



ISSN : 0973-7057

On the transference of *Pseudocaryophyllaeus elongata* Zenith & Gambhir, 2014¹ to the genus *Lytocestus* Cohn, 1908² under *Lytocestidae* Wardle and McLeod, 1952³ and a discussion on the status of *Pseudocaryophyllaeus clariae* Dan and Sahay, 2001⁴

Hem Srivastava^a, Umapati Sahay^a & Poonam^c

^{a*} Department of Zoology, R.U. Ranchi, Jharkhand, India

^bDepartment of Zoology, Vinoba Bhawe University, Hazaribagh, Jharkhand, India.

Received 12th January, 2014; Revised 15th February, 2014

Abstract : The genus *Pseudocaryophyllaeus* was established by Gupta, 1961⁵ with type species *P.indica* recovered from *Clarias batrachus* (Linn.) from Gauhati Assam, Since then following species have been added to the genus: *P.mackiewicz* Gupta & Parmar (1984)⁶; *P.pritai* Gupta & Singh (1984)⁷; *P.lucknowensis* Gupta & Sinha (1984)⁸; *P.clariae* Dan and Sahay (2001)⁴ and *P.elongata* Zenith and Gambhir (2014).¹ The last one appeared in *Journal of Experimental Zoology*, **17**: 141 – 144, 2014. The last species though described under the family *Capingentidae* Wardle & McLeod (1952)³; (Cestoda Carus, 1963⁹: Caryopyllidea van Beneden (in Carus, 1863⁹) suffers from a number of lacunae. One of the most important lacuna is that in the cestode under reference does not show vitellaria in cortical as well as medullary region (a character of family *Capingentidae*) rather vitellaria are entirely cortical as evined by camera lucida drawing & photomicrograph. The authors have reason to transfer therefore, the cestoda to the genus *Lytocestus* Cohn (1908).²

The authors have also gone into the details of *Pseudocaryophyllaeus clariae* Dan & Sahay (2001)⁴ published in *Trans.Zool.Soc.East.India*, **5(1)**: 39 – 54; 2001 and have pointed out the errors committed by the authors of the paper as regards 2nd set of vitellarial follicles which on examination of slides are follicles of ovary. Though they have retained the cestode under the family *Capingentidae* yet have suggested modification of the errors inadvertently committed.

Keywords: *Pseudocaryophyllaeus (indica, clariae)*, Transference, *Capingentidae*, *Lytocestidae*.

INTRODUCTION

A new species of a cestode known as *Pseudocaryophyllaeus elongata* has been described by Zenith Ng. and R.K.Gambhir from Manipur which is said to harbour *Clarias magur* (vide *J.Exp.Zool.India*. **17(1)**: 141 – 144, 2014. Its placement has been discussed.

MATERIALS AND METHODS

Original literatures have been consulted & few slides examined .

OBSERVATIONS AND DISCUSSION

It appears that the placement of *P.elongata* in the genus *Pseudocaryophyllaeus* Gupta (1961)⁵ seems to be wrong as –

Camera lucida drawing of the said species on page 142 indicates that vitellaria are situated in the cortical area where as in text, the authors claim that vitellaria are medullary in position (vide text). In case vitellaria are medullary the questions of mentioning “right vitellarial extension being 0.41 – 0.42 mm & left vitellarial extension 0.45 – 0.47 from posterior extremity” would not have been mentioned by the authors. The point mentioned in “ ” inverted comma above by the authors is indicative of that vitellaria are cortical in position which gets support from photomicrographs on page 143. This is also against the generic characters as laid by Gupta (1961)⁵.

*Correspondent author :

Phone :09934157570

E-mail : sahayumapati@gmail.com

Characters	Characters for <i>Pseudocaryophyllaeus</i> Gupta (1961) ⁵	Characters what has been mentioned for <i>P.elongata</i> Zenith et Gambhir (2014) ¹
1. Scolex	Scolex smooth, oval truncated anteriorly & marked off from rest of body	- Oval, truncated anteriorly & marked off from rest of body
2. Neck	Narrow	Long, & slender
3. Cirrus sac & uterovaginal canal	Open separately at the beginning of posterior ninth of body length- (lie far away from commissure)	Not mentioned
4. Uterine & vaginal pores	Common	Closed to commissure
5. Ovarian follicles	Cortical	Cortical (vide fig. –E-page 142 [J.Exp.Zool.India.17(1)])
6. Ovarian isthmus	Medullary	Faintly present. 0.03 – 0.06 x 0.11 – 0.13
7. Uterine coils	Never extend anterior to CS	Never extend anterior to CS but coils descend post to commissure (vide fig. E page 142, J.Exp.Zool. India)
8. Uterine glands	Present	Not mentioned
9. Receptaculum seminis	Absent	Absent
10. Vitelline glands	Partly cortical & partly medullary	Medullary in position Rt. Vit. Ext. 0.41 – 0.42. Lt. vit extension 0.45 – 0.47
11. Post ovarian median vitelline glands	Absent	---
12. Testicular follicles	Medullary extend from a little anterior to post region of neck up to a little anterior to cirrus sac.	Medullary, extend up to cirrus sac.

According to Mackiewicz (1972)¹⁰ the genus *Pseudocaryophyllaeus* Gupta (1961)⁵ belongs to the family *Capingentidae* Wardle & McLeod (1952)³.

Zenith and Gambhir (2014)¹ kept *Pseudocaryophyllaeus* elongata (?) under the family *Capingentidae*, Wardle & McLeod (1952)³ but did not provide section to substantiate the claim as the worm should have shown vitellaria partly cortical & partially medullary (point 10 of the comparative charge above. Both camera lucida drawing and photomicrographs shows cortical vitellaria thus *P.elongata* is transferred to the genus *Lytocestus*.

Hafeezullah (1993)¹¹ too accepts the genus *Pseudocaryophyllaeus* (vide his key to the Indian genera of *Caryophyllaeidae* [occasional paper 157, Z.S.I. page 25] which is as under.

Scolex broad, poorly defined, unspecialized, not marked off from rest of body; neck absent, testes few, arranged in two parallel rows; uterine coils extending anterior to cirrus sac, post ovarian vitelline follicles present.

———— *Paracaryophyllaeus* Kulakovskaya (1961).¹²

Scolex oval, well defined, unspecialized, distinctly marked off from body; neck present, long narrow, testes numerous strewn in medulla anterior to cirrus sac, uterine coils not extending anterior to cirrus sac, post ovarian vitelline follicles absent.

-----*Pseudocaryophyllaeus* Gupta (1961).⁵

But unfortunately Hafeezullah (1993)¹¹ forgot to see the paper of Mackiewicz (1972)¹⁰ & kept the genus *Pseudocaryophyllaeus* under *Caryophyllaeidae* Leuckart, (1878).^{13a,b}

Mackiewicz & Blair (1978)¹⁴ provided a key (as under) to the families of *Caryophyllidae* in which *Capingentidae* has been held valid (where vitellaria are partially cortical partly medullary).

1. Testes and vitellaria in cortical parenchyma, neither testes nor vitellaria internal to inner longitudinal muscles.

----- *Balanotaeniidae* Mackiewicz & Blair (1978).¹⁴

Testes and vitellaria in separate planes, testes, vitellaria

Srivastava *et al.* : On the transference of *P. elongata* Zenith & Gambhir, 2014 to the genus *Lytocestus* Cohn, 1908 under *Lytocestidae* Wardle and McLeod, 1952 and a discussion on the status of *P. clariae* Dan and Sahay, 2001

or both internal to inner longitudinal muscles. ——— 2

2. Vitellaria completely in cortical parenchyma, inner longitudinal muscles separate medullary testes from cortical vitellaria — *Lytocestidae* Hunter (1927)^{15ab}

Vitellaria either completely in medullary parenchyma or partially in medullary & cortical parenchyma . ----- 3

Vitellaria and testes in medullary parenchyma, inner longitudinal muscles external to vitellaria.

———— *Caryophyllaeidae* Leuckart (1878).^{13a,b}

Vitellaria partially in medullary and cortical parenchyma, inner longitudinal muscles between adjacent vitelline follicles. ——— *Capingentidae* Hunter (1930)^{15ab}

CONCLUSION

The cestode *Pseudocaryophyllaeus elongata* Zenith & Gambhir (2014)¹ does not belong to the family *Capingentidae* (vide key above) rather under the family *Lytocestidae* Hunter, 1927.^{15ab}

It is to be noted here that Mackiewicz (1981b)¹⁶ considered *Pseudocaryophyllaeus indica* Gupta (1961) conspecific with *Capingentoides batrachii*.

Agarwal (1985)¹⁷ studied the sections of *P.indica* & found that vitellaria are entirely cortical in the said cestode and hence considered *P.indica* valid under *Lytocestidae*. In Gupta's (1961)⁵ paper published in *Hel.Soc.Washington* **26(1)**, 38 – 50, section of *Pseudocaryophyllaeus indica* has been provided in which vitellaria is said to be partly cortical & partly medullary & hence Dan and Sahay (2001)⁴ considered it valid under *Capingentidae* supporting Mackiewicz (1972)¹⁰. Dan and Sahay (2001)⁴ statistically determined following characters to be conservative (non variable) while describing *Pseudocaryophyllaeus clariae* a new species.

1. Breadth of large vitelline follicle (2) length versus extent of 1st set of vitelline follicles rt. Side (3) Length versus extent of 2nd set of vitelline follicles (lt.side) (4) uterine extension (5) breadth of neck (6) Length versus extent of uterine length (7) length versus large vitelline follicle (rt.side) (8) Female gonopore from posterior end. (9) Length & breadth of eggs (10) Distance of male gonopore from posterior end.

Singh, Sahay and Prasad (2007)¹⁸ while providing a key to the genera of *Capingentidae* kept *Pseudocaryophylleus* under the family *Capingentidae* and

advocated that *Pseudocaryophyllaeus indica* a valid species where cirrus sac opening does not lie in utero-vaginal canal (i.e. male & female gonopore are separate), post ovarian vitelline glands are absent & scolex is without loculii & hold fast is marked off from rest of the body, ovary is band shaped ; cirrus sac and uterovaginal pore are at the beginning of posterior 9th of body & receptaculum seminis is absent.

Hafeezullah (1993)¹¹ however, considered *Pseudocaryophyllaeus* Gupta (1961)⁵ to be synonym of *Capingentoides* yet advocates that “till fresh information on muscle – vitellaria relationship becomes available in *P.indica* Gupta (1961)⁵ it is tentatively kept in the family *Caryophyllaeidae*” whereas the present authors have kept *P.indica* under *Capingentidae* because in this cestode vitellaria are partly cortical & partly medullary (vide fig. 12 page 45 *Hel.Soc.Wash.* **28:1**, 1961).

Dan and Sahay (2001)⁴ described *Pseudocaryophyllaeus clariae* recovered from *Clarias batrachus* at Ranchi. They claimed this worm to be new to the science but they too committed certain mistakes while describing it. These are –

1. They described two sets of vitellarial follicles : 1st set [viz. Rt. Side vitellarial extension 10.873 – 13.5622 (12.2134 mean); Lt. side vitellarial extension 10.3418 – 14.5084 (13.1264 mean)]. 2nd set [Rt. Side extension 0.8632 – 0.996 (0.913 mean) Lt. side extension 0.747 – 0.9628 (0.8466 mean)]

They inadvertently described 2nd set to be vitellaria present. On reexamination of the slide the second set of follicles are of ovary joined by isthmus. However the placement of the worm under *Pseudocaryophyllaeus* is justified as the cestode show vitellaria cortical as well as medullary, there being no post ovarian vitellaria.

The measurements of the following parameters of *Pseudocaryophyllaeus clariae* fall in the measuremental range of *Pseudocaryophyllaeus indica* Gupta (1961)⁵

i. Length & breadth 13.75 – 24.79 in *P.indica* but 20.1524 – 24.07 in *P.clariae*.

ii. Distance of cirrus sac from post. end (1.75 – 2.98 in *P.indica* but 1.6434 – 1.9754 in *P.clariae*).

iii. The distance of male gonopore from posterior end (The measuremental range in *P.indica* is at 1.42 – 2.95 where as it is at 1.6434 – 1.9754 in *P.clariae*).

iv. The distance of female gonopore (not given in *P.indica* but at 1.6102 – 1.909 from post end in *P.clariae*).

Differences however do exist in the aforesaid species which are as under:

a. Measurement of scolex- 1.04 – 1.31 x 0.626 – 0.134 in *P.indica* but 1.8924 – 2.739 in *P.clariae*.

b. Neck width – 0.175 – 0.365 in *P.indica* but 0.1162 – 0.1328 (mean 0.01204) in *P.clariae*.

c. Testes follicle – 0.14 – 0.28 x 0.06 – 0.11 in *P.indica* whereas larger follicles are 0.1328 x 0.0996 & smaller follicles are 0.0664 – 0.0996 x 0.0498 – 0.0664 in *P.clariae*.

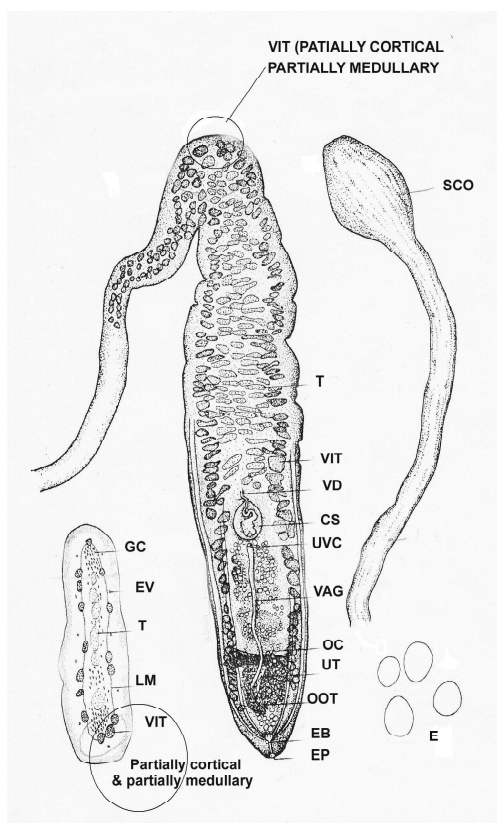
d. Ovary – 0.95 – 1.21 from posterior end in *P.indica*. However since 1st set of vitellarial follicles has been considered to be an ovary in *P.clariae*. This point is not comparable (the extent of ovary is posterior part in *P.clariae* is Rt. side – 0.8632 – 0.996 (mean 0.913) & of left side is 0.747 – 0.9628 (mean – 0.8466). The ovary irregular & follicular at a distance of 0.2656 – 0.4115 (mean

0.3209) is wrong in *P.clariae*.

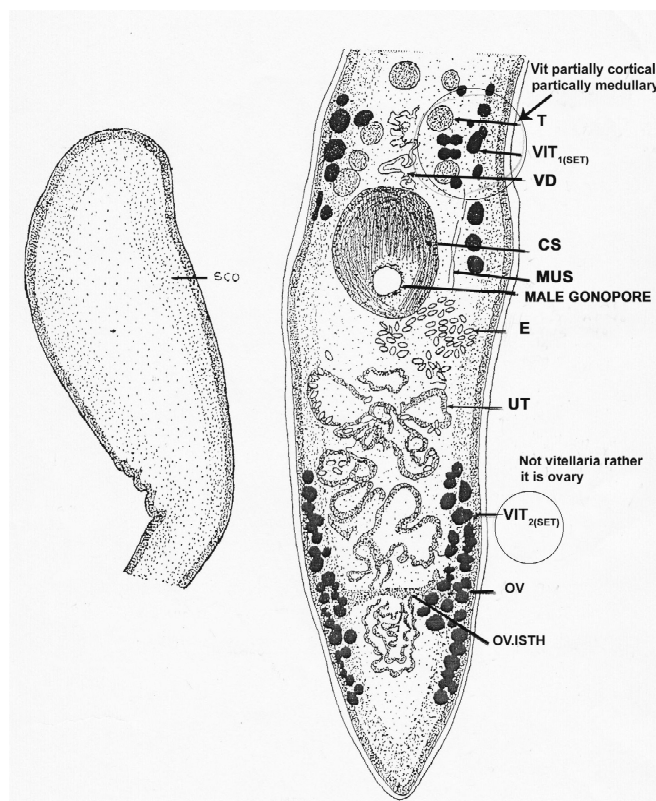
e. Female gonopore – situated below cirrus sac, the broad common aperture being 0.045 – 0.05 wide in *P.indica*, this has not been given in *P.clariae* instead its position below cirrus sac at a distance of 1.6102 – 1.909 (mean – 1.7928) from posterior end has been shown, hence wideness could not be compared.

f. Eggs – in both the above mentioned species are oval, non operculate however the length & breadth varies : Eggs are 0.05 – 0.06 x 0.035 – 0.045 in *P.indica* but 0.166 x 0.166 in *P.clariae* indicates that in the latter, it is round.

Therefore, without challenging the validity of *P.clariae* being a new *Pseudocaryophyllaeus* species on the basis of differences, its placement in *Capingentidae* (vitellaria partly cortical & partly medullary) stands with correction in the observation regarding second set of vitellarial follicles to be ovary.

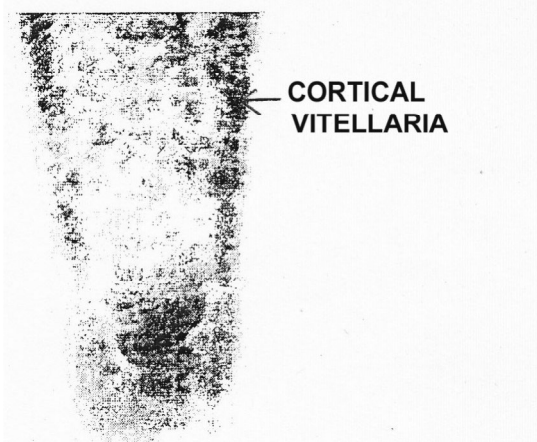


Pseudocaryophyllaeus indica Gupta, 1961
(from *Hel.Soc.Wash.*1961)



Pseudocaryophyllaeus clariae Dan & Sahay, 2001
(From *Tran.Zool.Soc.East.India.*)

Srivastava *et al.* : On the transference of *P. elongata* Zenith & Gambhir, 2014 to the genus *Lytocestus* Cohn, 1908 under *Lytocestidae* Wardle and McLeod, 1952 and a discussion on the status of *P. clariae* Dan and Sahay, 2001



***Caryophyllaeus elongatus* Zenith & Gambhir, 2014
(posterior end)**

REFERENCES

1. **Zenith, Ng. and Gambhir, R.K. 2014.** A new caryophyllid cestode of the genus *Pseudocaryophyllaeus* Gupta, 1961 from *Clarias magur* in Manipur India. *Jour.Exp.Zool.* **17(1)**: 141 – 144.
2. **Cohn, L. 1908.** Die Anatomie eines neuen Fisch-cestoden. Centralblatt für Bakteriologie, Parasitenkunde Infektionskrankheiten und Hygiene, Abteilung I. Originale **46**, 134 – 139.
3. **Wardle, R.A. & McLeod, J.A. 1912.** The Zoology of tapeworms. University of Minnesota Press. Minneapolis pp. 780.
4. **Dan, M.T. and Umapati Sahay, 2001.** Statistical observation on *Pseudocaryophyllaeus clariae* n.sp. (Capingentidae Wardle & McLeod, 1952) from Ranchi, Bihar. *Trans. Zool. Soc. East India*, **5(1)**: 39 – 54.
5. **Gupta, S.P. 1961.** Caryophyllaeids (cestode) from fresh water fishes in India. *Proc. Helm.Soc.Wash.* **28(1)**: 38 – 50.
6. **Gupta, V. and Parmar, S. 1984.** On a new caryophyllaeid *Pseudocaryophyllaeus mackiewiczzi* sp. nov. from the intestine of a fresh water fish *Heteropneustis fossilis* (Ham). From Gorakhpur. *Indian. Jour. Helminth.* **1982. 34(1)**: 136 – 138.
7. **Gupta, V. and Singh, S.R. 1984.** On a new species *Pseudocaryophyllaeus ritai* sp. nov. (Fam: Caryophyllaeidae) from the intestine of a fresh water fish *Rita rita*, from river Gomti at Lucknow, U.P. *Indian. Jour. Helminth.* **35(1)**: 11 – 14.
8. **Gupta, S.P. and N.Sinha, 1984.** On three new species of *Caryophyllaeids* from fresh water fishes of Lucknow. *Indian.Jour.Helminth.* **36(1)**: 73 – 80.
9. **Carus, J.V. 1863.** Raderthire, wurmer, Echinodermen, coelentsraten and protozoan p. 422 – 600 (W.C.Peters, J.V. carus and C.F. Gerstaecker) in “Handbuch der Zoologie”. Zweitter Band, Verlag von Wilhelm Engelmann, Leipzig.
10. **Mackiewicz, J.S. 1972.** Parasitological Review. *Caryophyllidea* (Cestoidea): A review. *Experimental Parasitology.* **31**: 417 – 512.
11. **Hafeezullah, M. 1993.** Caryophyllidae cestode fauna of India. *Rec. Zool. Sur. India.* Occasional paper No. 157: pp. 1 – 101.
12. **Kulakovskaya, O.P. 1961.** Materials on the fauna of *Caryophyllaeidae* (Cestoda; *Pseudophyllidea*) of the Soviet Union. *Parasitologicheskii Sbornik* **20**: 339 – 355 (Russian text) English summary.
- 13a. **Leuckart, R. 1878a.** *Archigetes sieboldi*, eine geschlechtareife cestodenamma. Mit Bemerkungen über die Entwicklung geschichte der Bandwürmer. *Zeitschrift für wissenschaftliche Zoologie.* **30**: 596 – 606.
- 13b. **Lenckart, R. 1878.** Bericht über die wissenschaftlichen Leistungen in der Naturgeschichte der niederen Thiere während der Jahre 1876 – 1879. *Archiv für Naturgeschichte.* **44**: 563 – 714.
14. **Mackiewicz, J.S. and D.Blair. 1978.** *Balanotaeniidae* fam.n and *Balanotaenia newguinenesis* sp.n. (Cestoidea : Caryophyllidea) from *Tandanus* (Siluriformes: *Plotosidae*) in New Guinea. *J.Helminth.* **52**: 199 – 203.
- 15a. **Hunter, G.W. III. 1927.** Notes on the Caryophyllaeidae of North America. *Journal of Parasitology* **14**: 16 – 26 plates I & II.
- 15b. **Hunter, G.W. III. 1930.** Studies on the Caryophyllaeidae of North America. *Illinois Biological Monograph* **11(192)**: 186pp
16. **Mackiewicz, J.S. 1981b.** Synoptic review of the Caryophyllaeidae (Cestoidea) of India, Pakistan & Nepal. *Himalyan. J.Sc.* **1**: 1 – 14
17. **Agarwal, S.M. 1985.** Caryophyllaeids and Caryophyllidiasis in India. *Indian. Rev. Life. Sc.* **5**: 139 – 161.

Biospectra : Vol. 9(1), March, 2014.

An International Biannual Refereed Journal of Life Sciences

18. **Singh, R.P. Umpati Sahay & Deepa Prasad, 2007.** On a new key to the genera of *Capingentidae* Carus, 1863; Caryophyllidea Von Beneden (in Carus, 1963) – Cestoda. *Natl. Jour. Life Sciences*. **4(2)**: 243 – 244.
- 19*. **Yamaguti, S. 1961.** Systema Helminthem. Vol. II. Cestodes of vertebrates. Inter science Publisher. N.Y. 1 – 860.
- 20*. **Tandon, V; R.Chakraborty & Das, B. 2005.** Four new species of the genus *Lytocestus* (Caryophyllidea : *Lytocestodae*) from edible catfishes in Assam & Meghalaya, India. *Jour.of Parasitic diseases*. **29(2)**: 131 – 142.
- 21*. **Poonam, 2007.** On a new species of the genus *Lytocestus* (Caryophyllidea: *Lytocestidae*) from *Clarias batrachus*. *Proc.Zool.soc.India* **6(1)**: 77 – 81.
- * **Additional references.**

* * *