

Epidemiology of *Neospora caninum* Infection in Oklahoma Beef and Dairy Cattle

Terry W. Lehenbauer¹, Sandra J. Rodgers², R. Gayman Helman², Jeremiah T. Saliki²

¹Department of Infectious Diseases & Physiology

²Oklahoma Animal Disease Diagnostic Laboratory

College of Veterinary Medicine

Oklahoma State University

Stillwater, OK 74078-2006

Abstract

Neospora caninum is a protozoan parasite that is closely related to *Toxoplasma gondii* and is considered to be an important cause of abortion in cattle, especially dairy cattle. Infection with this parasite may also cause decreased milk production and increased risk of culling for dairy cattle. The complete life cycle of this organism is not known. Two studies were conducted to provide epidemiological information about *N. caninum* infection in Oklahoma cattle. The presence of specific *N. caninum* antibodies in sampled cattle sera was determined by using an ELISA test kit. Reported relative operating characteristics for this test were 98.6% sensitivity and 98.9% specificity using a 0.5 sample to positive (S/P) ratio as the assay cutoff to distinguish positive from negative samples.

Prevalence surveys of *N. caninum* infection in cattle from U.S. herds have been primarily based on either diagnostic laboratory accessions associated with bovine abortions or samples from herds experiencing abortion problems. The purpose of the first study was to measure the prevalence of *Neospora caninum* in Oklahoma dairy cattle from herds that did not have a recent history of abortion problems or outbreaks. Nearly 1,000 samples were obtained from cattle in 16 dairy herds located across Oklahoma. Herd size ranged from 40 to 600 milking cows. Every sampled herd yielded at least one or more positive animals. The overall seropositive rate was 14.7% with herd prevalence ranging from 3.3% to 30.5%. There was no significant increase in seropositive rate with increasing age of cattle which was in agree-

ment with the transplacental route being the only mode of transmission that is currently recognized. Herd culling rates were influenced by herd seropositive rates. Negative trends were observed for the association between serological status and some milk production and reproductive performance variables, but the sample size was insufficient for detecting significant results. Based on the results of this study, *Neospora caninum* infection is endemic in Oklahoma dairy cattle.

A second study was conducted to estimate the relative risk that abortion status, age, sex, and production class (dairy or beef) had on *N. caninum* seroprevalence rates. Sera from 1,517 beef and dairy cattle submitted to the Oklahoma Animal Disease Diagnostic Laboratory over a 3-year period were evaluated for antibodies to *N. caninum*. Abortion was the clinical diagnosis for 794 of these samples; the clinical diagnoses were other than abortion for the remaining 723 samples. The percent positive in abortion and non-abortion samples was significantly different at 18.0% and 6.8%, respectively. The approximate relative risk or odds ratio for abortion cases being positive for *N. caninum* compared to non-abortion cases was 4.8 and 3.5, respectively, for beef and dairy cattle. The odds ratios for dairy cattle being positive compared to beef cattle were 1.8 and 2.4 for abortion and non-abortion cases, respectively. There were no significant differences in the seropositive rates between male and female cattle and for different age groups. Although the estimated risk of infection was greater in dairy cattle compared to beef cattle, *N. caninum* appears to be an important factor for abortion in both beef and dairy cattle.