

## Morphotaxonomic observation of new piscean tapeworm from *Dasyatis walga* in Ratnagiri District (MS) India

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### ABSTRACT

The present study was aimed to specify the morphological and morphometric characterization of Piscean tetraphyllidean *Anthobothrium jadhvae* Sp. Nov. tapeworm infecting spiral valve of marine fish, *Dasyatis walga* from Ratnagiri district (M. S.) India. Morphotaxonomic characterization reported as scolex is 'China Rose' like with tetrabothridia, ovary U-shaped situated in the posterior region of the segment, mature proglottids are three times longer than broad, testes are preovarian, Ootype is round in shape. This study provides an approach to understand the diversity of piscean tapeworm found in coastal region of Ratnagiri District based on morphotaxonomy.

Figure : 01

References : 18

Table : 01

KEY WORDS : *Dasyatis walga*, Ratnagiri district, Spiral valve, Tetraphyllidean tapeworm.

### Introduction

A healthy and mature fish is considered a nutrient base but when edible fish are found infected with tapeworm parasites that reduce the necessary nutrition from the host fish and secrete harmful substances. The market value of fish is also affected and if consumed, there is a risk of infection. To obtain more accurate information about tapeworm parasites and address all these facts, it is necessary to undertake morphotaxonomic studies. <sup>1</sup>Erected the genus *Anthobothrium* to accommodate a cestode *Anthobothrium cornucopia* recovered from *Galeus canis* and *Mustelus vulgaris* collected from the Belgian water. Most of the species belonging to genus *Anthobothrium* differ from each other due to relatively minor characters. Various authors have reviewed taxonomic status of the species belonging to this genus. By documenting and analyzing this parasitic relationship, we contribute to the

broader knowledge of parasitology and the intricate dynamics of ecosystems in this particular geographical area. The study aims to provide a comprehensive understanding of the taxonomic characteristics of *Anthobothrium jadhvae* Sp. Nov. collected from *Dasyatis walga* in Ratnagiri district.

### Material and Methods

Marine fish were taken from several locations in Ratnagiri District between October 2020 and September 2022 for the taxonomical study of tapeworms. Viscera were taken to the laboratory without delay, washed several times in cold saline, cut, and examined under a binocular microscope. For precise identification, the collected worms were fixed in hot 4% formalin after being cleaned in distilled water. After thoroughly washing the flattened parasites under running water, they were stained with hematoxylin. Camera Lucida was used to assist with all of the sketches. Every measurement was

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1

TABLE-1 : Comparative chart showing an account of old and new species of the genus *Anthobothrium*<sup>1</sup>

Species ⇒	<i>A. cornucopia</i> <sup>1</sup>	<i>A. auriculatum</i> <sup>8</sup>	<i>A. variabile</i> <sup>3</sup>	<i>A. laciniatum</i> <sup>4</sup>	<i>A. panjadi</i> <sup>11</sup>	<i>A. lintoni</i> <sup>13</sup>
Characters ⇕						
Country	Europe	Atlantic	England	Brazil	Ceylon	Ceylon
Host	<i>Galeus canis</i>	<i>Carcharhinus obscurus</i>	<i>Trygon centrura</i>	<i>Carcharhinus obscurus</i>	<i>Myliobatis maculata</i>	<i>Rhynchobatus djeddensis</i>
Bothridia	Horn like or trumpet like bothridia	Ear like bothridia loculi	Leaf like bothridia loculated	Trumpet like bothridia lancinated	Crumpled bothridia	Transversely hinged bithridia
Neck	Present	Absent	Absent	Present with spine	Very long	Very short
Mature proglottids	Longer than broad	Longer than broad	Seven time longer than broad	Longer than broad	Longer than broad edge smooth	Longer than broad
Testes	-----	-----	75	Numerous	Numerous	Numerous
Genital pore	Middle of the proglottid	Deep tubular,	Little below the middle	Anterior third of the length	Anterior third of the proglottid	Just anterior to the
Vagina	Anterior to cirrus pouch	-----	Anterior to cirrus pouch	Anterior to cirrus pouch	Anterior to cirrus pouch	Posterior to cirrus pouch
Ovary	Massive	-----	Bilobed . 'U' shaped	Bilobed, wing like	More or less 'H' shaped	Massive
Vitellaria	Granular	Granular	Small follicular below the ovary.	Large follicular., from ovary to anterior part	Granular in two rows	Granular

Species ⇒ Characters↓	<i>A. parvum</i> <sup>16</sup>	<i>A. crenulatum</i> <sup>17</sup>	<i>A. spinosum</i> <sup>17</sup>	<i>A. septum</i> <sup>17</sup>	<i>A. veravalensis</i> <sup>10</sup>	<i>A. sasooneense</i> <sup>15</sup>
Country	Europe	India	India	India	India	India
Host	<i>Mustelus manazo</i>	<i>Rhinobatus halvai</i>	<i>Carcharias acutus</i>	<i>Rhynchobatus djeddensis</i>	<i>Rhynchobatus djeddensis</i>	<i>Rhinobatos granulatus</i>
Bothridia	Circular membranous bothridia non loculated margin	Oval, born on pedicle, margin of bothridia crenulated	Thin leaf-like and born on flexible stalk,	Short pedicles and with 10-15 transverse septa	Different shape and non-crenulated	Loculated bothridia, no exact shape
Neck	Very long	Absent	present	Absent	Present	Present
Mature proglottids	Longer than broad	Much longer than width	Bell- shape	Many times longer than broad	Longer than broad	Long than broad
Testes	-----	16-21	50- 60	28-31	110	Numerous
Genital pore	Below the middle	Below the middle	Above the middle, unilateral	Little below the middle	Anterior 1/3 of the segment	Posterior half
Vagina	Anterior to cirrus pouch	Anterior to cirrus pouch	Situated anteriorly	Anterior to cirrus pouch	Anterior to cirrus pouch	Anterior to cirrus pouch
Ovary	Transversely elongated	Bilobed more or less 'H' shaped	-----	Bilobed, lobes are much elongated vertically	'U' shaped	Transversely
Vitelaria	Granular	Double row of glands	Granular in two lateral field	Duble row of glands extends below the ovary	Vitelaria follicular	Small follicular

Species ⇒	<i>A. altavelae</i> <sup>6</sup>	<i>A. afsanae</i> <sup>9</sup>	<i>A. barsami</i> <sup>9</sup>	<i>A. elenae</i> <sup>9</sup>	<i>A. jadhavi</i> Sp. Nov.
Characters ↓					
Country	Tunisia	Iran	Iran	Iran	India
Host	<i>Gymnura altavela</i>	<i>Carcharhinus dussumieri</i>	<i>Carcharhinus dussumieri</i>	<i>Carcharhinus leucas</i>	<i>Dasyatis walga</i>
Bothridia	Spoon shaped bothridia	4 stalked bothridia	two hemicircular bands of muscles	two prominent circular bands of muscles	Flower-like, 4 bothridia
Neck	Absent	Not mentioned	Not mentioned	Not mentioned	Present
Mature proglottids	Longer than wide	lacinations	longer than wide, lacinations	longer than wide	Three times longer than broad
Testes	59	22-54	16-64	30-83	94
Genital pore	Anterior 1/3 of the segment	lateral, alternating irregularly, preequatorial	Pre equatorial	lateral, alternating irregularly, preequatoria	Anterior 1/3 of the segment
Vagina	Anterior margin of cirrus pouch	sinuous to straight	extends along mid-line of proglottid	sinuous	Anterior to cirrus pouch
Ovary	Ovary 'H' Shaped	Ovary follicular, H-shaped	Ovary follicular, H-shaped	Ovary symmetrical, H-shaped	Ovary 'U' Shaped
Vitelaria	Follicular	Follicular	Follicular	Follicular	Granular

measured in millimeters, apart from any special character mentioned. The identification was made with the help of "Systema Helminthum"<sup>18</sup>.

### Description

The present tapeworm description on the basis of twenty four specimens of this specimen were collected from *Dasyatis walga*. The scolex is 'China Rose' like with four bothridia, which again looks like four flowers on a stock. The scolex is 2.212 (2.187 – 2.42) in length and 2.123 (2.098 – 2.152) in width. Bothridia sessile leaf like having a row of about 35 – 45 loculi along the margin of each bothridium measures 0.674 (0.647- 0.702) in length and 1.021 (0.992 – 1.058) in width. Each bothridium having accessory sucker at middle region. The powerful longitudinal muscle fibers are attached to each bothridium decrease in strength gradually, clearly visible upto neck region and then become separated from each other in immature and become feeble in mature proglottids. The scolex is followed by neck which is long, broader than long, it measures 1.578 (1.569 – 1.587) in length and 0.332 (0.299 – 0.666) in width.

There are numerous immature and mature proglottids within the strobila of the tapeworm. In immature proglottids reproductive set is not observed but observed in mature proglottids segments. The mature proglottids are three times longer than broad; it measures 0.764 (0.803 – 0.725) in length and 0.230 (0.186 – 0.275) in width. The testes are preovarian, round to oval in shape, situated in two rows up to cirrus pouch level and scattered anterior to cirrus pouch level, reaching anterior end of the segment. The number of testes 80 – 110 (94) in number, it measures 0.048 (0.045 – 0.051) in length and 0.040 (0.040 – 0.040) in width. The cirrus pouch is oval transversely placed, reaches up to the center of the proglottid at anterior one third of the proglottid, it measure 0.079 (0.075 – 0.084) in length and 0.048 (0.044 – 0.053) in width. The cirrus is convoluted tube inside the cirrus pouch, its measures 0.066 (0.062 – 0.071) in length and 0.048 (0.044 – 0.053) in width, forms vas deferens. The vas deferens runs anteriorly in the testicular field it measures 0.155 (0.106 – 0.124) in length and 0.006 (0.004 – 0.008) in width. The cirrus pouch and vagina open a common pore known as genital pore, oval in shape, it measures 0.004 (0.003 -0.005) in length and 0.019 (0.017 – 0.022) in width.

The ovary is bilobed, 'U' shaped, situated at posterior end of the proglottid, the lobes of the ovary reaching upto vitellarian fields it measures 0.117 (0.115 – 0.119) in length and 0.015 (0.013 – 0.017) in width, two vertically elongated lobes are joined with short

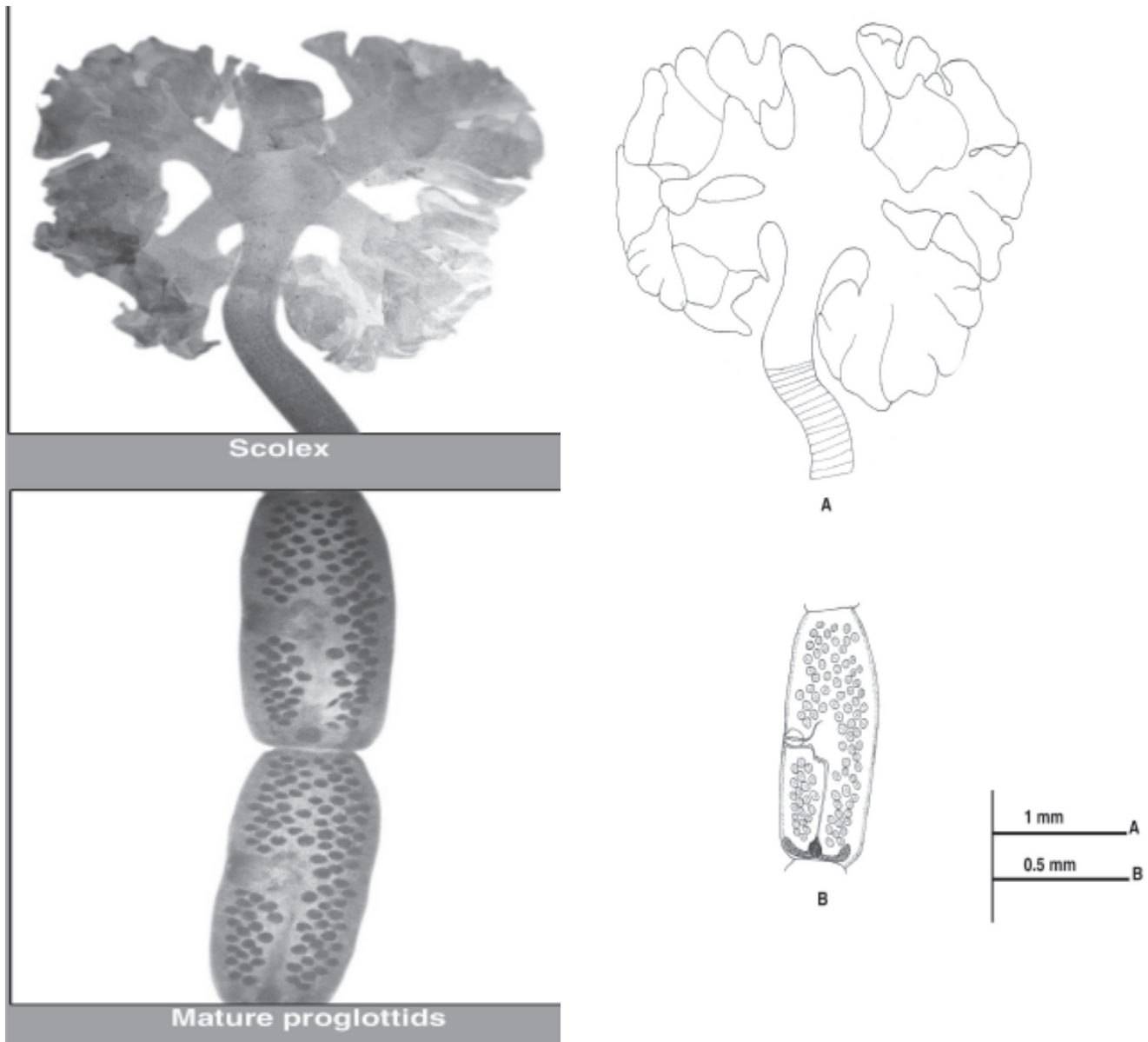
isthmus region just below the middle, it measures 0.013 in length and 0.004 in width. The vagina opens through a common genital pore, lies anterior to cirrus pouch and runs transversely up to the centre of the proglottid, turns vertically and open into ootype, it measures 0.452 (0.448 – 0.457) in length and 0.006 (0.004 – 0.008) in width. Ootype is round in shape, its measures 0.048 in diameter. The vitellaria are granular, situated in two laterals, fields in cortical parenchyma, not reaching upto lateral margins. Gravid proglottids were not found.

### Discussion

The genus *Anthobothrium* was established<sup>1</sup> with the type species *Anthobothrium cornucopia* from *Carcharhinus leucus*. Although the basic topography of the organs is similar to that of all the species in the genus *Anthobothrium*<sup>1</sup>, there are specific characteristics that set them apart from the species that follow.

Piscean present tapeworm differs from *A. lintoni*<sup>13</sup> in having the bothridia transversely hinged and ovary massive; *A. parvum*<sup>16</sup> in having bothridia circular membranous and ovary transversely elongated; *A. septum*<sup>17</sup> having bothridia short pedicles having 10-15 transverse septa, neck absent, testes 28-31 in number, ovary transversely placed and vitellaria follicular; *A. crenulatum*<sup>17</sup> in having bothridia crenulated, testes 16-21 in number, ovary 'H' shaped and one row of follicular vitellaria; *A. spinosum*<sup>17</sup> having bothridia leaf like, mature segment bell shape and testes 50 -60 arranged in two rows; *A. veravalensis*<sup>10</sup> which bothridia non- crenulated, neck present, strobila with about 90 proglottids, ovary 'U' shaped, vitellaria follicular, mature proglottids longer than broad; *A. amuletum*<sup>2</sup> which having cuneiform, testes 15-20 in number and ovary transversely placed; *A. sasoonense*<sup>15</sup> having bothridia loculated, ovary 'H'-shaped and vitellaria follicular; *A. altavelae*<sup>6</sup> having bothridia spoon shaped, testes 59 in number, Ovary 'H' shaped and vitellaria follicular; *A. afsanae*<sup>9</sup> Scolex lacking apical organ, with 4 stalked bothridia, Strobila capilliform flitriches, Proglottids craspedote, Testes round to oblong, Vagina sinuous to straight, Vitelline follicles; *A. barsam*<sup>9</sup> Scolex lacking apical organ, Vas deferens coiled, Vagina extends along mid-line of proglottid from Mehlis' gland to genital atrium; *A. elenae*<sup>9</sup> Scolex lacking apical organ, Cirrus-sac oval, Genital pore lateral, Testes round 30–83 number, Vagina sinuous, Ovary follicular symmetrical, H-shaped.

The comparing chart at the conclusion includes a few more and distinctive characteristics. These unique characteristics are sufficient to establish a new species within this genus



**Fig. 1 : *Anthobothrium jodhavi* sp. nov. (A) Scolex (B) Mature proglottid**

### Taxonomic Summary

Genus	<i>Anthobothrium</i> <sup>1</sup>	Accession Number	HRL/2022-10/1-5
Type Species	<i>Anthobothrium jadhavi</i> Sp. Nov.	Holotype and Paratype	Deposited in the Helminthology Research Lab.,
Host	<i>Dasyatis walga</i>	Date of collection	October 2020 to Sept. 2022
Habitat	Spiral valve	Etymology	Named in Honour of Late Prof. B. V. Jadhav
Locality	Ratnagiri		

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