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A study of a new cestode Lytocestus laturensis n. sp. (Lytocestdae, Hunter 1927) from Clarias batrachus

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Abstract
Fifteen species of cestode parasite were collected from intestine of Clarias batracus, at Latur, Maharashtra. They were stained with Harris haematoxylin for anatomical studies. The mature specimens were 4.973 in length and 0.446 – 1.607 in weadth. Head spatulate, narrow, neck medium. Testes oval, 850-900, ovary bilobed. Uterus tubular.

Keywords: clarias batrachus, lytocestus laturensis, cestode parasite

1. Introduction
The genus Lytocestus was erected by Cohn, 1908 with its type species L. adhaerens found in Clarias fuscus in Hong-Kong. This genus was first confirmed by Woodland (1926) [28] who included four more species in addition to the type species. They are L. filiformis Woodland (1923) [29] in Mormyrus casehiv Egyptian Sudan, L. chalmersius Woodland (1924) [30], L. cunnington Fuhrmann and Beer (1925) and L. indicus Moghe (1925) [14] (syn. Caryophyllaeus indicus) from clarias batrachus in India. The same were recorded by Mehra (1930) from clarias magur and Ramadevi (1973) [17] from clarias batrachus in India. Hunter (1927) placed the genus in sub-family of his own, namely Lytocestinae and retained only three species i. e. L. adhaerens, L. filiformis and L. indicus. He put the species L. cunningtoni and L. chalmersius in the genus Monobothriodides
Subsequent workers Gupta (1961) [5], Murhar (1963) [16] have adhered to these changes. Wardle and Mcleod (1952) [27] followed Hunters classification, but raised the status of Lytocestinae from sub-family to a family. Wardle, Mcleod and Radinovsky (1974) [27] suggested a new system of classification of cestodes, who used the term cotyloda as a class and the order caryophillidea is kept in this class. Mackiewicz (1972) [13] included the species L. Javanicus Bavinen, 1926 Furtado, 1963 Lynsdale, 1956 [11] and L. parvulus Furtado, 1963 in this genus. Johari 1959 considerd L. alesteri syn. of L. barmanicus Lynsdale 1956 [11], but Mackiewicz, 1962 [13] after examination of original material L. alestesi Lynsdale, 1956 [11] concluded that it should be considered a synonym of L. filiformis Woodland (1923) [29], Ramadevi (1973) [17] described L. longicollis from clarias batrachus in India. Later on Shinde and Phad (1988) [20] added L. marathwadanesis from clarias batrachus in India. After that (Shinde *et.al*) added two species of this genus is L. alii and L. Clariasae. (Jadhav *et al* 1991) [7], clarias batracus L. naldrgensis (Kadam *et.al* 1998) from clarias batracus, L. Teranaensis was erected in 1999 by Kolpuke and Shinde from wallago attu. D.N.Patil and Jadhav 2002 [8] was added L. Govindae from clarias batrachus. After that 2002 Pawar and Shinde added L. brtrachusae from clarias batrachus later on 2004, L. Shindei was erected by Khadap *et.al* from clarias batrachus. Tandon *et al* 2005 [26] added from new species L. Clariae, L. Allenuates and L. Assamensis in clarias batrachus.

2. Material and Methods
The present species were collected from the intestine of fish clarias batrachus from Latur. The cestode were fixed in 4% formalin and stained with Harris haematoxyiln. The drawing are made with aid of camera lucida. All measurements in mm.

3. Description
Fifteen specimens, of the cestode parasites, were collected from the intestine of a fresh water fish, Clarias batrachus; at Latur, Dist. Latur M. S., India. The parasites were stained with Harris haematoxylin and prepared whole mount slides, for anatomical studies. The worm measure 4.973 in length and 0.446 -0.607 in width.
The head is spatulate, markedly narrower than the body, slightly broad at the base, narrow at the apex, with irregular lateral margins and measures 2.803 in length and 0.982 to 0.446 in breadth.
The neck is of medium length, wide, narrow anteriorly, broad posteriorly; with irregular lateral margins, constrictions on the outer side and measures 2.231 in length and 1.607 to 0.803 in breadth.
The gonads are situated in the posterior region of the worm. The worms are larger than broad, with straight or convex margins and posterior blunt end. The testes are many in number, small and medium in size, oval in shape, 850 to 900 in number, pre-ovarian, scattered in the medullary region of the worm, in the central medulla, unevenly distributed, in 4-7 rows, from the base of neck to the gonads, not distributed in the posterior 1/3rd region of the worm and measures 0.041 to 0.089 in length and 0.107 to 0.125 in breadth.
The cirrus pouch is large in size, oval in shape, anterio-posteriorly situated, either to the left or to the right of the

middle line of the worm, opens through a genital pore; situated towards the posterior end of the worm, extends tapering towards the anterior end of it, curved and measures 0.893 in length and 0.338 to 0.178 in breadth.

The cirrus is thin, curved, slightly coiled tube, contained within the cirrus pouch and measures 0.767 in length and 0.053 in breadth. The vas deferens is short, thin, slightly curved, coiled and measures 0.535 in length, and 0.035 in breadth

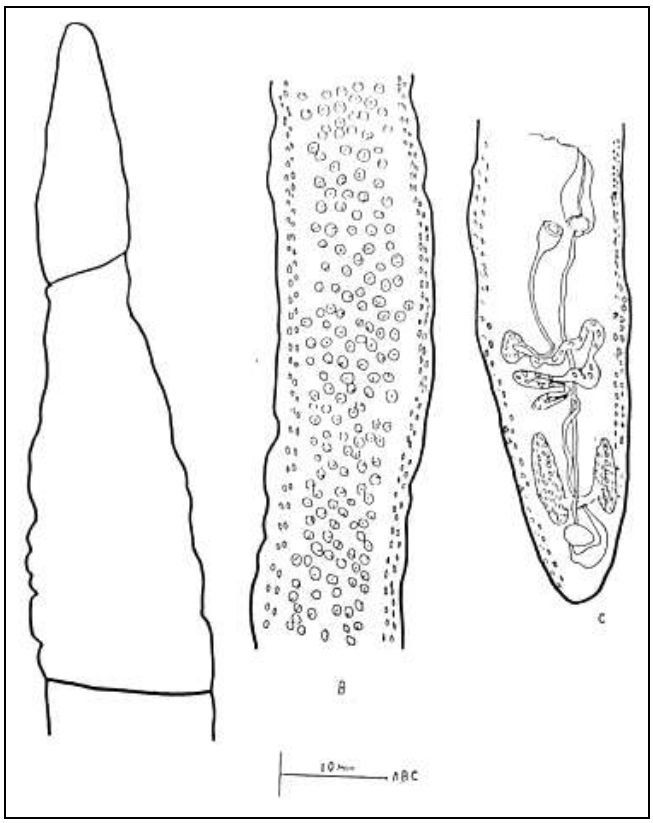

Fig 1: A – Anterior Region, B – Middle Region, C – Posterior Region

The ovary is bi-lobed, butterfly shaped in appearance, medium in size, almost ‘ H’ shaped in appearance, lobes anterio-posteriorly elongated, with irregular margin, near the posterior end of the worm, lobes almost oval, extending laterally up to the vitellaria and sub corticular region and measures 0.446 in length and 0.893 in breadth. The ovarian lobes are medium in size, spindle shaped in appearance, broader in middle, tapering at both the ends, uneven in size, poral lobe short and narrow; whereas aporal lobe long and wide. The isthmus is a short, bag pipe shaped, a wide tube, connecting the ovarian lobes, at 1/3rd from the posterior end of the lobes, curved anteriorly and measures 0.357 in length and 0.089 in breadth. The vagina is a thin tube, starts from the genital pore, runs medially and posteriorly, slightly curved, reaches and opens in to the ootype and measures 0.357 in length and 0.213 in breadth. The ootype is large in size, oval in shape, transversely elongated, obliquely placed, postovarian and measures 0.357 in length and 0.213 in breadth.

The vitelline follicles are small in size, oval in shape, anterio-posteriorly elongated, placed in the subcorticular region of the worm, in 1-2 rows on each lateral side and measures 0.053 to 0.071 in length and 0.035 to 0.053 in breadth.

The uterus is tubular, arises from the ootype, takes one or two turns, extends anteriorly, crosses the isthmus, extends anterior to the ovary, in the central medulla, takes right and left turns, enlarges and forms a convoluted tube, which is wide, loop shaped in appearance, transversely extending up to the subcorticular region of the worm, forms 4-5 folds, then becomes narrow, a thin tube, extends anteriorly, up to the genital pore region, opens on the right side of it, in the center of the worm, the thin uterine tube enlarges and then opens to the outside by an uterine pore and measures 30916 in length and 0.089 in breadth.

The uterine pore is large in size, oval in shape, double walled, obliquely placed in the middle region.

4. Result and Discussion

The worm under discussion, is having head spatulate, narrow than body, slightly broad at the base, narrow at the apex, posteriorly blunt and measures 2.803 in length and 0.982-0.446 in breadth. The neck is medium in length, wide, narrow anteriorly, broad posteriorly, constrictions on the lateral side and measure 2.231 in length and 1.607-0.803 in breadth. The gonads are in posterior region of the worm, testes 850-900, small, medium, oval, pre-ovarian, scattered in the medullary region of the worm, unevenly distributed, in 4-7 rows, from base of neck to the gonads, not distributed in posterior 1/3rd region and measure 0.071-0.089 in length and 0.107-0.125 in breadth. The vas deferens is short, thin, slightly curved, coiled and measures 0.535in length and 0.035 in breadth; cirrus pouch large, oval, anterio-posteriorly situated, on left or right side, opens through the genital pore, tapering at anterior end, curved; cirrus thin, curved, slightly coiled, within the cirrus pouch; ovary bi-lobed, butterfly shaped, medium, H shaped, lobes anterio-posteriorly elongated, with irregular margin, posterior end of worm, oval, lateral up to vitellaria, lobes spindle shaped, broader in middle, tapering at both the ends, uneven in size, poral lobe short, aporal lobe long; isthmus short, bag- pipe like wide, connecting lobes at 1/3rd from posterior end, measures 0.357 in length and 0.089 in breadth. Vagina thin, start from genital pore, open into ootype; ootype large, oval, anterio-posteriorly elongated, 1-2 rows on each lateral side; uterus tubular, 1-2 turns, wide, loop shaped, with 4-5 folds, narrow open by uterine pore oval, large, double walled, in middle of the worm.

After going through literature, the worm under discussion, in having testes 850 – 900 (numerous) comes closer to L. filiformis, L. indicus and L. paithanensis.

1. The present worm, differs from L. filiformis which is having testes numerous, large, round, in central medulla; cirrus pouch small, bent, between concavity of ovarian lobes; each lobe containing 6-11, separate, large follicles, connected by big spindle shaped isthmus; vagina short, wide, thick; uterus convoluted, pre-ovarian, tubular, with small and large convolutions, open by uterine pore; vitellaria numerous, follicular, large, rounded, all around the testicular zone and medullary parenchyma.
2. The present cestode, differs from L. indicus which is having 27.0-40.0 length, 0.3-0.5 width; testes 230-270, round, extending up to cirrus sac and extend lateral to cirrus sac; vas deferens followed by ductus ejaculatorious, ovary with numerous follicles, connected by big pipe shaped isthmus, ootype rounded;

uterus thick, coiled and vitellaria pre-ovarian, small, corticular, rounded, in 2-3 rows, on each lateral side.

3. The present worm, differs from L. alestesi which is having the length 10.5mm, neck is absent, testes more or less spherical 0.050-0.070 x 0.040-0.060, cirrus pouch oval in shape, medullary region, ovary biolobed to the posterior region of the body, uterus short, lie in loose follicles, vitellaria extend from short distance behind the most anterior testes, up to the anterior tips of the ovary.
4. The present worm differs from L. Birmanicus in having length of worm 10-12 and width 0.9, testes extend up to genital pore, wing like ovary with many follicles, uterus anterior loop reaching the space between the genital opening.
5. The present worm differs from L. longicollis which is having 10.8-20.2 in length and 0.50-0.84 in width, long neck 5.3 to 5.6, testes 105-140, spherical, broad cirrus pouch, convoluted vas deference, ovary 'H' corticular, around testes.
6. The present worm differs from L. marathwadensis which is having head slumpy, testes ovean, arranged in 2 or 3 rows in central medulla, ovary 'H' shaped, vitellaria small and oval, single row on latral side.
7. The present worm differs from L. alii in having head bluntly rounded, testes 460 – 480, cirrius pouch small, oval uterus, convoluted tube, vitellaria small, follicular, corticular 5-6 rows on each side.
8. The present worm differs from L. naldurgensis in having head long, blunt, testes 500-600 in numbers, scattered in medullary region, cirus pouch small oval obliquely placed, uterus wild, vitellaris small, follicular in 3-4 rows on each side.
9. The cestode differs from L. teranaesis in having head long, blunt, conical, testes 1200-1500 in numbers, ovary bilobed, tramgular lobes, uterus coiled loop shaped, vitellaria smaller in 4-5 rows.
10. The present cestode differs from L. nagapurensis in having head spatulate, blunted rounded, testes 1100-1150 in numbers, scattred all over segment axcept head and neck region. Ovary bilobed with many oval follicles.
11. The present cestode differs from L. assamensis in having head unarmed, undifferentiated, testes 266-565 in numbers, large, ovary bilobed, bent inwards in shape of inverted a, vagina distinct, uterus glandular, and vitelline follicles cortical.
12. The present cestode differs from L. kopardaensis in having head long, testes 1650 in numbers, ovary bilobed with irregular margin.
13. L. govindae in having head long, marked off from body, testes 1425-1475 in numbers, pre- ovarian, evenly distributed, cirus pouch small, oval obliquely placed, uterus wide convoluted.
14. The present cestode differs from L. Murhari in having head blunty, eleptical, elongated, testes 600-650, ovary bilobed, triangular lobe, uterus wide.
15. The present worm differs from L. gariephinusae in having head short, elongated, cirrus pouch small, oval, flask shaped and uterus large and irregular.
16. The present worm differs from L. Khami in having long elongated worm, head long, testes 1350-1400 in numbers scattered in central medulla, cirrus pouch small, elongated, ovary butterfly shaped, vitellara granular 2-3 rows on lateral margin in posterior half of the body.
17. The present worm differs from L. Vyasaei in having head large conical, testes 1022-1088 in numbers, cirrus pouch large, cylindrical, ovary butterfly shaped, uterus wide, coiled vitellaria rounded, follicular, 2-3 rows.

5. Conclusion

These distinct characters are enough to erect a new species for these worms and hence the name Lytocystus laturensis n. sp. proposed on locality.

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