



## Original Research Article

# Biosystematic Studies on *Moniezia (b) marathwadensis* sp. Nov. Parasitic in *Capra hircus* from Aurangabad District, M.S. India

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## ABSTRACT

### Keywords

Cestode  
parasite,  
*Moniezia  
marathwadensis*  
Sp.Nov.,  
*Capra hircus*,  
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Present investigation deals with systematic observation of a new species of the genus *Moniezia* i.e. *Moniezia (B) marathwadensis* Sp. Nov were collected from *Capra hircus* L. at Aurangabad (M.S.) India The present parasite comes closer to all known species of the genus *Moniezia*<sup>2</sup> due to general topography of organ but differs due to Scolex simple, almost quadrangular, it bears four, rounded suckers, placed at the corners, neck long, slightly narrow than scolex, Mature proglottids five times broader than long, Testes small, oval, 125-130 in numbers, Cirrus pouch large, elongated, Cirrus thin tube, straight, Vas deferens slightly curved, thin, Ovary compact, with numerous blunt acini, Vagina thin tube, posterior to cirrus, Receptaculum seminis broad, open into ootype, ootype rounded, medium, vitelline gland post ovarian, medium, rounded, excretory canal paired, interproglottidal glands 50-52 in numbers, arranged in double rows.

## Introduction

Sheeps and Goats are important livestock in India due to their great nutritional and economic value. The gastrointestinal cestode infections are very common for both small and large scale but their impact is more in subtropical areas of the world and particularly in India due to the availability of a wide range of agro-ecological factors suitable for diversified hosts and parasite species. The gastrointestinal cestode parasites causes great loss in nutritional and economic value of host in different ways like lowering of fertility, reduction in food intake, reduction in milk and meat production, reduction in weight of host and may be mortality in heavily parasitized

animals. Furthermore parasitosis appears to be a major factor for lowered productivity of Indian livestock. Hence the study of helminth parasites needed today.

The genus *Moniezia* was established by Blanchard, 1891. Skrjabin and Schulz (1937) divided this genus in to three subgenera as follows:

- 1] Inter proglottid glands grouped in rosettes- - - - -*Moniezia*.
- 2] Inter proglottid glands arranged linearly (Sometimes absent) - - -*Blanchariezia*.
- 3] Inter proglottid glands absent- -*Baeriezia*.

The present worm agrees in all characters with subgenus *Blanchariezia*. Skrjabin and Schulz (1937) having two species as *M. (B.) benedeni* (Moniez, 1879), Skrjabin and Schulz (1937) and *M. (B.) pallida* Monning, 1926. Later on two more species were added by Shinde *et al.* (1985). From the host *Ovis bharal* as *M. (B.) aurangabadensis* and *M. (B.) bharalae* at Aurangabad, M.S. India. Later on Patil *et al.* in 1997 described *Moniezia (B.) warananagarensis* from *capra hircus*. Kalse *et al.* in 1999 described *Moniezia (B.) murhari* from *Capra hircus*, *Moniezia (B.) caprai* was added by Pokale *et al.* in 2004 from *Capra hircus* and *Moniezia (B.) shindei* added by Pawar *et al.* in 2004 from *Ovis bharal*. Later on *Moniezia (B.) hircusae* added by Tat *et al.* in 2004 from *Capra hircus*. Borde *et al.* 2004 added *M.(B.)rajalaensis* from *Capra hircus* and Shelke *et al.* in 2004 added *Moniezia (B.) aishvaryee* from *Ovis aries*. Later on Nanware (2010a,b,c) added three new species in this genus i.e. *M.(B.) caprae*, *M.(B.) maharashtrae* and *M.(B.) kalavati* from *Capra hircus*. Kasar *et al.* (2010) added *M. madhukarae* from *Capra hircus*. Recently Shaikh *et al.* (2011) added *M. (B.) mansurae* from *Capra hircus*. Then *M. (B.) govindae* is added by Padwal and Kadam (2011) from *Capra hircus*. Humbe *et al.*, 2011 added two species i.e. *M. (B.) babai* from *Capra hircus* and *M. (B.) ovisae* from *Ovis bharal*. Later on *Moniezia (B.) interproglottina* (Shinde *et al.*, 2012) and *Moniezia (B.) orientalis* (Shinde *et al.*, 2013) reported from *Ovis bharal*.

## Material and Methods

Total ten mature tapeworms of this form were collected from the intestine of *Capra hircus* from Aurangabad District, M.S. India. The collected worms were washed in distilled water to render them from intestinal contents. The worms were preserved in hot 4% formalin, Borax carmine stain was used

for staining. The worms were passed through various alcoholic grades i.e. 30%, 50%, 70%, 90% and 100% then cleared in Xylene and mounted in DPX. The drawings were made with the aid of Camera lucida. All the measurements were given in millimeters.

## Results and Discussion

All the cestodes were whitish and long consisting scolex, immature and mature proglottids. The scolex is simple, almost quadrangular and slightly larger than neck and measures 0.7281 (0.0710–0.745) in length and 0.668 (0.599–0.737) in width it bears four rounded suckers placed at the corners. Big oval in shape measures 0.210 (0.001–0.226) in length and 0.244 (0.222–0.266) in width. Neck long slightly narrow than scolex measures 0.961 (0.954–0.967) in length and 0.588 (0.555–0.621) in width. Mature proglottids broader than long near about five times boarder with double set of reproductive organs and measures 0.935 (0.886–0.984) in length and 4.897 (4.681–5.113) in width. Testes small in size, oval in shape scattered in the posterior part of the segment. Not extending beyond the excretory canals on each side 125–130 in numbers and measures 0.041 (0.030–0.053) in length and 0.056 (0.045–0.068) in breadth. Cirrus pouch large, elongated, situated in the anterior middle part of the segment somewhat oval and measures 0.367 (0.348–0.386) in length and 0.113 (0.098–0.128) in width. Cirrus thin tube, straight, present within the cirrus pouch and measures 0.291 (0.272–0.310) in length and 0.018 (0.015–0.022) in breadth vas deferens slightly curved, thin and directed anteriorly and measures 0.150 (0.136–0.159) in length and 0.011 (0.007–0.015) in breadth. Ovary compact with numerous blunt acini, not extending beyond the excretory canal on each side and measures 0.378 (0.325–0.431)

in length and 0.291 (0.227–0.356) in width. Vagina thin tube posterior to cirrus pouch forms receptaculum seminis and measures 0.428 (0.416–0.439) in length and 0.015 (0.007–0.022) in width. Receptaculum seminis broad and open into ootype and measures 0.219 (0.204–0.234) in length and 0.015 (0.007–0.022) in breadth. Ootype rounded medium in size and measures 0.053 in diameter. Vitelline gland post ovarian medium in size, round in shape and measures 0.1212 in diameter. Vagina and cirrus pouch open into common pore known as genital pore situated anterior to the middle of the segment on lateral margin and measures 0.060 (0.053–0.068) in length and 0.030 (0.022–0.037) in width. A pair of longitudinal excretory canal is present which measures 0.882 (0.071–0.093) in length and 0.041 (0.030–0.053) in breadth. In between two segments interproglottidal glands 50–52 in numbers, arranged in double row lie at postero-anterior margin of proglottids, close to anterior and posterior margin at each segment, oval in shape and measures 0.071 (0.060–0.083) in length and 0.041 (0.030–0.053) in width.

The genus *Moniezia* was erected by Blanchard in 1891. The present form of Cestode under discussion in having Scolex simple, almost quadrangular, it bears four, rounded suckers, placed at the corners, neck long, slightly narrow than scolex, mature proglottids five times broader than long, testes small, oval, 125–130 in numbers, cirrus pouch large, elongated, cirrus thin tube, straight, vas deferens slightly curved, thin, ovary compact, with numerous blunt acini, vagina thin tube, posterior to cirrus, receptaculum seminis broad, open into ootype, ootype rounded, medium, vitelline gland post ovarian, medium, rounded, excretory canal paired, interproglottidal glands 50–52 in numbers, arranged in double rows.

The present species is comes closer to all the known species of the genus *Moniezia* in general topography of organ but differs due to some characters from following species.

i) The present form of worm differs from *Moniezia (B.) benedeni* (Moniez, 1879; Skrjabin and Schulz, 1937) which is having numerous proglottids and broader than long. Posterior proglottids fleshy, testes are 500 in numbers arranged in two groups, cirrus pouch short and wide, vas deferens with 2–3 coils, ovary with acini, in the center of the segments. Egg well developed interproglottidal glands linear and close to the posterior margin of the segments, arranged transversely and reported from the horse in Africa.

ii) The present cestode differs from *Moniezia (B.) pallida* (Monning, 1926) which is having mature segment squarish, testes 100-200 in numbers. Interproglottidal glands varies in size, cirrus pouch cylindrical, vagina anterior to cirrus pouch, and reported from horse in South Africa.

iii) The present tapeworm showing differences from *Moniezia (B.) aurangabadensis* (Shinde *et al.*, 1985) which is having the scolex quadrangular. Testes 1100–1200 in numbers, vas deferens coiled, cirrus pouch cylindrical, and small, ovary bilobed each lobe with acini, interproglottidal glands 12–15 in numbers and reported from *Ovis bharal* in India.

iv) The present cestode parasite differs from *Moniezia (B.) bharalae* (Shinde *et al.*, 1985) which is having testes rounded, 190-200 in numbers. Vas deferens short, fusiform genital pores bilateral, sub marginal, ovary bilobed interproglottidal glands arranged in two rows. Small in size 38-44 in numbers cirrus pouch small, oval obliquely placed, vitelline gland absent,

vagina anterior to cirrus pouch and reported from *Ovis bharal* in India.

v) The present cestode differs from *Moniezia (B.) warananagarensis* (Patil *et al.*, 1997) which is having scolex large, testes 300–320 in number distributed throughout the proglottids in single field ovary bilobed with 13–15 short blunt acini, interproglottid glands medium in size and 56 in numbers, cirrus pouch small, oval, vitelline gland elongated obliquely placed.

vi) The present tapeworm differs from *Moniezia (B.) murhari* (Kalse *et al.*, 1999). Which is having the scolex is squarish, testes 405–415 in numbers, cirrus pouch elongated in the anterior region of the segments, ovary inverted, horse shoe shaped with short blunt acini. Interproglottid glands are rounded and 63 in numbers.

vii) The present cestode parasite differs from *Moniezia (B.) caprai* (Pokale *et al.*, 2004), which is having scolex medium and squarish in shape, testes follicular, 255–260 in numbers, ovary horse shoe shaped. Interproglottid glands 15 to 17 pairs in numbers, cirrus pouch flask shaped.

viii) The present tapeworm showing differences from *Moniezia (B.) shindei* (Pawar *et al.*, 2004), which is having large scolex, mature segment craspedote, testes are 190-200 in numbers, scattered all over, interproglottid glands 76 in numbers and medium in size, vitelline gland large, vagina small in size, reported from *Ovis bharal* in India.

ix) The present cestode differs from *Moniezia (B.) hircusae* (Tat *et al.*, 2004), which is having scolex large, immature segment big, craspedote. Testes 168 in numbers. Scattered in a single field, ovary large, single mass. In anterior half of the

segment, cirrus pouch short, interproglottid glands 14–15 in number, vitelline gland oval to rounded.

x) The present cestode differs from *Moniezia (B.) rajalaensis* (Borde *et al.*, 2004) in having scolex globular, testes 250–260 in numbers, ovary horse shoe shaped and inter proglottid glands 31–32 in numbers.

xi) The present tapeworm differs from *Moniezia (B.) aishvarya* (Shelke *et al.*, 2004) which is having testes small and 255–265 in number, ovary large mass, cirrus pouch spindle shaped. Vitelline glands quadrangular in shape, interproglottid gland are 42–44 in numbers, and reported from *Ovis aries* in India.

xii) The present species differs from *M. (B.) caprae* (Nanware, 2010a) in having scolex large, broad anteriorly and narrow posteriorly, neck short, mature proglottids three and half times broader than long, testes 170 in numbers and inter-proglottid glands 40 in numbers.

xiii) It differs from *M. (B.) maharashtrae* (Nanware, 2010b) due to scolex oval, neck broader than long, mature proglottids four and half times broader than long, testes 116 in numbers and inter-proglottid glands 38 in numbers.

xiv) The present worm showing differences from *Moniezia (B.) kalawati* (Nanware, 2010c) which is having squarish scolex oval shaped cirrus pouch, testes small distributed throughout the segment, 172 in number ovary single mass with irregular margin, and 54 interproglottidal glands in the inter segmental region, either single or paired, irregularly arranged in the central width of the segment and leaving space on each lateral side.

xv) The present cestode differs from *Moniezia (B.) madhukarae* (Kasar *et al.*, 2010) in having the scolex simple, elongated, long neck, mature segments five to six times broader than long, testes medium in size, oval scattered posterior to segment, 210–240 in numbers, cirrus pouch oval, vagina posterior to cirrus pouch, ovary butterfly shaped, vitelline gland post ovarian.

xvi) The present form differs from *M. (B.) mansurae* (Shaikh *et al.*, 2011) in having the scolex is small, globular with musculature, suckers are slightly overlapping to each other, mature proglottids are broader than long, testes small, rounded and 160–170 in numbers. The cirrus pouch is large elongated and broader at opening ovary compact somewhat oval, vitelline gland is oval, compact and genital pore large in size, elongated coarse like and belly shaped and marginal. The vas deferens is thin straight tube.

xvii) The present form differs from *Moniezia (B.) govindae* (Padwal and Kadam, 2011) in having scolex large, globular, testes 100–140 in numbers, medium, scattered throughout proglottids, ovary compact, nut shaped and inter proglottidal glands 40–42 in numbers.

xviii) The Present cestode differs from *Moniezia (B.) babai* (Humbe *et al.*, 2011) in having scolex globular, elongated, testes 190–220 in numbers, cirrus pouch oval and ovary compact, rounded.

xix) The present tapeworm differs from *M.(B.) ovisae* (Humbe *et al.*, 2011) in having testes 155–165 in numbers, cirrus pouch oval and Ovary compact.

xx) It differs from *Moniezia (B.) interproglottina* (Shinde *et al.*, 2012) in having the scolex rectangular, suckers are oval to rounded, arranged in two groups, mature proglottids square, testes small, rounded and 40-45 in numbers. The cirrus pouch is cylindrical, ovary Bilobed, inverted 'U' shaped, vitelline gland is oval, compact, genital pore marginal, vas deferens is thin coiled tube and the interproglottid glands are arranged in two rows, 25 in each row.

xxi) It differs from *Moniezia (B.) orientalis* (Shinde *et al.*, 2013) in having scolex is simple, oval, muscular, suckers are oval to rounded, arranged in two groups, mature proglottids are four to five times broader than long, testes small, rounded and 35–40 in numbers. The cirrus pouch is cylindrical, ovary bean shaped, vitelline gland is oval, compact and genital pore marginal. The vas deferens is thin straight tube, the interproglottid glands are arranged in two rows, 16–18 in numbers (8–9 in each row).

From the above discussion it is clear that, the species under discussion is new to science and differs from the known valid species of the genus *Moniezia* in respect to taxonomic characters. Hence the species is named as *Moniezia (B.) marathwadensis* Sp. Nov. on account of Marathwada Region.

#### **Taxonomic summary**

**Genus** : *Moniezia* (Blanchard, 1891)

**Species** : *Moniezia (B.) marathwadensis* Sp. Nov.

**Type host** : *Capra hircus (L.)*

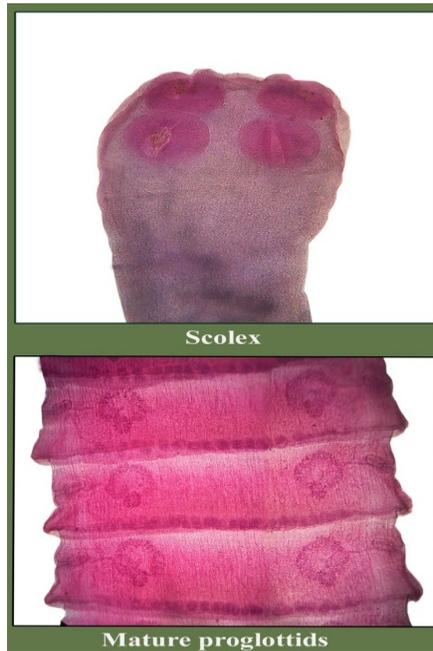
**Habitat (Site)** : Intestine

**Type locality** : Aurangabad, Maharashtra State, India

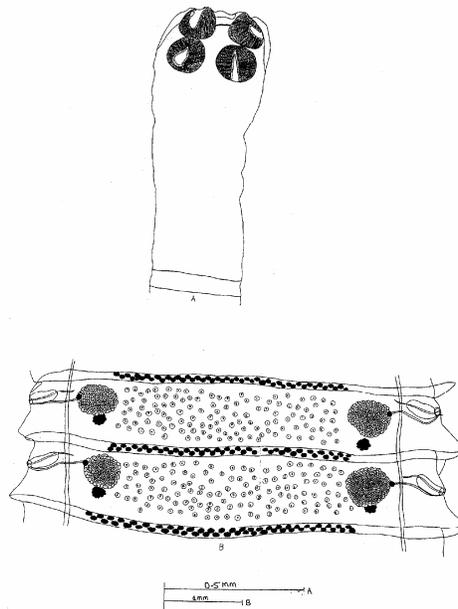
**Period of collection**: June 2005 to May 2007.

**Deposition** : Department of Zoology, Dr.B.A.M.U.Aurangabad (M.S.) India.

**Figure.1** Microphotograph of *Moniezia (B.) marathwadensis* Sp.Nov.



**Figure.2** Camera Lucida diagram of *Moniezia (B.) marathwadensis* Sp.Nov.



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