

Taxonomic redescription of *Raillietina parviuncinata* Meggitt, 1924 (Cestoda: Davaineidae) from Domestic Fowl (*Gallus gallus domesticus*) in Buldhana District, Maharashtra, India

Hanuman Lodhe¹, Sushil Jawale²

¹Research Centre, Department of Zoology, Maulana Azad College of Arts, Science & Commerce, Chhatrapati Sambhajanagar
Email: vaibhavlodhe398[at]gmail.com

²Department of Zoology, Sant Dnyaneshwar Mahavidhyalaya, Soegaon, Tq. Soegaon Dist. Chhatrapati Sambhajanagar

Abstract: A total of seventeen cestode specimens were collected from the intestine of domestic fowl, *Gallus gallus domesticus*, from Buldhana District, Maharashtra, India. Detailed morphological and morphometric investigations revealed that the cestodes possessed a distinct scolex, neck, immature, mature, and gravid proglottids. The scolex was dome-shaped with a protruded, oval rostellum armed with two rows of ten minute hooks and four large overlapping suckers. Mature proglottids were broader than long and contained 30-35 oval testes scattered in the posterior region. The reproductive system consisted of a well-developed cirrus pouch, vas deferens, genital pore, multilobed ovary, elongated vagina, compact Ootype, and a prominent vitelline gland. Excretory canals were present on both sides of the segment throughout the body length. The observed morphological characters and morphometric measurements correspond closely with those described for *Raillietina parviuncinata* Meggitt, 1924. The present study provides a taxonomic redescription of this cestode species from domestic fowl in Maharashtra and contributes to the knowledge of avian cestode diversity in the region.

Keywords: Buldhana District, Cestoda, Domestic fowl, *Gallus gallus domesticus*, *Raillietina parviuncinata*

1. Introduction

Cestodes are a diverse group of endoparasitic flatworms that inhabit the intestinal tract of a wide range of vertebrate hosts, including birds and mammals. Among avian cestodes, species of the genus *Raillietina* Fuhrmann, 1920 are commonly reported from domestic and wild birds and are known to cause significant pathological effects, resulting in reduced growth, weight loss, decreased egg production, and economic losses in poultry farming. The genus *Raillietina* belongs to the family Davaineidae and is characterized by a scolex armed with a rostellum bearing hooks, four suckers, and numerous proglottids containing well-developed reproductive organs.

Domestic fowl, *Gallus gallus domesticus*, serves as an important source of meat and eggs and plays a significant role in the rural economy of India. However, poultry birds are frequently infected with various helminth parasites, among which cestodes constitute an important group affecting their health and productivity. Accurate identification and taxonomic characterization of these parasites are essential for understanding their biodiversity, epidemiology, host-parasite relationships, and control strategies.

Raillietina parviuncinata was originally described by Meggitt (1924) and has subsequently been reported from domestic fowl in different geographical regions. Nevertheless, detailed morphological and morphometric studies from many parts of India remain limited. Taxonomic redescription based on fresh collections is important for confirming species identity and documenting variations in morphological characters that may arise due to geographical and host-related factors.

The present investigation was undertaken to study the cestode parasites infecting domestic fowl collected from Buldhana District, Maharashtra, India. Detailed morphological and morphometric analyses were carried out to redescribe *Raillietina parviuncinata* and to provide updated taxonomic information on this avian cestode species.

2. Materials and Methods

Cestode specimens (*Raillietina parviuncinata*) were collected from the intestine of domestic fowl, *Gallus gallus domesticus*, obtained from Buldhana District, Maharashtra, India. The recovered parasites were washed thoroughly in normal saline solution to remove adhering intestinal contents and mucus. The specimens were then killed and fixed in hot 4% formalin for preservation.

For morphological studies, the cestodes were stained with Acetocarmine and Harris haematoxylin, dehydrated through ascending grades of alcohol, cleared in xylene, and permanently mounted in DPX. Detailed morphological observations and measurements were made under a compound microscope. Illustrations were prepared with the aid of a Camera Lucida. All measurements are expressed in millimetres unless otherwise stated.

The identification and taxonomic characterization of the specimens were carried out based on their morphological and morphometric features using standard taxonomic keys and available literature on cestode parasites, including Systema Helminthum and relevant published records.

3. Results

Description

Seventeen specimens, of the cestode parasites, were collected, from the intestine of domestic fowl, *Gallus gallus domesticus* at Buldhana, district Buldhana (M.S) India, in the month of November-2023.

The cestodes were flattened, preserved in 4% formalin, stained with Harris haematoxylin or acetocarmine stain, passed through different alcoholic grades cleared in xylene mounted in DPX and drawings are made with the aid of Camera Lucida. All measurements are given in millimetres, otherwise mentioned.

The Cestodes are long having many segments and consist of Scolex, Neck, immature, mature and gravid proglottids. The scolex is dome shaped, protruded and measures, 2.185(1.900-2.470) in length and 2.166(2.052-2.280) in width. The rostellum is medium in size, oval and protruded and measures, 1.026(0.608-0.836) in length and 0.551(0.266-0.570) in width. It is armed with two rows of minute hooks, 10 in number. The suckers are four in number, oval in shape, large in size, occupy the major portion of the scolex, overlapping with each other, and measures, 1.293(1.256-1.330) in length and 0.830 in width.

The neck is small in size, narrow anteriorly and broad posteriorly and measures, 1.102(1.026-1.178) in length and 1.387(1.330-1.444) in width. The mature proglottids are large in size, square, longer than broad, narrow anteriorly and broad posteriorly and measures 3.591(3.154-4.028) in length and 5.092(4.75-5.434) in width.

The testes are medium in size, oval in shape, 30-35 in number, scattered at posterior region of the segment and measures, 0.109 (0.152-0.228) in length and 0.152(0.114-0.190) in width. The cirrus pouch is medium in size, oval in shape extends up to longitudinal excretory canal and measures, 0.741(0.722-0.760) in length and 0.228(0.190-0.2266) in width. Vas-deference is thin, short, slightly curved towards ovary and measures, 0.912(0.874-0.950) in length and 0.095(0.076-0.114) in width.

Genital pore is large in size, oval in shape, situated at the anterior side of the margin and measures, 0.19(0.114-0.266) in length and 0.19 (0.152-0.228) in width.

The ovary is large in size, irregular in shape, multilobed, situated in the centre at anterior half of the segment and measures, 1.387(1.330-1.444) in length and 2.052(1.634-2.470) in width. The vagina is a thin tube, posterior to cirrus pouch starts from genital pore, runs obliquely for a long distance and opens into the ootype and measures 1.995(1.976-2.014) in length and 0.095(0.076-0.114) in width. The ootype is small, oval, compact and measures 0.361(0.342-0.342-0.380) in length 0.247(0.266-0.228) in width. Vitelline gland is large, irregular and measures 0.437(0.380-0.494) in length and 0.741(0.722-0.760) in width. Excretory canal are wide, present on both the sides of the segment along the body length and measures, 0.361 in width.

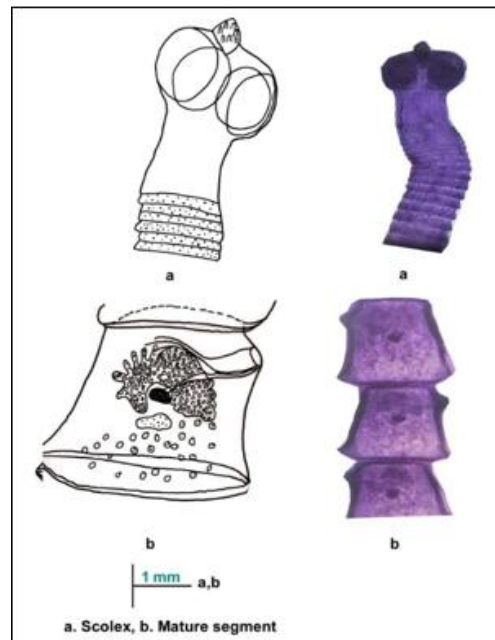


Figure 1: *Raillietina Parviuncinata* Meggitt, 1924

4. Discussion

The genus *Raillietina* was established by Fuhrmann in 1920. On the basis of a thorough review of the available literature, the present specimen exhibits the diagnostic features of the genus, including a dome-shaped scolex, a protruded rostellum armed with minute hooks, mature proglottids that are longer than broad and nearly square in outline, small round to oval testes numbering 30-35, an elongated cirrus pouch, and a multilobed ovary.

The present form shows close resemblance to *Raillietina parviuncinata*, Meggitt, 1924 in most of its morphological characters; however, certain variations have been observed. The parasite differs in its host preference, being recovered from *Gallus gallus domesticus* as compared to *Anas boschas domestica* reported in the original description. It also differs in the geographical locality, with the present material collected from Vaijapur, District Aurangabad, whereas the original species was reported from Burma and China. Additionally, slight variation is noted in the structure of the vitelline gland, which is irregular and comparatively smaller in the present specimen as opposed to the compact form described earlier.

Since these differences are considered minor and do not warrant the establishment of a new species, the present specimen is identified and redescribed as *Raillietina parviuncinata*, Meggitt, 1924.

5. Conclusion

The genus *Raillietina* Fuhrmann, 1920 is characterized by a scolex bearing a rostellum armed with hooks, four suckers, numerous proglottids, and well-developed reproductive organs. The present specimens collected from the intestine of domestic fowl, *Gallus gallus domesticus*, from Buldhana District, Maharashtra, exhibited all the diagnostic features of the genus, including a dome-shaped scolex, protruded rostellum armed with minute hooks, mature proglottids

broader than long, 30-35 testes, an elongated cirrus pouch, and a multilobed ovary.

A comparative study with the original description of *Raillietina parviuncinata* Meggitt, 1924 revealed close agreement in most morphological and morphometric characters. Minor variations were observed in host association, geographical distribution, and certain reproductive structures such as the vitelline gland. These differences are considered intraspecific variations and are insufficient to justify the establishment of a new species.

Therefore, the present cestode specimens are identified as *Raillietina parviuncinata*, Meggitt, 1924 and are herein redescribed from *Gallus gallus domesticus* in Buldhana District, Maharashtra, India. This study contributes to the knowledge of avian cestode biodiversity and extends the geographical record of the species in India.

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