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**Report of new mammalian tapeworm *stilesia shindei* Sp.Nov. from *Ovis bharal* (L.) at Solapur city, District Solapur (M.S.) India.**

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**DOI-** 10.5281/zenodo.8171842

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**ABSTRACT**

The present communication deals with the occurrence of a new mammalian tapeworm *Stilesia shindei* Sp.Nov. from *Ovis bharal* (L.) in Solapur city District Solapur (M.S.) India. It comes closer to all the known species of the genus *Stilesia* but differs from all the known species of the genus in having the scolex large in size, squarish in shape, neck is medium, mature proglottids broader than long, testes medium in size, oval to rounded in shape, cirrus pouch small in size, oval in shape, elongated, marginal, ovary is medium in size, oval in shape, vitelline gland post ovarian.

**Keywords:** Mammalian tapeworm / *Stilesia shindei* Sp.Nov., *Ovis bharal* (L.), Solapur City.

**Introduction:**

The terms systematics and taxonomy have been used in the past and to considerable extent even today synonymously to imply, the science of classification, although recently some workers have tried to define the two terms very precisely and restrict the scope of the two terms. Simpson defined the term taxonomy as the theoretical study of classification, including its bases, principles, procedures and rules. In taxonomy, the animal must be placed in different categories or ranks known as taxon. It can be defined as a taxonomic group of any rank sufficiently distinct to be worthy of being assigned to a definite category.

Taxonomy is merely a service science to other biological studies. Taxonomy is a basic tool for describing and explaining biological diversity. It also acts as historical framework for bio control, biogeography, ecology and evolution. Taxonomic data is challenging to handle. Some of the taxonomic data types include photographs of living specimens, dissection, observation, specimen data, original descriptions, identification keys and geographical areas.

Teaching and research in taxonomy is in crisis now a day. Universities and research organizations are keeping a low profile and not serious about activities relating to taxonomy. The process of correctly identifying and describing living organisms is in great demand and highly essential in scientific research and political profile of biodiversity issues. Unfortunately the numbers of taxonomists in the country have been reduced considerably and it is a serious concern. Taxonomic work on such groups has traditionally been left to specialists but it is imperative that suitable training is provided for the next generation of taxonomists.

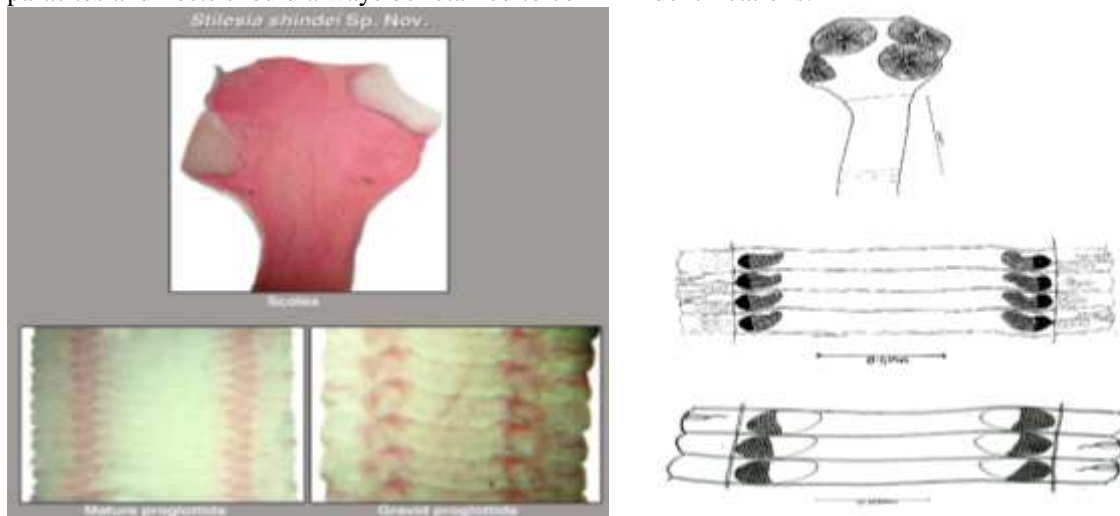
There are several such examples which clearly indicate the importance of taxonomic studies in biology. Therefore always a growing need to correctly identify the known parasites and the new species of parasites. This information should be properly recorded, stored and circulated amongst the parasitologists of different parts of the world. The genus *Stilesia* was erected by Railliet in 1893, from *Ovis aries* in Europe, Asia and Africa, as *Stilesia globipunctata*. Later on *S. hepatica* was added to this genus by Wolffhugel in 1903 from sheep and goat in East Africa. *Stilesia vittata* was reported by Railliet in 1896 from *Camelus dromedarius* from Africa and India. *Stilesia okapi* is erected as a new species of this genus by Leiper in 1936 from Okapi in Africa, is regarded by Baer, 1950 as a variety of *Stilesia globipunctata*, The author agrees with Baer to regard *Stilesia okapi* as *S. globipunctata*. Later on *S. leiperi* is added by Kadam et. al, 1980 from *Ovis bharal* (L.) Kalyankar et. al., 1981 described *S. caballeri* from *Capra hircus* (L.). *S. southwelli* is added by Shinde et. al., 1982 from *Capra hircus* (L.). Jadhav et. al., 1982 reported *S. aurangabadensis* from *Ovis bharal* (L.) at Aurangabad. Malhotra and Capoor, 1983 added two species to this genus i.e. *S. garhwalensis* from *Capra hircus* (L.) and *S. kotwarensis* from *Ovis bharal* (L.) Later on *S. marthwadensis* is added by Shinde et.al. 1985 from *Capra hircus* (L.). In 1999 two species are added i.e. *S. jadhavae* by Jadhav from *Ovis bharal* (L.) and *S. yawalensis* by Kalse et. al. form *Capra*

*hircus* (L.). Deshmukh and Shinde, 2001 added *S. dhondagae* from *Capra hircus* (L.). *S. capari* is added by Patil et. al., 2002 from *Capra hircus* (L.). In 2004 four species are added to this genus i.e. *S. ambajogaensis* by Pawar et. al., *S. pandeyi* by Nanaware and Jadhav *S. indapurensis* by Khadap, et.al. and *S. daulatabadensis* by Shelke and Shinde from *Capra hircus* (L.). Nanaware et. al., 2005 described *S. jadhavi* from *Capra hircus* (L.) *S. govindae* by Padwal and Jadhav, 2006 from *Ovis bharal* (L.) *S. shrigondaensis* Pokale et.al. (2008) from *Capra hircus* (L.)

The present communication, deals with the description of a *stilesia shindei* n. sp. collected from *Ovis bharal* (L.).

#### Material And Method:

All live parasites should be fixed in hot or warm fixative to kill them rapidly and at the same time avoid musculature contraction by the parasite, which then distorts their shape when fixed. Cestode parasites are thick hence they get flattened in 4% formalin overnight and then fixed for more time. Each helminth parasites species or type, from each organ should be placed in the separate tube or Petri dish and labeled with host species and host number, geographic locality, date of collection, location in host, fixative used and date of examination. Cestodes should be stained in the Harries hematoxylin or Borax carmine, dehydrated with alcohol grade and mounted on permanent slides with DPX or Canada balsam is the best mounting media for permanent museum storage and drawings are made with the aid of camera Lucida. All measurements are given in millimetres. Identification of cestode species may require the original descriptions in the primary literature. However, for most common groups, the identification up to generic level and often to species can be done through the systematic known keys. Example, specimens of parasites and hosts should always be retained to confirm identifications.



#### Description :

All the cestodes are long consisting scolex, immature, mature and gravid proglottids. The scolex is large in size, squarish in shape and measures 3.01 (2.93-3.1) in length and 3.5 (3.0-3.10) in width. Suckers are four in numbers, large in size, oval to rounded in shape, having two pairs, one pair placed in each half region of the scolex, suckers in each pair are slightly touches on each other and measures 1.33(1.26-1.4) in length and 1.39 (1.26-1.53) in width. The neck is medium in length and measures 2.74 (2.66-2.83) in length and 1.34 (1.16-1.53) in width.

The mature proglottids are broader than long almost 9-10 times broader than long and measures 0.65 (0.6-0.7) in length and 10.08(10-10.16) in width. The testes are medium in size, oval to rounded in shape, in two groups, 4 - 5 in each group and 9 in each segment and measures 0.51(0.43-0.60) in diameter. The cirrus pouch is small in size, oval in shape, elongated, marginal, situated in the anterior region of the segments, not reaching up to the longitudinal excretory canals and measures 0.36 (0.33-0.40) in length and 0.21 (0.20-0.23) in width. Cirrus is thin, contained within the cirrus pouch, straight or slightly curved and measures 0.33 (0.30-0.36) in length and 0.02 (0.01-0.03) in width. The vas deferens is a short, thin tube, not reaching up to the longitudinal excretory canals, anteriorly directed and measures 0.41(0.33-0.50) in length and 0.02 (0.01-0.03) in width. The ovary is medium in size, oval in shape, transversely placed, situated near to the longitudinal excretory canals, on its outer side, compact and measures 1.13(1.1-1.16) in length and 0.43(0.36-0.50) in width. The vagina is thin tube, arised from posterior to cirrus pouch, with few curves, runs for a long distance, reaches and opens in to the ootype and measures 1.48 (1.43-1.53) in length and 0.02 (0.016-0.033) in width. The uterine cap is large in

Atul S. Humbe

size, elongated, narrow proximally, broad distally, situated and attached to one side of the ovary, towards aporal side and measures 0.79 (0.73-0.83) in length and 0.41(0.33-0.50) in width. Vagina and cirrus pouch open into a common pore known as genital pore, which is small in size, oval in shape, regularly two times alternate, marginal, situated in the aporal sides of the segments and measures 0.23 (0.20-0.26) in length and 0.05(0.049-0.066) in width. Par uterine organs measures 1.11 (1.06 – 1.16) in length and 0.45 (0.4-0.5) in width. Ootype is rounded, medium in size and measures 0.14(0.13-0.16) in diameter. The excretory canals are in paired, in both the sides and measures 0.68(0.5-0.8) in length and 0.041(0.033-0.049) in width.

### Discussion

The genus *Stilesia* was erected by Railliet, 1893. The worm under discussion is having the Scolex large, globular, mature proglottids six to seven times broader than long, testes six to eleven in each segments, cirrus pouch small elongated, vas deferens is very large coiled thin tube, vagina is thin tube, slightly curved arises from posterior to cirrus pouch, ovary nut shaped, uterine cap small in size, genital pore oval in shape, Ootype is rounded, medium, excretory canals are present on both the sides.

1} The present parasite differs from *S. globipunctata* (Rivolta 1874) Railliet, 1893 in having scolex small in size, rounded, testes 4-7, cirrus pouch small, pyriform, ventral to vagina, ovary spherical, vagina dorsal to cirrus pouch and reported from *Ovis aries* in Europe .

2} The worm under discussion differs from *Stilesia vittata* Railliet, 1896, in having testes 5-9 each in two lateral groups, vas deferens closely coiled, cirrus pouch elongated, cylindrical, ovary rounded compact, genital pore in anterior half of the segment and reported from *Camelus dromedarius* in Africa.

3} The present tapeworm differs from *Stilesia hepatica* Wolfhugel, 1903, in having testes 6-7, in each side, pre ovarian, vas deferens not closely coiled, but extending up to excretory canal, ovary small, compact, oval, vagina anterior to cirrus pouch, genital pore in the middle of the segment and reported from the liver of *Ovis aries*.

4} The worm under discussion differs from *Stilesia okapi* Leiper, 1936 in having testes 2-3 testes in each lateral side and from *Okapi* in Africa.

5} The present parasite differs from *Stilesia leiperi*, Jadhav et al. 1980, which is having testes 5-6, on each side, cirrus pouch cylindrical, vas deferens not closely coiled but extend beyond long excretory canals, ovary medium, almost circular, compact with small acini and genital pore in anterior half of the segment and reported from *Ovis bharal* (L.)

6} The present worm differs from *Stilesia caballeroi*, Kalyankar et al, 1981. in having the scolex very small, testes 1 to 11 in number testes on each side, disposed in 2 to 3 rows.

7} The present form differs from *Stilesia southwelli* Shinde, et.al. 1982, which is having quadrangular scolex, mature proglottids 5 times broader than long, testes 4 in each two lateral groups, vas deferens very much coiled, reaching upto ovary, ovary small, round without acini, genital pore at 1/3rd from anterior margin of the proglottid, par uterine organs two in each proglottid, transversely elongated, containing (10-15) group of eggs.

8} The present worm differs from *Stilesia aurangabadensis*, Jadhav et.al. 1982, in having the scolex spherical, testes rounded, in two lateral groups, 5 on each lateral side of the proglottid and lateral to ovary, vas deferens not coiled, reaches up to longitudinal excretory canal, cirrus pouch cylindrical, ovary medium in size, compact, circular in poral half and reported from *Ovis bharal* (L.) in India.

9} The present tapeworm differs from *Stilesia garhwalensis* Malhotra and Capoor, 1983, in having the size of scolex 0.510-0.840 in diameter, testes 0-9 in numbers, size of cirrus pouch 0.011-0.101 in diameter, size of ovary 0.009-0.097 in diameter, genital pore situated at anterior 1/3rd level of lateral margin of proglottid.

10} The present cestode differs from *Stilesia kotwarensis*, Malhotra and Capoor, 1983 in having testes 1 to 12 in numbers, ovary small, spherical, situated inner to the longitudinal excretory canal on poral side, genital pore at anterior 1/3rd level of lateral margin of proglottid and reported from *Ovis bharal* (L.) in India.

11} The present form differs from *Stilesia marathwadensis* Shinde, et al, 1985, is having proglottids broader than long, testes 5-7 in number, rounded, in two groups and cirrus pouch cylindrical.

12} The present worm differs from *Stilesia jadhavae* Jadhav, 1999 in having the mature proglottids 8 times broader than long, testes 5-7 in numbers, ootype 0.045 in diameter, ovary 0.197 in diameter, vagina anterior to cirrus pouch and reported from *Ovis bharal* (L.) in India.

13} The present cestode differs from *Stilesia yawalensis* Kalse et. al. 1999, in having scolex quadrangular, mature proglottids broader than long, testes rounded, in 2 groups (5-6 in number), vas-deferens thin, curved, cirrus pouch oval, ovary medium, globular, a single mass, vagina thin and genital pore marginal.

14} The present parasite differs from *Stilesia dhondgae*, Deshmukh et.al. , 2001 in having scolex quadrangular, broad anteriorly, testes oval, 8-10 in numbers, arranged in 2 rows, vas deferens short, cirrus pouch small, oval, situated middle to posterior side, ovary bilobed and par uterine organ simple.

15} The present worm differs from *S. capari* Patil et.al. ,2002 in having scolex globular, testes 8-9 in numbers, vas deferens short, cirrus pouch small, ovary sac like and vagina anterior to cirrus pouch.

16} The present cestode differs from *S. ambajogaensis* Pawar et. al., 2004 in having scolex quadrangular, testes 25-30 in numbers, cirrus pouch cylindrical, elongated, ovary small, oval, vagina anterior to cirrus pouch and reported from *Bos indicus*, in India.

17} The present tapeworm differs from *Stilesia pandeyi*, Nanaware et. al. 2004, in having scolex large, with four suckers, neck short and wide almost four times broader than long, mature proglottids almost 17 times broader than long, with convex lateral margins and slight projections at posterior corners of proglottid, testes are on two lateral fields, twenty in number, cirrus pouch small, elongated, at one third of anterior margins of proglottid, obliquely placed, cirrus thin, slightly curved, vas deferens short, medium, obliquely placed, ovary small, oval, with 3-4 short, blunt acini, vagina thin tube, runs obliquely, ootype small and rounded, genital pores medium, oval.

18} The present cestode differs from *Stilesia indapurensis*, Khadap and Jadhav, 2004 in having scolex medium, quadrangular, broad anteriorly, mature proglottids squarish, testes oval, 8 to 9 in numbers, vas deferens curved, cirrus pouch large elongated, vagina thin, par uterine organs two in each mature segment.

19} The present parasite differs from *Stilesia daulatabadensis*, Shelke and Shinde, 2004 in having scolex globular, medium, squarish, testes acraspedote, eleven in number, 7 on poral and 4 on aporal side, vas deferens medium, slightly curved, cirrus pouch medium, oval, ovary medium, oval, single mass, vagina thin, long, anterior to cirrus pouch, slightly curved and par uterine organ 2 in number.

20} The present worm differs from *S. jadhavi* Nanaware and Jadhav, 2005 in having scolex globular, testes 14 in numbers, ovary lobulated and vagina anterior to cirrus pouch.

21} The present cestode differs from *S. govindae* Padwal and Jadhav, 2006 in having scolex medium, elongated, mature proglottids 15 times broader than long, testes 12-14 in numbers, cirrus pouch cylindrical, sac like, vas deferens long, ovary lobulated and vagina postero-ventral to cirrus pouch.

22} The present cestode differs from *S. shrigondaensis* Pokale et. al.,2008 in having scolex medium, rounded, mature proglottids broader than long, testes 10-12 in numbers, cirrus pouch oval, vas deferens short, ovary Medium in size, oval and vagina thin tube.

23} The present cestode differs from *stilesia kanegaonensis* P. S. Patil et. al., 2012 in having scolex large, oval, elongated longer than broad, mature segment are thin, short, broader than long, testes 17-19 in number, medium, oval in two lateral groups, cirrus pouch small, cirrus thin, vas deferens short, thin tube, ovary medium oval, compact, uterine cap small, elongated, vagina thin tube, Ootype small, round, placed on the lateral side of the ovary.

The present parasite differs from the above species and erect a new species hence the name *S. shindei* Sp. Nov. is proposed in honour of Prof. G.B. Shinde, who is well known Helminthologist in India.

#### **Taxonomic Summary:**

<b>Genus</b>	-	<b><i>Stilesia</i> Railliet, 1893</b>
<b>Species</b>	-	<b><i>Stilesia shindei</i> Sp.Nov.</b>
<b>Type host</b>	-	<b><i>Capra hircus</i> (L.)</b>
<b>Habitat (Site)</b>	-	<b>Intestine</b>
<b>Type locality</b>	-	<b>India, Maharashtra, Solapur</b>
<b>Holotype and Paratype</b>	-	<b>Deposited in the Helminthology Research Lab., Department of Zoology,</b>
<b>Etymology</b>	-	<b>Named in honour of Prof. G. B. Shinde.</b>

#### **Acknowledgement**

The author is sincerely acknowledged to Late Dr. Baba Jadhav, Prof. & Head, Department of Zoology, Dr. B.A.M. University, Aurangabad and Principal of S.G.R.G. Shinde College Paranda Dist-Osmanabad (M.S.) India for their support and blessings.

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**Atul S. Humbe**

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Atul S. Humbe

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