Prevalence of *Haemonchus contortus* in Sheep at Research Centre for Conservation of Sahiwal Cattle (RCCSC) Jehangirabad District Khanewal, Punjab, Pakistan

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Abstract.- The present study was carried out at Government Research Centre for Conservation of Sahiwal Cattle (RCCSC) Jehangirabad, District Khanewal from February 2007 to June 2007, to investigate the overall prevalence of *Haemonchus contortus* in sheep. The present study revealed that *H. contortus* had an overall prevalence of (77.7%). The males showed significantly (P<0.05) higher prevalence (84.6%) as compared to females (72.1%). Maximum prevalence (100%) was recorded in age group of 186-205months and minimum (50%) in the age group of 146-1650 months showing the statistical significance (P<0.05). Maximum prevalence (100%) was recorded in weight group of 72-78 and 79-85 kg, while weight group of 58-64 kg had minimum prevalence (50%) with statistical significance (P<0.05). The prevalence was statistically different (P<0.05) in different breeds of sheep; Awassi was more susceptible showing higher prevalence (93.3%) followed by Lohi (85.9%) and Hisardale (74.4%).

Key words: *Haemonchus contortus*, Lohi, Awassi, Hisardale sheep.

INTRODUCTION

Livestock production covers up to 40 percent of the gross value of agricultural production globally (Bachaya *et al*., 2006). Pakistan's economy has undergone considerable diversification over the years, yet the agricultural sector is still the largest and livestock represents an important sub-sector, which accounts for 49.1 percent of agricultural value added and about 11.4 percent of the GDP (Iqbal and Jabbar, 2005). In Pakistan about 30 to 35 million people are engaged in livestock raising with a holding of two to three cattle/buffalo and five to six sheep/goat per family which helps them to derive 30 to 40 percent of their income (Bachaya *et al*., 2006). The livestock includes buffaloes, sheep, goats, camels, horses, asses and mules. Sheep and goats which are known as small ruminants have pertinent position in the livestock sector as their population has doubled in the last 15 years (Iqbal and Jabbar, 2005). Sheep and goats are raised for mutton, wool and dairy products.

Gastro-intestinal nematode parasite infections are a major constraint to the sheep industry and cause production losses, increased costs of management and treatment, and even mortality in severe cases (Barger and Cox, 1984; Larsen *et al.,* 1995). Of various species of helminths, the prevalence of nematodes in animals has been reported at 25.1 to 92 percent. The species of nematodes that affect sheep the most, belong to the Super family Trichostrongyloidea and includes *Haemonchus*, *Trichostrongylus*, *Cooperia*, *Ostertagia* and *Oesophagostomum* (Bowman *et al.,* 2003). *Haemonchus contortus*, *Ostertagia ostertagi* and *Trichostrongylus colubriformis* are notorious owing to impaired productivity of small ruminants. These parasites negatively affect the livestock industry. On global basis *Haemonchus contortus* probably causes more losses than any other species of nematodes in ruminants (Marquardt and Demaree, 1985). Live weight gains are lower and there may be weight loss and even mortality in severe infections, especially if the diet is deficient in protein. Economic losses are primarily due to mortality, although losses in production can also be high (Barger and Cox, 1984). *H. contortus* causes retarded growth, low productivity, hematological and biochemical alterations, loss of appetite, loss of body weight, decrease in protein, impaired digestive efficiency and poor reproductive performance which can lead to loss of meat (27 percent) and wool (40 percent) among sheep/goats (Iqbal and Jabbar,

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2005; Bachaya *et al*., 2006), Although considerable work has been done on prevalence of *Haemonchus contortus* in sheep in Pakistan but so far research has not been conducted on *H. contortus* at Government Research Centre for Conservation of Sahiwal Cattle (RCCSC) Jehangirabad, District Khanewal. The Project was designed to study the overall prevalence of *H. contortus* relationship between sex, age, body weight, sheep breed and *H. contortus*.

MATERIALS AND METHODS

The present study was carried out to investigate the prevalence of *Haemonchus contortus* in sheep at Govt. Research Centre for Conservation of Sahiwal Cattle (RCCSC) Jahangirabad, District Khanewal form February to June, 2007. A total of the 333 sheep fecal samples were collected. All sheep belonging to the three different breeds including Lohi, Hissardale and Awasssi. Their age, sex and body weight was also recorded.

Fecal analysis and egg counts (eggs / gram of feces)
Rectal fecal samples from all sheep were collected manually in 10% formalin solution in suitable containers and carefully labeled with animal identification, age sex and month of collection. Samples were prepared for identification of *Haemonchus contortus* eggs in saturated NaCl solution. Eggs per gram (EPG) of fecal sample were counted to estimate the worm burden using McMaster technique (Hayat and Akhtar, 1999).
The McMaster technique was used for counting the number of nematode eggs per gram (epg) in feces by suspending the fecal material in a saturated salt solution. Two grams of each fecal sample was weighed out with the help of digital electronic balance (AY 220, Shimadzu Corporation, Japan) and placed in a plastic beaker (250ml). The fecal pellets were mashed fully with the help of mortar. About 30 ml of water was added into the beaker and mixed well along with the feces. The fecal sample was then homogenized for one minute with the help of homogenizer. One ml of sugar solution was placed in the test tube with the help of pipette and added 1 ml of fecal sample to the test tube with the same pipette. Then the solution was

mixed thoroughly. The fecal material passed through sieve to remove debris prior to pouring in McMaster chambers. The prepared samples were taken up with pipette and dispensed into both chambers of the McMaster counting slide (each slide comprising two chambers each of 10x10 mm; the space between object-glass and coverslip was 1.5 mm and each compartment contains of 0.15 ml). The number of the eggs (ova) of *Haemonchus contortus* within the both grid of the chamber was counted, using microscope (OSK, Japan) with magnification power of 10X and 40 X. The number of eggs in per gram of a fecal sample were obtained by the number (X) of eggs found multiplied with 60/2 and 1/0.15 or X200.

Eggs /gram (EPG) of feces = X 200
$X = \dfrac{\text{Total number of eggs}}{\text{Total number of counting chambers}}$

Results are expressed in percentages. Prevalence of *Haemonchus contortus* was calculated as, number of individuals of a host species infected with parasite / number of host examined and the values between various age groups, sex and body weight were compared by Chi Square test.

RESULTS AND DISCUSSION

Overall prevalence of H. contortus *in sheep*
Out of 333 samples collected from both male and female animals of different age and body weight groups, 259 were infected. The percentage of overall prevalence was 77.7%. The prevalence of is *H. contortus* is also reported by different researchers from Pakistan and different parts of the world. Naseem *et al.* (1987) reported 72% prevalence of *H. contortus* in sheep in Central Punjab, Pakistan. Pal and Qayyum (1992) reported prevalence of *H. contortus* as 9.43% in Swat, Pakistan. Afzal (1992) reported 14% prevalence of *H. contortus* in sheep in District Bahawalpur, Pakistan. Khan (1993) reported 50-76% prevalence of *H. contortus* in sheep in Rawalpindi, Pakistan. Iqbal *et al.* (1993) reported 21.7% prevalence of haemonchosis in sheep in Faisalabad, Pakistan. Sajid *et al.* (1999) reported 68% prevalence of *H. contortus* in sheep from different areas of Faisalabad, Pakistan. Fakae

and Chiejina (1993) reported 90-100% prevalence of *H. contortus* in eastern Nigeria. El-azazy (1995) reported a prevalence of *H. contortus* 47.9% from Jeddah, Saudi Arabia.

The differences in prevalence reported by these studies could be accounted on the basis of differential management practices (Lindqvist *et al*., 2001; Barger, 1999; Mandonnet *et al*., 2003), natural resistance (Pal and Qayyum 1992; Soulsby 2005; Chaudhry *et al*., 2007), drug treatment (Ali *et al*., 1997; Barnes *et al*., 2001), and local geo-climatic factors (Gupta *et al*., 1987; Pal and Qayyum 1993; Chaudhry *et al*., 2007) and nutrition (Preston and Allonby, 1987; Abbott *et al*., 1985; Datta *et al*., 1999).

Relationship between sex and H. contortus *in sheep*

The percentage prevalence of *H. contortus* in male and female sheep was recorded as 84.6, 72.1% respectively (Table I). The same aspect of the present study has been also reported by different researchers. The results of the present study are supported by Iqbal *et al*. (1993), Maqsood *et al*. (1996), Hussain *et al*. (1996), Mandonnet *et al*. (2003) and Vanimisetti (2003). Male sheep appear to be more susceptible to parasitic infections when compared to female sheep. Courtney *et al*. (1984) also reported the same results in sheep after puberty. Barger (1993) and Bilbo and Nelson (2001) reported that such differential prevalence of gastrointestinal nematodes in sheep may be due to stimulatory effects of estrogen and inhibitory effect of androgens on immune responses. The same factor could be responsible for the higher prevalence of *H. contortus* in male than female sheep during the present study.

Relationship between age and H .contortus *in sheep*

The relationship between age groups and *H. contortus,* infection in sheep was studied (Table II). The maximum infection (100%) was recorded in age group of (6-25 months) while minimum infection (50%) was observed in age group of (146-165 months). Results of the present study revealed that age of the host seems to have influence on the prevalence of infection. Similar results have been reported by (Hafeez, 1996; Maqsood *et al.,* 1996; Sajid *et al.,* 1999; Asanji, 1988; Dorny *et al.*, 1995;

Faizal and Rajapakse, 2001; Horak, 2003). Lower immunity in younger and older sheep could be responsible for the high prevalence of *H. contortus* in these animals.

Table I.- **Relationship between sex and *H. contortus* in sheep at RCCSC Jehangirabad, Khanewal.**

Sex	No. of sheep examined	No. of sheep infected	Prevalence (%)
Male	150	127	84.6
Female	183	132	72.1

Table II.- **Relationship between age and *H. contortus* in sheep at RCCSC Jehangirabad, Khanewal.**

Age (months)	No. of sheep examined	No. of sheep Infected	Prevalence (%)
6-25	139	120	86.3
26-45	54	39	72.2
46-65	40	28	70
66-85	32	20	62.5
86-105	25	20	80
106-125	31	23	74.2
126-145	4	3	75
146-165	2	1	50
166-185	4	3	75
186-205	2	2	100

Relationship between body weight and H. contortus *in sheep*

Relationship between body weight and *H. contortus*, infection in sheep was recorded (Table III). Maximum infection (100%) was observed in weight group of (72-78, 79-85 kg) while minimum infection (50%) was recorded in the weight group of (58-64 kg).

The results of present study revealed that as the weight of the animal increases the parasitic infection decreases. This might be due to the development of acquired immunity with gradual increase in weight along with age. Maximum (100%) prevalence was observed in body weight groups of (72-78, 79-85 kg) which could be due to the fact that sheep belonging to this weigh group represents the older age groups which is more susceptible to parasitic infection due to decreased immunity. Similar findings have been reported by Tasawar *et al.* (2007) and Horak (2003).

Table III.-   Relationship between body weight and *H. contortus* in sheep at RCCSC Jehangirabad, Khanewal.

Body weight (kg)	No of sheep examined	No. of sheep infected	Prevalence (%)
15-22	15	14	93.3
23-29	67	56	83.5
30-36	52	45	86.5
37-43	85	61	71.7
44-50	78	59	75.6
51-57	8	7	87.5
58-64	18	9	50
65-71	7	5	71.4
72-78	1	1	100
79-85	2	2	100

Table IV.-   Relationship of breeds and *H. contortus* in sheep at RCCSC Jehangirabad, Khanewal.

Breed	No. of sheep examined	No. of sheep infected	Prevalence (%)
Lohi	71	61	85.9
Hisardale	247	184	74.4
Awassi	15	14	93.3

Relationship of breed and H. contortus *in sheep*

The relationship between breed of sheep and prevalence of *H. contortus* was studied (Table IV) and it was observed that maximum infection was present in Awassi followed by Lohi and Hisardale which was 93.3, 85.9 and 74.4%, respectively. The results of present study indicated that breed of host seems to have influence on the prevalence of *H. contortus* infection. Similar results have been reported by Knight *et al.* (1973), Preston and Allonby (1979), Pal and Qayyum (1992), Wanvangu *et al.* (1997), Vanimisetti *et al.* (2003) and Chaudhry *et al.* (2007). Genetic variations and natural resistance could be responsible for the differential prevalence of *H. contortus* among different breeds of sheep.

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