

ON A NEW ACANTHOCEPHALA, *PALLISENTIS COLISAI*, FROM THE FISH *COLISA FASCIATUS* (BLOCH AND SCHN.), WITH A NOTE ON *ACANTHOGYRUS ACANTHOGYRUS* THAPAR, FROM THE FISH *LABEO ROHITA* (HAMILTON).

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In order to study the occurrence of Acanthocephala from the fishes of Delhi State, the alimentary canal of a number of species of fishes were examined at different times of the year from July, 1952 to May, 1953. All the fishes were collected from the local fish market near Juma Masjid or from fish hawkers. Care was taken to select only the species of fishes which are found in the Jumna river and the ponds of the Delhi State proper. The collection was made at irregular intervals according to the availability of fresh specimens. Altogether 101 fishes, belonging to 16 species, were examined, the details of which are given in the Table I.

The majority of the fishes examined were adult in size. Out of 16 species only in two, namely *Colisa fasciatus* collected on 31-8-52 and *Labeo rohita* on 18-9-52 the acanthocephalan worms were found. In *C. fasciatus* altogether 9 worms, 6 male and 3 female, were found. The parasites belong to a single species in the genus *Pallisentis* and since it cannot be assigned to any of the known species it is described here as a new species. A single male specimen of acanthocephala was found from *L. rohita*, which has been identified as *Acanthogyrus acanthogyrus* Thapar.

TABLE I.—Details of the Fishes Examined.

Name of fishes.	Number.	Measurement.	Date of collection.	Locality.	Whether infected or not.
Family Cyprinidae Sub-Fam. Cyprininae.					
1. <i>Labeo rohita</i> . . .	1	2'6"	18-9-52	Juma Masjid	Yes
	1	2'4"	3-4-53	"	No
	1	2'3"	10-4-53	"	"
2. <i>Labeo calbasu</i> . . .	1	1'	3-4-53	"	"
	1	1'1"	9-4-53	"	"
3. <i>Cirrhina mrigala</i> . . .	2	2'; 2'1"	30-7-52	Fish hawker.	"
	1	1'9"	20-9-52	"	"

TABLE I.—Details of the Fishes Examined—contd.

Names of fishes.	Number.	Measure- ment.	Date of collection.	Locality.	Whether infected or not.
Family Cyprinidae—contd.					
Sub-Fam. Cyprininae— contd.					
4. <i>Cirrhina reba</i> .	4	6" to 7"	5-8-52	Fish hawker.	No
	10	3½" to 4½"	13-4-53	"	"
5. <i>Puntius sarana</i> .	1	10"	5-8-52	"	"
	7	4" to 5"	12-4-53	Juma Masjid.	"
6. <i>Puntius ticto</i> .	12	2" to 2½"	20-7-52	"	"
7. <i>Aspidoparia morar</i>	6	3" to 4"	12-4-53	"	"
	15	5" to 6"	13-4-53	Fish hawker.	"
Family Notopteridae					
8. <i>Notopterus noto- pterus.</i>	4	9" to 12"	10-8-52	Juma Masjid.	"
Family Siluridae					
9. <i>Wallago attu</i> . .	6	6" to 7"	18-9-52	"	"
Family Bagridae					
10. <i>Mystus senghalu</i>	6	6" to 10"	27-7-52	"	"
	1	2'	23-9-52	Fish hawker.	"
	2	2'6" ; 3'3"	24-9-52	Juma Masjid.	"
Family Schilbeidae					
11. <i>Eutropiichthys vacha</i>	2	1' ; 1'2"	20-7-52	"	"
Family Sisoridae					
12. <i>Bagarius bagairus</i>	2	7" ; 9"	23-9-52	Fish hawker.	"
Family Channidae					
13. <i>Channa marulius</i>	3	6" ; 7½" ; 12"	27-9-52	"	"
14. <i>Channa striatus</i>	3	9" ; 10" 12"	6-4-53	Juma Masjid.	"
Family Anabantidae					
15. <i>Colisa fasciatus</i> .	6	2½" to 3"	31-8-52	Fish hawker.	Yes
Family Gobiidae					
16. <i>Glossogobius giuris</i>	3	4" ; 4½" ; 5"	27-9-52	"	No

Pallisentis colisai, sp. nov.

The body (Text fig. b) is long and cylindrical with a globular proboscis at the anterior end. The males are generally smaller than the females. The body is covered with spines. Maximum diameter is in the region of the anterior rows of hooks.

The proboscis is with a long neck and is devoid of spines. It is covered with four equidistant circles of 10—12 curved hooks in each circle. Hooks of the anterior circle are stouter and longer than those of the posterior ones. The proboscis sheath is a thin, ovoid, single-layered, muscular sac. It originates from the posterior end of the neck region and hangs down freely in the body cavity. Retractor and protractor muscles are present and are attached slightly above the free end of the proboscis sheath. A big oval nerve ganglion is embedded at the posterior end of the proboscis sheath. The ganglion forms the central nervous system of the worm, with a few nerve fibres which go out to supply the body wall. The lacunar system cannot be seen very clearly.

At the anterior part of the body, immediately below the neck region, 15—17 circular, equidistant rows, each with 18—20 close set collar spines, are present. This is followed by a short spineless region. The portion of the body behind this is covered with 21—67 regular spinose circles varying in numbers according to sex, separated from one another by wide spineless spaces. Each circle has 16—20 small arrow-shaped spines.

Sexual dimorphism is distinct in respect of the number of circles of spines over the body. In the male the range of variation of the number of circles is very little which is 21—22, while in the female it is fixed, the number being 67, in all the worms examined. Again in the former nearly half the body is covered with the circles of the body spines while in the female nearly five-sixth of the body is covered by the body spines.

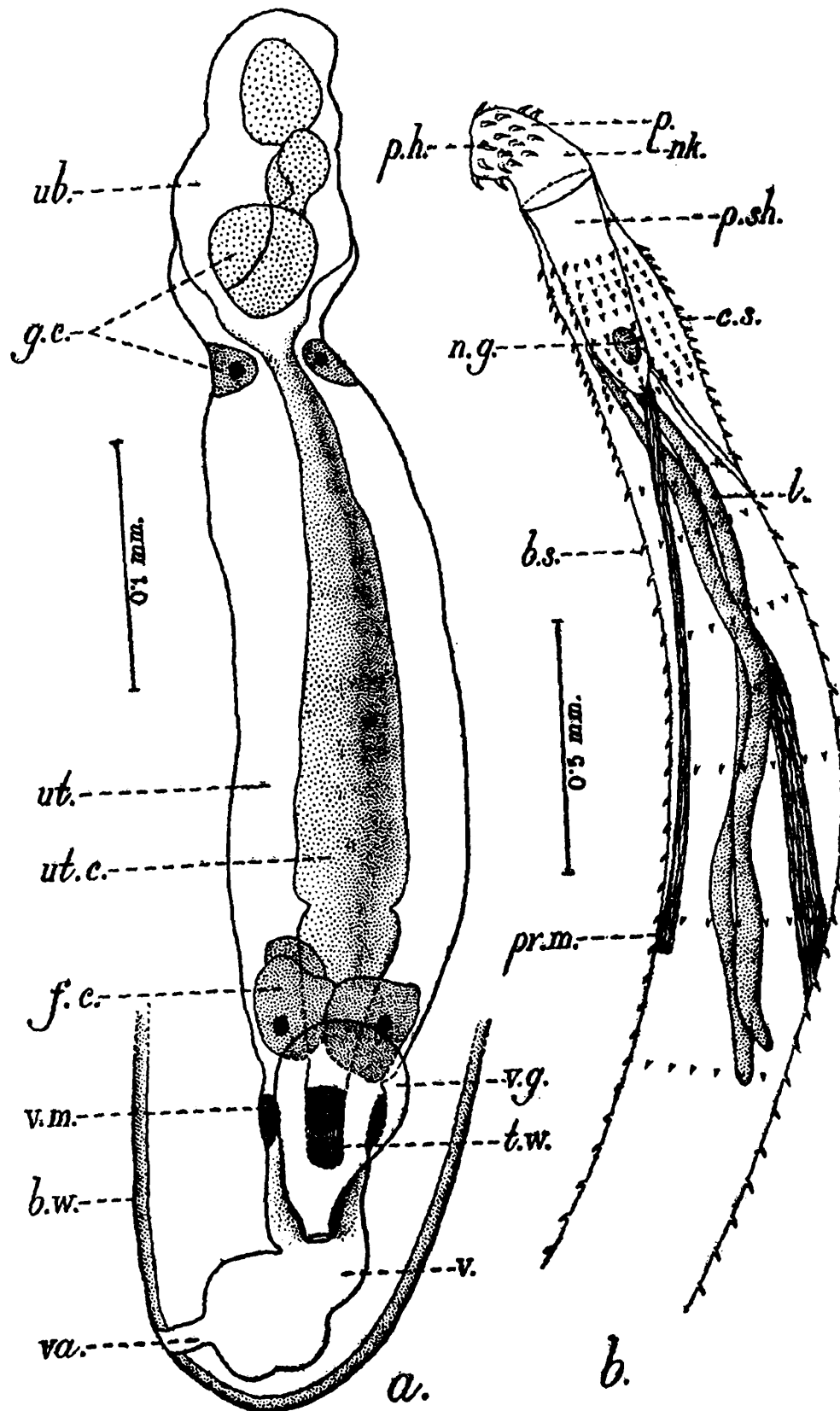
The two elongated lemniscii are situated on either side of the proboscis sheath and are nearly equal in length.

The body nucleus has not been observed.

The male genitalia consists of a pair of elongated elliptical testes lying one behind the other. Both the testes are almost equal in length and are cylindrical with both the ends blunt. The vas efferens runs downward from each testis. The single vas deferens opens at the base of the seminal vesicle, which is a large thin walled sac. The prostate gland is a single elongated structure and is situated immediately behind the posterior testis. It consists of 12—14 nuclei. The prostate gland opens into the prostatic reservoir. It is conspicuous and is a pyriform sac. The penis with the ducts opens in the bursa.

The female genitalia (Text fig. a) consists of a uterine bell, uterus, vaginal gland, vagina, vaginal muscles and vulva. The uterine bell is an elongated oval structure with two constrictions, one in the anterior end, the other in the middle region. The guard cells are seen inside and below the uterine bell. The uterus is a long flabby tube and

begins from the end of the uterine bell. The maximum diameter of the uterine cavity is towards the posterior part and near this region a distinct constriction is also noticed. The posterior portion of the uterus has a prominent tubular structure coming inside the elongated vaginal chamber. It is provided with thick frilled longitudinal muscles with a



TEXT FIG. 1.—(a) Posterior portion of *Pallisentis colisai*, female, showing the reproductive organ; b.w.—Body wall; f.c.—Flask cells; g.c.—Guard cells; t.w.—Tubular vaginal wall; u.b.—Uterine bell; ut.—Uterus; ut.c.—Uterine cavity; v.—Vagina; v.g.—Vaginal gland; v.m.—Vaginal muscle; va.—Vulva.

(b) Anterior region of *Pallisentis colisai*, male. b.s.—Body spine; c.s.—Collar spine; l.—Lemniscus; n.g.—Nerve ganglion; nk—Neck; p.—Proboscis; p.h.—Proboscis hook; p.sh.—Proboscis sheath; pr.m.—Protractor muscle.

transverse muscular band. Four flask cells lie at the posterior end of the uterus, below which the uterus passes in to the vagina. The tubular vaginal wall has two sets of strong muscular bands, known as vaginal muscles or vaginal sphincters. A pyriform sac, *i.e.*, the vaginal gland is situated over the vaginal wall and opens in the vagina below the uterine portion. The vulva is a small tubular structure placed more or less postero-laterally.

In the mature worms the ovary bursts liberating the ova in the body cavity in the various stages of development.

TABLE II.—*Measurements of Pallisentis colisai in millimeters.*

		Holotype.	Paratypes.
LENGTH	male	4.2×0.36	3.5—8.5×0.34—0.36
	female		5.4—12.9×0.61—0.62
PROBOSCIS (fully extended)		0.12×0.15	0.12—0.19 × 0.15—0.28
PROBOSCIS HOOKS	first circle	0.08	0.08
	second circle	0.07	0.07
	third circle	0.05	0.05
	fourth circle	0.04	0.04
PROBOSCIS SHEATH		0.34×0.14	0.28—0.68 × 0.14—0.28
COLLAR SPINE		0.02	0.02
BODY SPINE		0.02	0.02
LEMNISCII		1.06×.04	1.06—2.4 × 0.04—0.07
TESTES	anterior	0.38×0.15	0.34—0.38×0.11—0.15
	posterior	0.35×0.18	0.31—0.35×0.12—0.18

TABLE II.—Measurements of *Pallisentis colisai* in millimeters—contd.

	Holotype.	Paratypes.
PROSTATE GLAND	0.42 × 0.17	0.28—0.42 × 0.12—0.17
PROSTATIC RESERVOIR	0.25 × 0.12	0.25—0.45 × 0.11—0.12
SEMINAL VESICLE	0.29 × 0.12	0.29—0.45 × 0.08—0.12
BURSA	0.21 × 0.9	0.18—0.21 × 0.09

Name. *Pallisentis colisai*, sp. nov.

Host. *Colisa fasciatus* (Bloch and Schn.)

Location. Alimentary canal

Locality. Delhi

Holotype. Adult male ; collected by H. L. Sarkar ; 31st August, 1952.

Specimens on slide number (W 3855/1) preserved in the collection of the Zoological Survey of India, Calcutta.

Paratypes. Adult 5 males, 3 females ; collected by H. L. Sarkar ; 31st August 1952.

Specimens on slide retained by the author, Department of Zoology, University of Delhi.

Sarkar (1953), while describing the new species of *Pallisentis nandai* discussed the existing species of the genus *Pallisentis*. At present two species in addition to the above mentioned one are included in this genus. Van Cleave (1920) described *Pallisentis umbellatus*. Datta and Poddar (1935) transferred *Farzandia nagpurensis* Bhalerao to the present genus.

The present species *P. colisai* differs from the above mentioned three species on the following points.

The range of variations in length in both the male and female of *P. colisai* is very wide and is greater than that in *P. nandai*. The range of

the width of the body of both the sexes of *P. colisai* is very little while it is very prominent as compared with *P. umbellatus* and *P. nandai*.

The proboscis of *P. colisai* is smaller in size than that of *P. nandai*. The number of hooks in each circle of the proboscis of *P. colisai*, which is 10 to 12, differs from that of *P. umbellatus*, *P. nagpurensis* and *P. nandai* which are six and eight to ten respectively.

The proboscis sheath of *P. colisai* is smaller in size than that of *P. nandai*.

The number of circles of collar spines and the body spines of *P. colisai* differs from that of *P. umbellatus* and *P. nandai*. In *P. umbellatus* the number is 9 and 20 to 24 and in *P. nandai* it is 13 to 14 and 28 to 55 respectively, whereas in *P. colisai* it is 15 to 17 and 21 to 67 respectively. In *P. nagpurensis* the number of the collar spines is 14 and thus is different from that of the present species but nothing is known about the number of circles of body spines.

A distinct sexual dimorphism has been observed in *P. colisai* in regard to the length and breadth of the body as well as the number of circles of spines on the body. The length of the female is almost 1.5 times longer than that of the male, while the width is nearly double. In *P. nandai* difference of such magnitude has not been observed.

The number of body spine in *P. colisai* varies from 21 to 67 whereas in *P. nandai* it ranges from 28 to 55. In the male of *P. colisai* this number ranges from 21 to 22, whereas in *P. nandai* it ranges from 28 to 34. In the female of *P. colisai* the number is fixed being 67, whereas in *P. nandai* it ranges from 44 to 55.

Nothing is recorded about the sexual dimorphism in *P. umbellatus* and in *P. nagpurensis*.

In *P. colisai* the lemniscii are nearly equal in length whereas in *P. nandai* one of the lemniscus is two thirds of the length of the other. Nothing has been mentioned about the lemniscii in *P. umbellatus*. Regarding the proportion of lemniscii in *P. nagpurensis* nothing has been mentioned ; only the measurement of one lemniscus has been given.

The male genitalia of *P. colisai* agrees with that of *P. nandai* in respect of the arrangement of the structures but differs in the size of the testes. The anterior and posterior testes of *P. colisai* are more or less equal in length while the anterior testis of *P. nandai* is slightly longer than the posterior one. Like *P. nandai*, *P. colisai* differs from *P. nagpurensis* in respect of genitalia.

The size of the prostate gland of *P. colisai* is nearly half in size when compared with *P. nandai*. The number of nuclei of the prostate gland, which is 12 to 14 in *P. colisai*, differs from that in all the other species. In *P. nandai* it is 23 to 25, in *P. nagpurensis* it is 15 or more and in *P. umbellatus* it is 16.

TABLE III.—Measurements (in millimeters) and hosts of the different species of *Pallisentis*.

	<i>Pallisentis umbellatus</i> Van Cleave	<i>Pallisentis nagpurensis</i> (Bhalerao)	<i>Pallisentis nandai</i> Sarkar	<i>Pallisentis colisai</i> sp. nov.
DIMENSIONS OF THE BODY	6—10×0.3—0.5	♂: 14×0.45 ♀: 17.5×6.56	♂: 5.6—9.9×0.37—0.63 ♀: 6.3—10.4×0.35—0.56	♂: 3.5—8.5×0.34—0.36 ♀: 5.4—12.9×0.61—0.62
MEASUREMENTS OF PROBOSCIS	0.2 (diameter)	0.2×0.23	0.17—0.48×0.19—0.32	0.12—0.19 × 0.15—0.28
PROBOSCIS HOOKS :—				
Number of circles	4	4	4	4
Number of hooks in each circle	6	8—10	8—10	10—12
Measurements of hooks in each circle . .	(i) 0.089—0.119 (ii) 0.083—0.1 (iii) 0.053—0.065 (iv) 0.035—0.041		(i) 0.093 (ii) 0.08 (iii) 0.06 (iv) 0.033	(i) 0.08 (ii) 0.07 (iii) 0.05 (iv) 0.04
MEASUREMENTS OF PROBOSCIS SHEATH . .	In fully extended specimen, reaching slightly beyond the first series of body spines.	0.88×0.28	0.46—0.84×0.12—0.25	0.28—0.68 × 0.14—0.28

TABLE III.—Measurements (in millimeters) and hosts of the different species of *Pallisentis*—contd.

	<i>Pallisentis umbellatus</i> Van Cleave	<i>Pallisentis nagupensis</i> (Bhalerao)	<i>Pallisentis nandai</i> Sarkar	<i>Pallisentis colisai</i> sp. nov.
COLLAR SPINES :—				
Number of circles	9	14	13—14	15—17
Number of spines in each circle			18—20	18—20
Length of spine	0.018		0.029	0.02
BODY SPINES :—				
Number of circles	20—24		28—55	21—67
Number of spines in each circle			16—20	16—18
Length of spine	0.024		0.018	0.02
LEMNISCII		2.43 × 0.09	(i) 1.1—1.9 × 0.04 (ii) 0.72—1.3 × 0.004	1.06—2.4 × 0.04—0.07
TESTES :—				
anterior		1.04 × 0.23	0.43—0.56 × 0.14—0.16	0.34—0.38 × 0.11—0.15
posterior		0.74 × 0.23	0.37—0.53 × 0.14—0.16	0.31—0.35 × 0.12—0.18
PROSTATE GLAND :—				
size		2.65 × 0.2	0.77—1.4 × 0.14—0.22	0.28—0.42 × 0.12—0.17
number of nuclei	16	16 or more	23—25	12—14

TABLE III.—Measurements (in millimeters) and hosts of the different species of *Pallisentis*—contd.

	<i>Pallisentis umbellatus</i> Van Cleave	<i>Pallisentis nagupensis</i> (Bhalerao)	<i>Pallisentis nandai</i> Sarkar	<i>Pallisentis colisai</i> sp. nov.
PROSTATIC RESERVOIR			0.29 × 0.48 × 0.12—0.21	0.25—0.45 0.11—0.12
SEMINAL VESICLE		0.85 × 0.13	0.24—0.89 × 0.13—0.9	0.29—0.45 0.08—0.12
BURSA			0.43—0.51	0.18—0.21 × 0.09
BODY NUCLEI (number)			2	
HOST	<i>Ophicephalus argus</i>	<i>Ophicephalus striatus</i>	<i>Nandus nandus</i>	<i>Cotisa fasciatus</i>

The female genitalia of *P. colisai* differs from that of other species of *Pallisentis*. The uterine bell in *P. colisai* is an elongated oval structure whereas in *P. nagpurensis* and *P. nandai* it is a funnel shaped structure. In *P. nagpurensis* nothing has been mentioned about the presence of flask cells, whereas four of them are present in *P. nandai* and in the present specimens. A prominent vaginal gland is present in *P. colisai* which has not been observed in any other species of *Pallisentis*.

No body nucleus, like *P. umbellatus* and *P. nagpurensis*, has been observed in *P. colisai*, while two distinct body nuclei have been noticed in *P. nandai*.

In Table III the measurements and hosts of different species of *Pallisentis* have been given to facilitate comparison.

***Acanthogyrus acanthogyrus* Thapar**

A single specimen of acanthocephala has been found from the intestine of *Labeo rohita* (Ham.). The worm has been identified as *Acanthogyrus acanthogyrus* Thapar (1927). Datta and Poddar (1935) also found the same species of worms from the fish *Catla catla* (Ham.) from Calcutta, Diamond Harbour and Port Canning and from *Labeo rohita*, Calcutta.

The present specimen was a male one measuring 8.3 m.m. in length. Only minor variations in the characters of this specimen from those obtained from different hosts and localities are observed.

Thapar in his original description has not mentioned the locality of the occurrence of the parasite.

From the dimension of the body of the worms of the different host and localities it will be observed that the female is nearly double the male in length. Datta and Poddar observed 6 proboscis hooks in the worms found from the host *L. rohita* which differs from that of Thapar's observation. Regarding the number of the circles of the body spines, the present specimen does not correspond with the worm described by Thapar as well as by Datta and Poddar. The length of the lemniscii observed by Datta and Poddar is twice more than that of the worms observed by Thapar. The testis of the present specimen is nearly two and half times greater in length than that of the specimen described by Thapar. No nucleus has been observed in the prostate gland of the present worm. Thapar has pointed out that the opening of the male genitalia is guarded by spines which has not been observed by Datta and Poddar as well as by me.

TABLE IV.—Comparison of *Acanthogyrus acanthogyrus* from different hosts and localities as observed by Thapar, Datta and Poddar, and Sarkar.

	Thapar	Datta and Poddar		Sarkar
HOST	<i>Labeo rohita</i>	<i>Catla catla</i>	<i>Labeo rohita</i>	<i>Labeo rohita</i>
LOCALITY	not mentioned	Calcutta ; Diamond Harbour ; Port Canning	Calcutta	Delhi State
DIMENSIONS OF THE BODY	♂ 2.0—3.0 × 0.45—0.55 ♀ 6.0 × 0.9	♂ 3.49 × 0.68 (largest) ♀ 7.0 × 1.45 (largest)	♂ 2.8—8.0 × 0.6—1.1 ♀ 3.0—15.0 × 0.7—1.7	♂ 8.3 × 1.4
MEASUREMENTS OF PROBOSCIS	0.09—0.11 fully expanded 0.10 × 0.09		—	0.14 × 0.11
PROBOSCIS HOOKS :—				
Number of circles	3	—	3	3
Number of hooks in each circle	8	—	6	8
Measurements of hooks :				
in the first circle	60 μ ; 50 μ ;	—	—	0.07
in the last circle	40 μ.			
PROBOSCIS SHEATH	0.13 length thick walled	single walled	..	thick walled

TABLE IV.—Comparison of *Acanthogyrus acanthogyrus* from different hosts and localities as observed by Thapar, Datta and Poddar, and Sarkar—*contd.*

	Thapar	Datta and Poddar	Sarkar
BODY SPINES :—			
Number of circles	19—20 (anteriorly)	..	23 (anteriorly complete rings) ; 4 (incomplete rings)
Number of spines in each circle	20—21 (posteriorly)		several (posteriorly with 2 hooks in each.)
Length of spine	paired, 25 μ		..
LEMNISCII—			
Size	pear shaped, 2 in nos. 0.35 long	2, filamentous, few large nuclei, 0.86 \times 0.14	..
			2, long and narrow, each with a large nucleus.
TESTES—			
Measurements : anterior	0.17	..	ovoid
posterior	0.14		0.42 0.39
PROSTATE GLAND—			
Size	spherical	..	bilobed
Number of nuclei	2 or more		2 or more
			bilobed
			..
BURSA			
	protrusible
			..
GENITAL OPENING			
	guarded by spines
			..

In Table IV comparison of *A. acanthogyrus* observed by Thapar Datta and Poddar, and the author has been given.

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REFERENCES.

- DATTA, M. N. and PODDAR, T. N., 1935.—Acanthocephalan parasites of certain fishes from Calcutta. *Rec. Indian. Mus.*, **37**: 231-236.
- SARKAR, H. L., 1953.—On a new Acanthocephala, *Pallisentis nandai*, from the fish *Nandus nandus* (Hamilton), with notes on the other species of the genus. *Proc. Zool. Soc. Bengal.*, **6**: 138-147.
- THAPAR, GOBIND SINGH, 1927.—On *Acanthogyrus* n.g. from the intestine of the Indian fish *Labeo rohita* with a note on the classification of the Acanthocephala. *J. Helminth.*, **5**: 109-120.
- VAN CLEAVE, H. J., 1920.—Acanthocephala from China. I. New species and new genera from Chinese fishes. *Parasitol.*, (b) **20**: 1-9.