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STUDIES ON SOME ASPECTS OF THE EPIDEMIOLOGY
OF BOVINE LEPTOSPIROSIS.

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ABSTRACT

A survey of bovine sera indicated that titres to *Leptospira interrogans* serovar *hardjo* were present in 60% of New Zealand cattle; 18% of sera were positive against serovar *pomona* and 9% against serovar *tarassovi*. Detailed studies were undertaken in a herd with a high prevalence of *hardjo* and *pomona* titres. It was determined that more than 90% of newborn calves acquired titres detectable by the microscopic agglutination test (MAT) after suckling sero-positive dams. The magnitude of the titre acquired by a calf was strongly correlated with that of its dam. These titres declined steadily, with a half-life of 15 to 17 days; most calves were sero-negative after 100 days of age and all by 190 days of age. Following natural infection cattle developed peak titres ranging from 1:768 to 1:8689 within fourteen days after sero-conversion. Initially these titres fell rapidly, declining on average by 62% in the first year and 89% in the first two years after infection. Thereafter titres declined slowly with a mean loss of 5% of residual titre per year.

Chromatographical studies on sera from cattle of various ages and at various stages of infection revealed that both IgM and IgG were involved in MAT response to leptospiral infection. Passively acquired titres in calves were largely attributable to IgG₁ antibodies. The MAT response of infected cattle was initially attributable IgM antibodies but IgG₁ antibodies were involved within the first week after sero-conversion and became the predominant immunoglobulin within 42 days. In convalescent titres of more than one year's duration IgM antibodies frequently were not involved and, in some animals apparently infected for some years, IgG₂ accounted for up to 14% of the MAT response.

Prospective cohort studies on groups of calves indicated that most became infected with *hardjo* at about 12 months of age during the winter and early spring. Analysis of climatic factors indicated that outbreaks of infection were strongly correlated with the level of moisture in the environment rather than rainfall *per se*. Susceptible calves became infected only following close contact with other leptospiruric cattle; no other wild, feral or domestic animal

reservoir of *hardjo* infection was detected. Leptospirosis was demonstrated to persist for up to 14 months in *hardjo*-infected cattle. The existence of an endemic cycle was demonstrated in which calves infected during one winter infected younger, susceptible calves in the following winter.

Evidence was presented to support an hypothesis that bovine *pomona* infection is a self-limiting sporadic disease which is attributable to direct or indirect contact with infected pigs. The survival of *pomona* for six weeks in an acidic soil (pH 5.5) under simulated Manawatu winter conditions and the potential for spread of this serovar from pigs to cattle via the environment was demonstrated.

The existence of a period of up to three months after the loss of detectable colostral MAT titres during which calves appear to be refractory to experimental inoculation with *hardjo* was demonstrated. It was also shown that convalescent *hardjo* titres are protective against experimental challenge of cattle with that serovar. On the basis of experimental studies it is believed that cattle are susceptible to infection with *balcanica* and that it is not possible to distinguish between bovine infections with this serovar and *hardjo* except by cultural techniques.

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