Redescription and neotype designation for the poorly known fish parasitic cymothoid *Joryma brachysoma* (Pillai, 1964) (Crustacea: Isopoda) from India

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Abstract: A neotype is designated for *Joryma brachysoma* (Pillai, 1964). The general morphology and appendages of the female and male stages are illustrated and re-described based on the neotype and several additional fresh specimens collected from the type host *Pellona brachysoma* Bleeker (= *Sardinella brachysoma* Bleeker) from nearby the type locality. The present redescription and neotype designation further resolves the taxonomic ambiguity regarding the species identification and conserves the name of *J. brachysoma*.

Keywords: branchial fish parasites, Cymothoidae, type locality, *Sardinella brachysoma*, Kerala coast.

MATERIALS AND METHODS

Live specimens of *Joryma brachysoma* were collected from the Muttom fish landing center, southwestern coast of India (8°07’48”N; 77°19’12”E) and Mariyanadu fish landing centre, Trivandrum, Kerala coast (8°35’56.5”N; 76°48’47”E) in India. Specimens were removed from the branchial cavity of the host fish, fixed in 5% formaldehyde and preserved in 75% ethanol. Methods for dissection, mounting and drawings of appendages were according to the techniques described in Aneesh et al. (2019). Drawings were digital-inked using Adobe Illustrator and WACOM CTL-472/K0-c drawing pad. The specimens were microphotographed using multi-focusing dissection microscope Leica-M205A and image capturing software (Leica Application Suit). Sources for fish taxonomy and host nomenclature were FishBase (Froese and Pauly 2019) and Catalogue of Fishes (Eschmeyer 2019). The types and voucher specimens are deposited in the Western Ghat Field Research Centre of the Zoological Survey of India, Kozhikode (ZSI/WGRC).

RESULTS

Taxonomy

Suborder Cymothoida Wägele, 1989

Superfamily Cymothoidea Leach, 1814
Family Cymothoidae Leach, 1818

Genus *Joryma* Bowman et Tareen, 1983

Aneesh et al. (2019): 1449–1478.

*Agarna* – Schiödte et Meinert (1884): 328–329 *partim*.
Barnard (1936): 169; Pillai (1964): 211.

Type species: *Joryma sawayah* Bowman et Tareen, 1983, by original designation.

Species included: *Agarna engraulidis* Barnard, 1936; *Agarna tartoor* Pillai, 1954; *Agarna brachysoma* Pillai, 1964.

**Remarks.** A detailed generic diagnosis was provided for female, male and larvae by Aneesh et al. (2019). *Joryma* can be easily distinguished from other similar branchial cymothoid genera by the combination of the following characters: (1) asymmetrical and hunched body; (2) cephalon immersed in pereonite 1; (3) pereonite 1 anteriorly produced into lobe along one or both lateral margins of the head; (4) coxae of pereonites 2 and 3 medially expanded, much larger than remaining coxae and resembling the dorsolateral bosses (“ovarian bosses”) of epicarideans; (5) mandible palp enlarged, very stout, unsegmented/distinctly or incompletely segmented; (6) maxilla with pectinate scales on both lobes; (7) brood pouch posteriorly covered by a pocket formed from sternite; (8) uropod rami equal or unequal, not reaching the posterior margin of pleotelson.

Neotype designation for *Joryma brachysoma* (Pillai 1964): *Joryma brachysoma* was described by Pillai (1964) as *A. brachysoma*. *Joryma brachysoma* was described by Pillai (1964) as *A. brachysoma*. The original description of the female was brief with few illustrations (dorsal view, antennula, antenna, mandible, maxillula, maxilliped, pereopod 1 and 7, uropod and dorsal view of male) and is no longer comparable in detail to more recent descriptions of the species in the genus. The type locality (Trivandrum, Kerala, India) and the type host (*Pellona brachysoma* Bleeker (= *Sardinella brachysoma* Bleeker), were clearly mentioned.

Pillai (1964) stated that the holotype female was deposited in the Indian Museum, Kolkata, but he did not give a registration number. Enquiries at the Indian Museum, Kolkata, failed to reveal any material that could be identified, or indeed even potentially considered as the type ma-
terial for *J. brachysoma*. It seems that the types were either lost or destroyed, or possibly never deposited.

There are no confirmed subsequent records of *J. brachysoma* (see Bowman and Tareen 1983) transferred this species into the new genus *Joryma*. Identity of *J. brachysoma* has been consistently problematic with most of the subsequent reports either misidentification, e.g. Rijin et al. 2019 (they misidentified *Joryma malabaricus*); Anandkumar et al. (2017) (= *Catoessa gruneri* Bowman et Tareen, 1983); Ravichandran et al. 2010 (= *Catoessa boscii* [Bleeker, 1857]); Ravichandran et al. 2009 (= *Norileca indica* [Milne Edwards, 1840]) or unconfirmed records (Veerappan and Selvamathi 2009). The identification of *J. brachysoma* at present rests only on the Pillai’s original description and this species needs redescription to distinguish it from the other five species of the genus.

The new material of *J. brachysoma* described here was collected from the type host *S. brachysoma* from two different localities, Muttom fish landing centre, Tamil Nadu and Mariyanadu fish landing center, Trivandrum, both from southwestern coast of India. Mariyanadu is very close to the type locality of the Pillai’s specimens (Trivandrum, Kerala coast, India). We consider the locality of neotype to be similar to the type locality “as nearly as practicable from the original type locality” (ICZN–Art. 75.3.6 1999).

All the present Indian material agrees well with the description and figures given by Pillai (1964): cephalon exposed dorsally; not reaching margin of pereonite 1 expansion, pereonite 1 anterolateral expansion bilateral and slightly bilobed; pleonites 1 and 2 laterally overlapped by pereonite 7; pleonite 1 slightly visible in dorsal view. Pleotelson round-triangular, uropods rami unequal, mandibular palp distinctly 3-segmented.

The present study is slightly smaller (11.6 mm) than the material studied by Pillai (1964; females 13.5 mm). We are confident that the present material from India and Pillai’s material are conspecific. Therefore, we here designate a neotype for future studies.

### Joryma brachysoma (Pillai, 1964), Bowman et Tareen, 1983

Figs 1–8


Excluded from synonymy:


Anand et al. 2017:55–61, fig. 2f [= *Catoessa gruneri* Bowman et Tareen, 1983]

Aneesh et al. (2016): 1270–1277, figs. 2d–g [= *Joryma malabaricus* Aneesh, Helna et Trilles, 2019]

Ravichandran et al. (2009): 80–84, fig. 1–2 [= *Norileca indica* (Milne Edwards, 1840).]

Ravichandran et al. (2010): 97–98, fig. 2 [= *Catoessa boscii* (Bleeker, 1857)]


Material examined: 13 ♀♀ (ovigerous – total length of 11.6, 12.8 and 13.2 mm) (non-ovigerous – 10.5, 11.0, 11.6, 11.5, 12.0, 12.0, 12.0, 13.4 and 13.6 mm) and 3 ♂♂ (8.0, 9.0 and 8.0 mm).

Neotype: 1 ♀ (ovigerous,11.6 mm), Mariyanadu fish landing centre, Trivandrum, Kerala Coast (Reg. No. ZSI/WGRC/IR/INV/12289) from *S. brachysoma*, collected by P.T. Aneesh, date of collection 13 May 2018, host size 10.5 cm.

Vouchers: All from *S. brachysoma* collected by P.T. Aneesh,
1♀ (non-ovigerous, 12 mm) Muttom, southwestern coast of India (Reg. No. ZSI/WGRC/IR/INV/12290); 1♂ (8 mm) same information of neotype (Reg. No. ZSI/WGRC/IR/INV/12291).

Description of female neotype (Figs 1–5). Body about 2.0–2.3 times longer than wide, slightly asymmetrical, widest at pereonite 5. Cephalon anterior margin rounded, dorsally conspicuous, not reaching margin of pereonite 1 expansion. Eyes slightly visible, dorsal side. Pereonite 1 moderately expanded and longest. Pereonite 1 anterolateral expansion bilateral and slightly bilobed, on 3–6 subequal in length. Pereonites 2 and 7 slightly shorter than 4. Coxae 2 clearly visible dorsally, much enlarged produced anteriorly. Coxae 3–7 partly visible dorsally in hunched side. Pleonites 1, 2 and one side of pereonite 3 overlapped laterally by pereonite 7. Pleonites 1–5 subequal in length and width, lateral margin of pleonites slightly curving posteriorly. Pleotelson as long as wide, subacute with apex round. Pleotelson narrower than pleonite 5.

Antennula with 8 articles. Antenna with 8 articles, narrower than antennula, article 3 longest. Mandible with slightly curved and apically acute incisor, palp stout, distinctly 3-articled. Article 1 broader and longer than other articles; article 2 equal in width and 0.5 times the length of article 1; article 3 short and conical. Maxillula with 4 unequal slightly recurved apical robust setae. Maxilla with 2 apical robust setae on both median lobe and lateral lobe. Maxillipeds without oostegial lobe; article 3 with 3 apical robust setae.

Pereopods 1–3 subequal in length; pereopod 1 basis 2 times as long as greatest width; ischium 2 times longer than as basis; propodus as long as wide. Dactylus of pereopod 1–3 reaches up to merus. Pereopods 4–7 subequal in length. Pereopods basis gradually decrease in length and increase in width from pereopods 4–7. Pereopod 4 basis 2.7 times wide, pereopod 6 basis 1.9 times as long as wide. Pereopod 7 basis 1.5 times longer than greatest width. Ischium gradually increase in length from 4–7. Dactylus of pereopod 4–7 shorter than 3.

Pereopod 1 exopod 1.6 times longer than wide, lateral margin convex, distally broadly rounded, mesial margin weakly produced; endopod 1.7 times longer than wide, distally narrowly rounded; without retinaculae. Pleopods 2–5 similar to pleopod 1. Peduncles of pleopods expanded laterally into rounded lobes. Exopods of pleopods 3–5 with triangular proximalateral lobes. Uropod 0.6 times longer than the length of pleotelson, peduncle 1.8 times longer than endopod, peduncle lateral margin without setae. Endopod apically slightly pointed, lateral margin weakly convex, mesial margin weakly convex. rami unequal, exopod 1.2 times longer than endopod.

Brood pouch is typical for the genus.

Male (Figs 6–8). Smaller than female, body symmetrical, 2.5 times longer than wide, widest at pereonite 6. Cephalon sub-triangular with round anterior margin, 1.1 times wider than long, immersed in pereonite 1 to some extent. Eyes, prominent representing 30% of width of cephalons. Pereonite 1 anterolateral margins not produced; pereonite 1 longest, 7 shortest, 2–6 subequal. Coxae 2 and 3 clearly visible dorsally. Pleonite 1 overlapped laterally by pereonite 7. Pleonites subequal in length and width, lateral margins slightly directed posteriorly. Pleotelson as long as...
wide, slightly narrower than pleonite 5 with posterior margin broadly triangular.

Antennula with 8 articles, distinctly stouter than antenna. Antenna, 8-articled, narrower than antennula, article 3 longest. Maxillule and maxilliped similar to those with of female. Mandible palp narrower than female, Maxilla, inner lob with one and outer lobes with two robust setae.

Pereopods slightly increasing the size from 1–7. Penes, a pair of small tubercles visible on surface of sternite 7, medially united with minute opening at the apex. Appendix masculina of pleopod 2, straight, slightly shorter than endopodite and tapering gradually to narrow apex. peduncles of pleopods with few small setae. Uropods slightly shorter than pleotelson; rami unequal in length, curved and apically rounded, exopod longer than endopod.

Size: Ovigerous females (11.6–13.2 mm; average 12.5 mm), non-ovigerous females (10.5–13.6 mm; average 12.0 mm), male (body length in mm, 8–9 mm; average 8.3).

Colour: Male and female, live colour is white.

Host: Sardinella brachysoma Bleeker (Pillai 1964; Ravichandrana et al. 2009; Laila 1995; Present study).

Distribution: Recorded from Trivandrum, Kerala coast, Arabian Sea (Pillai 1964; Laila 1995); Parangipetrai, Tamil Nadu, Southeast coast of India (Ravichandrana et al. 2009); Present Indian materials are from, Muttom, Southwest coast of India and Mariyanadu, Trivandrum, Kerala coast.

DISCUSSION

The best combination of characters for identification of Joryma brachysoma are: cephalon not reaching the margin of pereonite 1 expansion; pereonite 1 antero-lateral expansion bilateral and slightly bilobed; pleonite 1 entirely overlapped by pereonite 7 and not visible in dorsal view; pleotelson sub-triangular, uropods rami unequal in length, exopod 1.2 times longer than endopod; mandibular palp distinctly 3-segmented.

Joryma brachysoma can be separated from its congeners by the following combination of characters: in J. malabaricus, the cephalon is conspicuous dorsally, extending beyond the pereonite 1 (vs cephalon not reaching the pereonite 1), pereonite 1 antero-lateral expansion unilateral and not bilobed (vs bilateral and slightly bilobed in J. brachysoma), the mandible palp not segmented (vs distinctly 3 segmented in J. brachysoma). In Joryma sawayah, pleotelson is triangular (vs subacute with the apex round in J. brachysoma), mandible palp is unsegmented (vs distinctly 3-segmented in J. brachysoma); in Joryma tartoor, cephalon is covered dorsally by pereonite 1 (vs cephalon conspicuous dorsally in J. brachysoma), antenna 9- or 10- segmented (vs eight in J. brachysoma). In Joryma hilsae, the cephalon is reaching the pereonite 1 (vs cephalon not reaching the pereonite 1 in J. brachysoma), uropod rami equal (vs unequal in J. brachysoma). In Joryma engraulidis, the cephalon is reaching beyond pereonite 1 (vs not reaching...
the pereonite 1 in *J. brachysoma*), anterolateral expansion of pereonite 1 unilateral and not bilobed (*vs* bilateral and slightly bilobed in *J. brachysoma*). *Joryma brachysoma* has been widely misidentified (as discussed by Aneesh et al. 2019). The present redescription based on the neotype and non-type specimens provides precise diagnosis of *J. brachysoma*.

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**REFERENCES**


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