

## On a new species of the genus *Spinometra* Mehra, 1931 (Plagiorchiidae: Astiotrematinae)

by

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(Fig. 1-4)

A new species of the genus *Spinometra*, namely *S. gigantea*, was found in the duodenum and ileum of *Cyclemys amboinensis* (Gray) along with a species of *Orientodiscus* in Jabalpur, during the summer of 1964. *C. amboinensis* is common in fresh water pools but the collection of these tortoises is supposed to be a sign of ill omen by the fishermen. Out of 8 tortoises examined, 100% were infected with the species of *Spinometra* and 62% with that of *Orientodiscus* sp. (Report on this latter species will be published separately).

The distribution in this case of double infection is shown in table 1.

TABLE 1.

*Distribution of the two trematodes in the host*

Date	Locality	No. of hosts examined	Duodenum		Ileum	
			<i>S. gigantea</i>	<i>Orientodiscus</i> sp.	<i>S. gigantea</i>	<i>Orientodiscus</i> sp.
4.3.64	Gokalpur tank Jabalpur	1	2	—	—	—
22.3.64	"	1	3	—	—	1
2.4.64	"	1	8	1	3	1
5.4.64	"	1	10	1	2	2
21.4.64	Bheraghat Jabalpur	1	11	3	4	2
24.4.64	"	1	5	—	—	—
3.5.64	"	1	9	—	5	1
10.6.64	"	1	4	—	—	—

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Out of 8 tortoises in table 1, 3 harboured both the species in duodenum and ileum; 1 both species in ileum and 1 species in duodenum; 1 both species but separately in duodenum and ileum; 3 only 1 species in duodenum. The total number of worms per duodenum varied from 2 to 14 and per ileum from 1 to 6. The highest infection of each genus was recorded in the month of April 1964; 15 *S. gigantea* and 5 *Orientodiscus* sp.

Samples of the flukes were taken from all the infected tortoises and a detailed examination of the collection showed a number of features which differentiate the new species *S. gigantea* from all hitherto known species of the genus *Spinometra* Mehra, 1931. The following is a description of its morphology.

Family.—PLAGIORCHIIDAE Ward, 1917

Subfamily—Astiotrematinae Baer, 1924

*Spinometra gigantea* sp. nov.

(Fig. 1-4)

Mature specimens with numerous eggs in the uterus are 12.07-19.12 mm long. The body is lanceolate with its widest part measuring 1.5-2.55 mm. The cuticle is well marked with spines; those of pharyngeal region are scale-like, of semicycloid shape with a free pointed end. They measure 0.012-0.015 mm at base and 0.018-0.021 mm in length. The rest of the spines are needle-like and measure 0.021-0.024 mm in length.

The oral sucker is terminal and its external diameter measures 0.270-0.375 mm. The ventral sucker, situated about  $\frac{1}{3}$  to  $\frac{1}{4}$  of the body length from the anterior end, is little larger than oral sucker or of the same size and measures 0.33-0.45 mm in diameter. The ratio of the suckers is 1:1.1 to 1:1.2.

The prepharynx is 0.22-0.31 mm long, being  $\frac{1}{62}$  of the total body length. Pharynx is 0.120-0.205 mm long. The esophagus is longer than the pharynx, being 11 times the latter's length, and bifurcates at 2.12-2.85 mm from anterior end of the body. The intestinal ceca are simple, bear no lobe-like out-growths and end asymmetrically in the posterior end of the body. The right cecum is shorter than the left; in some forms cecal ends are dilated.

The testes are situated slightly diagonally, one behind the other, in the post-equatorial region of the body. They are approximately of the same size, 0.67-0.69 mm long and 0.90-0.93 mm wide. They are ovate in shape. The anterior testis is located about  $\frac{2}{3}$  of the body length from the anterior end whereas the posterior one lies about  $\frac{3}{4}$  of the body length from the anterior end. The cirrus sac is large, elongated, wavy, situated on the dorsal right side of the ventral sucker, rarely left; in latter condition cirrus sac and metraterm occupy the same side. The cirrus-sac is 3.000-5.145 mm long and 0.18-3.00 mm broad; it extends posteriorly a little above the anterior level of the ovary. The vasa efferentia

unite after entering the cirrus sac and then the vas deferens expands immediately into a small but distinct seminal vesicle. The seminal vesicle is convoluted and occupies the major basal part of the cirrus sac. The duct of seminal vesicle is long and measures 0.72-1.29 mm long. The pars prostatica is elongated, thickly surrounded by prostate gland cells and is 1.55-1.65 mm long and 0.165-0.345 mm wide. The ductus ejaculator is short and the cirrus small, spiny measuring 0.301 by 0.375 mm, i. e., broader than long. The common genital pore is ventral, median, situated in front of the ventral sucker.

The ovary is pretesticular, post-equatorial, median or slightly dextral in position, small, ovoid in shape and measures 0.525-0.601 mm by 0.480-0.570 mm. The vitellaria are well developed. The vitelline follicles are small, arranged in bunches or groups and extend laterally from the level of the basal region of cirrus-sac up to the cecal ends. The vitelline follicles are mostly extracecal; right vitelline glands comprise 10 to 11 groups of follicles whereas left vitelline glands always contain larger number of groups of follicles, 12-14 in number. The vitelline reservoir and the Mehlis's glands are situated immediately behind the ovary. The vitelline reservoir opens into the oviduct before the oötype. The receptaculum seminis is situated posteriorly close to ovary, measures 0.45-0.60 mm by 0.27-0.45 mm and opens into the oviduct by a narrow duct, into which the Laurer's canal opens measuring 0.20-0.24 mm in diameter; it opens dorsally in the median line through a minute opening. The uterus consists of large transverse coils which are confined to the inter-cecal field between the ovary and the posterior end of the body. The coils are typically of a plagiorchiid type, running in between the two testes and ultimately open in front of the ventral sucker through a common median, genital pore. The metraterm is muscular, straight and measures 1.42-1.64 mm in length and 0.15-0.39 mm in breadth. The eggs are numerous, oval, non operculated; intra-uterine eggs in the origin of uterus measure 0.027 by 0.006 mm and in the metraterm 0.027 by 0.007 mm.

The excretory bladder is Y-shaped and thin; the excretory opening is subterminal and ventral. The basal region of the bladder is swollen and has a crenated margin; it runs in between the two testes and reaches in between the ovary and anterior testes where it bifurcates to form two short blunt cornua. Each cornu sends fine capillary-like collecting ducts which run anteriorly up to the level of the pharynx.

Inmature *Spinometra gigantea*, sp. nov. (Fig. 5)

DESCRIPTION: (Based on single specimen). The body is elongated, 2.44 by 0.48 mm and clothed in a spiny cuticle. The spines are thickly arranged in pharyngeal region then appear less and less, ultimately disappear in the posterior end. The oral sucker is terminal, 0.135 by 0.135 mm. The ventral sucker is rounded, muscular, situated nearly half of the body length from the anterior end. It measures 0.135 by 0.127 mm. The suckers are approximately of the same size. The prepharynx 0.030 mm long, contiguous with pharynx, 0.090 by 0.082 mm. The esophagus is 0.3 mm long, narrow and bifurcates in the mid-

fore body. The ceca with narrow areas, descend downwards to the posterior end of the body.

Reproductive fundamentals include two testes, ovary and the cirrus sac. The testes are situated in the middle of the posterior half of the body. They are oval and measure 0.037 mm in diameter. The cirrus sac is inclined over the dorsal right side of the ventral sucker and extends beyond the posterior margin of the latter. It is 0.525 mm long. The genital pore is situated medially in front of the ventral sucker.

The ovary is small, globular, pretesticular and median in position. It measures 0.030 mm in diameter.

## DISCUSSION

MEHRA (1) created the genus *Spinometra* with *S. kachugae* as the type species, which he obtained from the small intestine of *Kachuga dbongoka* at Allahabad. The genus was created on account of elongated lanceolate body tapering anteriorly; presence of a long narrow esophagus; position of the genital pore; testes large, elliptical or ovoid; ovary in front of testes; cirrus-sac large with convoluted vesicula seminalis; cirrus covered with spines and uterus winding backwards between the testes. It is further distinguished by the position of the vitellaria extending from the hinder end of cirrus sac to a small distance from posterior end.

According to MEHRA (2) and YAMAGUTI (3), one more species is included in *Spinometra*, *S. gangetica* MEHRA (2), differentiated from the type species in the size and shape of the body; greater size of the oral sucker; ratio in the size of the suckers (1:2); situation of the ventral sucker, i. e. 1/11 of the body length from the anterior end; small length of the oesophagus; genital opening in the left side of the ventral sucker but not in front of the latter, and greater size of the cirrus which is covered with scales.

The relative position of the gonads in the post-equatorial region of the body distinguishes the present form *S. gangetica* from the above-mentioned two species. It further differs from the type species *S. kachugae* in having the same size of suckers; simple ceca; median genital opening; situation of the ventral sucker and much bigger size of the body. It also differs from *S. gangetica* in size of the body, suckers ratio, situation of ventral sucker and median genital opening.

It is thus evident that the present form represents a new species of the genus *Spinometra* Mehra (1) for which the name *S. gangetica* is proposed because of its huge size.

Since the generic diagnosis of *Spinometra* as given by MEHRA (1) is inadequate, an emended diagnosis is given below.

### *SPINOMETRA* MEHRA, 1931 EMENDED

Plagiorchiiidae, Astiotrematinae: Body elongated, lanceolate tapering anteriorly to a point. Oral sucker and pharynx very small. Esophagus slender and

long bifurcating much in front of ventral sucker or *in between ventral sucker and oral sucker*. Ceca almost reaching posterior end with or without lobe-like outgrowths. Ventral sucker small, *situated 1/3 to 1/11 of the body length* from the anterior end. *Suckers ratio 1:1 to 1:3*. Testes tandem or slightly diagonal situated in middle third of the body. Cirrus sac very long, tubular, straight or wavy, reaching almost to the ovary, containing a winding seminal vesicle at its base. Well-developed prostatic complex and protrusible cirrus present, armed with scales or spines. Genital opening *preacetabular, median* or to the left side of the ventral sucker but not in front of the latter or preacetabular to the left side. Ovary pre-equatorial or *post equatorial*, ovoid, median or slightly sub-median. Receptaculum seminis voluminous, post ovarian. Laurer's canal present opening into the duct of receptaculum seminis. Vitellaria extra-cecal, forming bunches of follicles extending from ovarian zone to the cecal ends. Uterus intercecal or slightly extracecal, intertesticular; muscular metraterm present with folded or *straight* wall. Excretory bladder Y-shaped stem median with lateral branches and dividing in between anterior testis and ovary, the collecting ducts reaching up to the level of pharynx. Ova elliptical, measuring 0.027-0.034 mm by 0.006-0.136 mm.

#### KEY TO THE SPECIES OF THE GENUS *SPINOMETRA* MEHRA. 1931

1. Genital opening not in front of ventral sucker but to its left side. Ventral sucker situated 1/8 to 1/11 of body length from anterior end. Intestine without lobe-like outgrowths ..... *S. gangetica* Mehra, 1937.
- 1' Genital opening in front of ventral sucker. Ventral sucker situated 1/3 to 1/6 of body length from the anterior end. Intestine with or without lobe-like outgrowths ..... 2.
2. Genital opening left of ventral sucker. Anterior testis and ovary lie in the anterior half of the body. Suckers ratio 1:3. Ventral sucker situated 1/6 of the body length from the anterior end. Spination up to anterior testis. Intestine with lobe-like outgrowths. .... *S. kachugae* Mehra, 1931.
- 2' Genital opening median. Testes and ovary lie in the posterior half of the body. Suckers ratio 1:1.1 to 1:1.2. Ventral sucker 1/3 to 1/4 of body length from anterior end. Spination up to terminal ends of ceca. Intestine simple without lobe-like outgrowths. .... *S. gigantea*, sp nov.

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## SUMMARY

*Spinometra gigantea*, sp. nov. is described from the duodenum and ileum of a fresh-water tortoise *Cyclemys amboinensis* (Gray) from India. The genus *Spinometra* Mehra, 1931 is briefly reviewed, its diagnosis is emended and a key is given to differentiate its valid species.

## RESUMEN

Se describe la nueva especie de tremátodo *Spinometra gigantea*, que parasita el intestino delgado de la tortuga de agua dulce, *Cyclemys amboinensis*, de la India. Se da una nueva diagnosis genérica y una clave para diferenciar a las especies válidas.

## LITERATURE CITED

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Figs. 1-5. *Spinometra gigantea* sp. nov.

Fig. 1. Adult, ventral view.

Fig. 2. Dorsal view of excretory system in living condition.

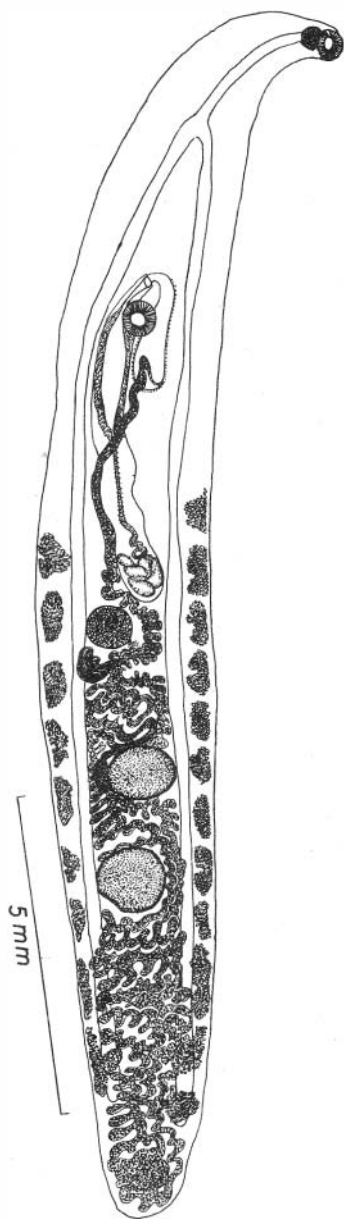


Fig. 1.

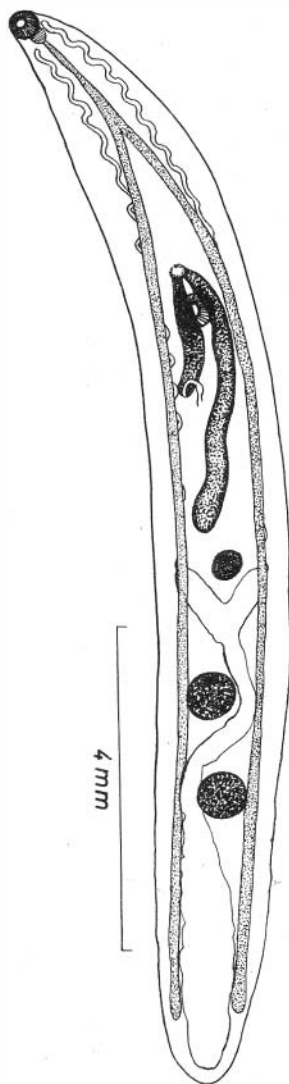


Fig. 2.

Fig. 3. Ventral view of male organ and metraterm (cirrus displaced).

Fig. 4. Ventral view of female organ.

Fig. 5. Ventral view of sexually immature individual.



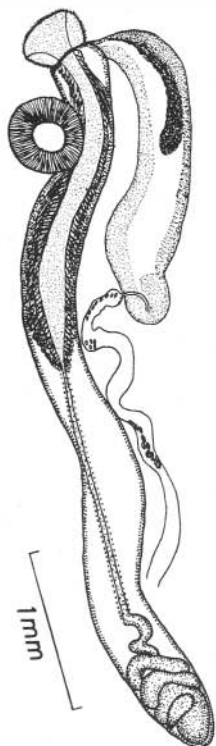


Fig.3.

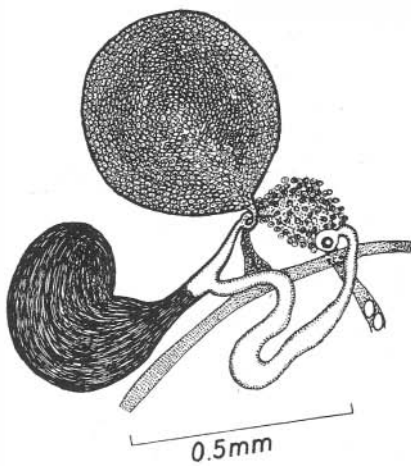


Fig.4.

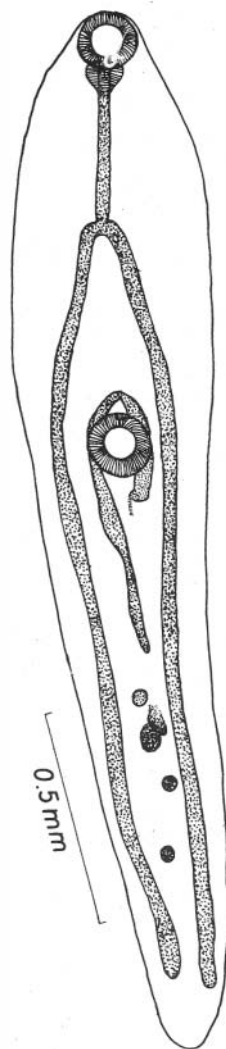


Fig.5.