

Further record of *Ceratothoa carinata* (Isopoda: Cymothoidae) parasitic on *Decapterus maruadsi* in Japanese waters

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Abstract. The cymothoid isopod *Ceratothoa carinata* (Bianconi, 1869) was found in the buccal cavity of the Japanese scad *Decapterus maruadsi* (Temminck & Schlegel, 1843) from the western Seto Inland Sea. This parasite is likely to be common in some local populations of *D. maruadsi* in Japanese waters.

Key words. *Ceratothoa carinata*, Isopoda, Cymothoidae, fish parasite, *Decapterus maruadsi*

The cymothoid isopod *Ceratothoa carinata* (Bianconi, 1869) is a parasite found in the buccal cavity of marine fishes in the Indo-West Pacific region, including off Mozambique, Malaysia, Japan, Australia, the Seychelles, New Caledonia, and the Red Sea (Martin *et al.*, 2013). In Japan, this isopod had been reported as *Ceratothoa curvicaudata* from the white trevally *Pseudocaranx dentex* (Bloch & Schneider, 1801) (misspelled as “*dentax*”) and the Japanese scad *Decapterus maruadsi* (Temminck & Schlegel, 1843) (misspelled as “*Decapteris maruadi*”) in Sagami Bay (as Sagami Sea) (Nunomura, 2006) and also as *Ceratothoa* sp. from *D. maruadsi* from off the Pacific coast of Toba, Mie Prefecture (Saito, 2009), but Martin *et al.* (2013) regarded both *C. curvicaudata* and *C. sp.* as junior synonyms of *C. carinata*.

Two (an ovigerous female and a male) and 14 (seven ovigerous females and seven males) specimens of *C. carinata* were found in the buccal cavity of one (197 g in body weight [BW]) and seven (193–313 [mean

248] g BW) individuals of *D. maruadsi* caught in the western Seto Inland Sea (33°20'N, 131°55'E) off Saganoseki, Oita Prefecture on 26 September 2013 and 17 March 2014, respectively. Isopod specimens were fixed in 10% formalin but later preserved in 70% ethanol. Representative voucher specimens (three ovigerous females and three males, collected on 17 March 2014) are deposited in the Crustacea (Cr) collection of the National Museum of Nature and Science, Tsukuba, Ibaraki Prefecture, Japan (NSMT-Cr 22949), and the remaining specimens are retained in the senior author's collection. The scientific and English names of fishes used in this paper follow Froese & Pauly (2014).

A pair of an ovigerous female and a male, sometimes with manca larvae, of *C. carinata* was usually found in the buccal cavity of infected fish: the female firmly attached to the bottom of the host's buccal cavity, especially to the tongue, while the male was found on the roof of the buccal cavity or beside the female (Fig. 1A).

The ovigerous females collected in this study are characterized by the pleotelson with a concave posterior margin (Fig. 1B-C). They also have a

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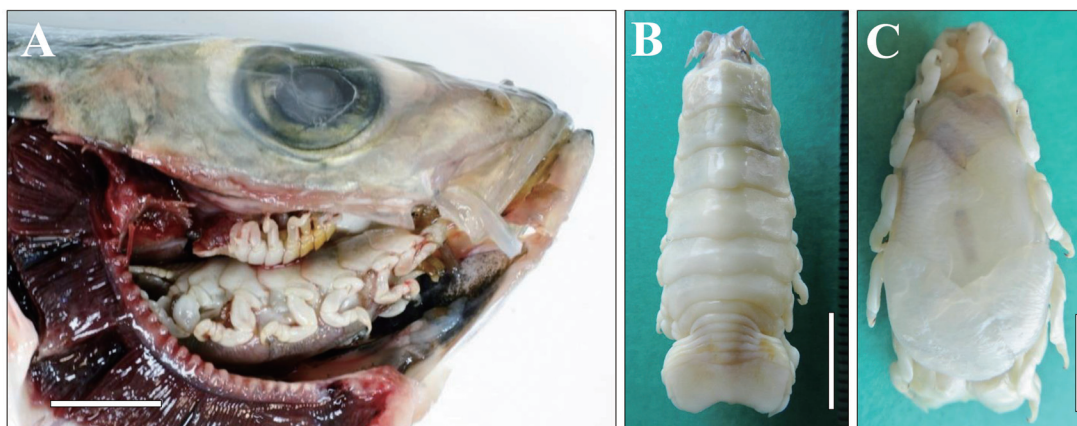


Fig. 1. *Ceratothoa carinata* infecting *Decapterus maruadsi*. A, an ovigerous female and a male attaching to the bottom and roof of the host's buccal cavity, respectively; B–C, an ovigerous female of *C. carinata*, dorsal (B) and ventral (C) views. Scale bars: 10 mm in A–C.

median longitudinal ridge on the pereon dorsal surface. These morphological features are identical to those of *C. carinata* redescribed by Martin *et al.* (2013) and *Ceratothoa* sp. reported by Saito (2009, fig. 2A). The specimens ranged from 29.5–37.5 (mean 32.7) mm long \times 11.4–14.7 (12.7) mm wide in ovigerous females (n=8) and 12.5–16.2 (14.8) \times 4.3–5.0 (4.8) mm in males (n=8).

Decapterus maruadsi is likely to serve as a common host for *C. carinata* in coastal waters of Japan, because its prevalence of infection is known to be high (up to 100%) in local populations of the fish (Saito, 2009). Also, according to the fishermen who caught the infected individuals of *D. maruadsi* in the western Seto Inland Sea off Saganoseki, the fish are often infected with large isopods, which are considered to be *C. carinata*. The fishermen, on the other hand, mention that no isopod occurs in the buccal cavity of the Japanese jack mackerel *Trachurus japonicus* (Temminck & Schlegel, 1844) caught in the same area of the sea, which may indicate that *C. carinata* exhibits different degrees of host specificity to fishes of the family Carangidae, in which both *D. maruadsi* and *T. japonicus* are placed.

Ogawa (2006) reported that *Ceratothoa imbricata* (Fabricius, 1775) (as *Conodophilus imbricatus*) infects *P. dentex* cultured in Japanese waters. However, the photographed ovigerous female specimen resembles *C. carinata* because it has the pleotelson with a concave posterior margin. On the other hand, the pleotelson of *C. carinata* (as *C. curvicaudata*) from *P. dentex* and *D. maruadsi* collected in Sagami Bay, Japan, has a sinuate posterior margin with a pair of concaved areas (Nunomura, 2006), which is slightly different from that of *C. carinata* described by Martin *et al.* (2013). Moreover, *P. dentex* is known to host another species of cymothoid, *Ceratothoa trigonocephala* (Leach, 1818) (as *Conodophilus trigonocephalus*), in Japanese waters (Shiino, 1951, 1965), but *C. trigonocephala* has been confused with *C. imbricata* (Hadfield *et al.*, 2014). These facts indicate that it is not easy to identify isopods of the genus *Ceratothoa* from *P. dentex*, and it is desirable to collect and examine many cymothoid specimens from *P. dentex* in Japanese waters in order to confirm or correct the previous identifications.

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