

A NEW TAPEWORM *Stilesia kaijensis* SP. NOV. (EUCESTODA: THYSANOSOMIDAE FUHRMAN, 1907) FROM KAIJ, MS, INDIA

LAKHE ASHOK DEVIDASRAO^{1*} AND JADHAV SHAM SAMPATRAO²

¹Department of Zoology, Arts, Commerce and Science College, Kille Dharur, District Beed, 431124, Maharashtra, India.

²Department of Zoology, Baburaoji Adaskar Mahavidyalaya, Kaij, District Beed, 431123, Maharashtra, India.

AUTHORS' CONTRIBUTIONS

This work was carried out in collaboration between both authors. Author LAD designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Author JSS managed the analyses of the study and literature searches. Both authors read and approved the final manuscript.

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ABSTRACT

The present research article deals with the new species of cestode parasite collected from the host *Capra hircus* at Kaij, Dist. Beed, MS, India. The present new species of cestode parasite is having distinguished features as compared with previously discovered species, hence it is proposed as novel species. The features of the worm are; scolex large, globular, with four suckers; neck very much short; mature proglottids broader than long; testes 20 in number; ovary bilobed, small, roughly rounded; small genital pores are regularly alternate.

Keywords: *Stilesia kaijensis*; tapeworm; eucestoda; thysanosomidae.

1. INTRODUCTION

Railliet in [1] erected a genus *Stilesia*, from *Ovis aries* in Europe, Asia and Africa, as *Stilesia globipunctata*. Later on *S. hepatica* was added to this genus by Wolffhugel in [2] from sheep and goat in East Africa. *Stilesia vittata* was reported by Railliet in [3] 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 worldwide, the following species are added to this genus by different researchers- 1) *Stilesia globipunctata* (Rivolta, 1874) Railliet, [1] from *Ovis aries*. 2) *Stilesia vittata* Railliet, [3] from *Camelus dromedaries*. 3) *Stilesia hepatica* Wolffhugel, [2] from *Ovis aries*. 4) *Stilesia okapi*, Leiper 1936 from

*Corresponding author: Email: ashokdlakhe@gmail.com;

Okapi. 5) *Stilesia leiperi*, Kadam et al. [4] from *Ovis bharal*. 6) *Stilesia caballeroi* Kalyankar et al. [5] from *Capra hircus*. 7) *Stilesia southwelli* Shinde et al. [6] from *Capra hircus*. 8) *Stilesia aurangabadensis* Jadhav et al. [7] from *Ovis bharal* at Aurangabad. 9) *Stilesia garhwalemis* Malhotra and Capoor, [8] from *Capra hircus*. 10) *Stilesia kotwarensis* Malhotra and Capoor, [8] from *Ovis bharal*. 11) *Stilesia marthwadensis*, Shinde et al. [9] from *Capra hircus*. 12) *Stilesia jadhavae* Jadhav, [10] from *Ovis bharal*. 13) *Stilesia yawalensis*, Kalse et al [11] form *Capra hircus*. 14) *Stilesia dhondagae*, Deshmukh and Shinde, (2001) from *Capra hircus*. 15) *Stilesia pandeyi*, Nanaware and Jadhav, 2004 from *Capra hircus*. 16) *Stilesia indapurensis*, Khadap, et al. [12] in *Capra hircus*. 17) *Stilesia daulatabadensis*, Shelke and Shinde (2004) from *Capra hircus*. 18) *Stilesia Jadhavi*, Nanware et al. [13] from *Capra hircus*. 19) Pawar et al. [14] *Stilesia ambajogaensis* from *Bos indicus* from Ambajogai 20) Sanap, 2016 21) Lakhe AD [15] *Stilesia shindei*, from *Ovis bharal* 22) Gul-e-lala et al. [16] *Stilesia cribbi* sp.nov from Goat *Capra hircus* in Pakistan and 23) Jadhav and Lakhe [17] *Stilesia jadhavae* sp.nov from *Capra hircus*.

Taxonomic summary

Genus : *Stilesia* Railliet, [1]
 Species : *Stilesia kaijensis* sp.nov.
 Host : *Capra hircus*
 Habitat : Intestine
 Locality : At. Kaij Tq. Kaij, Dist. Beed, M.S., India. Date of Collection: 5th May 2019
 Etymology : The name of the species is proposed after the locality.

2. MATERIALS AND METHODS

Fourteen cestode parasites were collected from the intestine of Goat *Capra hircus*. The collected parasites are long with thin musculature with numerous immature and mature segments. The worms were flattened, preserved in 4% formalin, stained with Harris haematoxylin, passed through various alcoholic grades, cleared in xylol, mounted in DPX and whole mount slides were taken for further anatomical studies. The drawings were made with the aid of Camera Lucida and all measurements are in millimeters.

3. RESULTS AND DISCUSSION

The scolex is large, globular, broad anteriorly and measures 0.841-1.137 X 0.681-1.394. The suckers are four in number oval, large, arranged in two pairs, separated from each other and measures 0.402-0.485 X 0.348-0.440. Neck short, almost squarish and

measures 0.144-0.189 X 0.599-0.644. Mature segments are broader than long, about 8-9 times broader than long and measures 0.144-0.174 X 1.455-1.470. Testes are 18-20 (20) in number, medium sized, arranged in two lateral fields, 10 on each lateral sides and measures 0.015-0.023 X 0.015- 0.030. The cirrus pouch small, cylindrical, oval, anteriorly directed, placed anteriorly from middle of the segment and measures 0.038-0.045 X 0.023-0.030.

Cirrus is thin, curved and measures 0.023 X 0.008. Vas deferens thin, small, coiled, anteriorly directed and measures 0.053 X 0.008. Ovary is bilobed, small, roughly rounded and measures 0.045-0.060 in diameter. Vagina is thin tube, posterior to cirrus pouch, coiled and opens into ootype, measures 0.129 X 0.008. Ootype is small, round and measures 0.008 in diameter. Genital pore is small, oval, regularly alternate, situated anterior to middle of the segment and measures 0.008 in diameter. Vitelline glands are absent. Pair of paruterine organs present on lateral side in each segment.

The worm under discussion deals with the description of new species *Stilesia kaijensis* sp.nov. After going through the literature the present worm differs from the earlier all known species. The details are as follows.

The present worm differs from *Stilesia globipunctata*, Railliet [1], in having the mature proglottid broader than long, distinct segmentation; testes 4-7 in two groups; vas deferens not closely coiled; cirrus pouch small, pyriform, ventral to vagina; ovary globular, median; vagina dorsal to cirrus pouch; uterus globular; par uterine organs developed from uterus.

The present cestode differs from *Stilesia vittata*, Railliet [3], in having mature segments broader than long, indistinct segmentation; testes 5-9 in two groups, on each side; vas deferens closely coiled; cirrus pouch elongated, cylindrical, cirrus armed; ovary rounded, situated between portal vessels; vagina posterior to cirrus pouch; uterus transverse, large tube near the anterior margin; par uterine organs two in number, in each segment, big, developed from uterus and internal to the excretory vessels.

The present form differs from *Stilesia hepatica*, Wolffhugel [2], in having the mature segments broader than long, craspedote, testes 6-7 in two groups, on each side, pre ovarian; vas deferens not closely coiled, extends up to longitudinal excretory vessels; cirrus pouch almost oval; ovary small, compact, oval; vagina anterior to the cirrus pouch, uterus a transverse and small tube, in the centre; par uterine organ situated internal to the longitudinal excretory vessel.

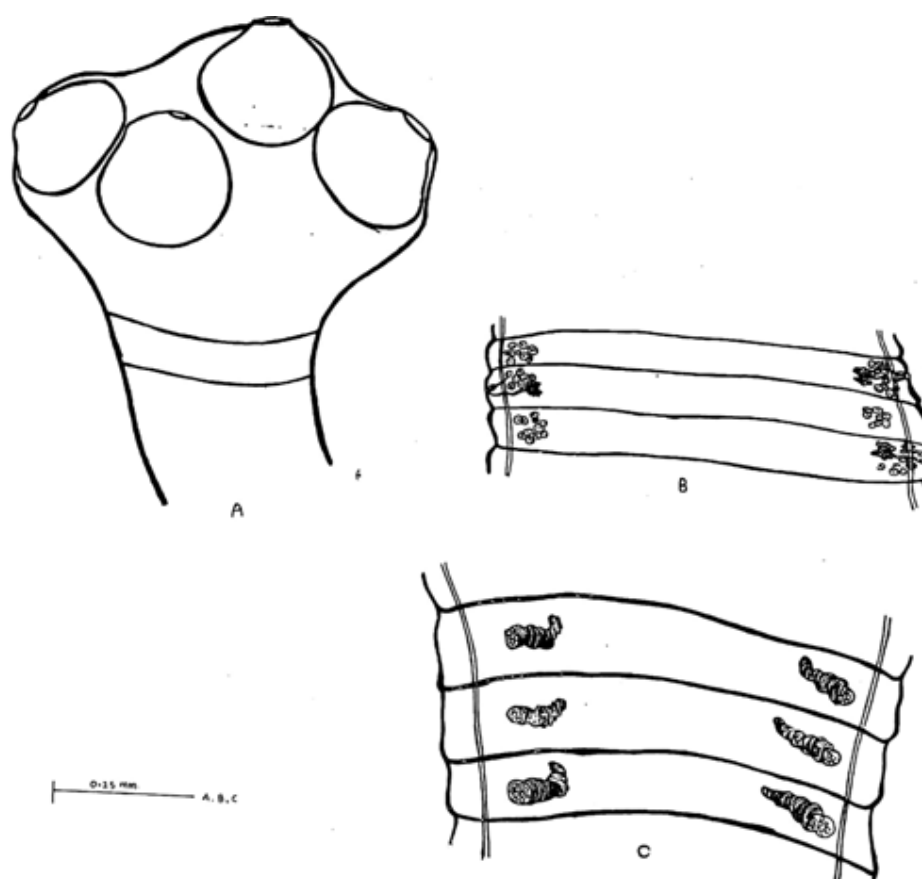


Fig. 1. *Stilesia kaijensis* sp. nov

- A) Scolex
- B) Mature segment
- C) Gravid segment

The present tapeworm differs from *Stilesia leiperi* Kadam et al. [4], in having the mature segments broader than long, testes 5-6 in two groups, on each side, postero lateral to ovary; vas deferens not closely coiled, but extends beyond the longitudinal excretory canals; cirrus pouch elongated, cylindrical; ovary medium, almost circular, compact, with small acini; vagina posterior to cirrus pouch; uterus in the form of broader transverse tube, in the anterior half of the segment, with two lateral sacs, having par uterine organs, at distal end and develops from uterus, situated in between dorsal and ventral excretory canals.

The present worm, differs from *Stilesia caballeroi* Kalyankar et al. [5], in having the testes 1-11 on each side; vas deferens forms a less dense bundle of convolutions, anterior to the testes; cirrus pouch oval; vagina opens into the genital cloaca, posterior to the cirrus pouch and the par uterine organs spherical on postero lateral surface.

The present cestode differs from *Stilesia southwelli* Shinde et al. [6], in having mature segments much broader than long; vas deferens very much coiled, reaching up to ovary; cirrus pouch large, sac like; ovary medium, almost round, compact, without acini, in the centre of the segments; vagina posterior to the cirrus pouch; uterus saccular, transverse tube with two large, oval par uterine organs in each gravid segment, containing 10-15 eggs.

The present tapeworm differs from *Stilesia aurangabadensis*, Majjid et al. [7], in having mature segments broader than long; testes 5, round, in two lateral groups; vas deferens straight, reaches to the longitudinal excretory canals; cirrus pouch elongated, cylindrical; cirrus coiled; ovary medium, circular compact; vagina a thin tube and postero dorsal to cirrus pouch.

The present worm differs from *Stilesia garhwalensis* Malhotra and Capoor [8], in having mature segments

broader than long, testes 0-9 in number, on each side, oval to spherical; cirrus pouch oval, extending half way between lateral margin and longitudinal excretory canal; ovary small, spherical; vas deferens coiled; par uterine organs two in number, one on each lateral side of the segment.

The present tapeworm, differs from *Stilesia kotdwarensis*, Malhotra and Capoor [8], in having the mature segment broader than long; testes oval to spherical, 1-2 in number, on each side, the number varies from segment to segment, maximum 6 on each side; vas deferens coiled, reaches up to the longitudinal excretory canals; cirrus pouch oval, extending half across between lateral margins and ventral to longitudinal excretory canal; ovary small, spherical; vagina posterior to the cirrus pouch; par uterine organs small, in between dorsal and ventral longitudinal excretory canals, two in each gravid segments.

The present form differs from *Stilesia marathwadaensis* Shinde et al. [9], in having the mature segments broader than long; testes 5-7, round, in two groups, postero lateral to ovary; vas deferens not coiled; cirrus pouch oval, elongated, cylindrical, present at the anterior margin of segment; ovary medium in size, oval in shape, compact in anterior half of the segments; vagina on the posterior side of the cirrus pouch; par uterine organs are two in number, oval and large. It also differs from *Stilesia jadhavae*, Jadhav [10], in having large ovary as compared to the present worm.

The worm under discussion differs from *Stilesia yavalensis* Shinde and Kalse [11], in having quadrangular scolex and from *Stilesia dhondagae* Deshmukh et al. (2001) in having quadrangular scolex and testes 8-10 in number, arranged in two rows, vas deferens short.

The present worm differs from *Stilesia capari* Patil and Menkudle [18], in having vas deferens short and ovary sac like. It also differs from *Stilesia pandeyi* Nanware et al. [19], in number of testes and shape of ovary.

The present cestode differs from *Stilesia indapurensis* Khadap [12], in having vas deferens curved; It also differs from *Stilesia daulatabadensis* Shelke and Shinde (2004) in having acraspedote testes and vas deferens slightly curved.

The present cestode parasite differs from *Stilasia ambajogaensis* Pawar et al. [14], in having mature segments broader than long; testes 25-30 (28) medium, oval, arranged in three fields, in two lateral groups in the central medulla, third group having

three testes in each segment, outside the longitudinal excretory canals, vas deferens short, thin tube; cirrus pouch medium long; ovary small, oval, a single mass; vagina thin, medium, curved, posterior to the cirrus pouch; genital pore small, oval, regularly alternate.

The worm under discussion differs from *Stilesia jadhavi* Nanware and Jadhav [13], in having testes 14 in number and ovary bilobed. The present worm differs from *Stilesia govindae* Padwal and Jadhav [20], in having ovary lobulated; testes 12-14 in number. It also differs from *Stilesia kanegaonensis* Patil (2012) in having vas deferens short; ovary divided into two pairs.

The present cestode differs from *Stilesia shindei* Lakhe [15], in having the mature segments squarish, broader than long, almost 16 times broader than long; testes medium, oval, 11-14 in number, 5+6 or 6+8 in each segment; ovary medium, oval, single mass, compact.

The present tapeworm differs from *Stilesia cribbi* Gule-e-Lala et al. [16], in having scolex globular, roughly rounded; neck small; mature segments wide; testes small globular 6-8 in number; cirrus pouch small; cirrus long; vas deferens long; ovary large, globular.

The worm under discussion differs from *Stilesia jadhavae* Jadhav and Lakhe [17], in having scolex large, quadrangular; neck short; mature segment small, broader than long; testes 24; cirrus pouch small; cirrus thin; ovary medium bilobed.

4. CONCLUSION

The above noted characters are valid enough to erect a new species *Stilesia kaijensis* sp.nov. of the host *Capra hircus* from Kaij, MS, India. Hence it is named as *Stilesia kaijensis* sp.nov. The name of the species is proposed after the locality.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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