

A Two-Day International (Web) Conference
New Vistas in Aquatic & Terrestrial Biology and Environment
During Current Pandemic (ATBE-2021)

26 & 27 March, 2021

Department of Zoology R.S.S.P. Mandal's Nanasaheb Y. N. Chavan Arts, Science and Commerce College Chalisgaon,
Dist. Jalgaon (M.S.) India.

On A New Cestode Of *Moniezia* (Cestoda-Anoplocephalidae) From The Intestine Of *Capra Hircus* (L.) From Ghansavangi, District Jalna (M.S.)

¹Arun Gaware, ²Rahul Khawal, ³Sunita Borde and ⁴Vijay Lakwal

¹Department of Zoology, Shri Shivaji ACS College Motala, Dist. Buldana (M.S.) India.

²Department of Zoology, Shri Vyankatesh ASC College, Deulgaon Raja Dist- Buldana (M.S.) India.

³Department of Zoology, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (M.S.) India.

⁴PG Department of Zoology, Nanasaheb Y.N. Chavan ASC College Chalisgaon, Jalgaon, (M.S.) India

Email – ¹arungaware26@gmail.com

Abstract: The present investigation deals with systematic observation of the cestode parasites *Moniezia* Blanchard, 1891, that is, *Moniezia mehdii* Sp. Nov. collected from the intestine of domestic goat *Capra hircus* Linnaeus, 1758 at Ghansavangi, District Jalna. The present worm comes closer to all the known species of the genus *Moniezia* in general topography of organ but differs due to having the scolex small squarish, mature proglottids nearly two times broader than long, testes small, oval to rounded in shape, 130-140 in numbers, cirrus pouch large cylindrical, ovary horse-shoe shaped, vitelline gland post ovarian, inter proglottidal glands 15-16 in numbers.

Keywords: Anoplocephalidae, *Capra hircus*, Jalna, *Moniezia*

1. INTRODUCTION:

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

- 1) Inter proglottidal glands grouped in rosettes-----*Moniezia*.
- 2) Inter proglottidal glands arranged lineally-----*Blancharia*.
(Some time absent)
- 3) Inter proglottidal glands absent-----*Baeriezia*.

The present worm agrees in all characters with subgenus *Blancharia*. Skrjabin and Schulz, 1937 includes having two species *M. (B.) benedeni* (Moniez, 1879), Skrjabin and Schulz, 1937 and *M. (B.) pallida*, Monnig, 1926. In India Shinde *et.al.*, 1985 added two species of the genus i.e. *M. (B.) aurangabadensis* and *M. (B.) bharalae* from *Ovis bharal* in Aurangabad district, (M.S.), India. Later on Patil, *et.al.*, 1997 described *M. (B.) warnanagarensis* from *Capra hircus* (L.). In 1999 Nanware, *et.al.* erected *M. (B.) kalawati* and Kalse, *et.al.* erected *M.(B.) murhari* from *Capra hircus* (L.). In 2004, Pawar *et.al.* added *M. (B.) Shindei* and Tat and Jadhav B. V. added *M. (B.) hircusae* from *Capra hircus* (L.). Pokle, *et.al.* added *M. (B.) caprai* from *Capra hircus* (L.). Borde, *et.al.*, 2007 erected new species i.e. *M. (B.) rajalaensis* from *Capra hircus* (L.). *M. (B.) caprae* is added by Nanware S. S. 2010. Padwal, *et.al.* 2011 added *M. (B.) govindae* from *Capra hircus* (L.). Later Humbe, *et. al.*, erected four more species i.e. *M (B.) babai*, 2011, *M. (B.) ovisae*, 2011, *M (B.) osmanabadensis*, 2012 and *M (B.) devraoi*, 2013. Later on Barote, *et.al.* added two more species i.e. *M. (B.) shegaonesis*, 2013 and *M. (B.) shivajiraovae*, 2014. Ravi Solunke, 2015 erected *M.(B.) sureshi* and Amol Thosar, *et.al.*, 2015 erected *M (B.) jadhavii* from *Capra hircus* (L.). Later on *Moniezia* (B) *marathwadensis* is added by Shaikh Kalim 2015, *Moniezia* (B) *bhalchandrai* is added by Kalse A. T. *et. al.*, 2016, Sunita Borde, *et. al.*, 2017 erected *M. (B.) bordeae* from *Ovis bharal* (L.) and Jadhav V.M. *et. al.* 2018 erected *Moniezia (B.) madhavae* from *Capra hircus* (L.). Recently Amol Thosar, *et. al.*, 2020 *Moniezia* (B) *shilae*, added to this genus from *Capra hircus* (L.).

The present communication, deals with the description of a new species, *Moniezia mehdii* Sp. Nov. collected from the *Capra hircus* Linnaeus, 1758 at Ghansavangi, District Jalna.

2. MATERIALS AND METHODS:

Cestode parasites were collected from the intestine of *Capra hircus* (L.) from Ghansavangi, District Jalna (M.S.) India. These cestodes were preserved in 4% formalin and stained with Acetocarmine or Harris Haematoxylin, passed through various alcoholic grades, cleared in xylene, mounted in D.P.X. and drawings are made with the aid of Camera Lucida. All measurements are given in millimeters. The identification is made with the help of Systema Helminthum.

3. DESCRIPTION:

The cestodes are long consisting scolex, neck and proglottids. Proglottids are immature and mature. The scolex is small in size, squarish in shape and measures, 1.567 (1.485-1.650) in length and 1.435 (1.386-1.485) in width. The suckers are large, oval in shape, four in numbers, arranged in two pairs, obliquely placed and measures, 0.429 in diameter. The neck is long and measures, 5.362 (5.280-5.445) in length and 0.957 (0.924-0.990) in width. Mature proglottids are large in size, rectangular, almost two time broader than long, each proglottids with a double set of reproductive organs and measures, 3.663 (3.630-3.696) in length and 7.837(7.425-8.25) in width. The testes are small, oval to rounded in shape, 130-140 in numbers, scattered in the posterior half of the segment in between two longitudinal excretory canals and measures, 0.049 (0.033-0.066) in diameter. The vas-deference is long, thin coiled tube and measures, 0.940 in length and 0.033 in width. The cirrus pouch is large, cylindrical, situated in middle margin of the segments and measures, 0.445 (0.396-0.495) in length and 0.297 (0.264-0.330) in width. The cirrus is thin tube, cylindrical, inside the cirrus pouch and measures, 0.445 in length and 0.297 in width. The ovary large, horse shoe shaped, compact with acinia, two in numbers and measures, 1.419 (1.353-1.485) in length and 1.320 (1.320 -1.320) in width. The ootype is small, elongated, anterior to the ovary and measures, 0.099 in diameter. The vagina posterior to cirrus pouch, long tube reaches to the ootype and measures, 0.858 in length and 0.049 in width. The genital pores medium in size, oval in shape, bilateral, middle in position and measures, 0.198 (0.165-0.231) in length and 0.066 (0.066-0.066) in width. The vitelline gland small, oval in shape, compact, post-ovarian and measures, 0.247 (0.231-0.264) in diameter. The Inter-proglottidal glands present in between two proglottids, oval to rounded, 15-16 in numbers, arranged in a single row in between two longitudinal excretory canals, and measures, 0.379 (0.330-0.429) in diameter. The longitudinal excretory canals are thin, present on both lateral sides of segments along the body length and measures, 0.082 (0.066-0.099) in width.

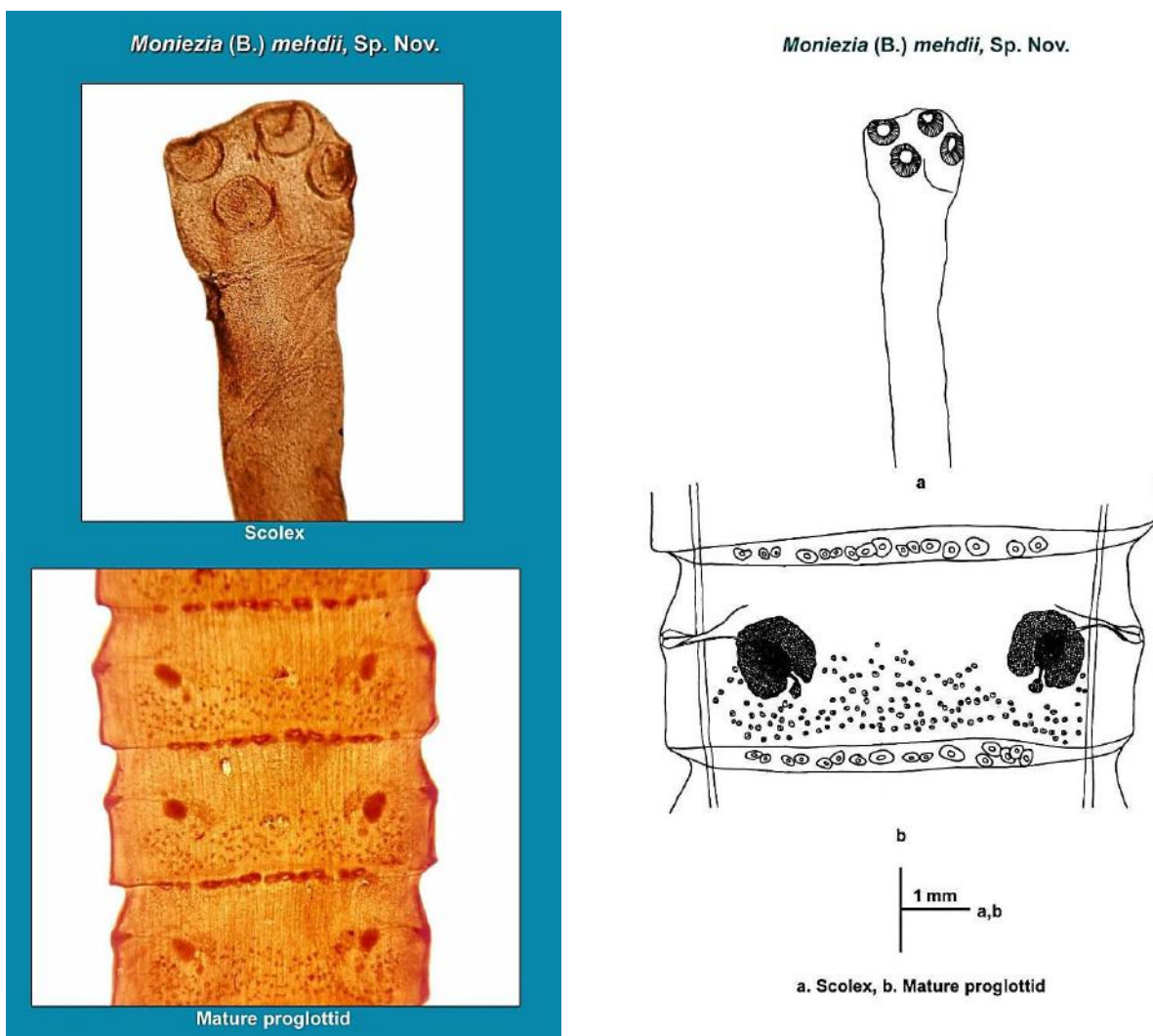


Fig. 1 Microphotograph And Camera Lucida Of
 a) Scolex; B) Mature Proglottid

4. RESULTS AND DISCUSSION:

The genus *Moniezia* was erected by Blanchard in 1891. The worm under discussion is having the scolex small squarish, mature proglottids nearly two times broader than long, testes small, oval to rounded in shape, 130-140 in numbers, cirrus pouch large cylindrical, ovary horse-shoe shaped, vitelline gland post ovarian, inter proglottidal glands 15-16 in numbers.

- The present worm differs from *Moniezia* (B) *benedeni*, Moniez, 1879, Skrjabin and Schulz, 1937, which is having numerous proglottids broader than long, posterior proglottids fleshy, testes 500 in numbers, arranged in two groups, cirrus pouch short and wide, vas deferens with 2-3 coils, ovary compact, in the center of the segments, eggs well developed, inter proglottidal glands liner and close to the posterior margin of the segments, arranged transversely and reported from the Calves and Lambs.
- The present cestode differs from *Moniezia* (B) *pallida*, Monnig, 1926, which is having the uterus external, dorsal and ventrally over excretory canals, the inter-proglottidal glands varying in size and reported from the host horse in South Africa.
- The present parasite differs from *Moniezia* (B) *aurangabadensis*, Shinde, *et al.* 1985, which is having the scolex quadrangular, testes small, 1100-1200 in numbers, vas deferens coiled, cirrus pouch cylindrical, oval with some rounded acini, gravid proglottids broader than long, uterus reticulate, inter proglottidal glands 12-15 in numbers and reported from *Ovis bharal* (L.).
- The present tapeworm differs from *Moniezia* (B) *bharalae*, Shinde, *et al.* 1985, which is having testes rounded, 190-200 in numbers, vas deferens short, elongated, fusiform, genital pores bilateral, sub marginal, ovary compact, inter proglottidal glands arranged in two rows, small in size, 38-44 in numbers and reported from *Ovis bharal* (L.).
- The present form differs from *Moniezia* (B) *warananagarensis*, Patil, *et al.* 1997, which is having scolex large, globular, testes 300-320 in numbers, distributed throughout the proglottids, in single field, ovary indistinctly lobed with 13-15 short, blunt acini, transversely elongated, inter proglottidal glands, 56 in numbers, oval, medium in size, cirrus pouch medium, oval, transversely elongated, slightly obliquely placed and extend beyond longitudinal excretory canal.
- The present cestode differs from *Moniezia* (B) *kalawati*, Nanware, *et al.* 1999. Which is having squarish scolex, oval shaped cirrus pouch, testes small, oval, distributed throughout the segment, 172 in numbers, ovary medium, short, blunt acini, and 54 inter proglottidal glands in the inter segmental region, medium, oval either single or paired, irregularly arranged in the central width of the segments and leaving space on each lateral side.
- The present tapeworm differs from *Moniezia* (B) *murhari*, Kalse, *et al.* 1999, in having the scolex squarish, testes 405-415 in numbers, cirrus pouch elongated in the anterior region of the segments, ovary inverted horse shoe shaped, indistinctly bilobed each with numerous short, blunt, round, acini and inter proglottidal glands 63 in numbers.
- The present parasites differs from *Moniezia* (B) *caprai*, Pokale, *et al.* 2004, which is having the scolex is medium, squarish, with large four suckers, without rostellum, testes oval in shape, 255-260 in numbers, cirrus pouch is medium in size and ovary medium in size, kidney shaped.
- The present worm differs from *Moniezia* (B) *shindei*, Pawar, *et al.*, 2004 in having scolex large, mature segments craspedote, testes 190-200 (195) in numbers, scattered all over segment and ovary a single mass, large, oval, cirrus pouch oval, elongated, in center of the segment and vitelline gland large, oval, internal to ovary.
- The present cestode differs from *Moniezia* (B) *hircusae*, Tat and Jadhav B. V., 2004 which is having scolex large, globular, mature segments big, craspedote, testes 168 in numbers, small, scattered in a single field, ovary large, oval, a single mass, in anterior half of the segment, inter proglottidal glands 14-15 in numbers, large, oval and cirrus pouch in anterior 1/3rd region of the segment.
- The present cestode differs from *Moniezia* (B) *rajalaensis*, Borde, *et al.* 2007, in having scolex large, globular, mature proglottids squarish, broader than long, testes 250-260 in numbers, medium, scattered throughout proglottids, ovary large, horse shoe shaped, inter proglottidal glands 31-32 in numbers, large, oval and cirrus pouch oval.
- The present cestode differs from *Moniezia* (B) *caprae*, Nanware S.S., 2010 in having scolex large, mature segment big, almost three and a half times broader than long, testes 84-85 in numbers, medium in size, oval in shape, ovary large, bilobed, inter proglottidal glands 40 in numbers, oval, rounded and cirrus pouch on each side.
- The present cestode differs from *Moniezia* (B) *govindae*, Padwal, *et al.*, 2011 in having scolex large, globular, mature proglottids big, broader than long, testes 100-140 in numbers, medium, scattered throughout proglottids, ovary large, compact, nut shaped, inter proglottidal glands 40-42 in numbers, large, oval and cirrus pouch elongated.
- The present cestode differs from *Moniezia* (B) *babai*, Humbe, *et al.*, 2011 in having scolex globular, mature segment four times broader than long, testes 190-220 in numbers, small in size, rounded in shape, ovary large, rounded, inter proglottidal glands 18-20 in numbers, oval, rounded and cirrus pouch on each side.
- The present cestode differs from *Moniezia* (B) *ovisae*, Humbe, *et al.*, 2011 in having scolex broad anteriorly and narrow towards neck, mature segment two times broader than long, testes 155-165 in numbers, small in size, rounded in shape, ovary large, bilobed, inter proglottidal glands 32-35 in numbers, oval, rounded and cirrus pouch on each side.

- The present cestode differs from *Moniezia* (B) *osmanabadensis*, Humbe, *et al.*, 2012 in having scolex globular, mature segment five times broader than long, craspedote, testes 170-200 in numbers, small in size, rounded in shape, ovary large, bilobed, inter proglottidal glands 38-40 in numbers, oval, rounded and cirrus pouch on each side.
- The present cestode differs from *Moniezia* (B) *devraoi*, Humbe, *et al.*, 2013 in having scolex quadrangular, mature segment four times broader than long, testes 160-180 in numbers, small in size, rounded in shape, ovary large, bilobed, inter proglottidal glands 40-45 in numbers, oval, rounded and cirrus pouch on each side.
- The present cestode differs from *Moniezia* (B) *shegaonensis*, Barote, *et al.*, 2013 in having scolex globular, mature segment four to five times broader than long, testes 190-220 in numbers, small in size, rounded in shape, ovary compact, inter proglottidal glands 20-25 in number, oval, rounded and cirrus pouch on each side.
- The present cestode differs from *Moniezia* (B) *shivajiraovae*, Barote, *et al.*, 2014 in having scolex squarish, large in size, mature segment six to eight times broader than long, testes 84-95 in numbers, small in size, rounded in shape, ovary horse-shoe shaped, inter proglottidal glands 40-42 in numbers, oval, rounded and cirrus pouch on each side.
- The present cestode differs from *Moniezia* (B) *sureshi*, Ravi Solunke, 2015 in having scolex oval, quadrangular, mature segment four to five times broader than long, testes 180-185 in numbers, single field, unevenly distributed, ovary medium, horse-shoe shaped, in appearance having numerous short, blunt acini, inter proglottidal glands 18-19 in numbers, oval and cirrus pouch on each side.
- The present cestode differs from *Moniezia* (B) *jadhavii*, Amol Thosar, *et al.*, 2015 in having scolex squarish, mature segment craspedote, five times broader than long, testes 210-220 in numbers, small, oval to round, ovary horse-shoe shaped, compact, inter proglottidal glands 46-52 in numbers, arranged lineally in one or two rows, cirrus pouch small oval.
- The present cestode differs from *Moniezia* (B) *marathwadensis*, Shaikh Kalim, 2015 in having scolex quadrangular, mature segment five times broader than long, testes 125-130 in numbers, small, oval in shape, ovary compact with numerous blunt acini, inter proglottidal glands 50-52 in numbers, arranged lineally in one or two rows, cirrus pouch large, elongated, oval.
- The present cestode differs from *Moniezia* (B) *bhalchandrai*, Kalse A.T. *et al.*, 2016 in having scolex quadrangular, mature segment rectangular in shape, almost four and half times broader than long, testes 196-200 in numbers, oval in shape, ovary medium in size, inverted cup shaped, inter proglottidal glands 13-14 in numbers, oval in shape, highly muscular, single regularly and lineally arranged, cirrus pouch large, oval in shape.
- The present worm differs from *Moniezia* (B.) *bordeae*, Sunita Borde *et al.*, 2017 in having scolex quadrangular, mature segment nearly four to five times broader than long, testes 130-170 in numbers, spread in the medulla in between the longitudinal excretory canals, ovary bean shaped, small, forms concavity posteriorly, inter proglottidal glands 5-9 in numbers, arranged single row, cirrus pouch on each side and reported from *Ovis bharal* (L.).
- The present cestode differs from *Moniezia* (B) *madhavae*, Jadhav V.M. *et al.*, 2018 in having scolex quadrangular, mature segment near five times broader than long, testes 45-60 in numbers, medium in size, oval in shape, ovary distinctly bilobed, inter proglottidal glands 40-42 in numbers, oval in shape, cirrus pouch small in shape, curved.
- The present cestode differs from *Moniezia* (B) *shilae*, Amol Thosar *et al.*, 2020 in having the scolex quadrangular, mature proglottids nearly four times broader than long, craspedote in shape, testes small in size, oval to rounded, 180-210 in numbers, cirrus pouch oval, ovary large, compact, horse-shoe shaped, vitelline gland post ovarian, inter proglottidal glands 26-30 in numbers.

The above differentiating characters are valid enough to erect a new species for these cestodes and hence the name *Moniezia* (B) *mehdii* Sp. Nov is proposed, in honour of late Prof. Syed Mehdi Ali, well known Helminthologist in India and Ex-head and professor, Department of Zoology, Dr. Babasaheb Ambedkar University, Aurangabad-431004.

ACKNOWLEDGMENTS:

Author is thankful to the Dr. S.W. Mamlkar Principal, Shri Shivaji College Motala for his support and also thankful Dr. Sunita Borde, Professor, Department of Zoology, Dr. Babasaheb Ambedkar Marathawada University, Aurangabad for her guidance.

REFERENCES:

1. Amol Thosar *et al.*, (2020): A Taxonomic study of a new Cestode *Moniezia* (B) *shilae*, Sp. Nov. (Cestoda: Anoplocephalidae) in *Capra hircus* (L.) from Aurangabad District International online Multidisciplinary Journal 1-6.
2. Amol Thosar, *et al.*, (2015): Morphological and molecular studies of *Moniezia* Sp. (Cestoda: Anoplocephalidae) a parasite of the domestic goat *Capra hircus* (L.) in Aurangabad district (M.S.), India. International Journal of Applied Research, 5(8): 10-13.
3. Barote, *et al.*, (2013): On a new species of *Moniezia* Blanchard, 1891 (Cestoda: Anoplocephalidae) in *Ovis bharal* from Bhuldhana dist. (M.S.) India. Trends in Parasitology Research, volume 2(3):1-4 (Online).
4. Barote, *et al.*, (2014): On a new species of *Moniezia* Blanchard, 1891 (Cestoda: Anoplocephalidae) in *Ovis bharal* from Bhuldhana dist. (M.S.) India. Trends in Parasitology Research, volume 3(1):1-4.
5. Barote, *et al.* (2014): On a new species of *Moniezia* Blanchard, 1891 (Cestoda: Anoplocephalidae) in *Ovis bharal* from Bhuldhana dist. (M.S.) India. Trends in Parasitology Research, volume 3(1):1-4.

6. Borde, S. N., et. al., (2007): A new tape worm from the host *Capra hircus* at Rajala (M.S). Nat. J. Sci., 4 (3) (126-128).
7. Humbe Atul, et. al., (2013): A New Mammalian Tapeworm *Moniezia devraoi* From *Capra hircus* at Amravati (M.S.) India. Weekly Science Research Journal.1(10).1-5.
8. Humbe, et. al., (2011): On a new species of *Moniezia babai*, Blanchard, 1891 (Cestoda: Anaplocephlidae) from *Capra hircus* (L.) from Buldhana district (M.S.) India. International multidisciplinary Research Journal. 1(8): 01-03.
9. Humbe, et. al., (2011): Occurrence of a new mammalian tapeworm *Moniezia ovisae*. International multidisciplinary Research Journal. 1(12): 01-03.
10. Humbe, et. al., (2012): A report of new mammalian tapeworm *Moniezia osmanabadensis* from *Capra hircus* (L.) at Osmanabad. District (M.S.), India. Journal of experimental science. 3(5): 08-10.
11. Jadhav V.M. and Kale M.K (2018):.Studies On a new species of Cestode parasite Genus *Moniezia* (Blanchard 1891) of *Capra hircus* from Dist. Sangli (MS) India. International Journal of Universal Print. 338-346.
12. Kalse A.T. and G.B. Shinde, (1999): On *Moniezia* (Blanchariezia) *murhari*, n. sp. (Cestoda : Anoplocephalidae Fuhramann, 1907) from *Capra hircus* (L.) in (M.S.) India. Rivista Di Parasitologia, Vol XVI (LX)N.1 APRILE 1999
13. Kalse A.T. and Suryawanshi R.B. (2016): Taxonomic studies of Mammalian tapeworm *Moniezia* (B.) *bhalchandrai* n. sp. from *Capra hircus* (L.)
14. Monnig, H. O., (1926): Three new helminths. Transactions of the Royal Society of South Africa. 13: 291-298.
15. Nanware, S. S. (2010): Report on occurrence of *Moniezia* (Blanchariezia) *caprae* Sp. Nov. (Cestoda: Anoplocephalidae) from *Capra hircus* (L.). The Biosphere. 2(1): 27-30.
16. Nanware, S. S., (1999): A new record of *Moniezia* (Blanchariezia) *kalavati* n. sp. from *Capra hircus* L. 13 th Nat. Cong. Parasitol.Eb.24-26. 1999.Sou. Abstract no.164, pp. 118.
17. Padwal Nitin and M. N. Kadam, (2011): Report of a new mammalian tapeworm *Moniezia govindae*. Rec Res Sci Tech 3 (2011) 30-33.
18. Patil, S. R. and Shinde G. B., (1997): A new species of the cestode *Moniezia*. (B) *waranaganarensis*, n. sp from Sheep. Riv. Di. Parasit.XIV(LVIII) N-2A: 905-997.
19. Pawar, S. B., (2004): A new cestode *Moniezia* (Blanchariezia) *shindei*, n. sp. from *Capra hircus* M.S. India. Rivista Di Parasit. XII (LXV) – N 2: 87 – 90.
20. Pokale, S. N., (2004): On a new species of *Moniezia caprai* Blanchard, 1891 (Cestoda :Anoplocephalidae) from *Capra hircus*. Utter Pradesh J. Zool. 24 (3): 285-288.
21. Ravi V. Solunke (2015): On A New Species of *Moniezia* (Blanchard, 1891) (Cestoda: Anaplocephali Dae) in *Capra hircus* (L.) from Latur Dist. (M.S.) India. International journal of scientific research Peer Reviewed and Refereed International Journal .514-516
23. Shaikh Kalim (2015): Biosystematic study on *Moniezia* (B) *marathwadensis* sp. Nov. parasitisc in *Capra hircus* from Aurangabad District, M.S. India.
24. Shinde G.B. et. al., (1985): Two new species of the genus *Moniezia* Blanchard 1891 Rivista Di Parasitologia, Vol.II (XLVI) APRILE 1985.
25. Skrjabin, K. J. and R. I. Schulz, (1937): Helminthology Miskow, 2nd Ed. PP. 418.
26. Sunita Borde, et. al., (2017): Diversity of Cestode parasites in Vertebrates from Marathwada region (M.S.) India. International Journal of the Social Research Foundation. IIC-DESW 2017-Special Issue: Vol. No. II. 276-283.
27. Tat, M. B. and B. V. Jadhav. (2004): A new tapeworm from the host, *Capra hircus* at Beed (Maharashtra) India. Nat. J. Life. Sci. PP. 255-258.
28. Wardle, R. A. et. al., (1974): Advances in the Zoology of tapeworms, 1950- 1970. Univ. Minnesota. Minnetoba Press, Monneapolis, 1-274.
29. Yamaguti, S. (1956): Systema Helminthum Vol-II. The cestode of vertebrates. Interscience publ. New York and London, 1-860.