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### Short Communication

## Seroprevalence of *Neospora caninum* Infection in Dairy Cattle in Tabriz, Northwest Iran

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### ABSTRACT

**Background:** The aim of this study was to determine the seroprevalence of antibody to *Neospora caninum* in healthy and aborted dairy cattle in Tabriz, capital of East-Azarbaijan in northwest of Iran.

**Methods:** In this cross-sectional study serum samples were collected from 266 healthy and aborted Holstein-Friesian cows from September 2008 to August 2009. The sera were analyzed to detect of antibody against *N. caninum* using the commercially ELISA kit.

**Results:** Seroprevalence of antibody to *N. caninum* was 10.5% in Tabriz dairy cattle. Also the abortion rate in all cattle sampled was 33.6% but percentage of seropositive aborted cattle was 18.4%.

**Conclusion:** Neosporosis could be one of the possible causes of abortion in dairy cattle in Tabriz and regarding the distribution in dogs as definitive host for the parasite, further studies in dog and cattle are recommended.

**Keywords:** *Neospora caninum*, Seroprevalence, Dairy cattle, Iran

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## **Introduction**

**N***eospora caninum* is one of the most important causes of abortion in cow worldwide (1). The first report of the disease was from Norway in 1984 in a dog with neuromuscular degeneration leading to hind limb paralysis (2). The development cycle of the parasite is indirect and dogs and coyotes are definitive host which sexual phase of development, resulting from the shedding of oocysts in the feces. Intermediate hosts such as bovine are infected by oocysts shedding of infected dogs (3). In many countries neosporosis is the major cause of reproductive failure, with considerable economic losses. Abortion is the main clinical manifestation of bovine neosporosis in cattle (4). Since the presence of antibody activity specific to *N. caninum* is indicative of infection, detect of antibody of *N. caninum* in sera samples of aborted bovine is the major methods for study of epidemiology of neosporosis (5). For this purpose a number of serological testes have been described, including indirect fluorescent antibody test (IFAT), the direct agglutination test (DAT) and Enzyme-Linked immunosorbent assay (ELISA) and immunoblots (IB) (6).

Although neosporosis has been reported from many parts of the world by investigations there are a few published reports on its occurrence in Iran (7-10). The aim of this study was to determine the seroprevalence of antibody to *N. caninum* in healthy and aborted dairy cattle in Tabriz, center of East-Azarbaijan Province, northwest of Iran.

## **Materials and Methods**

### ***Sampling***

This study was conducted from September 2008 to August 2009 in Tabriz capital of East-Azarbaijan in northwest of Iran. The

province has an estimated 70,000 cattle. Since the prevalence of neosporosis in Tabriz has not yet been reported, the prevalence of infection was assumed 50%. Furthermore, desired sample size by using a 95% level of confidence and 6% precision, was 266(11). Sampling were done by random cluster sampling method. Blood samples from Holstein-Friesian cows were collected by disposable needles and were transported to the parasitology laboratory and centrifuged at 1000 rpm for 10 min. All sera were stored at -20 °C until testing. Cow's age, season of abortion outbreak and semester of pregnancy in aborted cows were recorded.

### ***ELISA method***

For serological analysis, an indirect noncomparative ELISA described by Crowther was used (12). The sera were analyzed for detecting antibody to *N. caninum* by using the commercially ELISA kit (IDEXX, USA) according to the manufacture's instruction. OD of 0.15 was considered as cut-off based on the instruction of manufacture and, the ratio of sample for positive control was  $\geq 0.2OD$ .

### ***Statistical analysis***

A chi-squared test was used to analyze the association between infection to *N. caninum* and factors such as season of probable abortion outbreak and trimester of abortion. For the statistical analysis SPSS (Version 14) software was also used.

## **Results**

From 266 cattle sampled, 28 (10.5%) were seropositive to *N. caninum*. The percentage of seropositive aborted cattle was 18.4%.

The most rate abortion due to neosporosis was occurred in 4-6 years age group and the relationship was significant ( $P<0.05$ ) (Table 1). In addition there was a significant difference between abortion and winter as well as

trimester of pregnancy ( $P<0.05$ ). The highest risk of abortion due to neosporosis is in winter and during the third trimester of pregnancy gestation. But this difference is not significant.

**Table1:** Season of abortion, semester of abortion and age in 76 aborted cows

Season of abortion No. (%)				Semester of pregnancy No. (%)			Age(Years) No. (%)		
Spring	Summer	Autumn	Winter	1	2	3	<4	4-6	>6
10 (13.1)	13 (17.1)	26 (34.2)	27 (35.5)	0 (0)	34 (44.7)	42 (55.2)	29 (36.7)	35 (46)	12 (15.7)

## Discussion

The present study is the first to report on the seroprevalence of *N. caninum* in cattle in Tabriz. This study showed that the seroprevalence of antibody to *N. caninum* is 10.5% in dairy cattle in Tabriz. Also percentage of seropositive aborted cattle was 18.4%. Although the presence of antibodies to *N. caninum* in cattle only indicate expose to the parasite, probability of abortion in seropositive cattle is twice higher than in seronegative cattle (13).

In other investigation in Iran with *N. caninum*, serological results showed a considerable variance. The prevalence of infection in the present study seemed comparable with Sadrbazzaz et al. (2004) and Hajikolaei et al. (2008), in which they presented the seroprevalence of *N. caninum* in dairy cattle was 18% and 21% in Ahvaz and Mashhad (7,10). This difference may be due to type of test used, their cut-off points and other characteristics. In other studies in Iran about *N. caninum* the seroprevalence of the parasite was denoted in healthy and aborted cattle.

The results of this study showed that there was a significant relationship between abortion and age in neosporosis. The highest risk

of abortion due to neosporosis was in the 4-6 years old of cattle. Relationship between neosporosis and abortion is a speculative. Jensen et al. reported that seroprevalence increases with age (3). Razmi et al. reported the highest risk of abortion due to neosporosis in 1-2 years old cattle, and Sanderson et al. reported it in cows above 6 years of age (4,9). In contrast, Hajikolai et al. and Sadrebazzaz et al. showed no significant difference between age and seropositivity to neosporosis (7, 10).

The results of this study showed that was a significant difference between abortion and winter as well as trimester of pregnancy. The highest risk of abortion due to neosporosis is in winter and during the third trimester of pregnancy gestation. This result is not in agreement by Ortega and Yaeger et al. who presented that most abortions due to neosporosis occur during mid-gestation (6, 14). In other studies it is indicated that cows of any age may abort from 3 months of gestation to term (1).

It is concluded that neosporosis could be one of the possible causes of abortion in dairy cattle in Tabriz and regarding the distribution in dogs as definitive host for the parasite,

further studies in dog and cattle are recommended.

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