The Identity of the Seldom Found Caribbean and Gulf of Mexico Fish-Parasitic Isopod, Cymothoa caraibica Bovallius, Resolved: A Neoteric Synonym of C. oestrum (L.)

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We have studied cymothoid isopods of Caribbean fishes for 28 years and have attempted to find all the species reported from these waters. One species we have never been able to collect is Cymothoa caraibica, originally described by Bovallius (1885) from the south coast of Haiti. The author gave no host data and his only material was an immature female and three males. We now know that new species of Cymothoidae should not be described from juveniles or non-ovigerous (lacking brood pouch) females, and Bovallius (1885:28) recognized this problem stating: “It is very difficult to tell anything about the affinities, of the species without knowing the ovigerous female.” In the 118 years since its description, C. caraibica has only been reported three times: Tabb and Manning (1961) reported two specimens (sex not noted but probably females since males do not possess characters identifiable to species) from southwest Florida off Cape Sable, Menzies and Kruczynski (1983) reported three females and one male from off Ft. Myers, and Kensley and Schotte (1989) reported the species from Puerto Rico based on an non-ovigerous female held in the U.S. National Museum, Washington, DC, (USNM 236086, Condado Bay, San Juan, Puerto Rico, 25 June 1960; M. Schotte, pers. comm.). The status of C. caraibica is also in question because no large, mature, or ovigerous female has been described for this species (Trilles, 1975), and species in this family are mainly distinguished by characters observed in the ovigerous female (Bunkley-Williams and Williams, 1998).

No host was recorded from the original description by Bovallius, and Tabb and Manning only list a host “attached to a sciaenid, Bairdiella chrysura” [=B. chrysoura (Lacepède), Silver Croaker]. Many hosts have been reported for C. oestrum including a sciaenid by Boone (1921:96) “…in the collections of the U. S. National Museum…1 young male specimen on the gills of Cynoscion ciorchus [=Cynoscion leiarchus (Cuvier, 1830), Smooth Weakfish, and is thus an unpublished new host record, since the USNM label in the vial lists “Cynoscion leiarchus Weakfish”], Colon Market, Colon, Canal Zone, Panama.” Boone (1921) did not list the USNM number, 43775; collection date, 21 May 1911; and identifier, Harriet Richardson. Marilyn Schotte (pers. comm.) provided the USNM information, examined this specimen, and agrees that it is C. oestrum.

Only two seemingly important characters distinguish C. caraibica from the similar and sympatric C. oestrum (Linnaeus, 1793):
anterolateral angles (look like "shoulder pads") of pereonite 1 (first "body" segment) reaching to half length of cephalon ("head") or less vs. reaching to anterior margin of cephalon (Fig. 1); and eyes present (Fig. 1B) vs. eyes absent (Fig. 1C,D). The anterior margin of the cephalon in *C. oestrum* changes from rounded in immature specimens (similar to Figs. 1A,B) to truncate or indented in mature specimens (Fig. 1C,D). There is no difference in the cephalon shape, pereopods (legs), uropods, and pleotelson (tail shield) of specimens of *C. carabica* and *C. oestrum* of the same size, but some intraspecific variation occurs in the pleotelson shape and in the relationship of the relative endopod and exopod (of uropods) lengths of *C. oestrum*.

Cymothoid isopods are protandrous hermaphrodites, becoming mature males at a small size and developing into females at a larger size. If a juvenile attaches to a host with no other isopods of that species present, it develops into a female. Juveniles that attach later remain at a smaller size and are active males. Thus, the largest isopod present on a fish is either a female or a developing female. Over the past 35 years, we have collected *C. oestrum* from various fish hosts in the West Indies and Gulf of Mexico. To examine the developmental lineage of female *C. oestrum*, we measured 39 specimens that were females or the largest specimen on a host (males associated with females not measured) and found that the relation between the length of the anterolateral angles and the length of the cephalon is proportional to the total length of the isopod (Fig. 2). Some of our smallest *C. oestrum* are similar to the specimen of *C. carabica* illustrated by Menzies and
Kruczynski (1983:Fig. 17a). If the relative length of the anterolateral angles is expressed as a percentage of head length, the range is similar to that illustrated by Schultz (1969) for C. oestrum, with angles 50-100 % of the cephalon length; however, we found lengths from 5 to 120 %. Angles extending this far beyond the cephalon of this species had not been described previously, although Schiedte and Meinert (1884) illustrated a specimen of C. oestrum with anterolateral angles extending anterior of the cephalon (Fig. 1D). The value for the female type of C. caraibica falls among the C. oestrum values and is not significantly different (95 % confidence level) from the linear regression of those values (Fig. 2).

The absence or presence of eyes is problematic because all the species of mouth- or gill-dwelling cymothoid isopods have eyes as juveniles and gradually lose them until the eyes atrophy or become covered completely in mature adults (= ovigerous females). In our collection, eyes were present in specimens 7.5 to 17.5 mm long (N=13) and absent in specimens 19.0 to 38.5 mm long (N=26). Note that 17.0 mm is the length of the immature female type of C. caraibica at which size it would also have eyes if it were C. oestrum. Only two of our females, 16.0 and 17.5 mm long, had eyes while also being ovigerous. This size range appears to be the minimum for reproductive females, although their morphological characters continue changing as they become larger. Since the characters on which C. caraibica was based are identical to those found in C. oestrum when specimens of the same size are compared, we propose that C. caraibica is a synonym of C. oestrum.

We are slowly defining the developmental stages of C. oestrum. We have described its first four juvenile stages found on the host (Williams and Bunkley-Williams, 1994) and noted above the minimal size range at which it becomes a reproductive female. The longest specimen we found (38.5 mm) is slightly longer than previously reported (38.0 mm-Kensley and Schotte, 1989). The C. caraibica—C. oestrum synonymy demonstrates that a number of morphological serial variations may occur among the ovigerous females of a species. This is true not only for C. oestrum but also for many, if not most cymothoid species, and illustrates one of the complexities of cymothoid taxonomy (Bunkley-Williams and Williams, 1998).

The synonymy of C. caraibica with C. oestrum leaves only two species of Cymothae in the West Indies: the Jack-choking Isopod, C. oestrum, occurring largely in jacks (Family Carangidae) throughout the region, occasionally in Great Barracuda, Sphyraena barracuda (Walbaum), and Glasseye, Heteropriacanthus cruentatus (Lacepède); and the Snapper-choking Isopod, C. excisa Perty, 1835, occurring largely in snappers (Family Lutjanidae) only along the continental margins of the West Indies (Bunkley-Williams et al., 1999). These two isopods occasionally occur in other hosts, but many of these records are rare, accidental, or require confirmation. Both species can be easily distinguished because the anterolateral angles of pereonite 1 (“shoulder pads”) are broadly rounded in C. oestrum and are pointed (subacute) in C. excisa.

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