Serological study of *Neospora caninum* infection in cattle from Ahvaz area, Iran

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Abstract: **In order to investigate the seroprevalence of *Neospora caninum* infection in cattle in Southwestern Iran, blood samples were collected from Holstein (121 animals) and cross-breed (436 animals) cattle from three farms and seven areas of Ahvaz, respectively. All of the Holstein cattle were ≥4 years old but cross-breed cattle were from different age groups (< 2, 2-4, 5-6 and > 6 years old). Sera were examined by commercial ELISA kit. Anti - *N. caninum* antibodies were detected in 117 (21%) sera out of 557 tested. A Significant difference was found between Holstein (53.71%) and cross-breed (11.93%) cattle although there were not any significant differences between age groups.**

Key words: *Neospora caninum*, Cattle, Ahvaz, Iran.

Introduction

The protozoan parasite, *Neospora caninum*, is a major pathogen of cattle and dogs, being a significant cause of abortion in cattle in many countries (Dubey *et al.*, 2006). Cattle infected with the parasite are three to seven times more likely to abort compared to uninfected cattle. The parasite may be transmitted to cattle through the ingestion of oocysts or by congenital infection from mother to fetus via the placental (Innes *et al.*, 2005). Clinical signs have only been reported in individual calves younger then two months of age (Dubey, 1999b). Abortion is the only clinical sign observed in adult cows. Abortion due to *N. caninum* can occur at any time of gestation but the majority of abortions occur at 5-6 months of gestation (Dubey, 1999b; Hall *et al.*, 2005).

Since the recognized *N. caninum* in the 1980, there are only three reports about the seroprevalence of bovine neosporosis in Iran, which were reported by Badiei *et al* (2002) from Tehran (Center Iran) and by Sadrebazaz *et al* (2004) and Razmi *et al* (2006) from Mashhad (khorasan province), Northeastern Iran. The aim of this study was to determine the seroprevalence of *N. caninum* infection in cattle for the first time in Ahvaz (Khouzestan province), Southwestern Iran.

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Materials and Methods

Blood samples were collected from Holstein (121 animals) and cross-breed (436 animals) cattle in Ahvaz. Holstein cattle were selected from three farms but cross-breed cattle were selected from seven areas of Ahvaz. All of the Holstein cattle were ≥4 but cross-breed cattle were divided into four age groups (< 2, 2-4, 5-6 and > 6). Serum was collected after centrifugation at 2500´g for 10 min. All sera were stored at - 20°C until examination. Sera were tested for the presence of anti - *N. caninum* antibodies by ELISA kit (IDEXX laboratories). According to the manufacturer's instruction, the presence or absence of antibody to *N. caninum* was determined by sample to positive (S/P) ratio for each sample. Serum samples with S/P ratios less than 0.50 were classified as negative and greater than or equal to 0.50 were

classified as positive for *N. caninum* antibodies.

$$S/P = \frac{sample - NC\bar{X}}{PC\bar{x} - NC\bar{x}}$$

$NC\bar{x} = Negative \quad control \quad mean$

$PC\bar{x} = Positive \quad control \quad mean$

All obtained results related to breed, farm and age factors were analyzed by Chi-square test using soft ware SPSS, Trial version 9.0.

Results

Anti - *N. caninum* antibodies were detected in 117 (21%) cattle sera out of 557 tested. Upon statistical analysis of the results obtained, significant differences were found between Holstein (53.71%) and cross-breed (11.93%) cattle (table1). All Holstein farms presented seropositive animals however the occurrence observed in farm 1, 2 and 3 were 68.89%, 38.78% and 44.45%, respectively, and difference between these farm was significant (p=0.014).

As shown in table1, the rate of seropositive animals in area of 1 to 7 was 3.57%, 20.75%, 20.59%, 11.11%, 9.68%, 12.12% and 7.69%, respectively and difference between these area was significant (p=0.024). The proportion of seropositive animals in per age groups of cross-breed cattle is shown in table2. Statistical analysis showed that there was not an age-dependent antibody response (p=0.674).

Discussion

Serological study of Neosporosis was carried out in some countries and the results had considerable variance. These differences may be due to climate conditions, type of test, size of the herds and others else. For examples, all the studies which used the IFAT method, the cut - off points were different, thus making it difficult to compare these results. On the other hand, it is plausible that the climate condition influenced the seroprevalence at the herd and within herd level (Romero, 2005). For example, warm temperatures and humidity condition can promote the survival of oocysts (Sporulated and not - Sporulated) in soil and pastures for many months (Dubey, 1999a). The prevalence of infection in the

Table 1: Comparison of seroprevalence of *N. caninum* infection in Holstein and cross–breed cattle.

Breed	Herd or area	No. of animal	No. of positive (%)	No. of negative (%)
Holstein	1	45	31(68.89)	14(31.11)
	2	49	19(38.78)	30(61.22)
	3	27	15(55.55)	12(44.45)
	Total	121	65(53.71)	56(46.29)
Cross–breed	1	56	2(3.57)	54(96.43)
	2	53	11(20.75)	42(79.25
	3	68	14(20.57)	54(79.41)
	4	27	3(11.11)	24(88.89)
	5	62	6(9.68)	56(90.32)
	6	66	8(12.12)	58(87.88)
	7	104	8(7.69)	96(92.31)
	Total	436	52(11.93)	384(88.07)

Table 2: Seroprevalence of *N. caninum* infection in relation to age in cross–breed cattle.

Age	No. of animal	No. of positive (%)	No. of negative (%)
<2	80	11(13.75)	69(86.25)
2-4	124	15(12.1)	109(87.9)
5-6	113	10(8.85)	103(91.15)
>6	119	16(13.45)	103(86.55)
Total	436	52(11.93)	384(88.07)

present study seemed comparable with those reported else where in similar and non - similar conditions (Romero *et al.*, 2005; Sadrebazzaz *et al.*, 2004). The Costa Rican climatic condition is warm temperatures and humidity as same as of Khouzestan and the percentage of seropositive in Holstein cows was 43.2% (Romero *et al.*, 2005) but in Mashhad, Northeastern of Iran, which has warm temperature and dry climate, the percentage of seropositive in Holstein cows was 14.88% (Sadrebazzaz *et al.*, 2004).

In the present study there was a significant difference between cross-breed and Holstein and the later was seropositive higher than the other one. It might be due to the difference in the number of cattle

in a herd, because the ranges of the number of cattle in Holstein and cross-breed farms were 90-220 and 10-35, respectively. Although genetic predisposition to suffer neosporosis has not been mentioned in cattle, but the differences in the management between dairy and beef herds could explain the high prevalence of neosporosis in dairy cattle compared with that in beef cattle (Moore, 2005). Romero *et al.*, (2005) reported the percentage of seropositive cows was higher in jersey and Jersey / Holstein crosses compared to pure Holstein. In the study of Sadrebazzaz *et al* (2004) there were no significant differences in seroprevalence between the Holsteins and Brown Swiss breeds. And in the study of Guimarae *et al* (2004) seroprevalence in Holsteins was greater than mixed - breed cattle.

In the present study there was no association between *N. caninum* infection and age factor in dairy cattle. Association between seroprevalence infection of *N. caninum* and the age of animal was considered previously. For example, Sadrebazaz *et al* (2004) and wouda *et al* (1999) reported that there was no association between seroprevalence of *N. caninum* antibodies and the age of cattle. But kashinazaki *et al* (2004), Fuji *et al* (2001) and Guarino *et al* (2000) found that *N. caninum* prevalence increased with the age of cattle and buffaloes. According to the nature of parasite which transmitted both horizontal (postnatal) and vertical (congenital), it could be concluded that both of the two methods of transmission had an effect on the spread of *N. caninum* in Ahvaz, so that Kashiwazaki *et al* (2004) believed that postnatal infection was more important than congenital infection in dairy farms in Uruguay.

Based on the serology results it is concluded that neosporosis could be as one of the possible causes of abortion in cattle in this area.

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بررسی سرولوژیکی آلودگی به نئوسپورا کانینوم در گاوهای منطقه اهواز، ایران

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چکیده

به منظور بررسی آلودگی سرمی گاوهای اهواز به نئوسپورا کانینوم، نمونه خون از ۱۲۱ راس گاو هلشتاین و ۴۳۶ راس گاو دورگ به ترتیب از ۳ دامداری و هفت منطقه اهواز اخذ گردید. همه گاوهای هلشتاین بالای ۴ سال بوده و گاوهای دورگ به ۴ گروه سنی کمتر از ۲، ۴-۲، ۶-۵ و بزرگتر از ۶ سال تقسیم شدند. سرمها جهت جستجوی پادتن ضد نئوسپورا کانینوم با استفاده از کیت تجاری الیزا مورد آزمایش قرار گرفتند نتایج نشان داد که. (۲۱ درصد) ۱۱۷ راس از گاوهای تحت مطالعه دارای پادتن ضد نئوسپورا کانینوم بودند. تجزیه و تحلیلی آماری نشان داد که اختلاف معنی داری بین فراوانی آلودگی در گاوهای هلشتاین (۷۱/۵۳ درصد) و گاوهای دورگ (۹۳/۱۱ درصد) وجود داشت، گرچه هیچگونه اختلاف معنی داری بین گروههای سنی مختلف مشاهده نگردید.

واژه‌های کلیدی: نئوسپورا کانینوم، گاو، اهواز، ایران.

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