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On the validity of *Lytocestus heteropneustii* (Cestoda) Tandon, Chakravarty & Das 2005- a critical review

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Abstract : *Lytocestus heteropneustii* a new species of Caryophyllaeid Cestode recovered from the intestine of *Heteropneustes fossilis* at Assam/ Meghalaya was described by Tandon *et al.* (2005)¹ and kept under the family Lytocestidae Wardle and McLeod (1952)². In 2011 Ash *et al.* synonymised it with *Lucknowia fossilisi* (Gupta, 1961)³ without giving any argument (ref. page 900 *J.Parasitol* 97(5)) which is unwarranted and leads to confusion. The authors have candidly assessed the morphological characters of the species referred above by giving a comparative chart and have provided sufficient points in favour of the validity of *Lytocestus heteropneustii* and negated the synonymy proposed by Ash *et al.* (2011)⁴.

Keywords : *Lytocestus heteropneustii*, *Lucknowia fossilisi*, synonymy, revalidation

INTRODUCTION

Lucknowia fossilisi Gupta (1961)³ is a monozoic cestode recovered from the intestine of *Heteropneustes fossilis* at Guwahati (Assam). This species belongs to the family Lytocestidae (Caryophyllidea) Wardle and McLeod (1952)².

Mackiewicz (1981 b)⁵ had doubts about the existence of post ovarian vitelline follicles and polar filaments of egg in *Lucknowia fossilisi*. Polar filaments was absent in *Lucknowia indica* Niyogi, Gupta and Agarwal(1982)⁶. Agarwal (1985)⁷ however, held *Lucknowia fossilisi* valid saying there in that the presence of post ovarian vitelline follicles is characteristic of *Lucknowia*. Unfortunately, Hafeezullah (1993)⁸ transferred *Lucknowia fossilisi* in the

genus *Lytocestus* Cohn (1908)⁹ along with other species like *Capingentoides moghei* Pandey (1973)¹⁰. *Lytocestoides fossilisi* Kanth *et al.* (1984)¹¹ and *Capingentoides gorakhnathi* Agarwal and Singh (1985)¹² saying therein that the ovary is H shaped according to Mackiewicz (1981b)⁵ and not band shaped whose lateral arms are strongly follicular and anteriorly extends upto posterior level of vitellaria and posteriorly reach near posterior end of body. *Lucknowia fossilisi* was held valid by Sadaf *et al.* (2011)¹³. Transference of genus and species *Lucknowia fossilisi* Gupta (1961)³ to the genus *Lytocestus* was negated by Ash *et al.* (2011)⁴ and Ash (2012)¹⁴. However Ash (2011)⁴ considered *Lytocestus heteropneustii* Tandon, Chakravarty and Das (2005)¹ synonym of *L. fossilisi*.

The main purpose of the present author is to candidly assess the above synonymy.

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MATERIALS & METHODS

The original research papers have been consulted and few slides observed.

OBSERVATION & DISCUSSION

There are remarkable differences between *Lytocestus heteropneustii* Tandon *et al.* (2005)¹ and *Lucknowia fossilisi* Gupta (1961)³. These are as follows:

I. Ovary: Ovary in *L. heteropneustii* is bilobed, follicular H shaped. Ovarian lobes are joined to each other by ovarian isthmus, cortical, extending beyond Mehlis' gland complex posteriorly whereas in *Lucknowia fossilisi* ovary is transversely elongated band shaped, extends laterally on vitelline glands on both right and left side of body, transverse isthmus is present.

II. Testicular follicles: In *L. heteropneustii* the number of testicular follicles is 235-340, ovoid larger than vitelline follicles, medullary, commence a little behind anterior vitellaria extending upto near ovarian lobes. Whereas in *L. fossilisi* though number has not been given but testicular follicles are numerous, round or broadly oval medial bounded in lateral sides by vitelline follicles extending from little behind anterior vitelline follicles upto caudal region of vesicula seminalis (vesicula seminalis externa absent but vesicula seminalis interna is highly convoluted structure and fills almost entire space of cirrus sac).

III. Genital apertures: In *L. heteropneustii* uterus is glandular extending from in front of isthmus anteriorly beyond the lateral horns of ovary, **no uterine coils behind ovarian isthmus**, vagina distinct and joins terminal end of uterus to open unitedly at utero-vaginal pore. The cirrus sac is prominent, occupy entire thickness of medulla opening in front of utero-vaginal pore in worms measuring 9.57-19.14, the genital pore from

posterior end is at 1.52-4.16 (2.84±0.97) (bignonoporate). Where as in *Lucknowia fossilisi* utero vaginal pore is below cirrus sac and the aperture are situated in the beginning of last 6th-7th of body length. Length difference between two species do exists (*L. heteropneustii* is 9.57-19.14 whereas *Lucknowia fossilisi* is 5.8-6.78. (This may be on account of nutrition)

IV. Vitellarial follicles: there are differences in the shapes of follicles. The major difference is in extension. In *Lytocestus heteropneustii* vitelline follicles are ovoid to spherical, cortical, strewn in mid field of testicular region, commencing from base of neck upto anterior horns of ovary whereas in *Lucknowia fossilisi* vitellarial follicles are somewhat irregular circular or oval, mostly lateral in positions commencing at leaving a distance of 1.04-1.91 from anterior extremity in worms measuring 5.8-6.78 mm upto excretory bladder.

In both species commencement of vitellarial follicles is more or less same in the anterior region but extension posteriorly differs in *Lytocestus heteropneustii*; (**restricted upto ovary**) **but goes upto excretory bladder in Lucknowia fossilisi (more extensive)**. It is to be noted that small vitelline ducts interconnected the vitelline follicles, finally form two large duct which opens into a transverse duct (vitelline reservoir), a vitelloduct connects the vitelline gland system with oviduct.

Extensive vitellarial follicles in *L. fossilisi* possibly may be providing more of shell precursors in the form of phenolic compounds in vitelline follicles in presence of phenol oxidase and get tanned to form sclerotin of eggshell. More eggs are found in *L. fossilisi* compared to *Lytocestus heteropneustii*.

On the above grounds, two species are separate and *Lytocestus heteropneustii* is a valid species not a synonym of *L.fossilisi*.

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Comparative Chart

| PARAMETERS | <i>Lytocestus heteropneustii</i> Tandon, Chakravarty & Das , 2005 ¹ | <i>Lucknowia fossilisi</i> Gupta, 1961 ³ |
|----------------------|---|--|
| Body | Elongate, flat tapers anteriorly | 2 lateral main channels, elongated, flat |
| Length/breadth | 9.57-19.14x1.06-1.15(at the level of CS) | 5.8-6.78x1.13-1.3 wide at anterior region of CS |
| Scolex | Undifferentiated, smooth unarmed, base conical | Head stumpy, bluntly rounded and narrow than body.0.348-0.59x0.21-0.48 |
| Neck | Short neck,1.98-5.41 | Neck like constriction,0.522-1.218x0.365-0.73 |
| Testicular follicles | 235-340 ovoid larger than vitelline follicles medullary commence a little behind anterior vitellaria extend till ovarian lobes , 0.11-0.19x0.03-0.08 | 0.13-0.18x0.07-0.13. round or broadly oval, medullary, bound laterally by vitelline follicles upto caudal region of vesicula seminalis |
| Cirrus sac | Prominent, occupy entire thickness of medulla, open in front of U.V pore | Large ovoid medially placed . 0.34-0.43x0.27-0.31 |
| Ext. Sem. Ves. | Absent | Absent |
| Ovary | Bilobed, follicular H shaped, lobes joined by isthmus, cortical extend behind M.G complex. Ovary lobes 0.99-3.10x0.03-0.08 | Transversely elongated band shaped extends laterally on the vitellaria. Isthmus- 0.34-0.38x0.087-0.11(ovarian follicles 0.2-0.25x0.15-0.17) |
| Uterus | Glandular, extend from isthmus anteriorly beyond lateral horns of ovary, no coil behind isthmus | Arise from posterior end of ootype compactly coiled posterior to isthmus runs upto excretory bladder, never extend beyond CS, wall of glandular, opening uterus on the left side of vaginal opening in G.A |
| Vagina | Distinct, joins uterus distally to open at U.V pore | Present, joins uterus and forms U.V canal opens close to male pore, is a straight tube, get convoluted, extends from vaginal pore to anterior of ovary, turns left and open at ootype |
| Vitellaria | Ovoid, spherical cortical strewn in mid field of testicular region , from base of neck upto anterior horns of ovary(0.07-0.13x0.03-0.08 (follicles) | Irregular, circular or oval, lateral in position extends upto excretory bladder smaller than testes,0.06-0.14x0.05-0.1 |
| POV | Not mentioned | Present |
| Rec. Sem | Not mentioned | absent |
| Eggs | Ovoid/smooth operculate 30-40x20-50 µm | Oval,thick shelled 0.017-0.018x0.01-0.011 with polar filament |
| Host | <i>H.fossilis</i> Bloch | <i>H.fossilis</i> |
| Location/Locality | Intestine, Guwahati | Intestine, River Gomti, Lucknow |

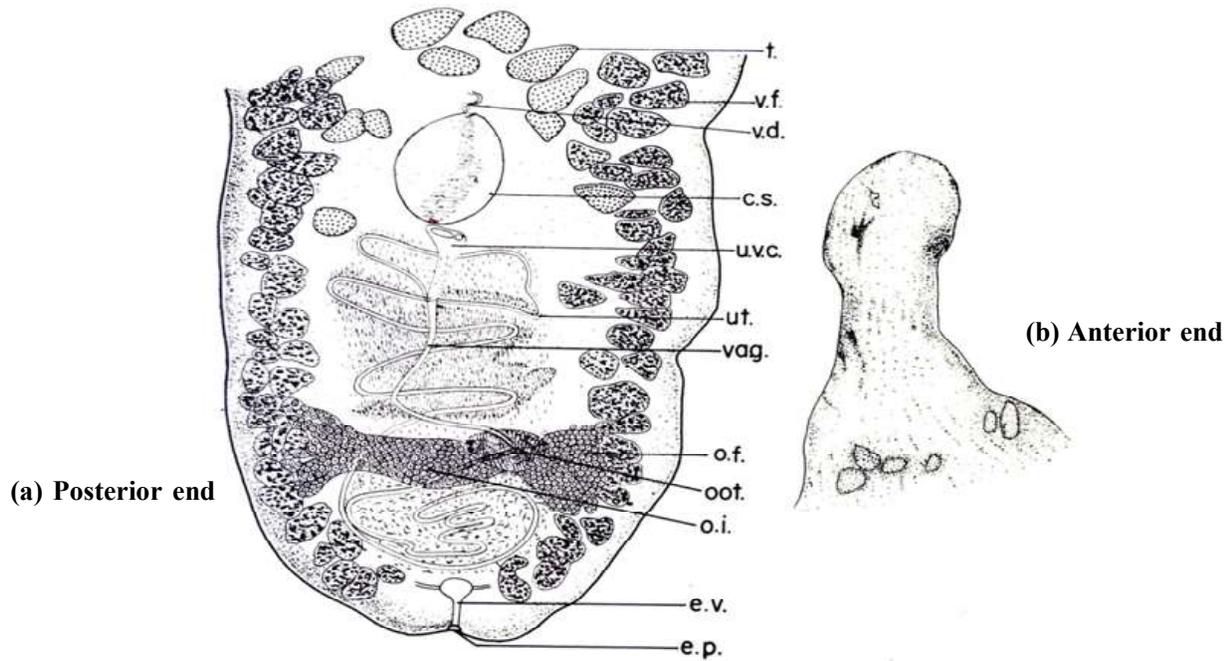


Fig.1- *L.fossilisi* Gupta (1961)³.

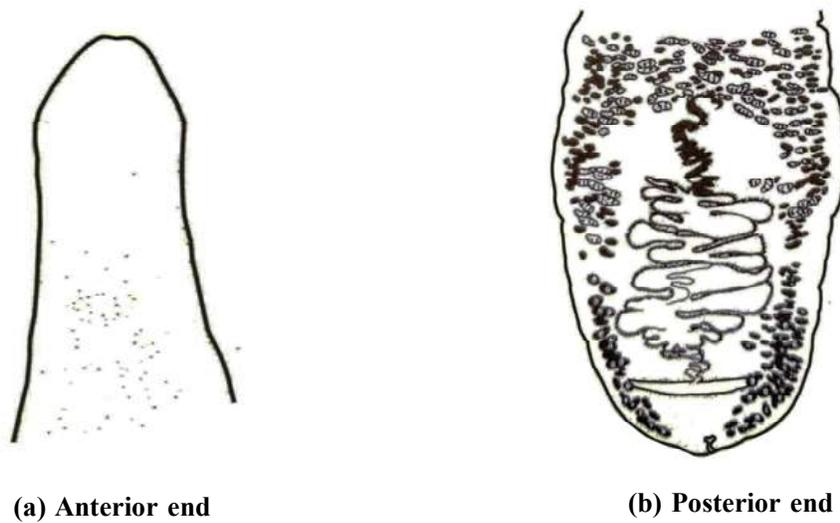


Fig.2- *L.heteropneustii* Tandon *et al.* (2005)¹.

(From research paper of respective authors)

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