

# ag animal health *spotlight* VETERINARY MEDICINE EXTENSION

WASHINGTON STATE UNIVERSITY EXTENSION & WSU COLLEGE OF VETERINARY MEDICINE

## Infectious Keratoconjunctivitis (Pink Eye in Cattle)



Pinkeye, also known as infectious bovine keratoconjunctivitis (IBK), is a bacterial disease of the eye of the cattle. *Moraxella bovis* is the primary cause of IBK. The disease is perceived to be of economic importance due to poor thrift in affected animals. The financial loss is due to decreased weight gain, increased treatment costs, and market discounts due to eye disfigurement and blindness. Certain strains of *Moraxella bovis* are capable of producing pit-like depressions in conjunctival and corneal epithelial cells causing impaired vision in affected animals. Pinkeye is the most common condition affecting beef heifers, and the second most common disease of nursing calves greater than three weeks old.

### Factors involved in the disease

Pinkeye is a highly contagious and infectious disease. The ability of *M. bovis* to cause the disease is influenced by host (the cattle) and environmental factors. The predisposing factors are

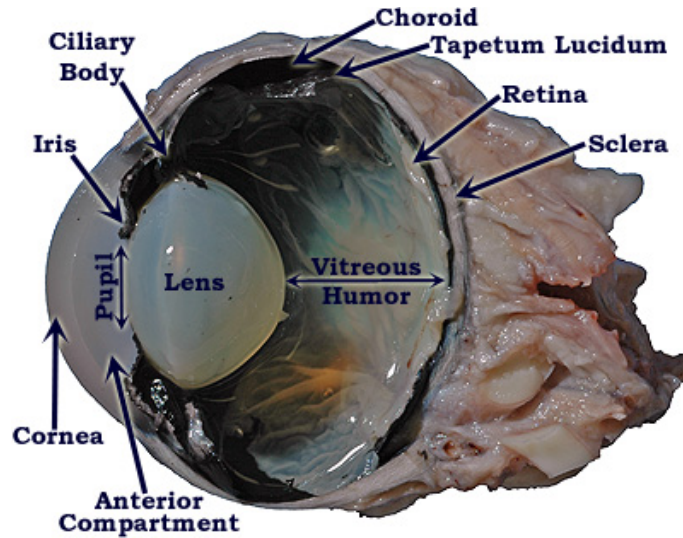
- breeds lacking eye pigment [1,2],
- young animals [3-6],
- poor host immune system, or virulent *M. bovis* strain [7],
- ultraviolet (UV) light (sunlight) exposure [3,7, 8-11],
- high face fly population [7],
- nutritional deficiencies (Vitamin A, Copper and Selenium),
- presence of other disease agents (*Chlamydia*, *Mycoplasma*, *Branhemella (Moraxella) ovis* and *Acholeplasma*, or viruses such as the Infectious Bovine Rhinotracheitis (IBR) virus) [7],
- hot months [7], and
- pasture conditions that causes eye irritation - dust, wind, tall grasses, weeds, or any other element creating mechanical injury to the eye, [7].

### Transmission of the disease agent

Cattle are the reservoir for the bacteria. The same strain can remain on the farm in carrier animals from year to year. *M. bovis* is transmitted by animal handlers or direct contact with eye and nose discharges of infected animals, contact with fomites (equipment or hands that can carry the disease), and most commonly by mechanical vectors [12-14]. The face fly (*Musca autumnalis*), the house fly (*Musca domestica*), and the stable fly (*Stomoxys calcitrans*) are instrumental in spreading the disease.

## Clinical signs

The clinical presentation of the disease, persistence of infection, and rate of progression will vary from animal to animal under field conditions [3]. One or both eyes may be involved. *M. bovis* exhibits several virulence factors, but only two cause clinical disease: the presence of fimbriae (type IV pili) on the bacteria cell surface and the secretion of a beta-hemolytic toxin which damages the cornea [15-20]. The incubation period is usually two to three days, but has extended to three weeks in experimental trials [3,9].



Cross section of the eye (Adopted from [district.bluegrass.kctcs.edu](http://district.bluegrass.kctcs.edu))

The progression of the disease is divided into several stages [21,22] as follows:

**Stage 1** – blepharospasm (excessive blinking), photophobia (avoidance of light), conjunctivitis and a lot of watery discharge are the earliest signs of the disease. There is a grey appearance of the cornea due to seepage of inflammatory fluid. The eye discharge starts out watery but can soon become cloudy. If both eyes are involved, the animal may be hesitant to move. Affected cattle have less of an appetite due to pain and a moderate fever.



Watery ocular discharge      Grey appearance of the cornea

**Stage 2** – within 24–48 h after the onset of clinical signs described in stage 1, a small grey cloudy area develops usually in the center of the cornea and radiates out over the whole cornea. During the next few days, the outer areas of the cornea become vascularized by the extension of blood vessels at the attachment of the sclera and grow across the cornea. (*These blood vessels make the cornea appear pink, which is how the disease received its name*).



Cloudiness and reddened appearance due to peripheral vascularization

**Stage 3** - Corneal ulceration may develop at this stage. The entire cornea will have a gray-white to yellow color with deep, central ulceration of the cornea within six days. Considerable individual variation occurs. Spreading of the inflammation to the inner eye and filling with fibrin gives the eye a yellowish appearance. Hemolytic *M. bovis* strains produce a pore forming cytotoxin (cytolisin/ hemolysin) [23] that promotes the development of corneal ulcers by lysis (death) of corneal epithelial cells [15,16].



Yellowish appearance due to ulceration and fibrin

**State 4** - Some animals recover spontaneously in three to five weeks- the ulcer heals and reduces, leaving a scar. In some cases the process becomes chronic, and the opacity takes 1–2 months to resolve. In other cases, depending on the severity of the disease, a white scar may be present even after full resolution of the disease. Occasionally, perforation of the corneal ulcer results in iris prolapse, in which case, blindness may result.



Once healing occurs (except if in Stage 4) the blood vessels will recede. The eye may continue to be a cloudy, blue color. The blue appearance may eventually resolve and the eye appears clear again.

### Treatment

*M. bovis* is often susceptible to oxytetracycline, ceftiofur, and penicillin. Antimicrobial drugs may be administered by subconjunctival injection or intramuscularly or subcutaneously, depending on the drug.

- Long acting tetracycline (9.9 mg/lb BWt, SQ). A second dose administered at 48 to 72 hours later may increase the number of cattle that responds to treatment. (Follow Beef Quality Assurance measures when administering injections). [24,25] Find a tetracycline product that is labeled for Pink Eye treatment.

- Injecting penicillin under the white part of the eye or lid is another option (1 ml (300,000 U) procaine penicillin G). This is an extra-label use of this drug and requires a veterinarian's prescription and label if used in this manner. It also requires excellent technique because it can be dangerous to the cattle. [26]
- Other antibiotics may be effective but are not labeled for Pink Eye in cattle (for additional treatments see <http://www.vetmed.ucdavis.edu/vetext/INF-BE.html>). If a labeled product is not working for you, contact your veterinarian for a new treatment protocol.



Bulbarconjunctival injections

**Note:** When treating animals, wash your hands or change gloves between animals to prevent spread of this bacteria.

### Eye patches

Eye patches can be glued over the affected eye, after treatment. Eye patches offer protection from any further irritation from dust, flies and sunlight. Protection is probably only of value to an individual animal when there is still a chance of saving sight in the eye. However, preventing flies access to the affected eye will reduce spread of the disease within the herd.

### Prevention

- 1. Fly control:** Use sprays, pour-ons, or dust bags early in the fly season and use insecticide impregnated ear tags when there is a heavy fly population. For effective fly control, two ear tags are recommended. Alternate the use of pyrethroids and organophosphates on a yearly basis to help prevent resistance development. A fly control program should focus on egg and larvae control. Multiple methods of control should be employed to achieve good results.
- 2. Grass, weed, and brush control:** Clip or graze pastures. Grazing management, brush beating, mowing, and spraying minimize pollen and mechanical irritation to the eyes.
- 3. Hay and/or feed bunk management** –avoid overhead hay feeders, spread hay out, do not feed hay containing mature seed heads or cheat grass in overhead feeders or in round bales, and increase bunk space to decrease direct contact.
- 4. Ultraviolet light (sun light)** - breed for eyelid pigmentation, provide shade or tree rows with ample room to prevent overcrowding.
- 5. Disease management** – provide proper immunization against viral diseases (IBR and BVD), isolate infected animals, and decrease environmental and nutritional stress.
- 6. Vaccination** – Commercial and autogenous pinkeye vaccines are available. Reported results by producers and veterinarians have been mixed from their use of these products [28]. Because pinkeye vaccines have not proven to be consistently effective in prevention, check with a local veterinarian about the use of these products in a specific geographical area. It should also be emphasized that vaccination is only part of a disease prevention program. For information on vaccines, go to: *Pinkeye Prevention and Treatment* at <http://www.vetmed.ucdavis.edu/vetext/INF-BE.html>.

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