

Pinkeye in Beef Cattle

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Pinkeye, also known as Infectious Bovine Keratoconjunctivitis or IBK, was first reported in 1889 and remains a very important disease of beef cattle in Tennessee. While the exact incidence of Pinkeye in Tennessee is not known, it has reported that about 45 % of beef herds in Missouri have this problem and about 9% of cattle in these herds have pinkeye problems each year. Other reports estimate that calves with pinkeye weigh up to 40 pounds less at weaning than calves that do not have this disease. In spite of the fact that the disease has been recognized for a long time and much research has been done, treatment and control programs are not as effective as we would like.



Pinkeye Bacteria

Most commonly, Pinkeye infections are due to the bacteria, Moraxella bovis. Cattle are the only known reservoir for this bacteria and it can be cultured from both normal and diseased eyes. This bacteria may be cultured in up to 20% of the eyes in a herd during the winter, when pinkeye is not usually a problem, and half of the herd when the disease is occurring. *M. bovis* can also be recovered from eyes for up to one month after the infection has healed. A number of strains of *M. bovis* exist and different herds can have problems with different strains. Also, a herd may have problems with more than one strain at the same time. Some strains cause more severe disease than others and so disease can be much more severe in some herds than in others. *M. bovis* can cause eye disease because of several unique factors that it possesses. This bacteria has little pili or feet that allow it to stick to the animal's cornea rather than being washed out by tears as other bacteria are. White blood cells are an important part of the animal's ability to fight infection, but *M. bovis* produces a chemical which can injure or kill these white blood cells. It also makes a chemical which can eat away the cornea allowing the bacterial to produce deeper infections.

While *M. bovis* is the only germ scientifically proven to cause pinkeye, other organisms have been associated with this disease. Branhamella ovis has been isolated from infected eyes in

Tennessee. *Mycoplasma* sp. is reported from some areas. It is not known whether these bacteria can cause pinkeye alone or act to make the animal more susceptible to pinkeye. The IBR virus has been shown to increase the risk of Pinkeye and make the resulting disease more severe.

Risk Factors for Pinkeye

A number of factors make Pinkeye more likely to occur in a beef herd:



Face Flies

The source of *Moraxella bovis* is the eyes of carrier cattle. These carrier cattle do not necessarily have pinkeye but serve as a source of the bacteria to the rest of the herd. In problem herds up to 20% of eyes harbor the bacteria even in the winter.

Face flies are the most important source of spread of pinkeye. More face flies in a herd results in more pinkeye.

Calves are more likely to be affected than adults, though maternal immunity protects most calves up to three months of age.

Calves born to heifers have more problems than calves born of adult cows.

A given herd may have a bigger problem in some years compared to others. For example, a herd that had a major pinkeye problem last year may have some immunity which will result in a smaller problem this year.

Weather conditions may affect the amount of ultraviolet light the animal's eye is exposed to. UV light causes changes in the eye which favors infection.

Pinkeye is seen more frequently in the summer and fall, likely due to increased light intensity and fly population.

Wind, dust and pollen can result in eye irritation making pinkeye more likely.

Infection with the IBR virus and modified live virus vaccination during pinkeye season can make pinkeye infection more likely and perhaps more severe.

Poor mineral supplementation may result in increased susceptibility to pinkeye.

While the pinkeye bacteria can be spread directly from animal to animal, it is more often spread by face flies. High face fly population's means more pinkeye in the herd.

Diagnosis of Pinkeye



Cow With Pinkeye

Pinkeye is easy to diagnose based on the appearance of the animal and the affected eye or eyes. The first sign of pinkeye infection is excessive tearing, avoiding light and squinting. This is also the stage of the disease where treatment is likely to be most effective. Within 24 to 48 hours of the first signs, an ulcer is seen in the affected eye, usually, but not always, near the center of the eye. The ulcer appears as a punched out area. This area will have a cloudy, gray appearance due to the injured cornea (the clear part of the eye) soaking up tears. Within about four

days of the first signs, new blood vessels will begin to grow from outer edge of the cornea toward the ulcer giving the cornea a reddish-pink color. It may take 10 days for these blood vessels to grow to the ulcer bringing in various blood elements important to the healing process. White blood cells may give the ulcerated area a cream or white color. The ulcer will begin to scar covering the ulcer and reducing the pain. Often the animal will begin to open the affected eye revealing a slightly raised pink area where the ulcer was originally. This entire process will require 3 - 8 weeks. The pink area will become a white scar which may be visible for months or be permanent. Some cases of pinkeye may be very severe with permanent blindness resulting. Affected cattle eat and drink less resulting in significant weight loss.

Laboratory culture of affected eyes may help provide information useful for antibiotic selection, treatment, and control of pinkeye. However, *Moraxella, bovis* is very sensitive to drying out and must be put into the proper growth medium within two hours after collection or the bacteria will not survive.

Treatment for Pinkeye

Any pinkeye treatment will be most effective if given early in the course of the disease. The only federally approved injectable antibiotics for the treatment of pinkeye are long acting injectable tetracycline antibiotics given at the standard label dose. This antibiotic is somewhat concentrated in the animal's tears. One injection of this antibiotic will generally result in fast healing and two injections (72 hours apart) will not only speed healing but also reduce bacterial numbers in the eye limiting the spread of the bacteria. Antibiotics have been injected around the eye for the treatment of Pinkeye through tetracycline is generally thought to be too irritating for this purpose and resistance of pinkeye bacterial to penicillin appears to be increasing. Various antibiotic sprays and powders have also been used to treat pinkeye. Glue-on eye patches are a useful part of pinkeye treatment. Eye patches make the affected animal more comfortable by keeping direct sunlight out of the eye making them more likely to graze. Since face flies will not feed in the dark, eye patches should also slow the spread of pinkeye. Eye patches will generally fall off on their own in about 10 days.

Prevention of Pinkeye

The face fly is the most important carrier of *Moraxella* from carrier cattle to cattle that are susceptible to pinkeye. Therefore, face fly control is likely the most important part of pinkeye control. However, face fly control is difficult because the face fly spends only a small amount of its time on the animal, treating the animal's face with insecticides can be a problem and flies from adjacent farms without a fly control program can quickly move into a given farm. It is likely that a combination of products and delivery system for face fly control will be most successful. Fly control should be in place by April or May of each year.

A number of effective products and delivery systems for fly control are available to cattle producers. These include spot-ons, pour-ons, dusts, dips, sprays, dust bags, fly flips, back rubbers, oral larvicide, boluses, fly baits and ear tags. All can be effective if properly used. Later in the fly season, a combination of methods may be necessary for acceptable face fly control.

Vaccines are also commonly used to control pinkeye. Pinkeye vaccines may be of some help in reducing the frequency of the disease and the severity of the cases that do develop. There are 10 or more pinkeye vaccines available in the US. Since different strains of *Moraxella* are found in different vaccines, some vaccines may be more effective in a particular herd than another. Label directions must be followed for these vaccines to be as effective as possible. Some recommend that the vaccine not be given to calves earlier than 2, 3 or five months of age. Some require a booster the first year the vaccine is given and some do not. Some are labeled to be given subcutaneously, some intramuscularly and some can be given by either route. The dosage for pinkeye vaccine is different for different products. Some are available in combination with blackleg vaccine. All must be given far enough ahead of the pinkeye season (three to six weeks) so that immunity is present when infection is likely.

Other control methods include pasture mowing during the summer to reduce irritation from pollen and grass seeds. Allowing adequate feed bunk space so that eye injuries are less likely can be important in some situations. It has been recommended that modified live IBR vaccine not be used during pinkeye season. If the herd has a good IBR vaccination program, then vaccinating in the winter or spring specifically because of pinkeye seems unlikely to be of help. Treating new herd additions and cows that frequently tear with Oxytetracycline antibiotics has been recommended as has treatment of the entire herd early in the course of the disease. However, flies from nearby farms can quickly bring in new bacteria. Also, these recommendations are off-label drug use and would require veterinary advice before they should be undertaken.

Pinkeye is a common disease in Tennessee that results in significant loss of productivity every year. However, a combination of control methods should result in a reduction in these losses.