

Taxonomic observation of cestode *Moniezia (B.) khandeshensis* n. sp. infecting *Capra hircus* (L.)

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ABSTRACT

The present paper deals with the description of a new species of genus *Moniezia*, Blanchard, 1891 subgenus *Blanchariezia*, Skrjabin and Schulz, 1937, viz. *Moniezia (B.) khandeshensis* n. sp. The present tapeworm differs from all other species of genus *Moniezia (B.)* in having scolex large, squarish in shape, with four suckers; neck medium; mature segment broader than long, with double set of reproductive organs; testes 52 in number; cirrus pouch oval in shape, cirrus thin; vas deferens thin, wavy; ovary medium, inverted cup shaped; vagina thin tube, posterior to the cirrus pouch; receptaculum seminis medium, spindle shaped; ootype small, round; genital pores bilateral, medium, oval; longitudinal excretory canals wide; interproglottid glands 15-19 in number; vitelline gland large, oval in shape and gravid proglottids large, rectangular with numerous round eggs.

KEY WORDS: *Capra hircus*, new species, *Moniezia (B.) khandeshensis* n. sp., Dhule.

INTRODUCTION

The genus *Moniezia* was established by Blanchard, in 1891 as a type species *Moniezia expansa* from *Ovis aries*. Skrjabin and Schulz, 1937 divided this genus, into three sub-genera as follows:

1. Interproglottidal glands grouped in rosettes.....*Moniezia*
2. Interproglottidal glands arranged lineally (sometimes absent).....*Blanchariezia*
3. Interproglottidal glands absent.....*Baeriezia*

The present worm agrees in all characters with subgenus *Blanchariezia* in which the following species are added, till to date, by different workers, in the world.

- 1) *M. (B.) benedeni* (Moniez, 1879) Skrj. et. Schulz, 1937
- 2) *M. (B.) pallida* Monnig, 1926
- 3) *M. (B.) aurangabadensis* Shinde, Jadhav & Kadam, 1985
- 4) *M. (B.) bharalae* Shinde, Jadhav & Kadam, 1985
- 5) *M. (B.) murhari* Kalse & Shinde, 1999
- 6) *M. (B.) jadhavae* Hiware, 1999
- 7) *M. (B.) kalawati* Nanware, Jadhav & Babare, 1999
- 8) *M. (B.) jalnaensis* Borde & Shinde, 1999
- 9) *M. (B.) warananagarensis* Patil & Shinde, 2000
- 10) *M. (B.) shindei* Deshmukh & Shinde, 2001
- 11) *M. (B.) hircusae* Tat & Jadhav, 2004
- 12) *M. (B.) aishvaryae* Shelke & Shinde, 2004
- 13) *M. (B.) caprai* Pokale, Shinde & Wagh, 2004
- 14) *M. (B.) rajalensis* Borde, Patil & Naphade, 2007
- 15) *M. (B.) punensis* Suryawanshi, Kalse & Chaudhari, 2008
- 16) *M. (B.) caprae* Nanware, 2010
- 17) *M. (B.) madhukarae* Kasar, Bhure, Nanware & Sonune, 2010
- 18) *M. (B.) maharashtrae* Nanware, 2010
- 19) *M. (B.) warudensis* Chaudhary 2010
- 20) *M. (B.) babai* Humbe, Jadhav & Borde, 2011

- 21) *M. (B.) govindae* Padwal & Kadam, 2011
- 22) *M. (B.) ovisae* Humbe, Jadhav & Borde, 2011
- 23) *M. (B.) mansurae* Shaikh, Chaudhary, Waghmare & Bhure, 2011
- 24) *M. (B.) orientalis* Shinde, Nanware, Bhure and Deshmukh, 2013
- 25) *M. (B.) parbhaniensis* Makne, 2013
- 26) *M. (B.) nagaonensis* Suryawanshi & Kalse, 2015
- 27) *M. (B.) bhalchandrai* Kalse & Suryawanshi, 2016
- 28) *M. (B.) fagnaensis* Suryawanshi & Kalse, 2017
- 29) *M. (B.) naidui* Suryawanshi & Kalse, 2017

The present communication, deals with the description, of a new species, as *Moniezia (Blanchariezia) khandeshensis* n. sp. collected from the intestine of a goat, *Capra hircus* at Dhule, Tq. & Dist. Dhule, M.S., India.

MATERIALS AND METHODS

The survey of *Capra hircus* were made at Dhule for Cestode infection in the month of December, 2007. Four Cestodes were collected from the intestine of *Capra hircus*. All the worms are flattened preserved in 4% formalin, stained with Harris Haematoxyline, passed through various alcoholic grades, cleared in Xylol, mounted in DPX and whole mount slide were prepared for anatomical studies, drawing were made with the help of camera lucida and microphotographs were taken by digital camera.

RESULT AND DISCUSSION

Description (Based on eight specimens): (Figs. 1.1 A, B)

The worms were large in size, muscular and consist of scolex, numerous immature, mature and gravid proglottids. The **scolex** is large in size, squarish in shape, broad anteriorly and slightly narrow posteriorly, with four medium suckers, without rostellum, distinctly marked off from the strobila and measures 0.300 to 0.330 in length and 0.283 to 0.373 in breadth. The suckers are medium in size, round in shape, arranged in two pairs in straight line, one pair in each half of it, slightly overlapping each other and measure 0.093 to 0.103 in diameter. The **neck** is medium in length, slightly broad anteriorly; narrow posteriorly, with slightly curved lateral margins and measures 0.260 to 0.270 in length and 0.186 to 0.233 in breadth.

The **mature proglottids** are medium in size, rectangular in shape, broader than long, almost two times broader than long, craspedote, each with a double set of reproductive organs, one set on each side of each segment, with irregular concave or convex lateral margins, with short, blunt, projections at the posterior corners of the segments and measure 0.176 to 0.206 in length and 0.413 to 0.440 in breadth. The **testes** are medium in size, oval in shape, 52 in number, evenly distributed, in a single field, in the central medulla of the segment, bounded laterally by the longitudinal excretory canals, majority of them in between the ovary of each side, few on the poral side of the ovary and measure 0.003 to 0.010 in length and 0.007 to 0.009 in breadth. The **cirrus pouch** on each side is medium in size, oval in shape, elongated, situated just in the middle of the segments, reaching the longitudinal excretory canals, slightly obliquely placed, directed anteriorly, medially and measures 0.034 to 0.050 in length and 0.014 to 0.017 in breadth. The **cirrus** on each side is a thin tube, slightly curved, contained within the cirrus pouch and measures 0.050 to 0.060 in length and 0.003 in breadth. The **vas deferens** on each side is thin, wavy, runs obliquely and measures 0.100 to 0.150 in length and 0.003 in breadth.

The **ovary** on each side is medium in size, inverted cup shaped in appearance, with irregular margin, each with numerous prominent, blunt, round acini, lobes directed posteriorly, placed in the middle of the

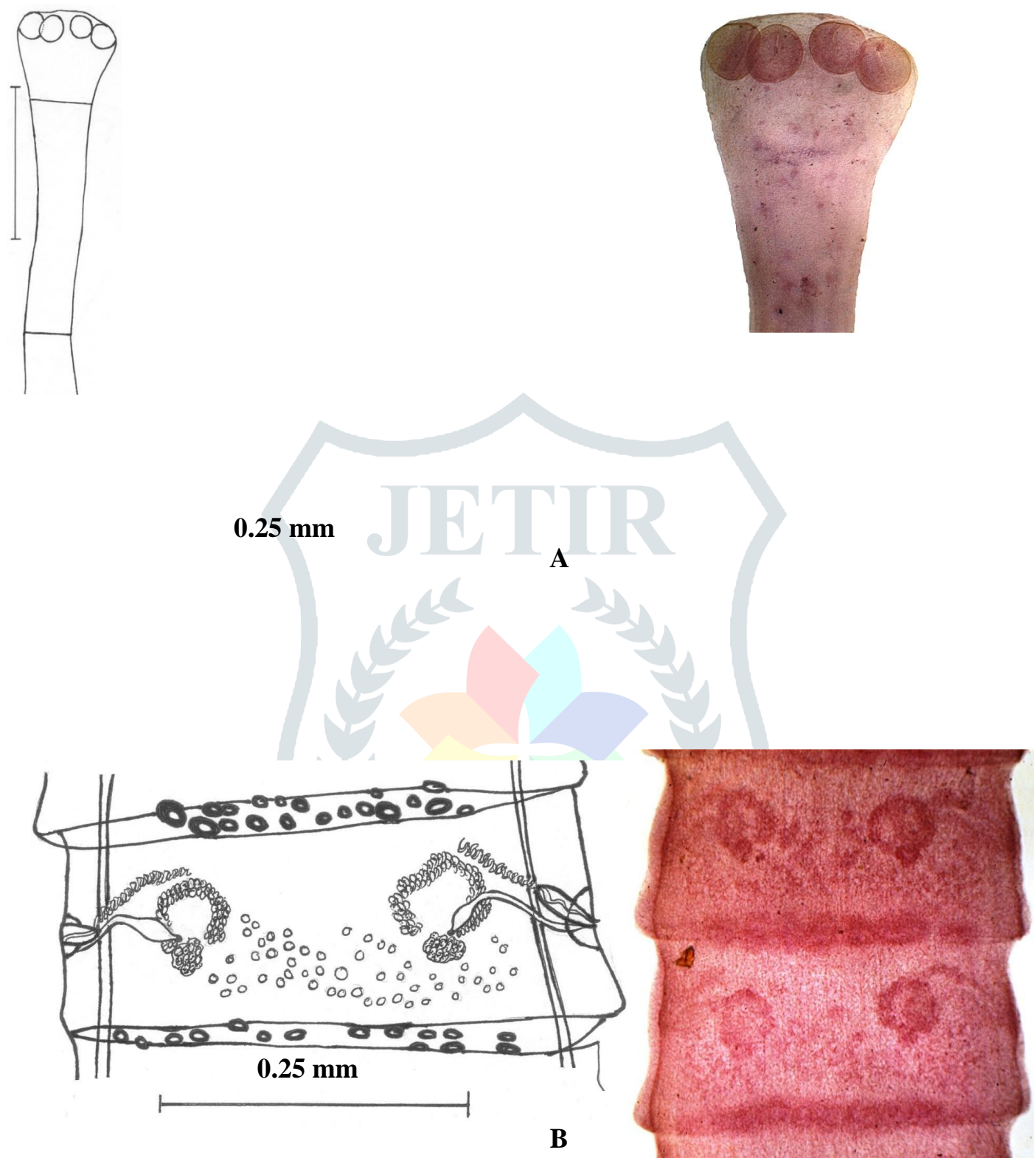


Fig: 1 - *Moniezia (B.) khandeshensis* n. sp.

A – Scolex; B – Mature segment

segments and measures 0.160 to 0.166 in length and 0.014 to 0.017 in breadth. The **vagina** on each side is a thin tube, situated posterior to the cirrus pouch, starts from the genital pore, extends anteriorly and then medially for a long distance, takes a turn posteriorly, enlarged and forms the receptaculum seminis, reaches

and opens into the ootype and measures 0.066 to 0.133 in length and 0.003 to 0.004 in breadth. The **receptaculum seminis** is medium, spindle shaped, in between the ovarian lobes, obliquely placed and measures 0.034 to 0.036 in length and 0.010 to 0.014 in breadth. The **ootype** is small in size, round in shape, situated posteroventral to the poral lobe of the ovary and measures 0.003 in diameter. The **genital pores** are bilateral, medium in size, oval in shape, placed in the middle of the segmental margin and measure 0.034 to 0.046 in length and 0.017 to 0.020 in breadth.

The longitudinal **excretory canals** are wide and measures 0.010 to 0.014 in breadth.

The **interproglottid glands** are present in the intersegmental regions, of the anterior and posterior margins of the segments, large in size, 15-19 in number, oval in shape, highly muscular, either single or paired, irregularly arranged and measure 0.004 to 0.027 in length and 0.004 to 0.014 in breadth. The **vitelline gland** on each side is large in size, oval in shape, obliquely placed, post ovarian, having short, blunt, round acini and measures 0.027 to 0.034 in length and 0.024 to 0.027 in breadths. The **gravid segments** were not stained properly.

Discussion

The genus *Moniezia* was established by Blanchard, 1891 and Skrjabin and Schulz, 1937 divided this genus, into three sub-genera as *Moniezia*, *Blanchariezia* and *Baeriezia*. The present worm agrees with subgenus *Blanchariezia*, in which the following 25 species are added till to date, by different workers, in the world

- 1) The worm under discussion differs from *M. (B.) benedeni* in the number of testes (55 vs. 500), ovary (inverted cup shaped vs, compact), cirrus pouch (elongated vs. short), interproglottid glands (15-19 vs. 10-12), vitelline gland (oval vs. absent) and host (*Capra hircus* vs. *Ovis aries*).
- 2) The parasite under discussion, differs from *M. (B.) pallida* which is having mature segments (rectangular vs. squarish), interproglottid glands (15-19 vs. varying in size) and host (*Capra hircus* vs. *Equus caballus*).
- 3) The present cestode, differs from *M. (B.) aurangabadensis*, in the number of testes (52 vs. 1100-1200), in shape of ovary (inverted cup shaped vs. bilobed), in the number of interproglottid glands (15-19 vs. 12-15) and in host (*Capra hircus* vs. *Ovis bharal*).
- 4) The present worm, differs from *M. (B.) bharalae*, in the number of testes (52 vs. 190-200) in the ovary (inverted cup shaped vs. bilobed & compact), in the number of interproglottid gland (15-19 vs. 38-44), vitelline gland (present, oval vs. absent) and in host (*Capra hircus* vs. *Ovis bharal*).
- 5) The worm under discussion, differs from *M. (B.) murhari* in the number of testes (52 vs. 405-415), ovary (inverted cup shaped vs. bilobed), interproglottid glands (15-19 vs. 63), and vitelline gland (oval vs. rounded).
- 6) The present tapeworm, differs from *M. (B.) jadhavae*, in the shape of scolex (squarish vs. dome shape), in the number of testes (52 vs. 30-50), in the ovary (inverted cup shaped vs. bilobed, butterfly shape), in the number of interproglottid glands (15-19 vs. 10-12), in position of vagina (posterior to cirrus pouch vs. anterior to cirrus pouch) and in host (*Capra hircus* vs. *Ovis bharal*).
- 7) The worm under discussion, differs from *M. (B.) kalawati*, in the number of testes (52 vs. 172), in the shape of ovary (inverted cup shaped vs. single mass) and interproglottid glands (15-19 vs. 54) and vitelline gland (oval vs. rounded).
- 8) The worm under discussion, differs from *M. (B.) jalnaensis*, in the number of testes (52 vs. 150-160), in the number of interproglottid glands (15-19 vs. 19) and in host (*Capra hircus* vs. *Ovis bharal*).
- 9) The present tapeworm, differs from *M. (B.) warananagarensis*, in the shape of scolex (squarish vs. globular), in the number of testes (52 vs. 300-320), in the shape of ovary (inverted cup vs. bilobed), in the number of interproglottid glands (15-19 vs. 56), vitelline gland (oval vs. elongated) and in host (*Capra hircus* vs. *Ovis bharal*).
- 10) The present worm, differs from *M. (B.) shindei*, in the number of testes (52 vs. 30-40), in the number of interproglottid glands (15-19 vs. 12-14), vitelline gland (oval vs. globular) and in host (*Capra hircus* vs. *Ovis bharal*).
- 11) The worm under discussion, differs from *M. (B.) hircusae*, in the shape of scolex (squarish vs. globular), in the number of testes (52 vs. 168) and in the number of interproglottid glands (15-19 vs. 14-15).

- 12) The present tapeworm, differs from *M. (B.) aishvaryae*, in the shape of scolex (squarish vs. globular), in the number of testes (52 vs. 255-265), in the shape of ovary (inverted cup vs. single mass), in the number of interproglottid glands (15-19 vs. 43-46), vitelline gland (oval vs. quadrangular) and in host (*Capra hircus* vs. *Bos indicus*).
- 13) The present worm, differs from *M. (B.) caprai*, in the number of testes (52 vs. 255-260), in the shape of ovary (inverted cup vs. inverted horse shoe) and in the number of interproglottid glands (15-19 vs. 30-34).
- 14) The present tapeworm, differs from *M. (B.) rajalensis*, in the shape of scolex (squarish vs. globular), in the number of testes (52 vs. 250-260), in the shape of ovary (inverted cup vs. horse shoe), in the number of interproglottid glands (15-19 vs. 31-32) and vitelline gland (oval vs. squarish).
- 15) The present parasite, differs from *M. (B.) punensis*, in the shape of scolex (squarish vs. quadrangular), in the number of testes (52 vs. 110-120) and in the number of interproglottid glands (15-19 vs. 18-22).
- 16) The present tapeworm, differs from *M. (B.) caprae*, in the shape of scolex (squarish vs. oval), in the number of testes (52 vs. 170), in the shape of ovary (inverted cup vs. bilobed) and in the number of interproglottid glands (15-19 vs. 40).
- 17) The tapeworm under discussion, differs from *M. (B.) madhukarae*, in the shape of scolex (squarish vs. elongated), in the number of testes (52 vs. 210-240) and in the shape of ovary (inverted cup shaped vs. bilobed, butterfly shaped).
- 18) The present worm, differs from *M. (B.) maharashtrae*, in the shape of scolex (squarish vs. oval), in the number of testes (52 vs. 116), in the shape of ovary (inverted cup vs. butterfly shaped) and in the number of interproglottid gland (15-19 vs. 38).
- 19) The present parasite, differs from *M. (B.) warudensis*, in the shape of scolex (squarish vs. quadrangular), in the number of testes (52 vs. 241-256), in the shape of ovary (inverted cup vs. compact) and in the number of interproglottid gland (15-19 vs. 30-35).
- 20) The present cestode, differs from *M. (B.) babai*, in the shape of scolex (squarish vs. globular), in the number of testes (52 vs. 190-220) and in the shape of ovary (inverted cup shaped vs. rounded).
- 21) The worm under discussion, differs from *M. (B.) govindae*, in the shape of scolex (squarish vs. globular), in the number of testes (52 vs. 100-140), in the shape of ovary (inverted cup vs. nut shaped) and in the number of interproglottid gland (15-19 vs. 42).
- 22) The present tape worm, differs from *M. (B.) ovisae*, in the number of testes (52 vs. 155-165), in the number of interproglottid gland (15-19 vs. 32-35 in pairs) and in host (*Capra hircus* vs. *Ovis bharal*).
- 23) The worm under discussion, differs from *M. (B.) mansurae*, in the shape of scolex (squarish vs. globular), in the number of testes (52 vs. 160-170) and in the shape of ovary (inverted cup vs. compact).
- 24) The present parasite, differs from *M. (B.) orientalis* which is having scolex (squarish vs. oval), testes (52 vs. 35-40), in the shape of ovary (inverted cup vs. bean shaped), interproglottid glands (15-19 vs. 33-37), vagina (posterior to cirrus pouch vs. anterior to cirrus pouch) and reported from host (*Capra hircus* vs. *Ovis bharal*).
- 25) The present parasite, differs from *M. (B.) parbhaniensis* which is having number of testes (52 vs. 240-246), in the shape of ovary (inverted cup vs. bilobed shaped) and interproglottid glands (15-19 vs. 27-30).
- 26) The worm under discussion differs from *M. (B.) nagaonensis*, in the number of testes (52 vs. 185), in the shape of ovary (inverted cup vs. horse shoe shaped) and in the number of interproglottid gland (15-19 vs. 33-37).
- 27) The present tape worm, differs from *M. (B.) bhalchandrai*, in the number of testes (52 vs. 196-200) and in the number of interproglottid gland (15-19 vs. 13-14).
- 28) The present cestode, differs from *M. (B.) fagnaensis*, in the number of testes (52 vs. 242), and in the number of interproglottid gland (15-19 vs. 44-50).
- 29) The parasite cestode under discussion, differs from *M. (B.) naidui*, in the shape of scolex (squarish vs. globular), number of testes (52 vs. 147) and number of interproglottid gland (15-19 vs. 30-35).

These characters are valid enough, to erect a new species, for these worms and hence the name *M. (B.) khandeshensis* n. sp. is proposed, after the locality.

TAXONOMIC SUMMARY

Type species	:	<i>Moniezia (B.) khandeshensis</i> n.sp.
Host	:	<i>Capra hircus</i> (Linnaeus, 1758)
Habitat	:	Small intestine.
Locality	:	Dhule, Dist. Dhule, M.S., India.
Holotype and Paratype	:	Deposited in the Helminthology Research Lab. Department of Zoology, Nanasaheb Y. N. Chavan College, Chalisgaon, Dist. Jalgaon (M.S.) India
Date of collection	:	December, 2007.
Ethymology	:	Named on locality

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