

# Infectious Bovine RHINOTRACHEITIS

## *Immunization and Relationship to Incidence of Abortion*

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Infectious bovine rhinotracheitis (IBR) was first recognized as an infection of the upper respiratory tract of cattle. It is now well established that this virus produces abortion, often in epizootic proportions. The IBR virus can also produce infection of the genital tract, digestive tract, nervous system, mammary tissue and the eyes (2, 3, 4).

Infected dams frequently exhibit no signs of impending abortion. Abortions sometimes occur following an outbreak of respiratory illness in animals maintained on the same premises. The time from infection of the dam to abortion is variable, but according to reports, the average incubation period is between three and eight weeks. The existence of active IBR virus carrier animals has been demonstrated (1). Modified-live IBR virus vaccines have been suggested as a possible cause of IBR abortion.

Despite the apparent increased practice of IBR immunization, the incidence of abortion has been increasing annually. A total of 425 fetuses were submitted to the North Dakota State University Diagnostic Laboratory for diagnosis during the first four months of 1971 — twice the number of fetal specimens received during the same period of the

previous year. These fetuses represented only a small percentage of the total losses in the state.

A survey of North Dakota cattle producers was conducted to determine the relative effect of the use of modified-live IBR virus vaccines on the incidence of abortion in cattle.

### **Investigational Procedure**

A questionnaire was designed to determine the relative effect of IBR immunization practices upon the subsequent incidence of abortion in cattle. Following is a list of the major points which were to be examined through the analysis of responses on the questionnaires:

- (1) The effect immunization of dams against IBR has on the incidence of abortion.
- (2) The effect on the incidence of abortion produced when non-immunized pregnant females have direct contact with IBR vaccinates.
- (3) The effect method of breeding (artificial or natural) has on the incidence of abortion.
- (4) The trimester of gestation in which abortion most frequently occurs.

The questionnaire was distributed among the county extension agents of North Dakota. The extension agents mailed the questionnaires to producers within their respective counties, collected the answered questionnaires and returned them to this station. Responses to the questions were compiled and statistically analyzed.

### **Results**

Fifty extension agents returned questionnaires that had been answered by stockmen. A total of

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2,830 of the 5,800 questionnaires that were distributed were completed and returned for analysis. This represented an over-all response of 48.7 per cent.

A total of 2,708 herds were considered in this study. A summary of classes of herds separated according to IBR vaccination history is presented in Table 1.

**Table 1. Comparison of all classes of herds separated according to IBR vaccination history (1970-71).**

	1	2	3	4	5	6	
	Cows Only	Cows-calves contact	Cows-calves no contact	Calves contact	Calves no contact	No vaccination	Total
Abortions	8	7	6	97	63	676	857
No Abortions	11	11	5	103	70	1651	1851
Totals	19	18	11	200	133	2327	2708

The first class includes those herds in which the cows were IBR vaccinates. In the second class, both cows and calves were IBR vaccinates. In the third class, both cows and calves were vaccinated and calves did not have contact with the breeding herd. Class four represents the herds in which the calves were IBR vaccinated and had contact with the breeding herd. Class five includes the herds in which calves were IBR vaccinates but did not contact the pregnant females. Class six represents the herds that were not vaccinated.

Statistical analysis of these data indicated that a significantly greater percentage of those herds exposed to IBR vaccines, by vaccination or contact with vaccinates, had abortions than herds that had not been exposed to vaccine or directly exposed to vaccinates.

Herds in which dams had been vaccinated were compared with herds in which dams had not been vaccinated. A significantly greater proportion of those herds in which dams had been vaccinated against IBR had abortion problems.

Cattle herds in which calves had been immunized against IBR and subsequently had direct contact with pregnant cows were compared with herds in which no animal had been vaccinated against IBR. A significantly greater proportion of the herds in which dams had direct contact with vaccinates reported abortions than herds in which dams had not been exposed to the vaccine virus by this means.

There was no significant difference between the percentage showing abortions in artificially and naturally serviced herds in which IBR abortion had been diagnosed.

The data indicated that the frequency of abortion was increased significantly during the second and third trimester of gestation.

## Discussion

The IBR vaccines have been developed from isolates from respiratory tracts of IBR-infected animals. Therefore, it is possible that antibodies produced in response to this antigen do not produce significant immunity to uterine infection. Also, it has been suggested that antibodies may be of less importance in determining recovery from viral infections than was originally believed.

The results of this study suggest that IBR vaccinates may become carriers and active shedders of live virus. Such an animal might readily serve as a source of herd infection, causing an outbreak of abortions.

At this point, it cannot be stated specifically that the entire increase in the proportion of herds showing abortion can be attributed to IBR abortion. However, it is reasonable to assume that the herds aborting from IBR increased proportionately, because IBR abortions have occurred in epizootic proportions and the majority of the laboratory diagnosed abortions in this state, this year, have been attributed to this virus.

The decreased frequency of abortions in the first trimester of gestation with increasing frequency in the later stages of pregnancy, observed in this study, might be explained by considering the time the dam most probably becomes infected. Quite likely, the dam contracts the infection during the first trimester of pregnancy in the fall, since this is the time the cows would usually have contact with vaccinated calves. The fetus would be less vulnerable in early gestation because it requires several weeks for systemic distribution of the virus in the dam, fetal infection, death, and expulsion of the fetus to occur.

## LITERATURE CITED

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