

# INFECTIOUS BOVINE KERATOCONJUNCTIVITIS

## CATTLE PINKEYE

Lew Strickland, DVM, MS, DACT, Extension Veterinarian  
Department of Animal Science

Infectious bovine keratoconjunctivitis (IBK), more commonly known as pinkeye in cattle, is a highly contagious bacterial infection of the eye. Although pinkeye is a non-fatal condition, it has a tremendous economic impact on the US cattle industry. Not only do calves weigh 36-40 pounds less at weaning, pinkeye also can affect prices received for cattle at sale because of price discounts. The magnitude of the discount, which can be quite large, will depend on the severity of the infection. Some estimates place the cost to the beef industry of decreased productivity and animal value due to pinkeye at \$150 million annually due to lower production (i.e., growth), sale value and treatment costs.

### Cause

Although pinkeye is most often the result of infection of the surface of the eye by the bacterial organism *Moraxella bovis* (*M. bovis*), several other viruses and bacteria also have been associated with the disease. Infectious bovine rhinotracheitis virus (more commonly referred to as “IBR”), *Mycoplasma bovis*, and *Moraxella bovovuli* (*M. bovovuli*) all may enhance the risk for infection, as well as increase ocular and nasal discharge that may facilitate the shedding of *M. bovis*. The surface of *M. bovis* has hair-like structures known as pili, which extend from the main body of the bacteria. The pili allow the bacteria to attach to the *conjunctiva* of the cornea and colonize, causing inflammation of the tissue lining of the lid and chamber of the eye. Ultimately, the degree of inflammation

may become severe enough to cause ulceration of the cornea that may eventually rupture, resulting in potential blindness. Seed heads, dust, pollen and UV light are environmental factors that increase the risk for development of pinkeye in cattle. These irritants scratch the cornea of the eye and allow for easier attachment of the *M. bovis* bacteria. Such irritants increase secretion of tears from the eye, which attracts face flies (*Musca autumnalis*) that can spread the bacteria that cause pinkeye.

### Transmission

Once exposed, the *M. bovis* organism resides on the eyes and in the nasal cavities of infected cattle. Asymptomatic carriers can harbor the organism for a period that may exceed one year. Transmission occurs through contact with secretions infected with *M. bovis*. This may be direct contact, through face flies, or contact with an inanimate object such as the rough or frayed rubber covering of a mineral feeder contaminated with *M. bovis*. Face flies are the vector primarily responsible for transmission, as they travel from animal to animal and up to several miles in search of a meal. They feed on the watery tearing from cattle’s eyes, and in the process spread the bacteria that can cause pinkeye from animal to animal. Face flies travel to several animals per day, so they have the potential for rapid of spread *M. bovis* throughout a herd. However, not all cattle exposed to *M. bovis* develop clinical signs of the disease.

## Clinical Signs

There are four stages of pinkeye, with clinical signs ranging from conjunctivitis, excessive tearing, photosensitivity, ocular pain, squinting of the eyelid, corneal edema, and corneal ulceration to corneal rupture and blindness. Depression of appetite is due to ocular discomfort or visual disturbance that results in an inability to locate food. The typical clinical course may vary from a few days to several weeks in duration. Most corneal ulcers in cattle with pinkeye heal without loss of vision; however, corneal rupture and permanent blindness often occurs in the most severe cases. Typically, recovery occurs in three to five weeks.

**Stage 1:** Affected eyes have excessive tearing and photophobia (increased sensitivity to light). They will blink frequently and the sclera (white portion of the eye) will turn red due to inflammation. Typically, a small ulcer develops in the center of the cornea that appears as a small white spot.

Edema in the cornea will result in a slightly cloudy gray appearance.

**Stage 2:** As the clinical signs progress, the ulcer spreads across the cornea. The cornea becomes increasingly cloudy as additional inflammation occurs. Portions of the iris are detectible, but compromised vision is possible. Blood vessels from the outside portion of the cornea begin to grow across the cornea to assist with healing. The cornea now appears pink, which is how the disease received its name.

**Stage 3:** The ulcer continues to progress and covers most of the cornea while inflammation continues to spread into the inner parts of the eye. The interior of the eye fills with fibrin and white blood cells. This gives the eye a yellow appearance versus the typical brown color.



Stage 1



Stage 2



Stage 3



Stage 4



Corneal scar

*All images courtesy of Virginia Cooperative Extension.*

**Stage 4:** The ulcer extends completely through the cornea, and the iris is protruding through the ulcer. The iris will form adhesions to the cornea even after healing. The recommend treatment is to enucleate the eye.

**Corneal scar:** Once the ulcer has healed (except Stage 4) the blood vessels recede; however, the eye may continue to be a cloudy blue color for a short period. Eventually the eye appears clear again with a white scar that slightly impedes vision.

## Treatment

Early treatment of cattle with pinkeye is important, not only for successful outcome of the affected animal, but also to reduce the shedding of the bacteria which will decrease the risk of transmission to other cattle.

*Moraxella bovis* is often susceptible to over-the-counter oxytetracycline (LA200, LA300, Biomylin). Medications such as ceftiofur, tulathromycin and florfenicol will require a prescription from a veterinarian.

Intramuscular antibiotic therapy is usually effective, especially during the early stages of the disease. When severe corneal ulceration exists, protect the eye from UV light, flies and other irritants with eye patches, or by creating a third eyelid flap. A veterinarian or someone adequately trained should perform this procedure.

Sub-conjunctival local injection is one of the more popular therapies to treat more severe cases of pinkeye. However, recent studies illustrate that topical uses of intramammary cloxacillin and intramuscular injections have a similar healing time to local injections of penicillin.

Sprays and topical ointments are only effective if used multiple times daily, which generally is not possible for most producers. In addition, many of the commercially available ophthalmic ointments have very long withdrawal times or are illegal to use in

cattle. Give all injections in the neck or in front of the shoulder according to Beef Quality Assurance recommendations. Consult a veterinarian before using any other medications. **Never** use any medication containing nitrofuracin, as its use in cattle has been illegal since May 2002. If treating several animals, wash your hands or change gloves between animals so you do not spread the bacteria to other cattle.

## Prevention

An ounce of prevention is worth a pound of cure in this situation, but can be time-consuming. Since face flies are responsible for transmission, a solid fly control program is imperative! Management practices that reduce the risk factors associated with pinkeye are the most effective tools in decreasing the incidence of disease. An appropriate vaccination program that includes infectious bovine rhinotracheitis (IBR) and bovine viral diarrhea virus (BVDV) along with a good nutrition/mineral program will decrease the incidence of pinkeye. Appropriate grazing, along with clipping pastures, will prevent seed-head development, reducing irritation to the eyes of cattle. Inanimate objects can also serve as an irritant to cattle eyes. Check mineral feeders and other areas for frayed or sharp edges that can easily damage the cornea and potentiate disease. To decrease the effect of UV light, breed for eyelid pigmentation and ensure shaded areas are available to cattle. Commercial and autogenous pinkeye vaccines are available. However, they should not be the sole means of preventing pinkeye. Due to the numerous strains of *M. bovis*, vaccinations have not proven to be consistently effective in prevention. Vaccination is only one part of pinkeye prevention strategies. Combine the management practices mentioned above to reduce the incidence of disease.

Pinkeye is an economically devastating disease that can be frustrating to a cattle

operation. A well-designed prevention/treatment program will assist in minimizing economic losses. If you have any questions, or need help in developing a program, contact your veterinarian or local Extension agent.

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