PREVALENCE OF *HAEMONCHUS CONTORTUS* IN MARKHOR OF CHITRAL GOL NATIONAL PARK

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**Abstract:** This study was conducted to investigate infection of *Haemonchus contortus* in the markhor population of Chitral Gol National Park (CGNP). For this purpose 25 faecal samples were collected randomly from different spots at enough distance from each other to prevent repetition. These samples were then microscopically analyzed for the presence of *H. contortus*. Out of these 25 samples, 10 (40%) were positive for the parasite. Diagnosis was made through larva identification most of which were in L$_2$ stagemolting into L$_3$. Our study shows *H. contortus* presence in markhor population of CGNP. To investigate the health status of markhor, damage being caused by the parasite and role of local livestock in transmitting the parasite to markhors of the park, however, needs further comprehensive surveys.

**Keywords:** Markhor, *Haemonchus contortus*, Chitral Gol National Park

**Introduction**

Goat is one of the small ruminants, that has served human with its products from ancient times along with cattle and sheep. It has been kept and raised by humans of especially tropical areas for it milk, meat and wool. Goat is a close relative of sheep but is more hardy than sheep and can tolerate a wider range of climates (Devendra and McLeroy, 1982). Six species of both wild and domesticated goats have been identified that can be distinguished on the shape of their horns. *Capra hircus* is the common domestic goat while *Capra falconeri* is the markhor (Bang et al., 1990; Goetsch et al., 2011).

Markhor is larger than any other *Capra* species that stands 65 -110 cm at the pectoral height. It weighs from 32–110 kg. the spirally twisted horns of the animal may grow up to 160 cm in case of male Markhors (Lux et al., 2004). Natural population of Markhor is found in Asian countries including Pakistan (national animal), Afghanistan, Turkmenistan, Tajikistan and India, at altitudes of 600 – 3600 m. According to the IUCN list it has been declared endangered species because the current global population has decreased to less than 2,500 mature individuals and the decline is continuing (Heptner et al., 1998; Angulo-Cubillan et al., 2007).

Domestic and wild animals are exposed to variety gastro-intestinal parasites including nematodes. These cause huge economical loss and bring considerable reduction in to the production of small ruminants (Barger and Cox 1984). Nematodiases caused by *Haemoncus contortus*, *Trichostrongylus spp.*, *Nematodirus spp.*, *Cooperia spp.*, and *Oesophagostomum spp.* are of prime importance in healthcare of small ruminants in tropics. Mixed infection of *Eimeria* and *Nematodirus battus* in lambs cause more severe disease than single infection (Terefe et al., 2004; Talpur et al., 2009).

Increased incidence of resistance to the chemotherapeutic agents by nematodes is of serious concern for the veterinarians and livestock departments. In face of this problem
new and effective therapies and dosage regimes are urgently needed (Bristol et al., 1983; Zawadzki et al., 2006; Rehman and Hamid, 2007; Sissay et al., 2007).

*Haemonchus contortus* infects the stomach of ruminants and feeds on blood from lesions it bores in the stomach wall. Adults live in the abomasum and feed on blood. Heavy infections, especially in the young one, can become fatal. *H. contortous* is more prevalent in goat, especially where they share habitat with sheep. It is responsible for major economic losses in goat and sheep throughout the world (Lichtenfels et al., 1994; Gharamah et al., 2011). The present study aimed at investigating the prevalence of the parasite in the markhor population of Chitral Gol National Park, KP, Pakistan.

**Material and Methods**

*Collection of Faecal Material*

Faecal samples were collected in Chitral Gol National Park, District Chitral, Khyber Pakhtoonkhwa, Pakistan. Samples were collected randomly from different spots in the Park at a distance of at least 500 meters from each other to prevent any sort of repetition. A total of 25 samples were included in the study, which were collected from October 2012 to December 2012.

*Preservation and Transportation*

Faecal samples were preserved in 10% formalin in the field. Samples were then immediately transported to Parasitology laboratory in the Department of Zoology, University of Peshawar.

*Microscopy and Diagnosis*

Each faecal sample was dissolved in 10 ml distilled water individually in a clean petri dish. From each sample three drops were placed onto a single glass slide individually and were placed with a coverslip. As per scientific demand, three readings were taken from each sample in this way using single slide. Simple direct method was used and each sample was observed under low and high magnification (10 X & 40X) respectively for eggs and larvae of *Haemonchus contortus*. 
Prevalence of *Haemonchus Contortus* in Markhor of Chitral Gol National Park

Fig. 1. Larvae of *H. contortus* (A), L2 molting to L3 (B).

**Results and Discussion**

In the present study a total of 25 samples were microscopically analyzed. Out of these samples 10 (40%) samples were positive for *Haemonchus contortus* infection. The rest of 15 (60%) samples did not show any sign of positivity for the parasite. Table 1 shows the prevalence of *Haemonchus contortus* in markhor of Chitral Gol National Park. The study revealed that the parasite is enough prevalent in markhor of Chitral Gol National Park. Though the sample size was very small, but to prevent any sort of bias, collections were kept at enough distance.

Cylindrical larvae of *H. contortous* were observed in 10 positive samples. The larvae observed during the study were either in L2 stage or molting from L2 to L3 (fig. 1 A and B). Hatching most probably would have occurred inside host body or immediately after defecation in faeces. Eggs were not seen. Most of the studies conducted with domestic goats and sheep show variable degree of prevalence in both the animals.

Haemonchosis is a serious nematode infection of usually small ruminants. *H. contortus* has been found as a dominant parasite of goat and sheep among the nematodes. The infection is seasonally variable with a peak from July to October. A 56-61% prevalence has been recorded for the parasite in goat and sheep in the previous studies (Chaudary *et al.*, 2007; Abebe *et al.*, 2010; Khajuria *et al.*, 2012). Based on the slaughter house generated data in Multan abattoir, out of 4740 sheep and got 1604 were *H. contortus* positive giving an overall prevalence of 33.84%. Out of the 1604 positive samples 793 were sheep and 811 were goats with individual prevalence of 37.18% and 31.10% respectively (Raza *et al.*, 2009).

*H. contortus* is highly prevalent in developed countries of Europe; in an extensive study a prevalence rate of 77% and 73% has been recorded in Switzerland and Italy respectively (Rinaldi *et al.*, 2015) confirming our short term study. The widespread distribution of *H. contortus* infection in Italy was confirmed in a study where 109 of 121 sheep farms showed the presence of the infection using various parasitological techniques including simple method (Musella *et al.*, 2011). In their recent extensive study, Rodriguez *et al.*, (2015) found *H. contortus* to be the highest prevalent nematode in sheep as compared to other nematodes in their study. They found its prevalence rate as 68%. Recovery of L3 larvae from faecal samples is normal for *H. contortus* as in experimental transmission of the parasite faecal samples contaminated with L3 larvae have been used. In this case the larva from the faecal sample rises on the forage grasses where from it is grazed by the host (Santos *et al.*, 2012).

<table>
<thead>
<tr>
<th>S.NO</th>
<th>Positive Samples</th>
<th>Negative Samples</th>
<th>Total</th>
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<tr>
<td>1</td>
<td>10 (40%)</td>
<td>15 (60%)</td>
<td>25</td>
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Conclusion

The natural population of markhor in Chitral Gol National Park harbours *H. contortus* with a high prevalence. The parasite being more damaging to young might be causing impacts on the population size of the animal by bringing high infant mortality. It might be a cause of poor adult health.

Recommendations

Detailed and full pledge research projects are needed to be launched for investigating the real status of the infection and expected threats to the magnificent animal and precious national asset of our country. Statistical modeling for spatial analysis of the parasitic infection in the said habitat of the markhor will be very much helpful in management of the parasite in the markhor population.

References


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