

FIRST REPORT ON MORPHOLOGY AND MORPHOMETRY OF *HAEMONCHUS CONTORTUS* IN SHEEP OF JAMMU (J&K) – INDIA

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ABSTRACT

Haemonchous contortus is one of the most common nematode infecting the small ruminants throughout the world and poses great threat to livestock. It has been reported from all areas of Jammu and Kashmir State but has posed a great problem to researchers regarding its identification. In this study an attempt has been made to study the morphology and morphometry of *Haemonchous contortus* recovered from the sheep and to relate it with some parameters like study area, host intensity, methodology and morphometry of the sheep. It was observed that all these factors have little effect on the morphology and morphometry of the parasites. The variations observed during the present study were of minor importance because they were found within the range of similarity and were not good enough to assign it as a new species as was expected. Some parameters regarding morphology and morphometry of this *Haemonchous contortus* were described for the first time which was not described by the previous authors and these could be of great taxonomic importance for the identification of this parasite which is being confused many times and is being labeled a new species.

KEY WORDS: *Haemonchous contortus*, Jammu, Morphology, Morphometry, Sheep.

INTRODUCTION

Haemonchosis is an important disease of sheep, goats and cattle wherever they are kept but the disease exerts its greatest economic effect in sheep in temperate and tropical countries especially where there is a good summer rainfall. *Haemonchous contortus* causes heavy death losses and poor growth and production. Several attempts have been made to study this parasite (Barber's Pole Worm) by various authors (Rudolphi, 1802; Masud and Jamil, 1887; Franklin, 1935; Ksull, 1939; Almedia, 1945; Sahai and Deo, 1964; Solusby, 1982; Altaif and Issa, 1983; Zahida, 1992; Gelaye and Wossene, 2003; Reyaz, 2005; Kuchay, 2012) from time to time in order to gain more information as for as its taxonomy is concerned for an effective treatment. The present taxonomical study was carried out for the first time in this part of Jammu and Kashmir State to add more information regarding the morphology and morphometry of *Haemonchous contortus*.

MATERIAL AND METHODS

The investigation was carried out for a period of one year 2007-08 in which different parts of study area were surveyed for collection of 257 gastrointestinal tracts of slaughtered sheep for parasitological investigation. The gastrointestinal tracts were separated anatomically, then each organ was opened separately and its contents and mucosa were washed in water to remove all parasites. The nematodes collected were washed in normal saline to free them from mucus. Then they were fixed in hot 70% alcohol. After fixation they were preserved in glycerin alcohol (glycerin: 70% alcohol, 1:3) and were mounted in glycerin and glycerin jelly (Urquhart et al., 1996). The drawings of the parasites or parts of parasites were made with the help of Prism Type Camera lucida and the measurements were made with the help of objective (stage) Micrometer only and objective and ocular Micrometer. Photographs of the permanent mounts were taken with the help of Olympus Digital Camera under Olympus CX21 Microscope (**FIGURE 1 and 2**). Identification of the adult parasites was done on the basis of various morphological and morphometric characters (Sahai and Deo, 1964; Solusby, 1982; Wahab, 1998 and Kuchay, 2012).

RESULTS AND DISCUSSION

During the present investigation 61 nematodes belonging to the genus *Haemonchous contortus* (Rudolphi, 1802) were recovered from the host sheep from different areas of Jammu. The specimens were examined in detail and assigned to *Haemonchous contortus* Cobb, 1898. However several intraspecific variations in size ratio of various body organs were also recovered. It was observed that the parasite was comparatively larger from the female host than those recovered from the male host species; accordingly the various internal organs of these parasites were variable; larger in large specimens and smaller in small specimens. Since the parasites compete for food and shelter the parasites which get

plenty of food, when the number is less they become large compared to the situation when the number is high. One possible reason for larger size of this *Haemonchus contortus* in female hosts could be that males have comparatively stronger immune system which could have checked the growth of these parasites or it may be due to some female hormonal effect. It was also observed that fixation had a direct effect on the size of the body and other body organs as the parasites fixed in too hot or too cold fixative shrink to different lengths as compared to those fixed in alcohol with optimum temperature. The reason could be that too hot fixative causes shrinkage of the parasites while as the parasite does not stretch fully in cool fixative and in both the causes the parasite appears shorter.

Table 1. Measurements in mm of *Haemonchus contortus* (Rudolphi, 1802; Cobb, 1898).

Particulars	Soulsby (1982)	Sahai and Deo (1964)	Wahab (1998)	Kuchay (2012)	Present Specimens
Body length	10-12(M) 18-30(F)	14-17 20-27	10-12 17-18	10.70 (9.55-1185) 21.44 (18.38-24.50)	15.09-18.72(M) and 22.24-26.33(F)
Max Width	-----	0.199-0.265 0.215-0.332	----	0.22 (0.15-0.29) 0.48 (0.32-0.64)	0.25-0.29(M) and 0.39-0.42(F)
Esophagus	-----	1.444-1.743 1.162-1.662	----	2.415 (1.44-2.86) 1.935 (1.29-2.58)	2.401 1.899
Spicule	0.46-0.506	0.398-0.448	0.40-0.48	0.39(0.26-0.52)	0.34
Gubernaculum	-----	0.199-0.349	----	0.244(0.185-0.304)	0.253
Dist. b/w Post end to Vulva	3.06-3.10	3.81-5.31	----	3.49 (2.11-4.45)	2.70
Dist. b/w Post-anus	0.49-0.55	0.415-0.513	----	0.52 (0.35-0.69)	0.26
Eggs	70-80×41-48 μ	0.0660.074× 0.033-0.049	0.96 μ	0.75×0.45 (0.55-0.95X0.3-0.6)	-----
Host	Domestic animals	Sheep and Goats	Sheep and Goats	Ruminants	Sheep
Locality	London	India	Bangladesh	Ladakh	Jammu

Morphology and Morphometry

Comparative characteristics have been given in **Table 1**. The *Haemonchus contortus* is filliform (slender) shape tapering towards the anterior end in male and towards both ends in female. Anterior end is relatively wide and blunt. The yellowish color parasite buccal cavity is small with a conspicuous tooth extending from dorsal wall. Buccal capsules absent.

Male

These measure 15.09 mm-18.72 mm in length and 0.25 mm- 0.29mm in width. The tail end bears a bursa. The bursa consists of three lobes. The lateral lobes are well developed and do not show any deep notch posterior. The dorsal lobe is small and slightly asymmetrically placed. Dorsal ray asymmetrical and bifurcated. Externodorsal ray is thin and long.

Lateral rays arise from ventral trunk. Ventral rays fused proximally and distally they are separated. Spicules are two in number, each measuring 0.34 mm in length.

Female

The body measures 22.24-26.33 mm in length and 0.39-0.42 in maximum breadth. Vulva is situated in posterior third of body at a distance of 2.70mm from the posterior end. The vulvar lips are inconspicuous but a linguiform process is invariably present. Uterus is divergent, eggs measure 0.07x0.03 mm in dimension. Tail is blunt without a spine. Anus is situated at a distance of 0.26 mm from posterior end.

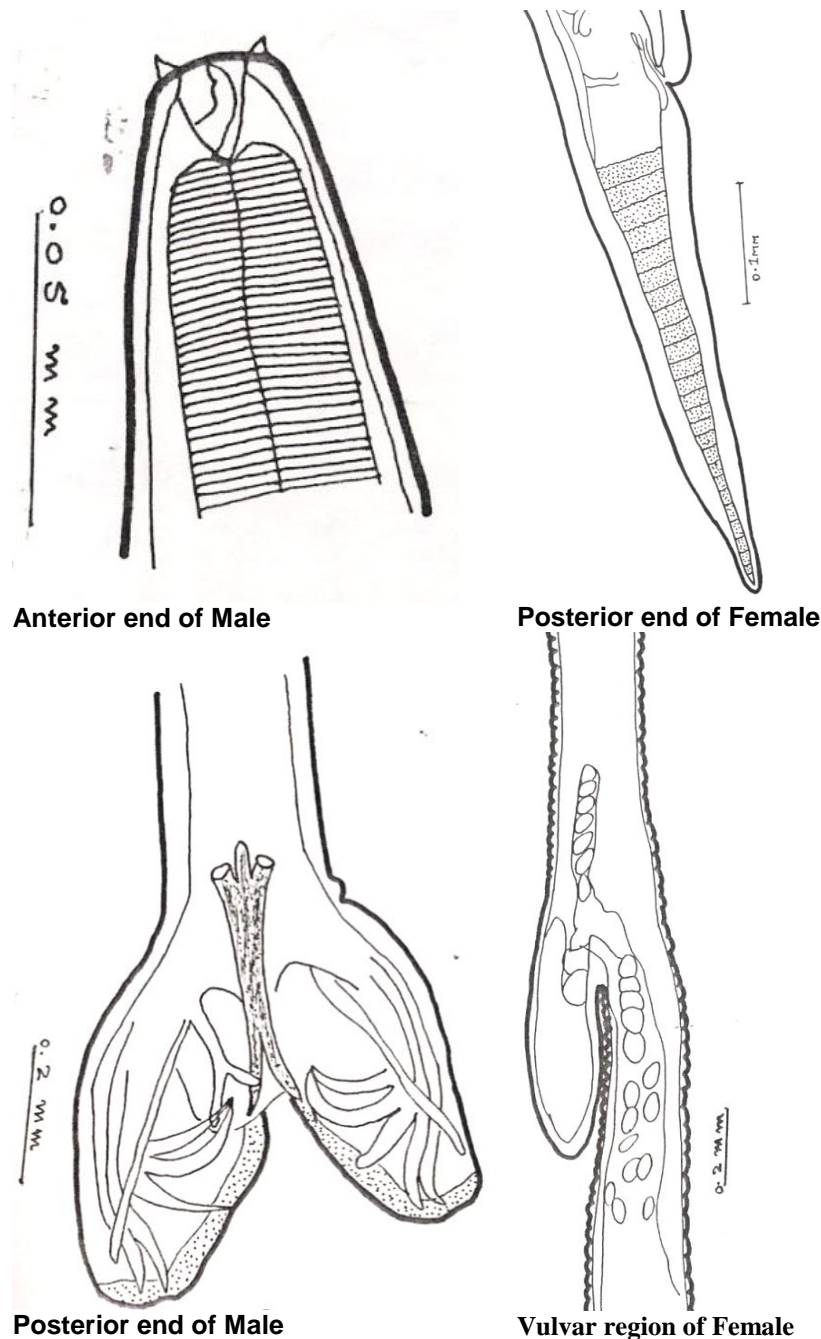


Figure 1: Camera lucida drawings of *Haemonchus contortus* (Rudolphi, 1802; Cobb, 1898)

Remarks

From the existing species of genus *Haemonchus* Cobb, 1898, the present form is found to be close to the description of *Haemonchus contortus* (Rudolphi, 1802) Cobb, 1898 as given by Sahai and Deo (1964), Solusby (1982), Wahab (1998) and Kuchay (2012) as regards its morphological and morphometric characters including: color, total length, maximum width, shape of bursal lobes, female genital apparatus, shape and size of spicules, with some intraspecific variations in size ratio as mentioned in comparative **Table 1** which are of less taxonomic importance, hence assigned to *Haemonchus contortus* (Rudolphi, 1802) Cobb, 1898. This is the first taxonomic study of this parasite from subtropical area of Jammu.



Figure2:*Haemonchus contortus* (Rudolphi, 1802; Cobb, 1898)

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