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Four Trematode Parasites (Plagiorchiidae Lühe, 1901 emend. Ward, 1917) from Reptiles of Lucknow

by

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In the following pages, four species of Plagiorchiid trematodes, one of them new to science, are described and discussed; the specimens were collected in Lucknow from three species of reptiles. The type specimens of *Astiotrema lissemydis* n. sp. have been deposited in in Dr. G. S. Thapar's Helminthological Collection, Lucknow, U. P., India.

Family: PLAGIORCHIDAE Lühe, 1901, emend. Ward, 1917
Subfamily: Plagiorchiinae Pratt, 1902
Genus: *Astiotrema* Looss, 1900

Astiotrema reniferum (Looss, 1898) Loos, 1900
(Figs. 1-10)

A large number of specimens of this form were collected from the intestine of a single host *Kachuga dhongoka* (Gray) at Lucknow.

DESCRIPTION: Body elongate, spinose; hindbody somewhat broader than forebody with rounded extremities. Is measures 1.40 to 3.85 mm in length and 0.42 to 1.66 mm in maximum width in the region of anterior testis. Oral sucker subterminal, ovoid, 0.11 to 0.17 × 0.11 to 0.22 mm in size. Prepharynx small and thin-walled; pharynx ovoid or globular, 0.03 to 0.13 × 0.05 to 0.17 mm in size; esophagus long, tubular, 0.14 to 0.60 mm in length; intestinal ceca simple running along sides of body up to anterior end of hind testis or to some distance

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anterior to caudal end. The posterior extension of intestinal ceca varies in different specimens. In some specimens ceca are equal while in others right intestinal cecum is larger or smaller than left one. Ventral sucker spherical or ovoid equal to, smaller or larger than oral sucker, 0.16 to 0.30 × 0.11 to 0.28 mm in size and lying at 0.40 to 0.83 mm from anterior extremity.

Genital pore preacetabular, median or submedian at 0.39 to 0.82 mm from anterior extremity. Excretory pore terminal. Excretory bladder Y-shaped, median stem passing between two testes in a sigmoid curve divided into two short arms between ovary and anterior testis.

Testes entire, spherical or deeply lobed, diagonal and intercaecal; anterior testis equatorial or postequatorial. The shape and nature of testes are subject to much variation. Anterior testis equal to, or smaller or larger than posterior testis, lying anterior to left intestinal cecum, 0.16 to 0.55 × 0.18 to 0.36 mm in size at 0.60 to 2.6 mm from anterior end. Posterior testis situated on right side touches intestinal cecum, 0.16 to 0.59 × 0.18 to 0.39 mm in size at 0.19 to 1.9 mm from hind end of body. Cirrus pouch claviform, elongated, 0.39 to 1.0 mm in size lying dorsal to ventral sucker on right side of it, extending far beyond acetabulum as far as ovary. Vesicula seminalis an elongated sac occupying basal part of cirrus sac, 0.20 to 0.39 × 0.12 to 0.15 mm in size; pars prostatica tubular, 0.04 to 0.06 × 0.05 to 0.06 mm in size; ejaculatory duct, 0.16 to 0.22 mm long opening at genital pore.

Ovary submedian, postequatorial, lobed or entire, lying on right or left side at postero-lateral margin of ventral sucker measuring 0.13 to 0.36 × 0.09 to 0.30 mm in size at 0.6 to 1.42 mm from anterior extremity. From its postero-lateral side arises oviduct which opens at oötype. Receptaculum seminis a large sac, 0.06 to 0.11 × 0.11 to 0.8 mm in size, lying obliquely or transversely between ovary and anterior testis. Vitellaria small, follicular, extracaecal but at places overlapping ceca, extending from level of ventral sucker up to hind end of anterior testis or a little anterior to hind end of body. Posterior extension of vitellaria either equal or left side larger than that of right side. Vitelline ducts of both sides meet behind posterior margin of ovary to form a common duct opening at oötype Uterus arises from posterior side of oötype and runs posteriorly between two testes up to hind end of body. Terminal part of ascending limb extends close to left intestinal cecum to open at genital pore. Eggs oval and operculate, 0.021 to 0.031 × 0.012 to 0.015 mm in size.

HOST: *Kachuga dhongoka* (Gray).
LOCATION: Intestine.
LOCALITY: Lucknow.

DISCUSSION: The genus *Astiotrema* Looss, 1900 according to published works contains 26 especies reported from different parts of the World. They are:

Astiotrema reniferum (Looss, 1898) Looss, 1900, type species; *A. impletum* (Looss, 1898) Looss, 1900; *A. monticelli* Stossich, 1904; *A. emydis* Ejsmont, 1930; *A. elongatum* Mehra, 1931; *A. loossi* Mehra, 1931; *A. gangeticus* Harshey, 1932; *A. spinosa* Chatterji, 1933; *A. indica* Thapar, 1933; *A. rami* Bhalerao, 1936;

A. odhneri Bhalerao, 1936; *A. orientale* Yamaguti, 1937; *A. amydae* Ogata, 1938; *A. fukuii* Ogata, 1938; *A. dassia* Dayal, 1938; *A. foochowensis* Tang. 1941; *A. nathi* Gupta, 1954; *A. hoshiarpurium* Gupta, 1954; *A. srivastavai* Gupta, 1954; *A. thapari* Gupta, 1954; *A. matthaii* Gupta, 1954; *A. geomydis* Siddiqui, 1958; *A. giganticum* Tewari, 1958; *A. lobiorchis* Tewari, 1958; *A. mehrai* Tewari, 1958; *A. sudanensis* Khalil, 1959; *A. trituri* Gabda, 1959 and *A. cyclemysi** Siddiqi, 1965.

BHALERAO (3) synonymised *A. gangeticus* to *A. loossii*. GUPTA (6) synonymised *A. amydae* and *A. foochowensis* to *A. orientale*. YEH and FOTEDAR (17) in a comprehensive review of the genus *Astiotrema* transferred *A. emydis* to *Leptophallus* and considered *Gauhatiana* Gupta, 1953 to be congeneric with *Astiotrema*. They recognised the following forms as valid species with their synonyms:

1. *A. reniferum* (Looss, 1898) Looss, 1900 (Syns. *A. elongatum* Mehra, 1931; *A. loossii* Mehra, 1931; *A. gangeticus* Harshey, 1932; *A. spinosa* Chatterji, 1933; *A. indica* Thapar, 1933; *A. rami* Bhalerao, 1936; *A. dassia* Dayal, 1938; *A. hoshiarpurium* Gupta, 1954; *A. thapari* Gupta, 1954 and *Gauhatiana batrachii* Gupta, 1954); 2. *A. impletum* (Looss, 1898); 3. *A. monticellii* Stossich, 1904; 4. *A. odhneri* Bhalerao, 1936 (Syns. *A. orientale* Yamaguti, 1937; *A. amydae* Ogata, 1938; *A. fukuii* Ogata, 1938; *A. foochowensis* Tang, 1941; *A. nathi* Gupta, 1954; *A. srivastavai* Gupta, 1954 and *A. matthaii* Gupta, 1954).

YEH and FOTEDAR (17) distinguished these species from each other on the basis of the following characters: (i) the relative length of caeca, (ii) the ratio of suckers and (iii) the distribution of vitellaria. BURTON (4) is in complete agreement with this proposal. KHALIL (7) synonymised *A. odhneri* with *A. reniferum* on the basis of the variability in the extent of caeca observed in the specimens collected in Sudan from a fresh water turtle. AHLUWALIA (1) considered *A. geomydis* to be a synonym of *A. impletum*. SIDDIQI (11) considered *A. lobiorchis* and *A. mehrai* to be synonyms of *A. reniferum*.

The author does not agree with YEH and FOTEDAR (17) and considers that the relative length of ceca and ratio of suckers are variable characters and of little specific importance. In the author's specimens oral sucker is smaller, equal or larger than ventral sucker and intestinal ceca extend up to hind end of anterior testis or up to a little beyond hind end of hind testis. YEH and FOTEDAR (17) ufortunately distinguished *A. reniferum* and *A. odhneri* on the basis of relative length of ceca, considering it to be a useful character. From the above facts it is evident that the differential characters suggested by Yeh and Fotedar are variable and thus unacceptable. Hence the author is in favour of KHALIL, (7) in considering *A. odhneri* Bhalerao, 1936 to be a synonym of *A. reniferum*.

The author does not agree in transferring *A. emydis* to *Leptophallus* nor

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* *Astiotrema cylemisi* Siddiqi, 1965 contains an error in the Latin composition of the genitive. It should be treated as *Astiotrema cyclemydis*.

in holding *Gauhatiana* to be congeneric with *Astiotrema*. The form *A. emydis* is easily distinguished from *Leptophallus* on the nature of vitellaria and on the position of cirrus pouch. The genus *Gauhatiana* is distinct from the genus *Astiotrema* in having vitellaria into two distinct aggregations. The anterior follicles lie on each side of the esophagus anterior to intestinal bifurcation and posterior follicles on the lateral sides of the body from behind the ventral sucker to posterior region of hind testis.

TEWARI (13) distinguished *A. giganticum, A. lobiorchis* and *A. mehrai* from other species of *Astiotrema* on the shape of testes, relative size of suckers, extension of vitellaria, shape of ovary and size of receptaculum seminis. It is my experience from the collection of *Astiotrema* that the minor differences pointed out by Tewari except the extension of vitellaria are too variable and of no importance. Accordingly all the three species fall into synonymy with *A. reniferum*. Further the author is of the opinion that *A. trituri* and *A. sudanensis* are synonyms of *A. reniferum*, as the differences pointed out are variable characters. Therefore the genus *Astiotrema* at present comprises the following five species, viz. *A. reniferum, A. impletum, A. monticellii, A. emydis* and *A. cyclemydis*.

Astiotrema lissemydis n. sp.
(Fig. 11)

Thirteen specimens of this form were collected from the intestine of a turtle, *Lissemys punctata punctata* (Bonnaterre) at Lucknow.

DESCRIPTION: Body elongated, with rounded extremities, 1.82 to 2.95 × 0.49 to 0.54 mm in size. Its is covered with small backwardly directed spines. Oral sucker large and subterminal measuring, 0.19 to 0.22 × 0.19 to 0.21 mm. Prepharynx present; pharynx globular, 0.09 to 0.13 mm in diameter; esophagus very short immediately dividing into two simple intestinal ceca extending almost to posterior end of body. Numerous glands occur at base of pharynx and open into esophagus. Ventral sucker oval, smaller than oral sucker, 0.09 to 0.13 × 0.09 to 0.16 mm in size and lying between cirrus pouch and anterior testis at 0.57 to 0.98 mm i. e., nearly one third of body length from anterior extremity.

Genital pore median or submedian, lying between ventral sucker and intestinal bifurcation at 0.42 to 0.79 mm from anterior extremity. Excretory pore lies at hind end of body. Excretory bladder Y-shaped. The main stem extends up to testes, then divides into right and left branches.

Testes entire, rounded or oval, postovarian, situated diagonally one behind other in second quarter of body. Anterior testis smaller than posterior, 0.17 to 0.30 × 0.16 to 0.35 mm in size at 0.75 to 1.4 mm from anterior extremity. Posterior testis, 0.20 to 0.33 × 0.30 to 0.38 mm in size at 0.56 to 0.86 mm from hind end of body. Cirrus pouch claviform, elongated, dorsal to acetabulum, 0.25 to 0.50 × 0.10 to 0.16 mm in size, extending far beyond ventral sucker as far as ovary. Vesícula seminalis large, occupying a greater portion of ventral sucker, 0.18 to 0.25 × 0.05 to 0.08 mm in size; pars prostatica oval, 0.04 to 0.05 × 0.03 to 0.05 mm in size; ejaculatory duct long, narrow, 0.07 to 0.15 mm

in length, opening at genital pore.

Ovary oval, entire, preequatorial, close to acetabulum, 0.15 to 0.20 × 0.16 to 0.23 mm in size and lies at 0.56 to 1.1 mm from anterior extremity. From hind end of ovary arises oviduct which opens at oötype. Receptaculum seminis pear shaped and elongated transversely, 0.11 to 0.12 × 0.04 to 0.05 mm in size. Vitellaria small, follicular, extending from genital pore to a little posterior to hind end of posterior testis where they are confluent medially. They are mainly lateral in position but cover intestinal ceca and at places extend into intercecal space. Uterus arises from left side of oötype and runs posteriorly in a sinuous course towards posterior end and then passes anteriorly to left of cirrus sac and opens at genital pore. Eggs oval and non operculate, 0.025 to 0.041 × 0.0125 to 0.024 mm in size.

HOST: *Lissemys punctata punctata* (Bonnaterre).
LOCATION: Intestine.
LOCALITY: Lucknow.

DISCUSSION: The new form differs from all the known species of the genus *Astiotrema* with the exception of *A. emydis* and *A. cyclemydis* in having a very short oesophagus. The new form differs from *A. emydis* in the extension of vitellaria much below the bifurcation of ceca and in not being confluent medially anterior to ventral sucker, in the extension of ceca up to hind end of body and in having ovary smaller than testes. From *A. cyclemydis* it is distinctive in the nature of vitellaria which are confluent medially behind posterior testis, in the extent of uterine coils, in having a preequatorial ovary and in the possession of numerous glands at the base of pharynx. Accordingly it is regarded as a new species with the specific name *A. lissemydis* n. sp.

KEY TO THE SPECIES OF THE GENUS *ASTIOTREMA* LOOSS, 1900

1. Esophagus short 2
   Esophagus long 4

   2. Vitellaria confluent anterior to ventral sucker ..... *A. emydis* Ejsmont, 1930
      Vitellaria not confluent anterior to ventral sucker 3

3. Vitellaria confluent medially behind posterior testis and ovary preequatorial ..... *A. lissemydis* n. sp.
   Vitellaria not confluent medially behind posterior testis and ovary equatorial ..... *A. cyclemydis* Siddiqi, 1965

   4. Vitellaria extend from pharnyx up to hind end of posterior testis 5
      Vitellaria restricted to anterior half of body ..... *A. impletum* (Looss, 1899) Looss, 1900

5. Vitellaria restricted to second quarter of body ..... *A monticellii* Stossich, 1904
   Vitellaria from pharynx to hind end of posterior testis ..... *A. reniferum* (Looss, 1899) Looss, 1900

Genus: *Xenopharynx* Nicoll, 1912

Xenopharynx biliphaga Srivastava, 1954
(Figs. 12-17)

Seven specimens of this form were collected from the gall bladder of a water snake, *Tropidonotus piscator* (Wall.) at Lucknow.

DESCRIPTION: Body enlongated, espinose with a bluntly conical anterior and rounded posterior end, 1.54-4.62 × 0.62-1.70 mm in size. Oral sucker spherical, subterminal, 0.14-0.36 × 0.15-0.35 mm in size. Prepharynx well developed, 0.02-0.06 × 0.11-0.18 mm in size; pharynx globular, 0.09-0.-8 × 0.10-0.24 mm in size; esophagus 0.11-0.26 mm it long; intestinal ceca equal or subequal, extended almost to hind end of body or a little anterior to it, simple or sinuous, narrow or as broad as half the maximum width of body and occupying almost whole space within body. Ventral sucker oval or spherical, smaller than oral sucker, 0.16-0.20 × 0.16-0.32 mm in size at 0.84-1.33 mm nearly one third from anterior extremity.

Genital pore median at cecal bifurcation at 0.52-0.86 mm. from anterior extremity. Excretory pore terminal. Excretory bladder Y-shaped and branching behind testes.

Testes spherical, entire, intercecal of partly cecal, equal or subequal, equatorial, postequatorial, diagonal or symmetrical. Right testis, 0.06-0.30 × 0.07-0.34 mm in size at 0.98-1.32 mm from anterior extremity and left testis, 0.06-0.37 × 0.07-0.33 mm in size at 0.88-1.48 mm from hind end of body. Cirrus sac elongated, pear shaped, 0.12-0.29 × 0.05-0.13 mm in size overlapping intestinal bifurcation at 0.06-0.20 mm in front of ventral sucker. Vesicula seminalis tubular and coiled, 0.10-0.51 × 0.011-0.041 mm in size; ejaculatory duct short, 0.012-0.026 mm long, opening at genital pore; pars prostatica long, sac-like, 0.04-0.095 × 0.01-0.025 mm in size, surrounded by a large number of prostate gland cells.

Ovary ovoid, smaller or larger than testes, pretesticular, submedian, 0.04-0.20 × 0.05-0.19 mm in size, close or away from ventral sucker. Its lies on left side of body at 0.78-0.95 mm from anterior extremity. Receptaculum seminis pear shaped, 0.03-0.14 × 0.04-0.22 mm in size, immediately behind ovary. Vitellaria follicular extending from sides of oral sucker to anterior level of anterior testis or up to a little posterior to hind end of posterior testis. They overlap intestinal ceca, occasionally extending beyond inner margins of latter. In some specimens vitellaria are uneven in their posterior extent. Two vitelline ducts of either side join each other near oötype to form a common vitelline duct. Descending uterus extends from oötype in regular loops behind posterior testis and then ascends passing between testes to open at genital pore. Uterus largely intercecal crossing inner margins of ceca irregularly. Eggs oval, operculated, 0.031-0.05 × 0.015-0.030 mm in size.

HOST: *Tropidonotus piscator* (Wall.)

LOCATION: Gall bladder.
LOCALITY: Lucknow.

DISCUSSION: To date the genus *Xenopharynx* Nicoll comprises the following 13 species:

Xenopharynx solus Nicoll, 1812, type species; *X. piscator* Bhalerao, 1926; *X. biliphaga* Srivastava, 1954; *X. indica* Baugh, 1956; *X. pyriformis* Simha, 1958; *X. heterovitellatus* Simha, 1958; *X. nicolli* Tewari, 1959; *X. orientalis* Tewari, 1959; *X. raipurensis* Tewari, 1959; *X. mehrai* Tewari, 1959; *X. hirakudensis* Chatterji et Kruidenier, 1961; *X. sambalus* Chatterji et Kruidenier, 1961; *X. dhamini* Chatterji et Kruidenier, 1961.

RAI and AGRAWAL (9) recognised *X. solus* Nicoll, 1912 from *Tropidonotus piscator* at Jabulpur. Due to morphological variations they considered that *X. orientalis, X. nicoll, X. mehrai, X. raipurensis, X. piscator, X. heterovitellatus, X. hirakudensis* and *X. sambalus* are synonyms of *X. solus*. They recognised the following valid species, besides *X. solus*: *X. pyriformis, X. biliphaga* (Syn. *X. indica*) and *X. dhamini*. The author does not agree with Rai and Agrawal and considers that *X. piscator* and *X. heterovitellatus* are valid species and *X. orientalis, X. nicolli, X. mehrai, X. raipurensis, X. hirakudensis* and *X. sambulus* are synonyms of *X. biliphaga* instead of *X. solus*.

The present form is referred to *X. biliphaga* Srivastava, 1954 obtained from *Tropidonotus piscator* at Lucknow. In the author's specimens the size, shape and relative position of testes and ovary, narrow or wide ceca, position of genital pore, extend of uterine coils and vitellaria and relative size of prepharynx are highly variable characters. BAUGH (2) described *X. indica* from the gall bladder of a colubrid snake from Banaras. On a careful comparison of the description of this species with the specimen of *X. biliphaga* at the author's disposal it is found that both species are identical. The difference existing between *X. biliphaga* and *X. indica* is the presence of spines on the ventral surface of the body, which in the opinion of the author should not form a basis for the separation of one species from the other. The author is therefore in agreement with RAI and AGRAWAL (9) in considering *X. indica* to be a synonym of *X. biliphaga*. TEWARI (14) distinguished *X. nicolli, X. mehrai* and *X. orientalis* from all other species in having testes symmetrically placed at one level, and *X. haipurensis* from *X. pyriformis* in the posterior extent of vitellaria, in having testes prequatorial and in the relative size of suckers. In the author's specimens the testes are symmetrical or obliquely one behind the other or nearly opposed across mid line, equatorial, pre- or postequatorial, equal or unequal in size and the vitellaria extend from oral sucker up to anterior level of anterior testis or a little posterior to hind end of testes. Consequently *X. nicolli, X. mehrai, X. orientalis, X. raipurensis* and *X. pyriformis* fall into synonymy of *X. biliphaga*. Further, the extent of variation in the author's specimens invalidates *X. heterovitellatus*. CHATTERJI and KRUIDENIER (5) distinguished *X. hirakudensis* from *X. biliphaga* in the extent of vitellaria, well developed prepharynx, ovary smaller than testes, ventral sucker smaller than oral sucker and in having narrow intestinal ceca; *X. sambalus* from

X. hirakudensis mainly in having vitellaria up to anterior margin of anterior testis; testes nearly in the same plane; excretory bladder bifurcating well anterior to testes and in having intestinal ceca broader; *X. dhamini* from *X. biliphaga* in having testes opposing and intestinal ceca narrow. In the author's opinion all these forms are identical and fall into synonymy with *X. biliphaga.*

The genus *Xenopharynx* therefore comprises the following four valid species with their synonyms:

X. solus Nicoll, 1912, type species.

X. piscator Bhalerao, 1926.

X. biliphaga (Syns. *X. indica* Baugh, 1956; *X. heterovitellatus* Simha, 1957; *X. nicolli* Tewari, 1959; *X. orientalis* Tewari, 1959; *X. mehrai* Tewari, 1959; *X. raipurensis* Tewari, 1959; *X. hirakudensis* Chatterji et Kruidenier, 1961; *X. sambalus* Chatterji et Kruidenier, 1961; *X. dhamini* Chatterji et Kruidenier, 1961 and *X. heterovitellatus* Simha, 1958).

X. pyriformis Simha, 1958.

KEY TO THE SPECIES OF THE GENUS *XENOPHARYNX* NICOLL, 1912

1. Testes anterior to ovary ..... *X. solus* Nicoll, 1912
   Testes posterior to ovary 2
2. Ventral sucker smaller than oral sucker ..... *X. biliphaga* Srivastava, 1954
   Ventral sucker larger than oral sucker 3
3. Posterior extent of vitellaria up to level of testes; testes in third quarter of body *X. pyriformis* Simha, 1958
   Posterior extent of vitellaria behind posterior testes up to of uterine coil; testes in posterior half of body ..... *X. piscator* Bhalerao, 1926

Subfamily: Encylometrinae Mehra, 1931
Genus: *Encylometra* Baylis & Cannon, 1924

Encylometra colubrimurorum (Rud., 1819) Dollfus, 1929
(Figs. 18-21)

A large number of specimens of this form were collected from the esophagus of *Tropidonotus piscator* (Wall.) at Lucknow.

DESCRIPTION: Body espinose, fusiform, with rounded anterior and posterior ends tapering to a blunt point, measuring 6.35-7.43 × 0.97-2.15 mm in size. Oral sucker subterminal and subspherical, 0.56-0.78 × 0.56-0.78 mm in size. Prepharynx short and thin walled; pharynx well developed, ovoid, muscular, 0.25-0.48 × 0.37-0.50 mm in size; esophagus very short, immediately bifurcating into two intestinal ceca which occupy a lateral position near body wall, terminating at or near posterior extremity and equal or subequal in length; left cecum slightly longer than right one. Ventral sucker oval or spherical, larger than oral sucker, preequatorial, 0.74-0.834 × 0.74-0.86 mm in size at 1.572-2.080

mm i.e., about one third of body length from anterior extremity. Ratio of oral to ventral sucker is 3: 4.

Genital pore lies nearly half way between ventral sucker and left body margin, intercecal, cecal or extracecal, 1.76-2.32 mm from anterior extremity. Excretory pore lies at hind end of body. Excretory bladder Y-shaped. Main stem extends beyond testes, then divides into right and left branches.

Testes entire, subspherical, closely tandem or diagonal in median line in posterior half or in middle region of body. Anterior testis, 0.25-0.40 × 0.24-0.35 mm in size at 2.38-3.70 mm from anterior extremity. Posterior testis larger or smaller than anterior testis, 0.32-0.40 × 0.26-0.36 mm in size at 2.80-3.51 mm from hind end. Cirrus pouch crescent-shaped, lying transversely away or overlapping anterior border of ventral sucker, 0.675-0.980 × 0.22-0.26 mm in size. Vesicula seminalis elongated, tubular, straight or coiled in a spiral, 0.68-1.1 × 0.08-0.125 mm in size; pars prostatica narrow and tubular, 0.11-0.225 × 0.05-0.07 mm in size; ejaculatory duct tubular, 0.14-0.31 mm long. A large number of prostate gland cells surround space in cirrus pouch around vesicula seminalis and pars prostatica.

Ovary oval or rounded, median or submedian, close behind ventral sucker or slightly away from it. It measures 0.12-0.35 × 0.16-0.23 mm in size at 2.5-3.0 mm from anterior extremity. Receptaculum seminis oval, small, lying close on left side of ovary, 0.13-0.18 × 0.21-0.30 mm in size. Oviduct arises from ovary and opens at oötype. Vitellaria small, follicular, lying along ceca, extending from a little posterior to ventral sucker to caudal end of body. Two vitelline ducts run transversely to open at oötype. A large number of Mehlis's gland cells surround oötype. Uterus intercecal, convoluted, filling nearly entire space behind ovary. Ascending limb passes into metraterm which is dorsal to left side of ventral sucker. Eggs oval, non operculate, 0.069-0.118 × 0,032-0.061 mm in size.

HOST: *Tropidonotus piscator* (Wall.)
LOCATION: Esophagus.
LOCALITY: Lucknow.

DISCUSSION: YAMAGUTI (15) listed the following species under the genus *Encylometra* Baylis et Cannon, 1924:

E. colubrimurorum (Rud., 1819) Dollfus, 1929 (syns. *E. bologenensis* (Baer, 1924), Baylis; *E. natricis* Baylis et Cannon, 1924; *E. asymmetrica* Wallace, 1936 (syn. *E. microrchis* Yamaguti, 1933); *E. caudata* (Polonio, 1859) Dollufus, 1928; *E. japonica* Yoshida et Ozaki, 1929; *E. koreana* Park, 1940; *E. microrchis* Yamaguti, 1933 (syn. *E. japonica* Yoshida et Ozaki, 1929); *E. vitellata* Gupta, 1954.

PARK (1940) considered *E. microrchis* to be a synonym of *E. japonica*. YEH (16) in a critical review of the genus recognised only three valid species viz. *E. colubrimurorum* (Rud. 1819) Dollfus, 1929; *E. japonica* Yoshida et Ozaki, 1929 (synonyms *E. microrchis* Yamaguti, 1933, *E. koreana* Park, 1940 and *E. vitellata* Gupta, 1954); and *E. asymmetrica* Wallace, 1936. He distinguished the

species on the basis or relative length of ceca. In *E. colubrimurorum* the ceca are equal, in *E. japonica* subequal, while in *E. asymmetrica* they are very unequal, In the author's specimens the ceca are of variable length and in some cases they are "In *E. colubrimurorum* the ceca are quite equal and will not become otherwise unless distorted. In *E. japonica* the left cecum is only slightly longer than the right and they may look symmetrical when the specimen is contracted. Fortunately the contracted state is easy to observe as in *Encylometra* the caeca are straight and when the specimen is contracted the caeca become wavy."

The author wishes to point out that in the collection of her well preserved specimens the ceca in four specimens are equal and straight while in the other specimens they are subequal and straight. Hence the relative length of ceca, equal or subequal, is a variable character and cannot be considered as a main basis for distinguishing *E. colubrimurorum* from *E. japonica.* Consequently *E. japonica* falls into the synonymy of *E. colubrimurorum.*

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SUMMARY

Four species of trematode parasites of reptiles collected in Lucknow are described, namely, *Astiotrema reniferum* (Looss, 1898) Looss, 1900, from *Kachuga dhongoka, A. lissemydis* n. sp., from *Lissemys punctata punctata,* and *Xenopharynx biliphaga* Srivastava, 1954, from *Tropidonotus Piscator,* of the subfamily Plagiorchiinae Pratt, 1902; and *Encylometra colubrimurorum* (Rud., 1819) Dollfus, 1929, of the subfamily Encylometrinae Mehra, 1931, from the esophagus of *T. piscator.* Keys to the species of *Astiotrema* Looss, 1900 and *Xenopharynx* Nicoll, 1912 are given. The importance of the variation in position of organs in the taxonomy of these trematodes is pointed out in the discussion.

RESUMEN

Se describen cuatro tremátodos parásitos de reptiles, colectados en Lucknow: *Astiotrema reniferum* (Looss, 1898) Looss, 1900, de la tortuga *Kachuga dhongoka, A. lissemydis* n. sp., del intestino de la tortuga *Lissemys punctata punctata,* y *Xenopharynx biliphaga* Srivastava, 1954, de la culebra de agua *Tropidonotus piscator,* los tres de la subfamilia Plagiorchiinae Pratt, 1902; y *Encylometra colubrimurorum* (Rud., 1819) Dollfus, 1929, del esófago de *T. piscator,* de la subfamilia Encylometrinae Mehra, 1931. Se presentan claves para las especies de *Astiotrema* Looss, 1900 y *Xenopharynx* Nicoll, 192. En la discusión de las diversas especies se hace notar la importancia de tomar en cuenta la variabilidad de posición relativa de los distintos órganos, que ha servido en muchas ocasiones como criterio para distinguir nuevas especies, y que la autora considera base suficiente para reducir a sinominia algunas especies ya descritas.

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Figs. 1-9. *Astiotrema reniferum* (Looss, 1898) Looss, 1900, showing gradual variations in the position of various organs. Compare also with Fig. 10.

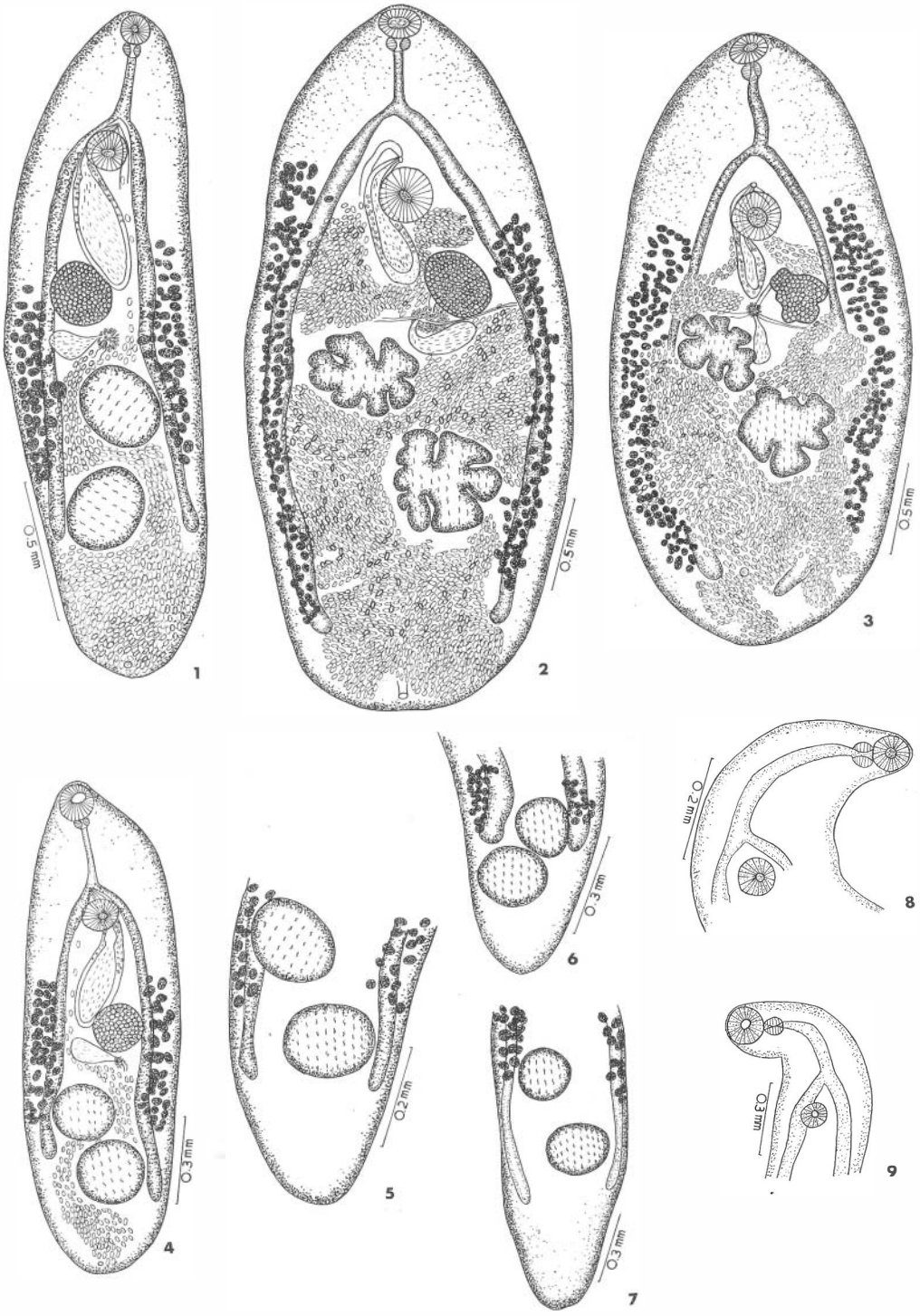
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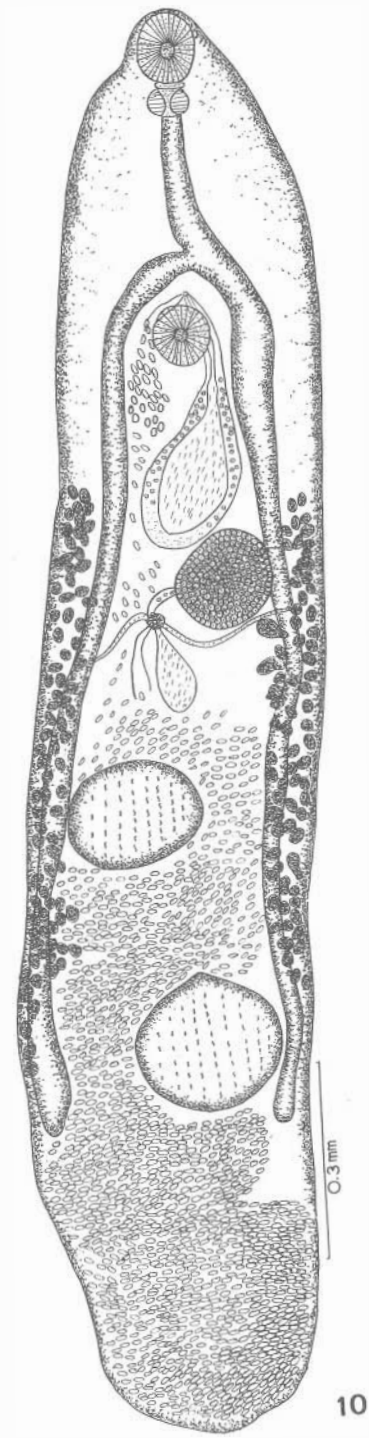
Fig. 10. *Astiotrema reniferum* (Looss, 1898) Loos, 1900. Compare with Figs. 1-9.

Fig. 11. *Astiotrema lissemydis* n. sp. Ventral view.



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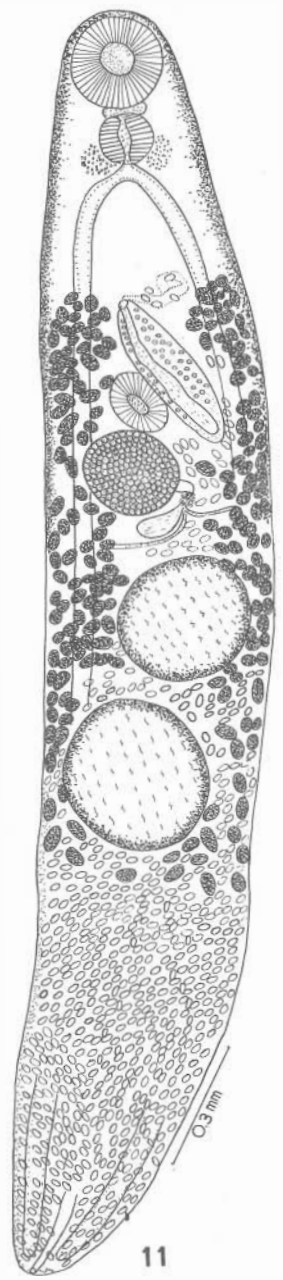

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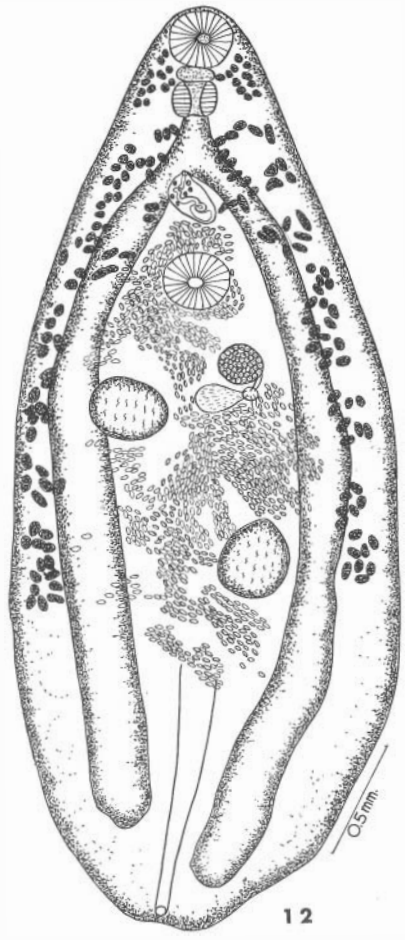
Figs. 12-17. *Xenopharynx biliphaga* Srivastava, 1954.
Figs. 12-16. Variation in the position of varios organs.
Fig. 17. Cirrus pouch enlarged.



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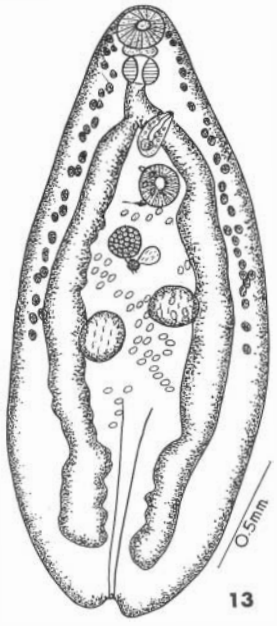

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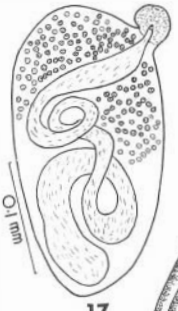

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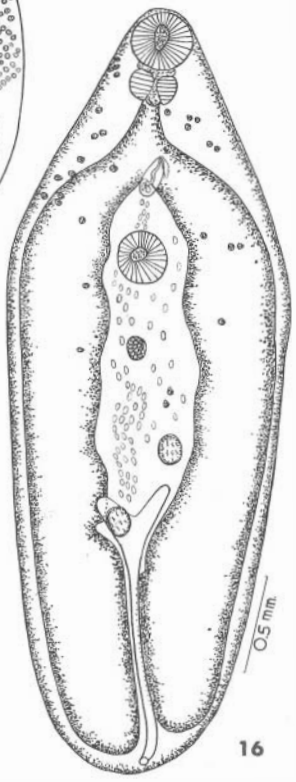

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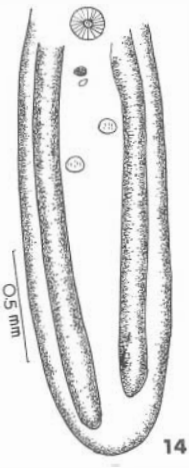

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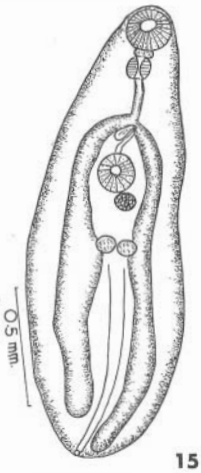

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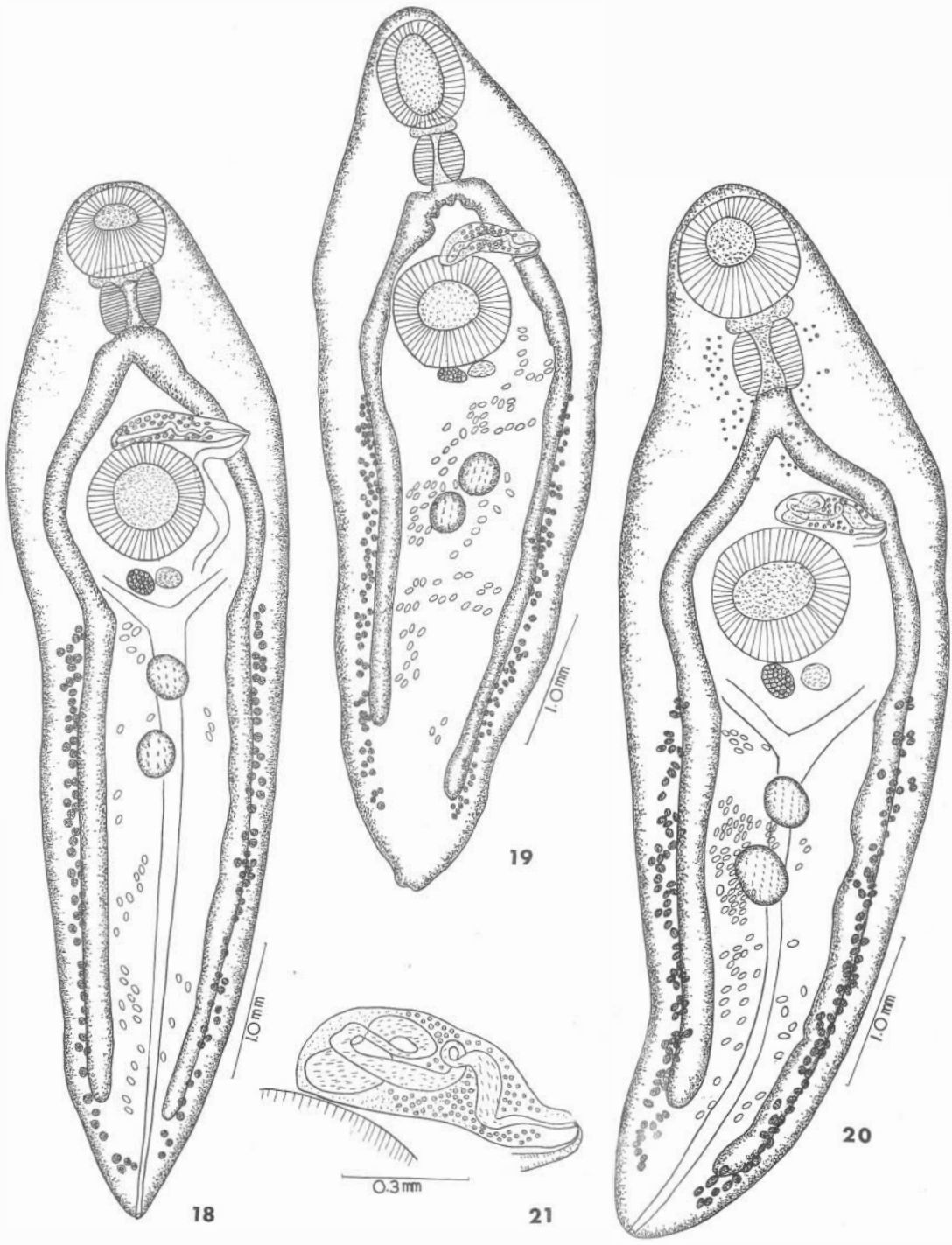
Figs. 18-21. *Encylometra colubrimurorum* (Rud., 1819) Dolfus, 1929.
Figs. 18-20 Variations in the position of various organs.
Fig. 21. Cirrus pouch enlarged.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