

***HYMENOLEPIS DIMINUTA* RUDOLPHI, 1819 (HYMENOLEPIPIDAE: CYCLOPHYLLIDEA) FROM HOUSE RAT *RATTUS RATTUS* LINNAEUS, 1758 (RODENTIA: MURIDAE) FROM HYDERABAD, SINDH, PAKISTAN**

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Abstract

Present study reports a tapeworm *Hymenolepis diminuta* Rudolphi, 1819 from House rat *Rattus rattus* Linnaeus, 1758 from Hyderabad, Sindh, Pakistan. Only 24 hosts were captured in present lot from Hyderabad city. Out of these only ten hosts were found harboring tapeworms of genus *Hymenolepis* Weinland, 1858 with prevalence 41.7%. *H. diminuta* is more prevalent in males (50%) than female hosts (33%) during present study. The diagnostic characters of present tapeworm include scolex with four rounded suckers, a rostellum without arms, typical reproductive organs and gravid proglottids having a good number of eggs. Previously there is no record of *H. diminuta* Rudolphi, 1819 from Hyderabad, Sindh, Pakistan.

Keywords: *Hymenolepis diminuta*, *Rattus rattus*, Hyderabad, Sindh, Pakistan.

INTRODUCTION

Helminths of Rats have great medical as well as zoonotic importance. They are harbored by men, livestock and other domestic as well as wild animal groups. Family Hymenolepididae comprises very complex group of cestodes consist of more than 600 species reported from aves and nearly 230 species from mammals. Family Hymenolepididae includes various genera based on their morphological traits (Czaplinski and Vaucher, 1994). Genus *Hymenolepis* was considered as one of the largest cestode genus which includes more than 300 species reported from mammals and birds as a definitive hosts (Lopez-Neyra, 1942, a). Its species are found in Palearctic, Ethiopian, Nearctic and Oriental regions of the world (Lopez-Neyra, 1942, a; Gardner and Schmidt, 1988; Makarikov and Tkach, 2013). *H. diminuta* is found embedded in host body; in a day it produces more than 250,000 eggs and, in a year, single tapeworms produce millions of eggs. It is a large number within short period but very few of them reach maturity (Andreassen *et al.*, 1999).

Hymenolepis spp. recovered from rodents and humans reported by Stojcevic *et al.* (2004); Andreassen *et al.* (1999); Hancke and Suárez (2016); Tresnani *et al.* (2016); Hernández-Mazariegos (2016); Lopez-Neyra (1942); Gardner and Schmidt (1988); Makarikov and Tkach (2013) and in Pakistan by Rafique *et al.* (2009) and Ahmad *et al.* (2014).

MATERIALS AND METHODS

Live hosts House rat (*Rattus rattus* Linnaeus, 1758) were trapped from Hyderabad city of Sindh, Pakistan. Twenty four hosts were collected and brought to the Parasitology laboratory of department of Zoology, University of Sindh, Jamshoro for helminthological studies. Live cestodes belonging to the genus *Hymenolepis* Weinland, 1858 (Platyhelminthes: Cestoda) were collected from intestine of ten hosts. Tapeworms were fixed in AFA (Alcohol-Formaline-Acetic Acid) solution, stained with Borax Carmine, dehydrated in graded series of ethanol, cleared in clove oil and xylol and finally mounted in Canada balsam. Drawings were made with the help of Olympus BH2-DA Drawing Attachment. Photographs were taken with OMAX Digital Trinocular LED Microscope with 10MP Digital USB Microscope Camera. Measurements are given in millimeters (mm). Specimens are deposited in the Department of Zoology, University of Sindh, Jamshoro, Pakistan.

RESULTS

During present study (January, 2019 to August, 2019), a total of 24 House rats were examined for the investigation of *Hymenolepis diminuta* Rudolphi, 1819. Out of these ten House rats were found positive with 45 specimens of *H. diminuta* Rudolphi, 1819.

TAXONOMIC SUMMARY

Family	Hymenolepididae
Genus	<i>Hymenolepis</i> Weinland, 1858
Species	<i>Hymenolepis diminuta</i> Rudolphi, 1819
Host	House rat <i>Rattus rattus</i> Linnaeus, 1758
No. of host examined	24
No. of host found positive	10
No. of specimen recovered	45
Prevalence	41.7%
Site of infection	Intestine
Locality	Hyderabad, Sindh, Pakistan
Status	New locality record

DESCRIPTION

Body whitish in color; scolex cylindrical shaped (0.22×0.23) in size; rostellum unarmed biconcave shaped, without hooks (0.09×0.04); four unarmed suckers present, nearly round in shape (0.08×0.07), separated by rostellum; all segments broader than long, divided into immature, mature and gravid proglottids, immature proglottids (0.16×0.88), mature proglottids (0.20×1.05) and gravid proglottids (0.27×0.94) in size; three testes round to oval shaped, arranged in straight line, separated by ovary, single poral testis (left side of ovary) and two aboral once (right side of ovary) (0.13×0.11) in size; cirrus sac smooth, long, slightly curved anteriorly (0.55×0.06); ovary multilobed, nearly round shaped, located at middle of mature proglottids (0.06×0.07); uterus form irregular network; vitelline gland present at middle of mature proglottids, above ovary (0.16×0.13) in size; retained parts of uterine wall in gravid proglottids; unilateral pores present; eggs oval to round shaped, (0.09×0.08) in size.

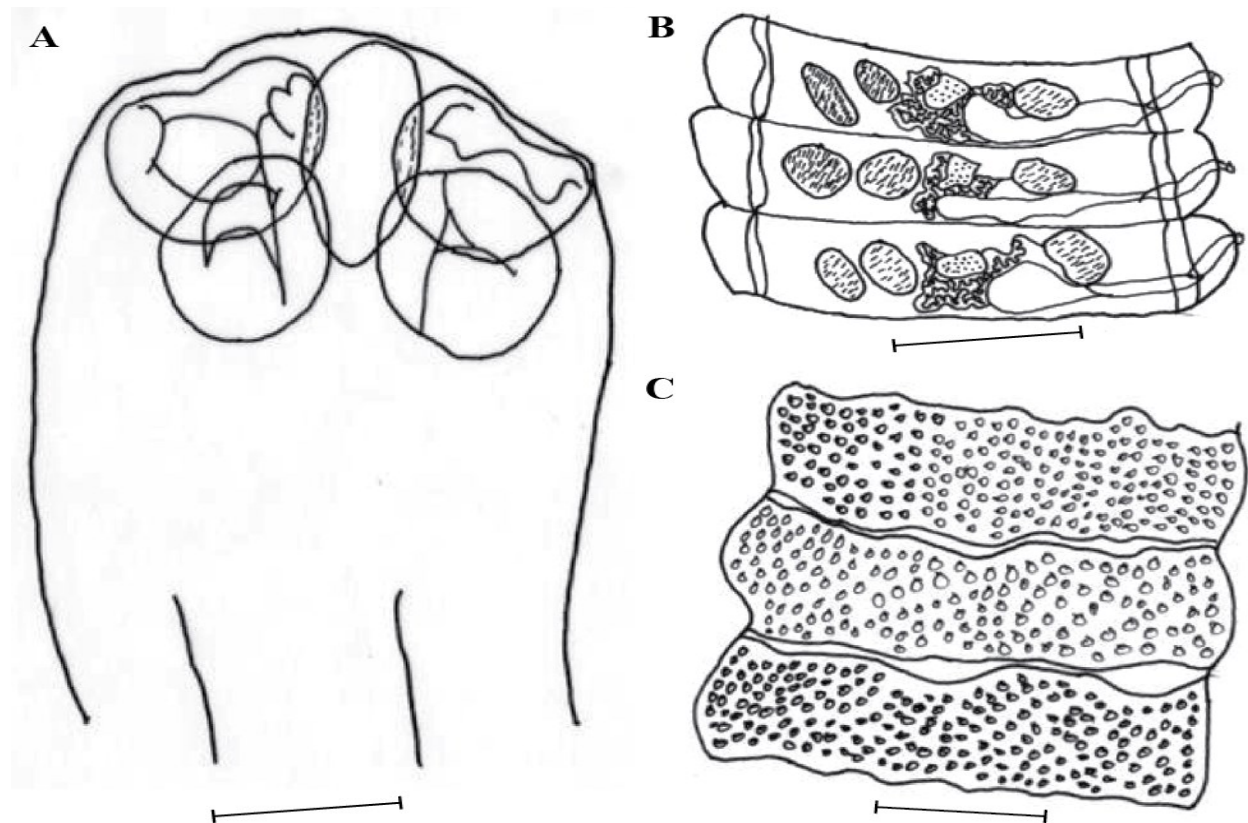


Fig. 1: Line drawing of *Hymenolepis diminuta* Rudolphi, 1819. A. Scolex; B. Mature proglottids; C. Gravid proglottids. Scale Bar: 0.01 mm.

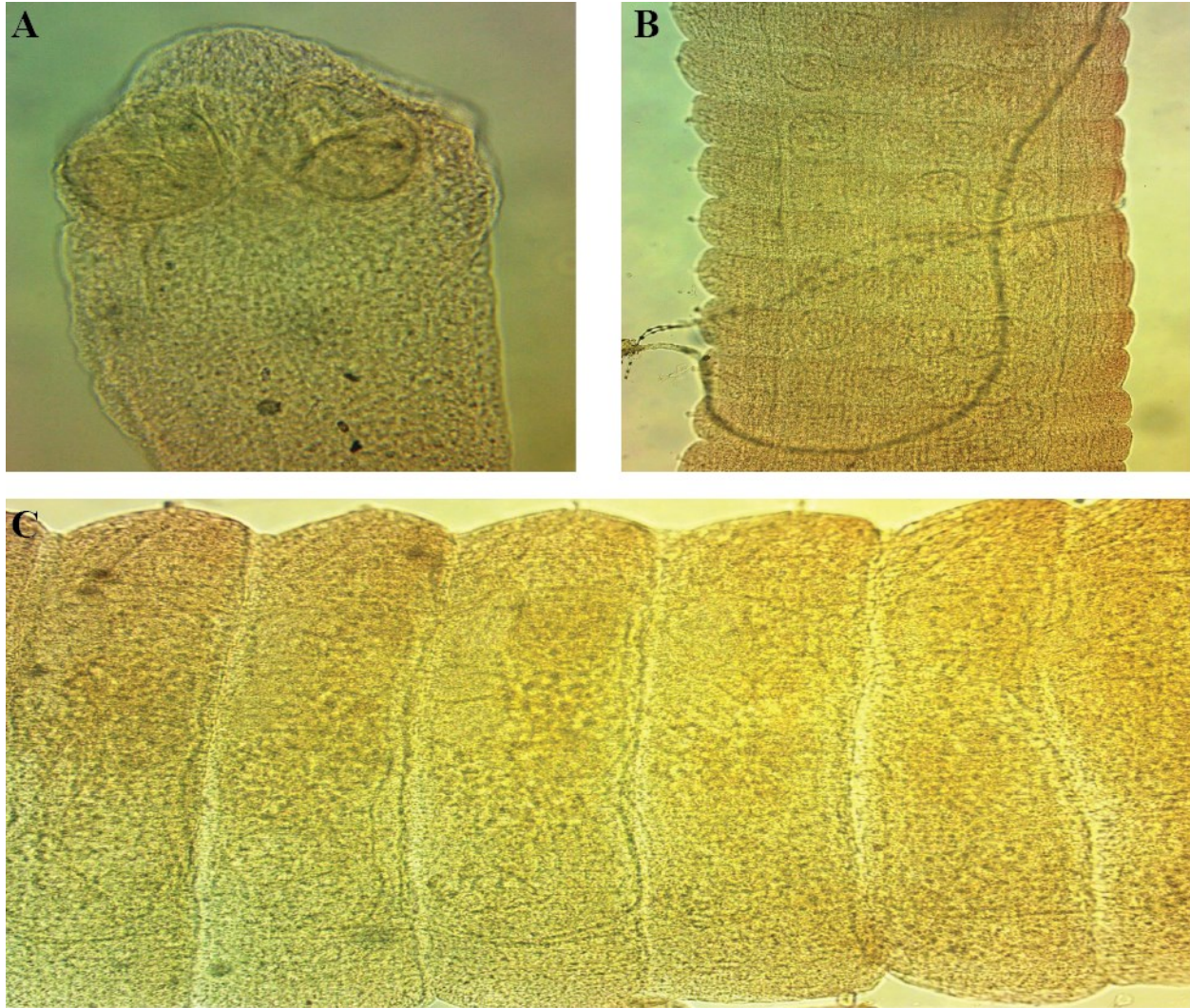


Fig. 2: Photographs of *Hymenolepis diminuta* Rudolphi, 1819. **A.** Scolex; **B.** Mature proglottids; **C.** Gravid proglottids.

DISCUSSION

Commensal rodents harbour many helminth species which cause morbidity in human. These helminth parasites include tapeworms *Hymenolepis diminuta* and *Rodentolepis nana*, and round worms *Calodium hepaticum* (syn. *Capillaria hepatica*) and *Angiostrongylus cantonensis* (Meerburg *et al.*, 2009). Various studies report that they disturb physiology and immunity of their hosts by damaging their tissues, compete for nutrients, decrease blood volume and other body fluids.

H. diminuta previously reported from *Rattus norvegicus* and other rodents of families Sciuridae, Gliridae, Dipodidae, Cricetidae, Muridae and Gerbillinae (Ryzhikov *et al.*, 1978). *H. diminuta* and *H. nana* cause Hymenolepiasis in human beings, both are sister species very closely related with each other (Andreassen *et al.*, 1999) common in humid and warmer areas causing clinical symptoms mostly in children (Hernández-Mazariegos, 2016). *H. diminuta* differs from *H. nana* in having scolex with four rounded suckers and a rostellum without arms. It has typical reproductive organs and gravid proglottids having a good number of eggs. While *H. nana* has scolex with four small, rounded suckers and a rostellum with arms having a crown of 20–30 hooks, reproductive organs, gravid proglottids and good number of eggs.

H. diminuta Rudolphi, 1819 collected during present study have whitish body, scolex cylindrical, rostellum unarmed biconcave without hooks, four unarmed suckers nearly rounded shaped separated by rostellum and all segments broader than long.

H. diminuta is also reported by Rafique *et al.* (2009) with prevalence (20-60%) and Ahmad *et al.* (2014) with prevalence (37.3%) from Pakistan. Both reports are related with present findings (41.7%). *H. diminuta* is more prevalent in male (50%) than female hosts (33%) during present study. Ahmad *et al.* (2014); Waugh *et al.* (2006); Nama and Parihar (1976) also reported maximum prevalence in males.

Previously, in Pakistan, *H. diminuta* is recorded from Punjab province but no report is available from Sindh with special reference to Hyderabad. However, *H. diminuta* is being recorded for the first time from Hyderabad.

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