Pinkeye in Cattle
(Infectious Bovine Keratoconjunctivitis)

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"Pinkeye," or infectious bovine keratoconjunctivitis, is an important infectious disease of the eyes of cattle. In 1889, Frank Billings first reported pinkeye in cattle in Nebraska. The disease has been reported worldwide since. It is still one of the most difficult cattle diseases to prevent or treat in a practical manner.

Pinkeye is economically important because infected animals may fail to gain weight at a normal rate or may even lose weight. In one carefully controlled field study the economic significance of the disease was emphasized by the difference between weight gains of the calves which did not have pinkeye and those which did, including even short and minor infections. At weaning time in the fall, the calves which had not had pinkeye averaged 17 pounds heavier than calves in the same herd which had pinkeye during the summer.

Infected animals may become blind and have difficulty finding food and water and may injure themselves. Milk cows may drop in production by 50%. Treatment is an additional production expense. Losses are highest in range calves under weaning age and in yearlings. Calves passing through salesyards with one eye badly scarred will bring $20 to $30 less than their herdmates.

The disease may occur in any season of the year but is most common in summer. Although any age animal may be infected, the disease is most prevalent in those under two years old. Incidence is usually highest in new beef calf crops on summer range.

It is believed that flies, including face flies, may transmit the disease from animal to animal. The seasonal incidence of the disease correlates with the seasonal peak of fly population. Flies feed on the discharges from the eyes of infected animals.

The discharge from the eyes of infected animals may contaminate feed, water, and the surrounding premises. Some investigators suspect that some animals may become disease "carriers" after recovery from infection. Often the disease is brought into a herd by newly purchased animals which have been previously exposed to the disease.

**Symptoms**

Disease symptoms appear 48 hours to one week after exposure in the spring, summer, and fall. Symptoms may not show up for four weeks in winter. The disease may last two to four weeks, involving as many as 90% of the animals in a herd.

Pinkeye is characterized by lacrimation or watering of the eyes, sensitivity to light, redness and swelling of the eyelid, redness of the conjunctiva or "white" of the eye, and cloudiness of the clear cornea, which interferes with vision. A pink or red ring often will surround the cornea. Watering may become thick and yellow. In severe cases, ulcers may appear on the cornea. Permanent damage to vision may occur from severe ulceration and permanent scars.

Rupture of the cornea may occur in severe cases, followed by complete destruction of the eye and permanent blindness. Some eyes will remain sore and require complete removal in order for satisfactory gains to occur.

**Cause of Pinkeye**

At one time it was believed that bacteria known as *Moraxella bovis* were the only cause of the disease. It is now known to be a complex disease involving several factors in addition to the bacterial organism.

Initial damage to the eye tissues may be caused by a number of factors, including ultraviolet light waves in sunlight, allergens, vitamin A deficiency, viral infection, and mechanical irritation from dust, wind, grass awns, insects such as flies and face flies, and other irritants.

IBR (infectious bovine rhinotracheitis virus or "red nose") virus has been found to be an initiating factor of pinkeye in some areas of the country and during some seasons of the year. However, it is not universally involved as the ultraviolet light waves of sunlight and mechanical irritations are. When IBR has been found to be involved, it has been more common in fall and winter than in summer. Other viruses, such as bovine virus diarrhea, affect the eye tissue but have not been found frequently in typical pinkeye.

Cattle with pigmented skin around the eye show an increase in resistance to mild eye irritants. However, when highly infectious bacteria or viruses are involved, cattle with pigmented skin can become readily infected.

Any of the initial factors alone or in combination may damage the eye tissue, resulting in redness (inflammation) of the conjunctival (white) tissue of the eye, watering, and pain. The damaged tissue is then quite susceptible to bacterial invasion.
Infection with bacteria is most frequently caused by a bacterial species known as *Moraxella bovis* but may, on occasion, be caused by other bacterial species. It is during bacterial infection that the eye discharge becomes yellow and thick. The clear cornea of the eye becomes cloudy or milky, often with a red ring of blood vessels around the edge.

In experimental work, Dr. Hughes and coworkers at the National Animal Disease Laboratory at Ames, Iowa, have reproduced pinkeye experimentally in calves with a combination of ultraviolet light and *Moraxella bovis* organisms. Their work demonstrated the importance of the role of ultraviolet light. It damages eye tissues, making them susceptible to invasion by the bacteria.

**Prevention**

The question is frequently raised regarding the effectiveness of a vaccine or bacterin in preventing pinkeye. Bacterins made from several bacteria which infect cattle are available, but no bacterin which includes *Moraxella bovis* is currently on the market. No dependable immunizing process for pinkeye has yet been developed. The probability of one being developed in the near future is low.

**Treatment**

Many methods of treatment are available, but their effectiveness varies from area to area and year to year. The real effectiveness of any treatment is impossible to determine without leaving untreated, infected animals as controls for comparison.

Medications must be applied frequently in most cases. Herd treatment of range cattle obviously is not practical in most cases, but the results may be gratifying if infected animals can be treated early and frequently. The initial lesion is often an ulcer on the surface of the eyeball. Mild cautery on this ulcerated area, accompanied by a subconjunctival injection of steroid and antibiotic, will often break the disease process and bring prompt recovery. These procedures are delicate and should be performed by or under the auspices of a veterinarian.

Many pinkeye medications are sold commercially and when diligently applied will shorten the course of the disease. The bacteria involved frequently are found resistant to many of the antibiotics. Suitable eye swabs sent to a laboratory for culture and antibiotic sensitivity frequently will give insight as to the antibiotic most likely to be successful in treatment.

Dye preparations color the surrounding area and reduce the ultraviolet irritation from sunlight. The incorporation of anesthetic agents assists in reducing pain in badly infected eyes. Treatment should vary according to the stage of eye disease under treatment. The use of defatted sterile milk injected subcutaneously seems to stimulate the body repair mechanism and promote healing.

Infected animals should be isolated from the rest of the herd and kept in the shade when practical and possible. Flies and other insects should be controlled to prevent further irritation and mechanical transmission of bacteria from animal to animal. The animals should have daily attention to be sure that they obtain adequate feed and water and to keep them out of ditches, wire, water, and other places where they may be injured.

**Control**

Good herd management is essential in control. Infected animals should be kept separate from noninfected ones. Flies and insects should be controlled to prevent irritation of the eyes and mechanical transmission of infectious organisms. A good control procedure for infectious diseases is to isolate new animals for 60 days before allowing them to mix with the rest of the herd.