeye. No scientific evidence supports feeding *excessive* levels of any vitamin or mineral, including Vitamin A, to 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. Cool, clean drinking water (instead of stagnant creek or pond water) improves intake and provides the necessary fluid for tear production to protect the corneal surface. This is exceptionally important in dry, dusty, and/or windy conditions. Tears are essential to wash away pathogens and tear proteins include antibodies to fight infection. Do not forget to regularly check and clean automatic waterers, especially in the summer. Other host factors unrelated to management can contribute to pinkeye. White-faced cattle, particularly Herefords, are more prone to the disease, likely due to enhanced reflection of UV radiation on the cornea. Reported heritability of pinkeye is low to moderate so any control through genetics is unlikely or will be slow, at best.

Environmental factors contributing to pinkeye are those that can irritate or injure the eye's corneal surface and predispose the eye to infection, include ultraviolet rays from the sun, face flies, dust, seed heads and tall weeds. UV radiation promotes formation of "dark cells" in the cornea; these are damaged cells that are targets of *M. bovis* attachment. Dust particles, seed heads, tall weeds, and sharp stubble can scratch the corneal surface. Face flies irritate eyes when feeding, with abrasive blotting mouthparts that rasp, scrape, and penetrate the conjunctival tissues, triggering tear and mucus production that feed the insects. Bacteria in the secretions of pinkeye-infected cattle can survive on or in face flies for 2 to 3 days and infect other animals when the flies feed again. Cattle display "fly avoidance behaviors" including head throws, tail flicks, and bunching together with heads directed inward when face flies feed. Preventing eye damage with good face fly control, removing irritant seed heads and weeds, and by providing shade for UV protection reduces the opportunity for pinkeye to strike.

Face fly control is challenging and is not the same as horn fly control. Face flies are "blotters" that feed on tears instead of "piercers" that feed on blood as horn flies do. Fly control methods that depend on insecticides delivered in the bloodstream have no effect on face fly numbers. Face flies spend only a few minutes at a time on or around the head, which is a difficult area to protect. They are also strong fliers and may move two miles or more during their life so they can easily transfer pinkeye from herd-to-herd and farm-to-farm. Face flies can be partially controlled with feed-through insecticides such as IGRs (insect growth regulators), offered in feed or mineral. Both horn fly and face fly females lay their eggs in very fresh manure. IGRs can reduce the number of fly maggots developing to adults, provided the IGR is started early enough in the spring and cattle consume a sufficient daily dose. IGRs should be started in mid-spring, 30 days prior to fly season, and removed 30 days after fly season is over. Supplemental adult fly control is still needed to control adult flies moving in from nearby herds. Adult face flies can be somewhat controlled with repellents and insecticides applied directly to the face and eyes of cattle.

Insecticide impregnated ear tags or forced-use dust bags provide the most consistent reductions in face fly numbers. Back rubbers with fly flyps or fly bullets tied at 4-6" intervals along their length and placed in forced-use areas like mineral feeders or entrances to water sites will consistently deliver insecticide to the face. The goal is to reduce face flies to less than 10 flies per head. The Veterinary PestX Database (Figure 1), available at https://www.veterinaryentomology.org/vetpestx is a tremendous resource to identify insecticide ear tags, dusts, feed-throughs, pour-ons, sprays, and premise treatments and their mode of action (MOA) group to control almost any type of cattle pest (see Figure 2). Fly control products must be rotated annually to a different MOA to preserve effectiveness. Repeatedly exposing face flies to insecticides in the same MOA group or to sublethal doses and killing most, but not all flies, allows survivors to develop resistance to all insecticides within the same MOA group. That genetic resistance can then be passed to their progeny.

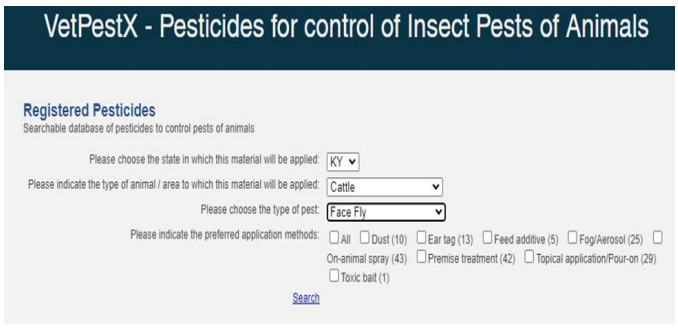

Figure 1: Screenshot of the Veterinary PestX Database dashboard.

Insecticide Impregnated Ear Tags

Active Ingredients	MOA Group	Brand Names
15% coumaphos + 35% diazinon	1B	Corathon; 2 tags
coumaphos + diazinon	1B	Co-Ral Plus; 1 tag for horn fly, 2 tags for face fly suppression
20% pirimifos-methyl	1B	Dominator; 2 tags
20% diazinon	1B	Optimizer / X-Terminator
40% diazinon	1B	Patriot; 2 tags
permethrin	3A	Atroban Extra, Apollo, Deckem, Ear Force, Gard Star Plus, New Z Permethrin, Permectrin Insecticide Ear Tags, Super Deckem II (10%) ; 2 tags
beta-cyfluthrin	3A	CyLence Ultra (8%) CyGuard 15%; 2 tags
10% *zeta*-cypermethrin	3A	PYthon MagnuM, ZetaGard; 1 tag
10% *lambda*-cyhalothrin	3A	Saber Extra, Excalibur; 2 tags

Figure 2: Example of Mode of Action (MOA) groups. The group number represents the MOA followed by a letter that relates to chemical structure. In the example above, there are 2 different MOA groups: 1B (organophosphates), and 3A (synthetic or synergized pyrethroids).

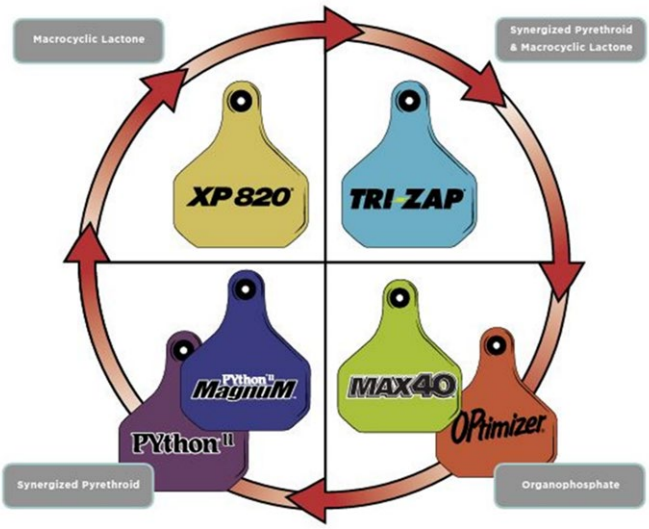

Figure 3: Example of fly tag rotation system (Y-tex Corporation). [UK does not specifically endorse any fly control product; example above is for illustration only]

While fly tags can be an effective method to reduce face flies, it is important to use 2 tags (one in each ear) for optimal control of face flies. Some manufacturers offer "insecticide cattle strips" that can be slipped onto the shaft of an existing ID tag, alleviating the need for two tags in one ear. Read the label and look for tags that "control" face flies, instead of those that "aid in control" and observe the length of time control *of face flies* is expected. Additional insecticide products will be needed for late season fly control when the tags begin to lose effectiveness. All insecticide ear tags should be removed at the end of the season to

decrease development of resistance and, most importantly, rotate fly tags to a different mode of action (MOA) each year (see Figure 3).

Figure 4: Fly trap made with fly paper wrapped around a protein tub with chicken wire, placed near water and mineral sites. Photo courtesy of Gregg Brann, Grazing Specialist, TACD, and Synergistic Grazing Management Consultant [https://gregbrann.com]

Other non-chemical fly control methods can prove useful such as sticky fly traps placed around high animal traffic areas, or wherever livestock congregate in pastures (Figure 4). There are reports that garlic powder mixed in mineral helps reduce face fly numbers although there is little research to verify its success.

Early detection of animals with the first clinical signs of pinkeye (excessive tearing, squinting, and blinking) and then prompt, effective treatment is essential to reducing spread to herd mates and limiting scar formation in the eye. Long-acting prescription antibiotics such as long-acting oxytetracycline (LA-300®) or tulathromycin (Draxxin®) are specifically labeled for pinkeye treatment. If those two antibiotics lose effectiveness, a veterinarian may prescribe florfenicol (Nuflor®), ceftiofur (Excede®), or other antibiotics to be used in an extra-label manner for treatment. Injectable antibiotics are considered the best option because of their long duration of activity and effectiveness in eliminating bacteria, enabling the cornea to heal. Other remedies may reduce pain and allow healing, but the bacteria can be shed for weeks if not eliminated. When severe ulceration exists, the cornea may need extra protection with either a patch, a third eyelid flap, or the eyelids may need to be sutured (stitched) together. Remember, preventing spread by recognizing and treating affected animals as soon as they show the first symptoms is crucial in controlling a disease outbreak. Active cases of pinkeye with excessive tearing attract flies that widely spread the aggressive bacteria. Additionally, topical application of a fly repellant to the face of an affected animal and quarantine away from the herd will also help reduce spread.

Pinkeye vaccines, whether commercial or autogenous (custom-made), will usually help reduce the number of affected animals or lessen the severity of clinical signs but cannot be completely relied upon to prevent pinkeye. Immune responses to pinkeye vaccines 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 genes coding for pili is likely responsible for why some herds 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. When commercial vaccines are ineffective, an “autogenous” or custom-formulated vaccine can be manufactured from bacteria cultured

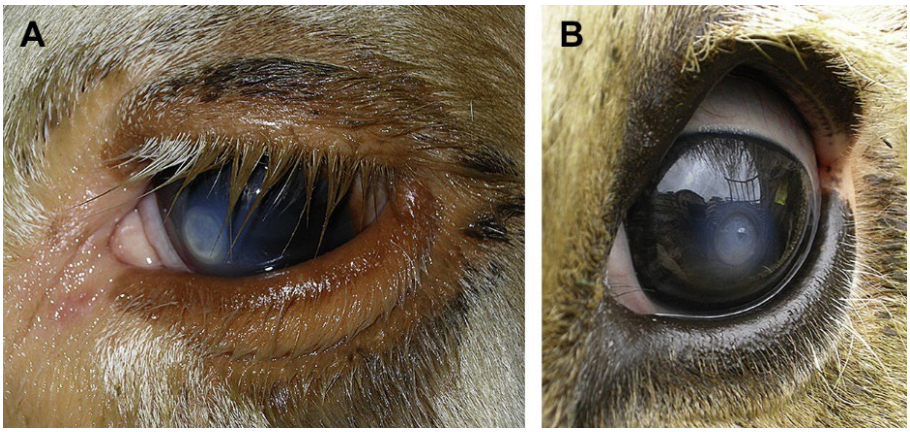

Figure 4 : Corneal ulceration in the early stages of pinkeye. Photo from Veterinary Clinics of North America, Food Animal Practice 26 (2010), page 489.

from affected eyes within a certain area. To make a vaccine, all samples for bacterial culture 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 autogenous vaccine formulations, especially those that include *M. bovoculi* antigens, often show beneficial results in the field. Autogenous vaccines do lose effectiveness within one to two years as mutations and unpredictable recombinations create new bacterial strains and a new batch of vaccine must be made from new cultures. Timing is very important with pinkeye vaccine administration. Peak immunity occurs 1-2 weeks after the booster (2nd) dose and most vaccines require 2 doses, 1-2 weeks apart. Therefore, the optimal pinkeye vaccine program must begin 4-6 weeks before 'pinkeye season' starts.

In summary, pinkeye is one of the most common diseases of cattle and is of major economic importance to Kentucky cattle producers. Although 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, face fly control and maintaining as irritant-free environment as possible. Vaccines, either commercial or autogenous, will help but cannot be completely relied upon to prevent pinkeye. Once cases begin, antibiotic treatment decisions are best made with your veterinarian who will consider effectiveness and cost of the antibiotic, withholding times, and provide a prescription for the product. For more information on insect control, ask your local county extension agent for the UK Extension Publication "ENT-11: Insect Control for Beef Cattle".

What makes a "Good Complete" Mineral?

Dr. Katie VanValin, Extension Specialist, Department of Animal and Food Science ,University of Kentucky

You've probably heard it a dozen times, "Make sure you put out a good complete mineral," but what does this mean? Like many aspects of beef production, one perfect recipe for a mineral that will meet the needs of all cattle throughout the year does **not** exist. A good mineral is a product that can provide supplemental minerals in a form and source that allow cattle to consume enough minerals to prevent deficiencies. Unfortunately, not every mineral product on the shelves at the local farm store will meet this definition. Here are a few considerations when looking for a "good" mineral.

The first thing to consider is the form of mineral you are looking for. The form typically refers to how the mineral is delivered to the cattle and includes blocks, loose free-choice minerals, loose minerals for mixing in feed, or injectables. While blocks continue to be a popular choice, these products are typically 95-99% salt. These products are often missing minerals such as calcium and phosphorus, and even when

trace minerals such as copper, zinc, or selenium are included, the concentrations are so low that cattle cannot consume enough of the product for this form of supplementation to be effective. Injectable mineral products are an effective method of delivering a dose of minerals quickly. However, this form of mineral supplementation does not contain all recommended supplemental minerals and shouldn't be used as a complete mineral program. When cattle are on feed, selecting a loose mineral that has been formulated to be mixed directly into the feed can be a convenient and effective method of mineral supplementation. For cattle on pasture, a loose free-choice mineral will typically be the best form of mineral supplementation to meet requirements for all supplemental minerals.

While mix-in or free-choice minerals are effective forms of mineral supplementation, a closer look at the mineral tag can allow you to select the product that is both cost-effective and meets the needs of your herd. The guaranteed analysis section of the mineral tag provides the concentration of selected minerals included in the supplement. One must look at the ingredient section for a complete list of included minerals. However, if it is not listed under the guaranteed analysis, the concentration of a specific mineral is unknown. When comparing two mineral products of the same form, be sure to look at the target intake that the mineral was formulated for. The target intake is listed in the directions section of the tag. If one mineral was formulated for a daily intake of 3 ounces and another product formulated for 4 ounces, the 3 oz. product may look like it contains more minerals, but this is not a fair comparison. Be careful not to compare apples to oranges.

It is also important to consider the source of the minerals in the supplement. The source refers to the kind of each individual mineral included in the mix and can be determined by looking at the ingredients list. Some mineral sources are more "bioavailable" than others. When a mineral source is more bioavailable, more of the mineral consumed can be used by the animal. Typically, inorganic sources of minerals are used in all mineral supplements. However, organic, chelated, or hydroxy sources of some minerals may also be included as these sources are often more bioavailable. When cattle are at risk of developing a deficiency for a specific mineral, looking for a mineral that includes more bioavailable sources may be advantageous. In the Southeast, cattle tend to be at risk for developing copper and selenium deficiencies, whereas manganese deficiencies, for example, would be rare. Thus, looking for a mineral that includes more bioavailable sources of copper (copper amino acid complex, basic copper chloride, copper lysine, etc.) and selenium (selenium yeast) is an important consideration when selecting a "good" mineral. Often mineral supplements will include multiple sources of a single mineral, and it is impossible to tell from a mineral tag alone how much of the mineral is being supplied from each source. This information can be gained by asking your feed dealer or nutritionist.

Consider what else can be provided in the mineral supplement. The mineral can effectively deliver feed additives such as ionophores, ingredients to manage flies or antibiotics. The efficacy of these added ingredients and the mineral supplementation program relies heavily on mineral intake. All mineral supplements are formulated to be consumed at a target rate. For free-choice supplements, this is typically 2-4 ounces. For a good mineral to work well, target intakes should be met. A 50 lb. bag of mineral with a target intake of 3 oz should last 30 cows for about 8 days.

Remember that what might make a good mineral for a producer in the western United States may not be the best option for a producer in the Southeast. Also, specific mineral needs or additive needs may change with the time of year and stage of production. For example, it is recommended that lactating

cows at risk of developing grass tetany consume a high-magnesium mineral. For help understanding the mineral requirements of cattle in your local area and to discuss what a “good” mineral looks like for your herd, reach out to your local Extension office.