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VM55

# Infectious Bovine Rhinotracheitis IBR (Red Nose)[1]

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Infectious Bovine Rhinotracheitis (IBR) was originally recognized as a respiratory disease of feeder cattle in the western United States during the early 1950s. As investigations progressed and laboratory diagnostic techniques improved, IBR became recognized as a complex of disease syndromes found throughout the United States. The IBR virus can persist in a clinically recovered animal for years. The virus remains inactive and "hidden" following an infection and is thought to be re-activated by stresses applied to the animal. Once the virus becomes reactivated, the infected animal sheds the IBR virus through secretions of the eyes, nose and reproductive organs. Animals infected with these "hidden" viruses are frequently considered to be reservoirs of the disease. Animals clinically sick with IBR also spread the virus via secretions of the eye, nose, and reproductive organs. As the virus spreads from animal to animal, it becomes increasingly "hotter", that is, its ability to cause disease increases.

The virus that causes IBR is capable of attacking many different tissues in the body and, therefore, is capable of producing a variety of *clinical disease forms* according to which tissues of the animal it infects. The clinical diseases caused by the IBR virus can be grouped as (1) respiratory tract infections, (2) eye infections, (3) abortions, (4) genital infections, (5) brain infections, and (6) a generalized infection of newborn calves.

Clinical signs associated with the IBR *respiratory tract infections* are usually confined to the upper respiratory tract (nose, throat, and wind-pipe). Signs include difficult inhalation; rapid breathing; and a profuse, clear, watery nasal discharge that, as the infection progresses, becomes a sticky yellow discharge that hangs in long strands from the nostrils. The infected animal takes on a body stance with the head and neck extended, exhibits mental depression and a decreased appetite, and has an elevated body temperature that ranges from 104 to 108°F. Most infected animals rapidly lose weight, and eventually the nostrils become encrusted. If the crusts on the nostrils are rubbed off, the nose looks very red and inflamed, hence the term "red nose."

The respiratory form of IBR is usually observed after concentrating susceptible cattle together. Large numbers of cattle in close contact provide an ideal situation for the rapid spread of the shedding IBR virus. It requires about one week following infection for the initial signs of the disease to appear, and it will last for 10 to 14 days in most susceptible animals.

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How long it takes the disease to travel through the herd depends on how closely the cattle are confined. It could take less than a month for the disease to go through a pen of feedyard cattle in close confinement, or several months for it to travel through a group of spread-out, pastured cattle. In general, the respiratory form of IBR does not cause death. The stresses associated with this disease reduce the resistance to other infections. The other infections cause death.

The ocular or eye form of IBR infections may occur either with the respiratory form of the disease, or by itself, manifested only as a severe inflammation of the delicate lining of the eyelids and the "whites of the eye" (conjunctivitis). The infection usually occurs in both eyes. Initially the excessive tear production can give the eye a "clean scrubbed" appearance while the rest of the face is very dirty due to dust accumulation on areas wetted by overflowing tears. Although large amounts of tears occur and the edges of the eyelids may show to be crusty, rarely will we see a white spot in the center of the eye. If that white spot in the center of the eye develops, it is usually due to another infection superimposed on the IBR infection. Again, for control, IBR eye infections may need to be differentiated from "true pinkeye" which supposedly starts in the center of the eye rather than the "whites" of the eye.

Abortions due to IBR are thought to occur following exposure to IBR virus from two different sources. In the first source, after exposure to the natural disease strain of IBR, the virus multiplies in the upper respiratory tract and begins to circulate in the blood stream of the susceptible animal. During circulation, the IBR virus migrates to the uterus of the pregnant cow. Once in the uterus, the virus invades the fetal blood system and the fetus. After the fetus is infected, widespread multiplication of the IBR virus occurs. Infection of the fetus may occur at any stage of pregnancy, but if the fetus is about four to six months of age, fetal death may result. The fetus dies one to three days after replication of the virus begins in its body. Abortion then occurs within two to seven days after death of the fetus. The whole process from initial infection of the cow to abortion may be as short as 18 days or as long as three months. Hence, abortion occurs during the sixth to ninth month of pregnancy. The second source of IBR virus that has resulted in abortions is vaccination of non-protected pregnant cows, or of calves nursing non-protected pregnant cows, with replicating IBR vaccines. Calves recently vaccinated with the modified virus can shed the replicating vaccine virus to the cows. Replicating IBR vaccines are modified live IBR virus vaccines that replicate in the body of cattle following intramuscular or subcutaneous injection. The replicating form of IBR vaccine virus has been modified so that it will not cause disease in mature animals or calves. However, in non-protected cows, these modified viruses can cross into the fetus, cause fetal infection and death, and result in abortion.

Cattle that exhibit the gential form of the IBR disease complex are primarily sexually mature males and females. The signs of the genital infection in the cow include a thick, white- to brownish-colored vulvar discharge that clings to the vulvar tuft of hair. The vulva is swollen, and upon examination the lining of the vulva and vagina will be reddened, contain patches of sloughing tissue and/or contain small pus-filled pimples (pustules). Hence the name *Infectious Pustular Vulvovaginitis* (IPV). The vaginal-vulvar infection causes severe irritation, causing the cow to hold her tail in an elevated position, exhibit excessive tail-switching, and urinate frequently. Pustules and discharges similar to those seen in the cow may be observed on the bull's penis and prepuce. The genital IBR infection in the bull is believed to result from mating with an IPV-infected female. In both the male and female, the irritation caused by the infection results in a temporary loss of the desire to mate. The course of IPV is usually 2 to 3 weeks and abortions or respiratory symptoms are not usually present.

IBR brain infections have been found to occur in young beef and dairy calves. The infected calf refuses to eat and exhibits intermittent generalized tremors with periods of excitement that are characterized by uncoordinated movements, running, circling and stumbling. These symptoms are usually followed by mental depression, physical collapse, coma and death.

A fatal generalized IBR infection occurs in newborn calves that become infected in the uterus or early after birth. This condition is often associated with a herd experiencing abortions.

The body temperature of the calf may exceed 104° F and is accompanied by a complete loss of appetite, mental depression and respiratory distress. This may very well be the fate of the IBR-infected fetus that survived the multiplication of the virus and was not aborted.

## Treatment and Prevention of IBR

As with other viral infections, there is no antibiotic or sulfonamide treatment available for IBR infections. However, since the resistance level to other diseases is substantially reduced in cattle exhibiting clinical signs of IBR, antibiotic or sulfonamide treatment must be administered to reduce the challenge of other infections.

The question of whether to vaccinate during an IBR outbreak in a herd of susceptible pregnant cows becomes one of relative probabilities. Vaccination of confined animals during the early stages of an IBR outbreak (before abortions start) would probably reduce the incidence of abortions, since early protection could be provided for animals that were not yet infected. However, in confinement situations where the cows have already started to abort, we must assume that many cows have already been exposed by the time the first abortion occurs. Vaccination in this instance could not be expected to dramatically reduce the incidence of abortion.

When animals are widely scattered, such as range cattle, fewer cows may be infected and on the way to aborting. In this situation, vaccination may be able to reduce the incidence of abortion but probably will not be able to completely stop abortions from occurring. Something else that we must consider is that gathering animals to administer vaccine may increase the probability of exposing uninfected cattle to the IBR virus.

In non-pregnant cattle (open cows, open heifers, bulls, and calves), I would choose to vaccinate the cattle during an outbreak of IBR. In this case, the vaccine form of choice is the IBR intranasal vaccine (described below).

The best way to control IBR is to *raise the resistance* to IBR before the disease challenge occurs. You raise the resistance by properly vaccinating the herd. IBR vaccine is available in three basic forms.

### Replicating IBR Vaccine

Modified Live Virus - should not be used in pregnant cows or in calves nursing pregnant cows. Usually requires only one injection to provide protection. A booster is recommended when an IBR exposure is anticipated.

### Non-Replicating IBR Vaccine

Killed Virus and Chemically Altered Virus are safe to use in all cattle. Requires two doses initially and an annual booster to provide adequate protection.

### Intra-Nasal IBR Vaccine

Intra-nasal IBR Vaccine is safe to use in all age cattle regardless of pregnancy status. Immunity is rapid but short-lived. This is the vaccine of choice to stimulate rapid resistance when an outbreak of IBR is occurring or is anticipated. A booster vaccination with a replicating or a non-replicating form of IBR vaccine is required to provide longer protection.

The basic principle of establishing an immune population **before** a disease appears is particularly important in the control of IBR, especially the abortion form of IBR.