Introduction

Cryptosporidiosis is basically a gastrointestinal infection caused by the coccidian protozoa called Cryptosporidium (Chacin-Bonilla, 1995). Cryptosporidium is also able to infect the respiratory tracts of many vertebrate species. Of the eight valid species (Fayer, 1997), C. parvum has the broadest host range and this species is infectious for more than 80 species of mammals (O’Donoghue, 1995). Cryptosporidiosis has been detected in dogs, cats, and horses and these animals may represent an important reservoir of infection for humans. Cryptosporidiosis in horses was initially described in 5 immuno-deficient Arabian foals. Subsequently, however, cryptosporidiosis has been reported in immuno-competent horses worldwide (Santin and Trout, 2007). Cryptosporidium causes acute or asymptomatic self-limiting infection in adult animals and immune-competent humans, but in young livestock, particularly ruminants, as well as in immune-compromised humans, the infection may often be fatal. In comparison with epidemiological data for bovine and human cryptosporidial infection there is scant information concerning equine Cryptosporidium infection (Fayer, 1997). The major clinical sign of Cryptosporidiosis in foals is diarrhea, but most Cryptosporidium infections in adult horses are asymptomatic (Santin and Trout, 2007). Infection in horses is limited to the small intestine. Gross lesions may consist of hyperemic intestinal mucosa and yellowish intestinal contents (Aiello, 2005). Though equine cryptosporidiosis has been reported in various regions of the world (Olson et al, 1997; Santin and

Abstract

To investigate the prevalence of Cryptosporidium infection in horses, a total of 100 fecal specimens were collected randomly from five farms in Ardabil. Samples were taken during a year, 25 specimens each season. The presence of oocysts in the samples was confirmed by modified Ziehl-Neelsen staining of direct smears of the fecal material from each horse. The overall infection rate of horses was 19% . The infection rates in spring, summer, autumn and winter were 21%, 45%, 5% and 2%, respectively. The results show a significant relationship between infection and season and most of the infected cases were seen in summer.

Keywords: Cryptosporidium, horse, Ardabil, oocysts, infection and Iran.
Trout, 2007). This report presents the infection of Cryptosporidium in the horse of Ardabil the city of Iran.

**Materials and Methods**

A total of 100 fecal specimens were collected randomly from five farms in the different regions of Ardabil city. Horses were maintained almost under the same housing and feeding situation and were taken to pasture during spring and summer. All the horses were 3-8 years old. Samples were taken from different clinically healthy breeds, during April 2013 and March - 2014, 25 specimens each season (five samples from each farm). Five grams of fresh, formed stool was collected from each horse. Each fecal sample was placed in a 10% neutral buffered formalin solution in a 1:3 stool / formalin ratio and refrigerated (Cole et al., 1999). The presence of oocysts in the samples was confirmed by modified Ziehl–Neelsen staining of direct smears of the fecal material from each horse (Anonymous, 1991). Stained slides of each fecal sample were evaluated at a magnification of ×1000 (Cole et al., 1999). ANOVA (Analysis of variance) and F test were used to understand the statistical relationship.

**Results**

The results of the microscopic investigation for Cryptosporidium in each season are shown in Fig.-1. The overall infection rate of horses was 19%. The infection rates in spring, summer, autumn and winter were 21%, 45%, 5% and 2%, respectively.

Based on ANOVA and F test, difference between infection rates in seasons was significant (p<0.01), with the highest infection rate in summer and the lowest infection rate in winter (Table – 1).

**Discussion**

According to the results, the highest and the lowest infection rates were seen in summer (45%) and winter (2%), respectively (Fig. -1). It seems that it can

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Spring</th>
<th>Summer</th>
<th>Autumn</th>
<th>Winter</th>
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</thead>
<tbody>
<tr>
<td>Mean Temperature (°C)</td>
<td>23</td>
<td>28</td>
<td>12</td>
<td>-2</td>
</tr>
<tr>
<td>Relative Humidity (%)</td>
<td>45.3</td>
<td>26.9</td>
<td>47.6</td>
<td>54.8</td>
</tr>
<tr>
<td>Amount of Precipitation (mm)</td>
<td>115.3</td>
<td>6.8</td>
<td>98.6</td>
<td>125.5</td>
</tr>
</tbody>
</table>

**Table - 1. Data obtained from Islamic Republic of IRAN Metrological Organization during April 2013 and March 2014.**

**Fig. 1. Cryptosporidial infection rates in different seasons.**

**Fig. 2. Cryptosporidium Oocyst by modified Ziehl-Neelsen staining.**
be due to the high and seen in summer (45%) and winter (2%), respectively (Fig. -1). It seems that it can be due to the highest and lowest temperature, respectively in the summer (28°C) and winter (-2°C). The highest infection occurred in spring and summer, when horses were taken to pasture after the spring rainfall (Table - 1). Seasonal or temporal trends in the increased incidence of cryptosporidiosis vary from country to country. These trends in urban and rural areas may reflect direct zoonotic contact and indirect effects of rainfall, farming events such as lambing, calving, and environmental pollution with farm waste (Fayer, 1997). During a two-year study in India, the highest prevalence of cryptosporidiosis in bovine was recorded in rainy season followed by summer and winter (Seuli et al., 2006). Cryptosporidium oocysts were observed in the stools of 9 of 124 Italian children with diarrhea, examined in 1984. All cases occurred in the warm season (Caprioli et al., 1989). In our study, the overall cryptosporidial infection rate in the horses was higher compared to that reported by authors from Germany and some regions of the U.S.A. (Cole et al., 1998 and Forde et al., 1998). It can be concluded that different climatic conditions can affect the prevalence of cryptosporidiosis in horses. Vaccines are not available for cryptosporidiosis in human and the control and prevention of the infection is limited because of the environmentally resistant oocysts and the ignorance of all its possible transmission routes (Chacin-Bonilla, 1995). According to the results, the highest parasite activity is seen in warm weather, so veterinarians and the people with close contact to horses need to be aware of the zoonotic potential of Cryptosporidium.

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**References**


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