Short Paper

A survey on cryptosporidial infection in horse in Urmia area, northwestern Iran

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(Received 24 Apr 2005; revised version 24 Oct 2005; accepted 29 Oct 2005)

Summary

To investigate the prevalence of *Cryptosporidium* infection in horses, a total of 221 faecal specimens were collected from 18 villages of Urmia, northwestern Iran. The samples were studied microscopically by modified Ziehl-Neelsen staining. The cryptosporidial infection was found in the collected samples from 11 of 18 villages. Although the prevalence of the infection was 15.8%, none of the infected horses appeared clinically ill.

Key words: *Cryptosporidium*, Horses, Urmia, Iran

Introduction

Cryptosporidium is able to infect the digestive or respiratory tracts of many vertebrate species. Of the eight valid species (Fayer *et al*., 1997), *C. parvum* has the broadest host range and this species is infectious for more than 80 species of mammals including human (O'Donoghue, 1995; Majewska *et al*., 1997). *Cryptosporidium* causes acute or asymptomatic self-limited infection in adult animals and immunocompetent human, but in young livestock, particularly ruminants, as well as in immunocompromised human, the infection may often be fatal. In comparison to epidemiologic data for bovine and human cryptosporidial infection, there is little information concerning equine *Cryptosporidium* infection (Casemore *et al*., 1997; Fayer *et al*., 1997). Although equine cryptosporidiosis has been reported in various regions of the world and has been connected with diarrhoea in foals, some aspects of the infection still remain unclear (Snyder *et al*., 1978; Coleman *et al*., 1989; Fernández *et al*., 1988; Netherwood *et al*., 1996; Xiao and Herd, 1994; Beelitz *et al*., 1996; Olson *et al*., 1997). Furthermore, considering the importance of the horse in this region, the role of equine cryptosporidial infection, as a source of zoonotic disease, should be elucidated. Davoodi and Noori (2000) were reported an infection rate of 8% in horses in Miandoab area. Naghibi and Vahidi (2002) reported a rate of 26.7% in Mashhad. However, no detailed quantitative study has been carried out in Urmia, northwestern Iran. The present study was undertaken to investigate the prevalence of *Cryptosporidium* infection in horses in 18 localities of Urmia region, northwest of Iran

Materials and Methods

Between September 2002 and May 2003, faecal samples from 221 (140 male and 81 female) horses were randomly collected from 18 villages of Urmia region (Table 1, Fig. 1). This area is a semi-humid region, with a mean rainfall of 350 mm with the maximum mean temperature of 28.3°C

Table 1: Data obtained from 221 working horses from 18 localities in Urmia region, northwest of Iran, tested for cryptosporidial infection.

Locality	Positive (%)		Age				Sex			
			<5		≥5		Male		Female	
			No	Positive (%)	No	Positive (%)	No	Positive (%)	No	Positive (%)
A	15	4(26.6%)	9	3(33.33%)	6	1(16.66)	12	4(33.33%)	3	-
B	17	7(41.1%)	9	3(33.33%)	8	4(50%)	12	3(25%)	5	4(80%)
C	2	-	2	---	-	-	-	-	2	-
D	22	5(22.72%)	9	3(33.33%)	13	2(15.38%)	9	2(22.22%)	13	3(23.07)
E	2	1(50%)	2	1(50%)	-	-	-	-	2	1(50%)
F	7	3(17.64%)	10	2(50%)	7	1(14.28%)	6	1(16.66%)	11	2(18.18%)
G	5	2(40%)	-	-	5	2(40%)	3	2(66.66%)	2	-
H	9	1(11.11%)	1	-	8	1(12.5%)	4	-	5	1(20%)
I	1	-	-	-	1	-	1	-	-	-
J	4	-	-	-	4	-	1	-	3	-
K	2	-	-	-	2	-	-	-	2	-
L	30	7(23.33%)	10	3(30%)	20	4(20%)	27	7(25.92)%	3	-
M	3	1(33.33%)	-	-	3	1(33.33%)	2	1(50%)	1	-
N	22	3(13.63%)	6	-	16	(18.75%)	19	3(15.78%)	3	-
O	6	1(16.66%)	4	-	2	1(50%)	4	1(25%)	2	-
P	19	-	5	-	14	-	12	-	7	-
Q	9	-	5	-	4	-	4	-	5	-
R	36	-	3	-	33	-	24	-	12	-
Total	221	35(15.83%)	75	15(20%)	146	20(13.69%)	140	24(17.14%)	81	11(13.58%)

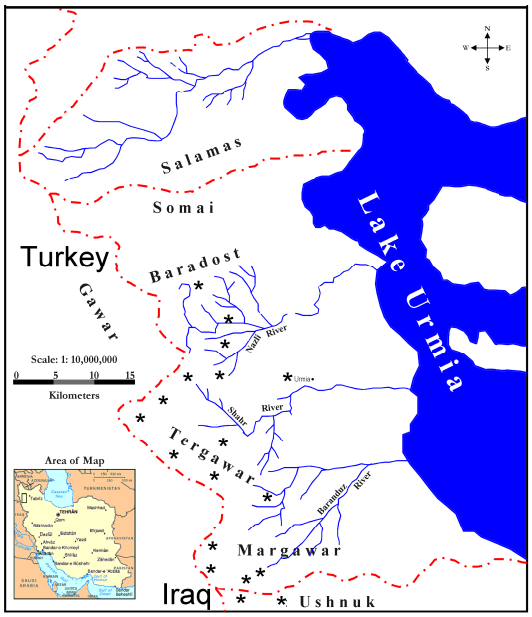

Fig. 1: Geographical location of the sampled villages in northwest of Iran. Asterisks indicates the areas where samples were taken

in August and the minimum mean temperature of -5°C in January. Most faecal samples were taken directly from the rectum of each animal; some samples were collected from fresh faeces on the ground. The date of collection, the name of village, age and sex of each horse and the name of the owner were recorded. Age was estimated by examination of teeth. The horses in 18 villages were kept in stables and they had free grazing. Most of horses were used for working. According to the West Azerbaijan Veterinary Organization, there are approximately 3,000 horses in Urmia area. According to the previous study (Davoodi and Noori, 2000), the prevalence of cryptosporidiosis in horse was 8%, so the sample size increased to 221 for more accuracy.

χ^2 test was used for analysing statistical association between the data results. Differences were considered significant when $p<0.05$.

To demonstrate *Cryptosporidium* oocysts, thin smears of emulsified faecal specimens were dried, stained by modified Ziehl-Neelsen technique (Anonymous, 1991) and examined using oil ocular (×1000). In each positive slide, the size of at least ten cryptosporidian oocyst was measured by micrometric eyepiece.

Results

Results of the microscopic examination for *Cryptosporidium* are shown in Table 1. Of 221 samples taken, 35 (15.8%) were positive for the infection. Twenty-four (17.1%) males and 11 (13.6%) females were positive; the age of these animals ranged from one to 12 years. Of 18 locations, 11 had infected horses. Twenty percent of horses aged <5 years and 13.9% of those aged ≥5 years had infection with *Cryptosporidium* (Table 1).

No significant differences between the

rate of infection in different ages, sexes and different villages was observed. The measurement of the size of oocyst in each positive faecal smear revealed that all horses were, most probably, infected with *C. parvum*. The mean size of the oocysts was 4.5 × 4.1 (SD: 0.4 × 0.3) µm (Fig. 2).

Discussion

This is the first report of cryptosporidial infection in horses in Urmia region. The infection was identified in animals on 11 of 18 examined villages. It indicates that equine cryptosporidiosis is associated with particular localities. Absence of equine cryptosporidiosis was previously reported in other parts of the world and was associated neither with the age of the horses nor with the mode of life, i.e., whether they are feral or domestic (Reinmeyer *et al*., 1984; Abou-Eisha, 1994; Johnson *et al*., 1997; Bray *et al*., 1998).

In our study, the overall rate of cryptosporidial infection in horses was higher than that reported by authors from Germany, Poland and Texas and Colorado, USA, which ranged from 0.33–9.4% (Beelitz *et al*., 1996; Cole *et al*., 1998; Forde *et al*., 1998; Majewska *et al*., 1999). The rate however was lower than that reported by researchers from Canada and other localities of Louisiana, Colorado and Texas, USA which ranged from 17–100% (Snyder *et al*., 1978; Coleman *et al*., 1989; Xiao and Herd, 1994; Olson *et al*., 1997).

The age distribution among horses in this area is relatively even, ranging from one to 12 years; only 3.2% of horses were over 11 years. This low life expectancy of working horses is consistent with surveys done in Mediterranean countries (Svendsen, 1991), Morocco (Pearson and Oussat, 1996; Wallace, 2003) where few donkeys were found with age over 12 years. This is in stark contrast to those found in countries such as Britain where they have an average life expectancy of 37 years of age (Svendsen, 1991). The reasons behind this are numerous but are based around the fact that equines in the UK perform less work and receive on the whole better veterinary care. It is important to note that the area of the study was exactly located between the territories of Iran, Turkey and Iraq, and the residents of the area are usually traveling and transact by horses (because of the

Fig. 2: *Cryptosporidium* oocyst in horse faeces (×100)

harshly mountainous route). This is the reason for native inclination to buy and keeping the adult horses and they have little tendency for keeping young and older animals. Indeed, for the higher cost of raising young animals, the farmers are showing little interest toward keeping foals. So samples in this study were mostly taken from adult animals.

The prevalence rate of infection in our study area was also higher than Davoodi and Noori (2000) study conducted in Miandoab area. The reason for this difference might be due to the unsuitable hygienic and horse keeping conditions in Urmia area.

Those infected horses with *Cryptosporidium* could be a significant source of the parasite, both for other animals (including humans) and for the environment. In addition, horse faeces that used for soil fertilization, also enhanced the likelihood of contamination of food and watersheds.

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