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Four new species of the genus *Lytocestus* (Caryophyllidea, Lytocestidae) from Edible Catfishes in Assam and Meghalaya, India

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Four new caryophyllaeid species of the genus *Lytocestus* from catfishes, three from *Clarias batrachus* (L.) and one from *Heteropneustes fossilis* (Bloch), from Guwahati (Assam) and Sheila (Meghalaya) are described. The differential characters of *L. clarius* n. sp. are an elongated body with a short neck and undifferentiated scolex, H-shaped ovary the arms of which extend beyond the Mehlis' gland, closely lying but separate genital apertures and spiny eggs. *L. attentuatus* n. sp. has a filiform body with undifferentiated scolex and slender neck, inverted A-shaped ovary, vitellaria in two fields lateral to the testes, and smooth operculate eggs. Elongated body, narrow scolex without a terminal introvert and tapering anteriad, inverted A-shaped ovary, uterine coils not extending posterior to the ovarian isthmus and the presence of external seminal vesicle are the distinguishing features of *L. assamensis* n. sp. A short neck, undifferentiated scolex, H-shaped ovary, and smooth operculate eggs characterize *L. heteropneustii* n. sp.

INTRODUCTION

During an exploration of caryophyllaeids of the edible catfishes, *Clarias batrachus* and I *JHeteropneustes fossilis,* collected from Guwahati (Assam) and brought alive to Shillong markets for sale, and also of the same piscine hosts from Sheila (East Khasi Hills, Meghalaya) eight species of *Lytocestus* were recovered- 7 from *C. batrachus* and 1 from *H. fossilis.* While 4 of these represented the already known species (Chakravarty and Tandon, 1988), the remaining 4 forms appeared new to science. It is noteworthy that these forms were strictly host specific even though *H. fossilis* and *C. batrachus* share the same habitat.

The present communication deals with the description and erection of these forms as new species of the genus *Lytocestus.*

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MATERIALS AND METHODS

The specimens comprising the present material were recovered from the intestine of the freshly killed fishes, *C. batrachus* and *H. fossilis,* from time to time. The intensity of infection was low in both the hosts, it being 1-2 parasites per host.

The worms, after stretching in hot water, were flattened under a coverslip. Bouin and 10% neutral buffered formaldehyde were used as fixatives and borax carmine and Meyer's carmalum were used for staining the whole mounts. For histological studies transverse and sagittally cut series of 6-7 urn thick paraffin sections, stained with haematoxylin and eosin were used.

The characters considered herein important for taxonomic purpose were also evaluated statistically. For analyzing the significance student's r-test was applied.

The measurements of all the forms studied herein are

given in Table 1.

Family: Lytocestidae Wardle et. McLeod, 1952

[Synonyms = Lytocestinae Hunter, 1927; Bovieninae Fuhrmann, 1931; Lallidae Johri, 1959]

Genus: *Lytocestus* Cohn, 1908

[Synonym = *Lucknowia* Gupta, 1961]

1. *Lytocestus clariae* n. sp.

The collections comprised 112 specimens of this form.

DESCRIPTION (Based on measurements of 10 specimens and several series of histological sections; Figs. 1-8).

Body elongate, flat with no trace of internal or external segmentation, tapering at anterior end, body proper divided into cortex and medulla by two layers of longitudinal muscles. Scolex undifferentiated, smooth, unarmed, with bluntly tapering extremity, followed by short neck devoid of reproductive organs. Testes numerous (270-495 in number), occupying medullary region, ovoid, larger than vitelline follicles, extending from just behind anterior follicles of vitellaria, posteriorly up to cirrus sac; cirrus sac compact, bulbous; ductus ejaculatorius opening close to female pore into shallow genital atrium. Ovary bilobed, H-shaped, follicular, extending posteriorly behind Mehlis' gland, lobes cortical in disposition and joined to each other by medullary ovarian isthmus anterior to Mehlis' gland; uterus glandular, extending in front of isthmus up to cirrus sac; vaginal tube joining uterus at distal end to open unitedly at shallow atrium. Vitelline follicles ovoid, commencing from short distance anterior to testes, extending up to level of cirrus sac, arranged in two rows lateral to testes; no post ovarian vitelline follicles present. Excretory pore terminal. Eggs oval, spinuous and operculate, as observed under phase contrast microscope.

Host: *Clarias batrachus* (L.)

Location: Intestine

Locality: Guwahati (Assam, 94° 16' E and 26°46' N, India), Sheila (Meghalaya, 91°38' E and 25°08' N, India)

Deposition of specimens: Holotype (No. 286), 2 Paratypes (No. 287) and 1 slide of transverse sections (No. 288) in helminthological collection of Eastern Regional Station (ERS) of Zoological Survey of India (ZSI); other Paratypes and series of histological sections in helminthological collections of the Department of Zoology, North-Eastern Hill University, Shillong.

Etymology: Named after the generic name of the host.

DISCUSSION

The disposition of the vitellaria in the cortex and testes in the medullary zone ascertains the inclusion of the present form in the family Lytocestidae Wardle and McLeod, 1952. Further, owing to the characters such as the presence of undifferentiated scolex, the absence of postovarian yolk glands, the uterine coils covered with a thick coat of accompanying cells and the ejaculatory duct enclosed within a compact parenchymatous bulb, the present form belongs to the genus *Lytocestus* Cohn, 1908.

The genus *Lytocestus* was erected for the cestodes from the siluroid host, *Clarias fuscus*, from Hongkong. The generic diagnosis was given as: holdfast undifferentiated and not broader than the body, parenchyma muscles in a ring around the testes, and no postovarian yolk glands present. To the type species *L. adherens* Cohn, 1908, several species have been added to date. They are *L. filiformis* (Woodland, 1923) Fuhrmann and Baer, 1925 *[=CaryophylIaeus filiformis* Woodland, 1923; *Monobothrioides filiformis* (Woodland, 1923) Woodland, 1937; *L. alestesi* Lynsdale, 1956 fide Mackiewicz (1962)] from *Mormyrus coschive* of river Nile at Khartoum; *L. indicus* (Moghe, 1925) Woodland, 1926 *[=Monobothrioides indicus* (Moghe, 1925) according to Woodland (1937)] from *C. batrachus* in India; *L.javanicus* (Bovien, 1926) Furtado, 1963 from *C. batrachus* in Java [=*Caryocestus javanicus* (Bovien, 1926)]; *L. birmanicus* Lynsdale, 1956 *[=L. alestesi* Lynsdale, 1956, according to Johri (1959)] from *C. batrachus* from Rangoon, Burma; *L. parvulus* Furtado, 1963 from *C. batrachus* in Singapore and Malacca; *L. longicollis* Rama Devi, 1973 from *C. batrachus* in India; *L. lativitellarium* Furtado et Tan,

1973 from *C. batrachus* in Malaysia; *L. puylaerti* Khalil, 1973 from *C. liberiensis* in Sierra Leone (Africa); *L. fossilis* Singh, 1975 from *H. fossilis* from Kathmandu (Nepal); and *L. marcuseni* Troncy, 1978 from *Marcusenius harringtoni* from Chad basin in Africa. *L. fossilis* is the only species included in the genus which possesses post-ovarian vitelline follicles. Though its author placed this species under the genus *Lytocestus* the histological details for ascertaining the family or genus allocation are lacking in its account, thus raising a doubt for including the form with post-ovarian vitelline follicles in the genus. Likewise, another genus *Lucknowia* Gupta, 1961 that was erected as a new genus distinct form *Lytocestus* on the basis of the extension of vitelline glands up to the posterior end of the body (Gupta, 1961) was considered synonymous with *Lytocestus* by Mackiewicz (1994), who opined that the ovarian follicles of *Lucknowia* were mistaken for postovarian vitelline follicles (Mackiewicz, 1981). All the *Lytocestus* species, however, appear to be distributed in the Ethiopian and Oriental regions of the zoogeographical realm. Of these, three species, namely, *L. indicus*, *L. longicollis* and *L. fossilis*, are represented from the Indian Subcontinent; besides, *L. birmanicus* and *L. filiformis* have also been reported from C. *batrachus* from the northeastern region of India (Chakravarty and Tandon, 1988). The measurements of the known species of *Lytocestus* are provided herein in Tables II and III.

On comparison with the known Indo-Malaysian species of *Lytocestus (L. javanicus, L. parvulus, L. longicollis, L. filiformis* and *L. lativitellarium),* the present form stands close to them in possessing an undifferentiated scolex that tapers anteriad, ovarian lobes extending behind the Mehlis' gland and uterine coils up to the cirrus sac and in the anterior extent of the testes, i.e., a little posterior to the anterior follicles of vitellaria. In having a short neck and also in the extent of testes and vitellaria, the present form comes close to *L. indicus* and *L. birmanicus.* However, it differs from all of them in having a genital atrium (in which open the male and female pores) and spinous eggs. All the species mentioned above have distinctly separated genital apertures and smooth-surfaced eggs.

The present form shares the similar pattern of distribution of vitelline follicles (i.e., concentrated laterally) as in *L. lativitellarium* but stands apart from the latter species in having smaller body size and shorter neck (about one-fifth to one-sixth of the body length), the vitellarial distribution commencing much anteriorly, and larger spiny eggs.

In view of the above differences, the present form stands out as a species distinct from the known species of *Lytocestus* and is, therefore, considered a new species and named after the generic name of the host.

Specific Diagnosis: *Lytocestus clariae* n. sp. Elongated body, undifferentiated scolex, short neck, H-shaped ovary, with arms extending beyond the Mehlis' gland; confluent male and female apertures opening in shallow genital atrium; spiny eggs.

2. *Lytocestus attenuates* n. sp.

A total of 98 specimens of this forms were collected.

DESCRIPTION (based on the measurements of specimens and several series of histological sections; Figs. 9-16)

Body thin, slender, elongated, flattened, posterior end broader than anterior, body proper divided into outer cortex and inner medulla by two layers of longitudinal muscles. Scolex smooth, undifferentiated, unarmed, with bluntly rounded extremity, followed by long narrow neck. Testes ovoid (155-398 in number), longer than vitelline follicles, occupying medullary region, extending from just posterior to anterior vitelline follicles caudad up to cirrus sac; cirrus sac medullary, enclosing thin winding ejaculatory duct, opening separately from and anterior to utero-vaginal pore. Ovary bilobed, follicular, inverted A-shaped, lobes extending to posterior level of Mehlis' gland and joined to each other by ovarian isthmus, ovarian lobes cortical, isthmus medullary; Mehlis' gland well developed, behind ovarian isthmus; uterus glandular, extending from behind Mehlis' gland anteriad beyond lateral horns of ovary and up to cirrus pouch; vagina distinct, straight or slightly convoluted, joining terminal end of uterus to open at utero-vaginal pore. Vitelline follicles ovoid, arranged in two rows lateral to testes, extending from just anterior to testes up to

cirrus sac. Excretory pore terminal. Eggs smooth, operculate.

Host: *Clarias batrachus* (L.)

Location: Intestine

Locality: Guwahati (Assam, 94° 16' E and 26° 46' N, India), Sheila (Meghalaya, 91°38' E and 25°08' N, India)

Deposition of specimens: Holotype (No. 292), 2 Paratypes (No. 293) and 1 slide of transverse sections (No. 294) in Helminthological collection of ERS of ZSI; other Paratypes and series of histological sections in the Department of Zoology, North-Eastern Hill University, Shillong.

Etymology: Named after the shape of the body.

DISCUSSION

In sharing the characters such as shape of the body (which is thin, slender and elongated) and undifferentiated scolex, the present form comes close to *L. longicollis, L. parvulus, L. flliformis, L. fossilis* and *L. javanicus.* However, it differs from each of them in certain characters: from *L. longicollis* in having a still longer neck and previtellarial region and in not possessing a receptaculum seminis; from *L, parvulus* in lacking a linear arrangement of vitelline follicles in five rows; from *L. fossilis* in the absence of post-ovarian vitelline follicles; and from *L. flliformis* in having oval and large vitelline follicles as compared to the small and globular ones occurring in the latter species. *L. javanicus* differs from the present form in not having a long neck. The present form also differs from the type species in characters such as the shape and the size of the body and size of the egg. In lacking a prominent holdfast, which is a distinct feature *of L. indicus* and *L. birmanicus,* the present form can be distinguished from these species. It also stands apart from *L. clariae* n. sp. described herein, in having distantly apart genital apertures and smooth-surfaced eggs.

Therefore, considering all the above differences, it is proposed to assign to the present form the rank of a new species.

Specific Diagnosis: *Lytocestus attentuatus* n. sp. Body filliform; scolex undifferentiated; long, slender neck; ovary inverted A-shaped; testes medullary, vitellaria in two fields lateral to testes; eggs smooth, operculate.

3. *Lytocestus assamensis* n.sp.

65 specimens of this form were recovered during the study.

DESCRIPTION (based on measurements of 10 specimens and several series of histological sections, Figs. 17-24).

Body very long, slightly tapering anteriorly, body proper divided into cortex and medulla by two layers of longitudinal muscles. Scolex undifferentiated, smooth and unarmed, with bluntly tapering extremity; well developed gland cells present, with distinct zone of dense aggregation 3-4 mm from anterior extremity. [This distinct glandular region provides the only clue for distinguishing and delimiting the scolex region from the neck; limits of the latter otherwise are not well demarcated from the rest of the body proper]. Testes numerous (266-565 in number), occupying medullary region, ovoid, larger than vitelline follicles; cirrus sac prominent, opening separately from female genital pore; external seminal vesicle present. Ovary bilobed, bent inwards in shape of inverted A, ovarian wings joined by isthmus, whole ovary cortical; Mehlis' gland well developed, behind isthmus; uterus glandular, extending from in front of isthmus anteriad beyond lateral horns of ovary; vagina distinct, joining terminal end of uterus to open unitedly to exterior at utero-vaginal pore immediately posterior to male opening. Vitelline follicles cortical, mainly concentrated in lateral fields generally not spreading throughout whole peripheral medulla of testicular zone, commencing from pretesticular region, extending posteriad up to level of cirrus sac. Excretory pore at terminal hind end. Eggs smooth, operculate (as confirmed from the observations of eggs ex utero under phase contrast).

Host: *Clarias batrachus* (L.)

Location: Intestine

Locality: Guwahati (Assam, 94° 16' E and 26° 46' N, India), Sheila (Meghalaya, 91 °38'E and 25°08'N, India)

Deposition of specimens: Holotype (No. 289), 2 Paratypes (No. 290) and 1 slide of transverse sections (No. 291) in Helminthological collection of ERS, ZSI; other Paratypes and series of histological sections in the Department of Zoology, North-Eastern Hill University, Shillong.

Etymology: Named after the state of Assam from where the fish hosts were first collected.

DISCUSSION

While ascertaining its specific status and on comparing it with the known forms of *Lytocestus,* the present form stands close to *L. longicollis* in sharing the characters such as the undifferentiated scolex, the inverted A-shaped ovary and the uterine coils extending beyond the anterior horns of ovary. However, it differs from the same in not possessing a receptaculum seminis, which is the characteristic feature of I. *longicollis.* Besides, the size of the body, testes and vitellaria and the distribution of vitellaria within the testicular field in the present form further distinguish it from *L. longicollis* in which the vitellaria are confined to the lateral fields.

On comparison with *L. parvulus,* the present form distinctly differs in not possessing five rows of vitelline follicles. The size and shape of the testes and vitellaria, which are much larger and ovoid in the present form, are the characters that differentiate it from *Lfiliformis.* While the present form is broad and flat occupying the full width and considerable length of the host's intestine, the body is much slender and elongated in *L. javanicus.*

On comparison with the other new forms described herein, the present form differs from I. *clariae* in possessing distinctly apart genital apertures and non-spinous eggs, and from *L. attenuates* in the distribution of testes and vitellaria that are intermingled and not confined to the lateral fields, and in the extent of uterine coils that are limited only up to the ovarian isthmus and not beyond.

Specific Diagnosis: *Lytocestus assamensis* n. sp. Body very long; scolex undifferentiated, without terminal introvert; long neck; inverted A-shaped ovary; uterine coils not extending beyond ovarian isthmus; external seminal vesicle present; vitellaria mainly in lateral fields of testicular zone.

4. *Lytocestus heteropneustii* n.sp.

The collection comprised 22 specimens of this form.

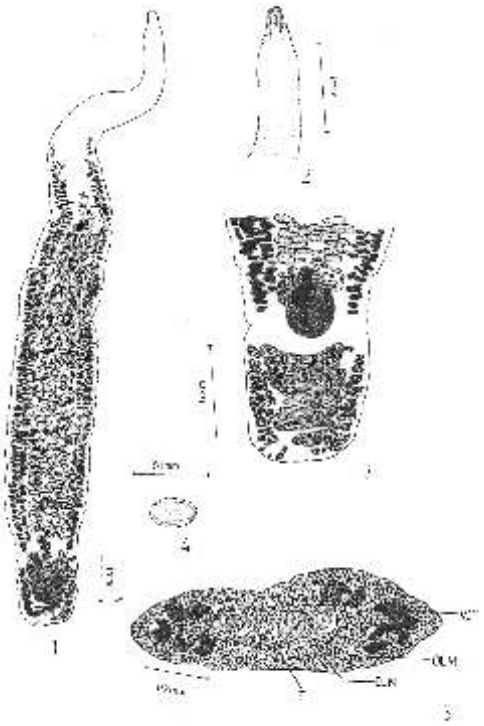
DESCRIPTION: (based on the measurements of 6 specimens and few series of histological sections; Figs. 25-32).

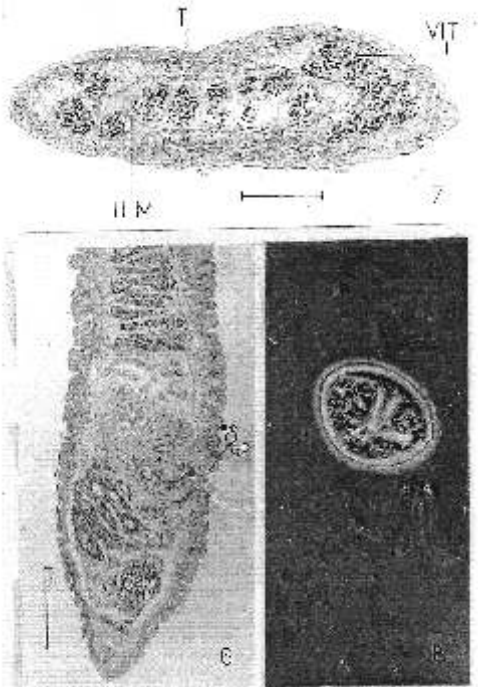
Body elongate, flat, with no trace of internal or external segmentation, tapering anteriorly, broader posteriorly; body proper divided into cortex and medulla by two layers of longitudinal muscles. Scolex undifferentiated, smooth, unarmed, base conical, bluntly tapering extremity followed by short neck. Testes numerous (235-340 in number), ovoid, larger than vitelline follicles, medullary in distribution, commencing little behind anterior vitellaria, extending till near ovarian lobes; cirrus sac prominent, occupying entire thickness of medulla, opening from and just in front of utero-vaginal pore; external seminal vesicle absent. Ovary bilobed, follicular, H-shaped, ovarian lobes joined to each other by ovarian, isthmus, cortical, extending beyond Mehlis' gland posteriorly; uterus glandular, extending from in front of isthmus anteriad beyond lateral horns of ovary, no uterine coils behind ovarian isthmus; vagina distinct, joining terminal end of uterus to open unitedly at utero-vaginal pore. Vitelline follicles ovoid or spherical, cortical in disposition, strewn in mid-field of testicular region, commencing from base of neck up to anterior horns of ovary. Excretory pore terminal. Eggs smooth, ovoid, operculate.

Host: *Heteropneustes fossilis* (Bloch)

Location: Intestine

Locality: Guwahati (Assam, 94° 16' E and 26°46' N, India), Sheila (Meghalaya, 91°38' E and 25°08' N, India)

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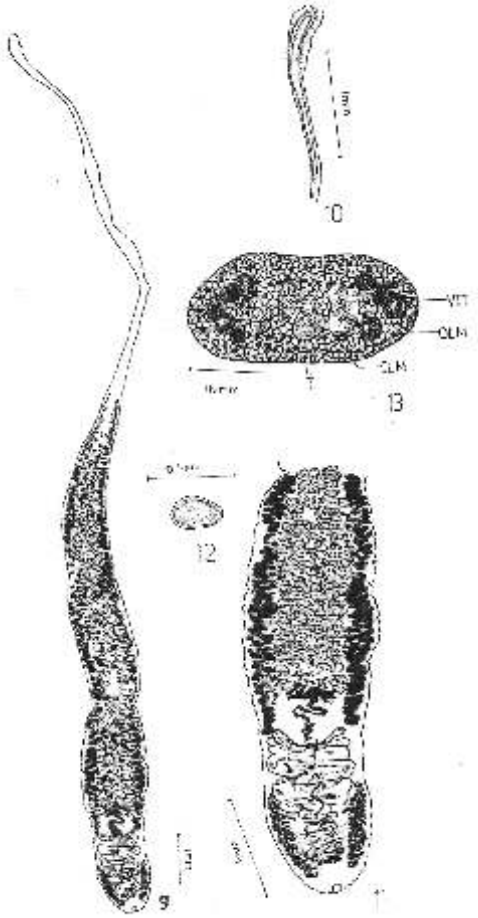

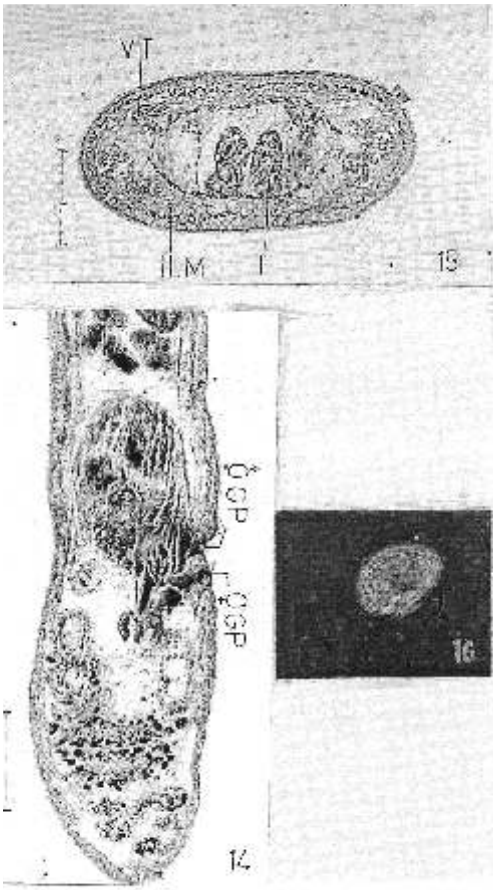
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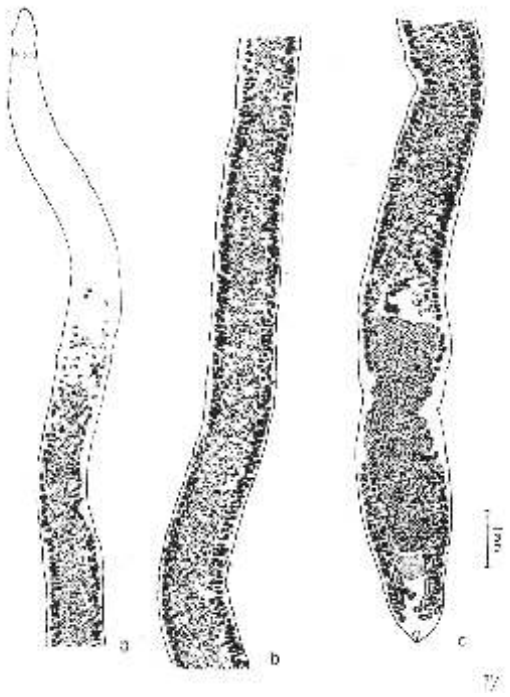
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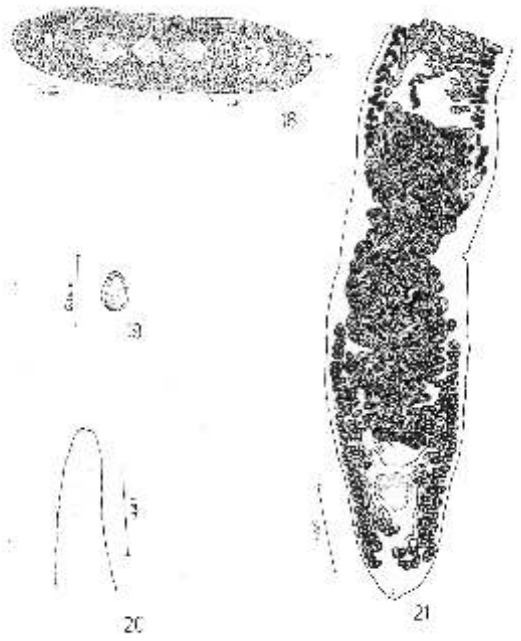
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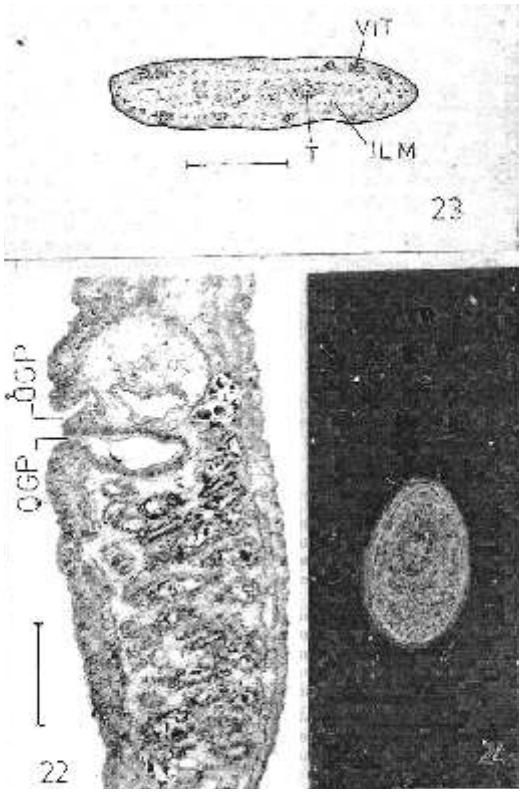
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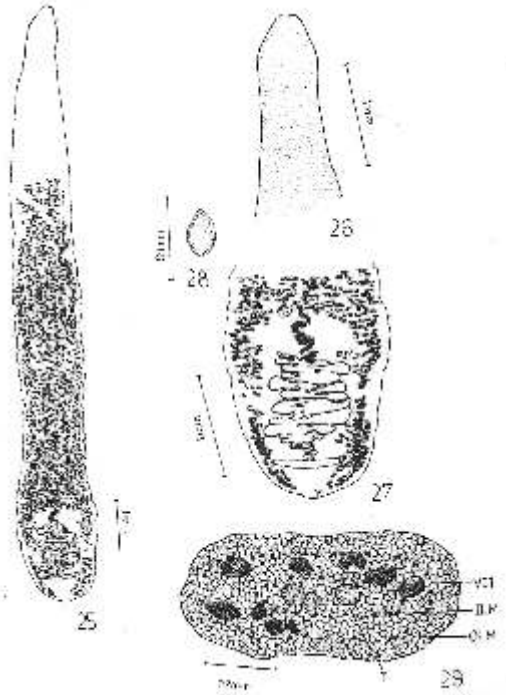
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Table I. Morphometric measurement (in mm or mentioned otherwise) and characters of four new species of *Lytocestus* (mean ± standard deviation)

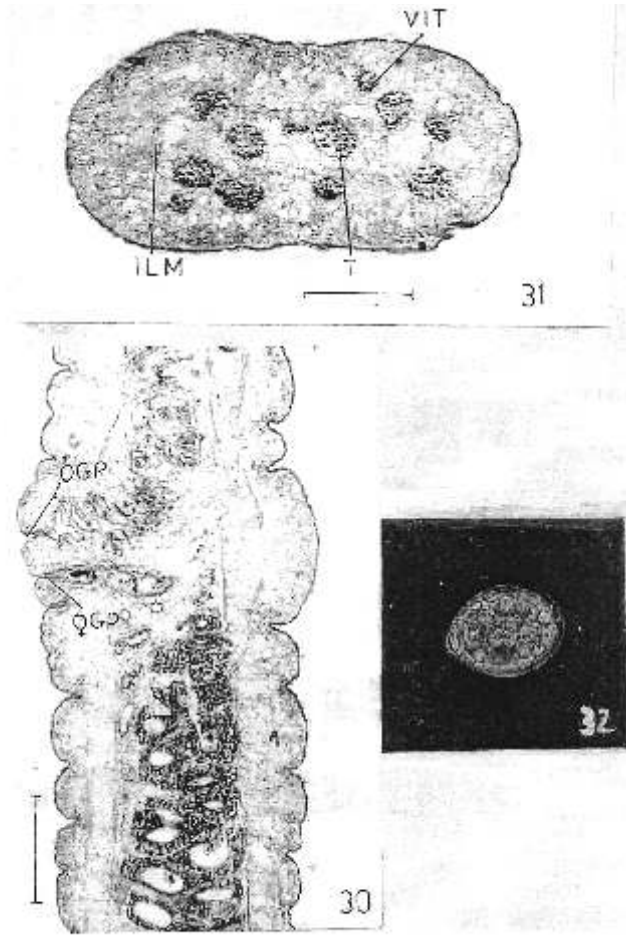
Characters	*Lytocestus clariae* n.sp.	*Lytocestus attenuatus* n.sp.	*Lytocestus assamensis* n.sp.	*Lytocestus heteropneustii* n.sp.
Length of the body	8.58-22.44 (12.9±4.12)	11.88-35.44 (19.31±0.45)	25.54-50.82 (35.24±8.97)	9.57-19.14 (14.35±3.52)
Maximum breadth of the body (at the level of cirrus sac)	0.66-2.31 (1.32±0.67)	0.66-1.18 (0.90±0.17)	1.32-4.62 (2.45±1.24)	1.06-1.45 (1.25±0.13)
Length of the neck	1.18-6.93 (2.44±1.34)	6.14-7.06 (6.6±0.08)	4.62-15.18 (10.47±3.60)	1.98-5.41 (3.69±1.49)
Testicular follicles : Length X Breadth	0.06=0.22 (0.15±0.05)x 0.04-0.11 (1.61±0.01)	0.08=0.18 (0.12±0.04)x 0.03-0.15 (0.08±0.03)	0.10-0.53 (0.19±0.20)x 0.06-0.15 (0.09±0.05)	0.11-0.19 (0.15±0.03)x 0.03-0.08 (0.05±0.02)
Ovary shape	H-shaped	Inverted-A shaped	Inverted-A shaped	H-shaped
Ovarian lobes : Length X Breadth	0.53-1.65 (0.99±0.34)x 0.46-1.32 (0.85±0.27)	0.53-1.52 (0.85±0.32)x 0.53-0.92 (0.70±0.93)	1.52-5.08 (2.80±1.09)x 0.79-2.62 (1.58±0.57)	0.99-3.10 (2.04±0.86)x 0.92-1.32 (1.12±0.14)
Vitelline follicles : Length X Breadth	0.05-0.18 (0.10±0.04)x 0.02-0.08 (0.05±0.05)	0.05-0.17 (0.08±0.04)x 0.03-0.15 (0.04±0.03)	0.06-0.14 (0.09±0.04)x 0.04-0.08 (0.05±0.03)	0.07-0.13 (0.10±0.02)x 0.03-0.08 (0.05±0.01)
Pretestes distance	1.38-6.93 (3.13±1.54)	6.79-21.05 (10.60±4.76)	5.28-16.50 (12.47±4.04)	1.98-6.27 (4.12±1.93)
Previtelline distance	1.18-6.93 (3.13±1.54)	6.14-13.00 (6.6±0.08)	4.62-15.18 (10.47±0.01)	1.85-5.41 (3.63±1.98)
Distance between anterior extent of testes and vitellaria	0.13-1.18 (0.52±0.37)	0.46-8.05 (1.85±2.78)	0.66-0.82 (0.74±0.01)	0.12-1.12 (0.62±0.43)
Position of the genital pore from the posterior extremity	0.85-2.11 (1.48±0.38)	0.79-1.52 (1.16±0.31)	1.98-5.20 (3.43±1.07)	1.52-4.16 (2.84±0.97)
Eggs	Spinous, Operculate 30-50 (40±0.01) x 20-30 (25±0.01) µm	Smooth, Operculate 40-60 (50±0.01) x 20-30 (24±0.01) µm	Smooth, Operculate 30-50 (40±0.01) x 20-30 (25±0.001) µm	Smooth, Operculate 30-40 (35±0.006) x 20-50 (35±0.009) µm

Table II. Morphometric measurement (in mm) and some characters of some known species of *Lytocestus* (after original descriptions)

Characters	*L. filiformis* (Woodland, 1923) Fuhrmann et Baer, 1925	*L. indicus* (Moghe, 1925) Woodland 1926	*L. birmanicus* Lynsdale, 1956	*L. parvulus* Furtado, 1963	*L. lativitellarium* Furtado et Tan 1973
Length of the body	7.5-24	15-29	10-12	3.6-5.7	25-31
Maximum breadth of the body (at the level of cirrus sac)	1-2	1.82-2.73	0.9	0.24-0.90	1.35-1.95
Length of the neck				0.75-2.10	9.9-10.6
Pretestes distance					0.6-0.8
Testicular follicles (Length x Breadth)		0.095-0.119x 0.002	0.15-0.18x 0.10-0.13	0.10-0.15x 0.05-0.10	0.105-0.325x 0.030-0.090
Cirrus sac				0.12-0.15	0.225-0.238
Ovary : shape		H-shaped	H-shaped	H-shaped	H-shaped
Ovarian lobes				0.3-0.45	0.094-0.138 x 0.044-0.067
Receptaculum seminis	Absent	Absent	Absent	Absent	Absent
Genital pores (and)	Separate	Separate	Separate	Separate	Separate
Genital atrium	Absent	Absent	Absent	Absent	Absent
Interpore distance	0.025	0.220-0.270	0.180	0.045	0.150
Previtelline distance			4.0		
Vitelline follicles (Length X Breadth)		0.077-0.088x 0.088-0.112	0.10-0.12x 0.04-0.06	-0.100x0.050	0.067-0.086 x 0.030-0.050
Distribution of vitelline follicles			Two lateral bands	5 rows encircling testes	concentrated laterally
Postovarian vitellaria	Absent	Absent	Absent	Absent	Absent
Eggs	0.062-0.070 x 0.029-0.033	0.080x0.040	0.050x0.030	0.026-0.033 x 0.023-0.045	0.019-0.023 x 0.030-0.033

Table II. Morphometric measurement (in mm) and some characters of some known species of *Lytocestus* (after original descriptions)

Characters	*L. longicollis* Rama Devi	*L. puylaerti* Khalil	*L. fossilis* Singh	*L. marcuseni* Troncy
Length of the body	10.8-20	3.06-4.12	16.0-20.5	8-11
Maximum beadth of the body (at the level of cirrus sac)	0.5-0.84	0.67-0.7	2.4-3.2	1.1
Length of the neck	5.36-7.6		1.6-1.9x0.86-1.2	
Pretestes distance		0.602-0.723		
Testicular follicles	0.10-0.16	0.058-0.14 x 0.105-0.195	0.16-0.22x0.35-0.44	0.480x0.375
Ovary : shape	H-shaped	H-shaped	H-shaped	
Ovarian lobes	0.46-0.78	0.046-0.058 x 0.035-0.039		
Receptaculum seminis	Present	Absent	Absent	Absent
Genital pores	Separate	Separate	Common	Separate
Genital atrium	Absent	Absent	Present	Absent
Interpore distance	0.05-0.08	Very short		0.065
Previtelline distance		0.602-0.723	3.5-4	2.5
Vitelline follicles	0.0339-0.07	0.58-0.116x 0.015-0.027	0.15-0.19x0.30x0.35	0.30-0.060x 0.010-0.020
Distribution of vitelline follicles		Annular		
Postovarian vitellaria	Absent	Absent	Present	Absent
Eggs	0.046-0.054 x 0.023-0.031	0.046-0.058 x 0.035-0.039	0.32-0.04 x 0.024-0.028	0.045-0.055 x 0.030-0.035



Deposition of specimens: Holotype (No. 295), 2 Paratypes (No. 296) and 1 slide of transverse sections (No. 297) in Helminthological collection of ERS, ZSI; other Paratypes and series of histological sections in the Department of Zoology, North-Eastern Hill University, Shillong.

Etymology: Named after the generic name of the host.

DISCUSSION

In having a somewhat stumpy and stout body, the present form differs from the slender and/or long-necked *L. filiformis, L. javanicus, L. lativitellarium, L. attentuatus* and *L. assamensis.* In lacking a holdfast distinct from the neck, the present form stands apart from *L. indicus* and *L. birmanicus.* In both *L. puylaerti* and *L. marcusenii* the vitellaria are arranged in an annular manner and not intermingling with the testicular follicles as in the present form. On comparison with *L. fossilis,* the only other species of the genus described from the same host, i.e., *H. fossilis,* the present form distinctly differs in the absence of postovarian yolk glands. Even if the genus *Lucknowia* is considered a valid genus and not a synonym of *Lytocestus,* the species *Lucknowia fossilis* Gupta, 1961 (described from the same host) also differs from the present form in the extension of vitellaria up to the postovarian region and posterior end.

In view of the above differences, the present form is regarded as a new species of the genus.

Specific Diagnosis: *Lytocestus heteropneustii* n. sp. Body elongate, short neck, undifferentiated scolex; H-shaped ovary, testes medullary, vitellaria strewn in mid-field of testicular zone; eggs oval, smooth-surfaced, operculate.

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