Impact of host’s diet and parasite intensity on morphology of *Moniezia expansa*

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Abstract

The present study is a part of the helminthological study conducted on ruminants of Ladakh for the time period of one year. In the present study impact of diet of the host and intensity of the parasite on Morphology of a Cestode (*Moniezia expansa*) was taken into consideration for which postmortem examination of slaughtered host animals belonging to different age groups and of either sex feeding on different diets were carried out and the parasite/s recovered were processed and were subjected for the study of morphology and morphometry. It was observed that diet and intensity was having a relation with morphology and morphometry of the parasite. In case of higher intensity the size of parasite was comparatively small as compared to the specimens with low intensity, so was the case with respect to diet of the host it was observed that the parasites recovered from the host animals which feed on highly nutritive food were larger in size as compared to those specimens recovered from the hosts which feed on average or below average food. The parasite being reported for the first time from this region has been briefly redescribed with some intraspecific variations.

Keywords: Diet, Intensity, Morphology, Morphometry, *Moniezia expansa*, Ladakh

Introduction

Helminthiasis has been found as one of the causes of the production losses, which arise primarily through severe weight loss, poor meat, milk and wool production, carcass and offal condemnation and impaired reproductive performance, etc. and has a direct effect on economy and biodiversity of this region. If this loss is to be reduced, then steps need to be taken to control these parasitic infections which need detailed information regarding the species of parasite present, intensity of the infection, the host to be infected, effect of sex, age, season, breed, and various environmental factors in a particular region. Among the various cestode parasites *M. expansa* is one among the most occurrence species, the parasites inhabit the intestines of the host and its morphology is so good to adjust successfully in this environment. Although the parasite does not harm the host to a greater extent to cause a serious problem but in heavily infected and small aged animals the parasite could prove harmful to the host by utilizing the hosts digested food not only resulting in malnutrition but also makes host weak and more susceptible to other diseases by decreasing its immunity.

Although a lot of work has been done on various aspects of this parasite species by various authors from different corners of the World (Baylis, 1935; Anantaranjan, 1951; Borthakur and Das, 2006; Fukui, 1959) as well as from Jammu and Kashmir region (Ayesha et al., 2008, Muzaffar, 2010) of the Jammu and Kashmir state however no work has been done in Ladakh the third region of the same state where ruminants are comparatively more important because it is comparatively poor in other resources.

Material and methods

Different parts of the study area were surveyed and gastrointestinal tracts of slaughtered animals were collected and processed for detection of parasites. The various organs of GIT were separated from each other as well as from suspensor ligaments and were placed individually in shallow plastic jars containing normal saline solution (0.85%). The small and large intestines were firstly pressed from one end to other and the content was taken into a large plastic jar which was latter examined for collection of cestodes which come out (if present) by pressing mechanism and latter a longitudinal incision was given to the intestines to open them for further observations. The parasites thus collected were fixed in Carnoy’s fixative and preserved in 70% alcohol; the preserved material was taken out of the preservative and was stained in aceto alum carmine. After staining the material was subjected to dehydration by passing it through various grades of alcohol viz., 30%, 50%, 70%, 90%, 100% I and 100% II. The time duration in each grade was 5-10 minutes. After complete dehydration the material was transferred to a clearing agent (xylene in this study). The dealkoholized material was mounted in canadabalsam or DPX on glass slides for a detailed morphological study. The drawings of the parasites or parts of parasites were made with the help of prism type camera lucida for morphometry process. Identification of parasites was done on the basis of various morphological and morphometric characters (Bambroo 1969; Bali 1970; Soulsby 1982). The used climatological dataset was provided by government meteorological department agent of Ladakh.

Results and discussion

The results of present study showed there was a considerable difference in size of the parasites with respect to the diet of the host. It was observed that the parasites were usually larger in those host animals which feed on highly nutritive diet as
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Table 1. Comparative characteristics of Moniezia expansa

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Total length</td>
<td>2-4m</td>
<td>200-400cm</td>
<td>450-600</td>
<td>523 (453-593)</td>
</tr>
<tr>
<td>Max. breadth</td>
<td>5-10</td>
<td>5-11</td>
<td>1.6 cm</td>
<td>1.3 (1.2-1.4)</td>
</tr>
<tr>
<td>Scolex</td>
<td>0.6-0.9</td>
<td>0.65-0.92</td>
<td>0.36-0.8</td>
<td>0.91x1.06 (0.85-0.97x1.03-1.09)</td>
</tr>
<tr>
<td>Suckers</td>
<td>0.25-0.32</td>
<td>0.25-0.35</td>
<td>.....</td>
<td>0.40x0.37</td>
</tr>
<tr>
<td>Mature Segment</td>
<td>1.1-1.3x</td>
<td>4.4-4.5x</td>
<td>.....</td>
<td>0.96x3.5</td>
</tr>
<tr>
<td>Gravid Segment</td>
<td>0.75-0.82x</td>
<td>0.75-0.9x5.5-5.6</td>
<td>.....</td>
<td>0.55x3.96 (0.048-0.062x3.05-4.87)</td>
</tr>
<tr>
<td>Egg</td>
<td>70-90 µ</td>
<td>70-90</td>
<td>56-67 µ</td>
<td>0.054 x0.075 (0.068-0.082x0.051-0.057)</td>
</tr>
<tr>
<td>Host</td>
<td>Sheep</td>
<td>Sheep</td>
<td>Domestic animals</td>
<td>Ruminants</td>
</tr>
<tr>
<td>Locality</td>
<td>Kashmir</td>
<td>Kashmir</td>
<td>London</td>
<td>Ladakh</td>
</tr>
</tbody>
</table>

Photomicrograph 1

Photomicrograph 2

Photomicrograph 3

Fig. 1. Moniezia expansa Rudolphi, 1891,

compare to those who feed on comparatively low standard diet while as the intensity was in a reversed order that higher in case of later ones and lower in former ones. Similarly an association was observed between intensity and morphometry of the parasites as it was observed that in case of higher intensity the size of parasite was comparatively small as compared to the specimens with low intensity. The parasite being reported for the first time from some of the hosts of this region is briefly described with some intraspecific variations as under.

Description

Comparative characteristics have been given in Table 1. The specimens are white in colour, tapering, and measures 453-593 cm in length 1.2-1.4 cm in width. The scolex was 0.85-0.97 mm X 1.03-1.09 mm in diameter; with prominent four suckers measuring 0.38-0.42mm X 0.35-0.39mm. The scolex leads into neck followed by segments. The mature segments contain reproductive organs and are broader (3.7-3.9 mm) than long (0.93-0.99 mm) and each contain two sets of genital organs. Gravid segments measures 0.048-0.062 mm by 3.05-4.87 mm. The ovaries and the vitelline glands form a ring on either side, median to the longitudinal excretory canals, while the testes are distributed through out the central field or they may be concentrated towards the sides. At its posterior border each proglottid contains a row of interproglottid glands, arranged around small pits. The eggs are somewhat triangular in shape, containing a well-developed pyriform apparatus, and measures 0.068-0.082 mm X0.051-0.057 mm in diameter.

Remarks

The morphological studies of the present specimens confirmed their identification to Moniezia expansa as described by (Bambroo 1969; Bali 1970; Soulsby 1982) on the basis of various morphological characters as body length, maximum width, and size of suckers, scolex, presence of two sets of reproductive organs per mature segment, and presence of continuous band of interproglottids. However some intraspecific variations in size ratio of body and various other body organs were recorded in the present specimens presented in table given above. It is therefore assigned to Moniezia expansa Rudolphi, 1891. This is the first report of this species from this Ladakh region.
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Fig. 2. Moniezia expansa Rudolphi, 1891 (A) Scolex, (B), Mature segment, (C) Gravid segment and (D) Egg.

Conclusion

From the present study it is obvious that diet of the host as well as intensity of the parasite species have a direct impact on the morphology of the parasite species M. expansa in this study.

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References


