

Shortfin scad, *Decapterus macrosoma*, a new host record for *Ceratothoa carinata* (Isopoda: Cymothoidae)

Kazuya Nagasawa^{1*} and Shigeo Harada^{2,3}

¹Graduate School of Biosphere Science, Hiroshima University,
1-4-4 Kagamiyama, Higashi-Hiroshima, Hiroshima 739-8528, Japan

²Wakayama Prefectural Fisheries Experimental Station, 1557-20 Kushimoto,
Kushimoto-cho, Wakayama 649-3503, Japan

³Present address: Arida Promotions Bureau of Wakayama Prefecture, 2355-1 Yuasa,
Yuasa-cho, Wakayama, 643-0004 Japan

Abstract. Specimens of *Ceratothoa carinata* (Bianconi, 1869) were collected from the buccal cavity of shortfin scad, *Decapterus macrosoma* Bleeker, 1851, commercially caught in the Kii Channel and adjacent waters, western North Pacific, off Wakayama Prefecture, central Japan. These are a new host record for *C. carinata*. The posterior margin of the pleotelson of ovigerous females of *C. carinata* was concave, whereas that of an immature female was nearly straight.

Key words: *Ceratothoa carinata*, Isopoda, Cymothoidae, fish parasite, *Decapterus macrosoma*, new host record

The cymothoid isopod *Ceratothoa carinata* (Bianconi, 1869) is a buccal-cavity parasite of marine fishes in the Indo-West Pacific (Martin *et al.*, 2013; Hadfield *et al.*, 2016). The species has so far been recorded from five species of perciform fishes, including four species of the family Carangidae and one species of the Lutjanidae: white trevally, *Pseudocaranx dentex* (Bloch & Schneider, 1801) (Nunomura, 2006, 2011), amberstripe scad, *Decapterus muroadsi* (Temminck & Schlegel, 1844) (Nunomura, 2006), Japanese scad, *Decapterus maruadsi* (Saito, 2009, 2014; Nagasawa *et al.*, 2014; Nagasawa & Harada, 2016), bigeye scad, *Selar crumenophthalmus* (Bloch, 1793) (Martin *et al.*, 2013; Hadfield *et al.*, 2016) (all Carangidae), and yellow-banded snapper, *Lutjanus adetii* (Castelnau, 1873) (Lutjanidae) (Trilles, 1972a, 1972b). The first three hosts have been recorded from Japan, where the isopod was first

reported as *Ceratothoa curvicauda* Nunomura, 2006 (Nunomura, 2006) and later *Ceratothoa* sp. (Saito, 2009), but currently, following Martin *et al.* (2013), *C. carinata* has been used as the scientific name (Saito, 2014; Nagasawa *et al.*, 2014; Nagasawa & Harada, 2016). During a study on cymothoid infections of carangids in the Kii Channel and adjacent waters, western North Pacific, off Wakayama Prefecture, central Japan, we found *C. carinata* infecting shortfin scad, *Decapterus macrosoma* Bleeker, 1851, and collected some specimens of the isopod, which are reported herein. This represents a new host record for *C. carinata*.

Nineteen specimens (nine females, 10 males) of *C. carinata* were collected from the buccal cavity of *D. macrosoma* commercially caught in the Kii Channel and adjacent waters from June 2013 to May 2016: nine specimens (four females, five males) from five fish (193–241 [mean 216] mm in fork length [FL]) landed at Tanabe on 14 June 2013; two specimens

*Corresponding author: ornatus@hiroshima-u.ac.jp

(one female, one male) from one fish (138 mm FL) at Kushimoto on 19 July 2013; six specimens (three females, three males) from three fish (216–223 [mean 220] mm FL) at Shioya on 1 July 2014; and two specimens (one female, one male) from one fish (250 mm FL) at Ena on 19 May 2016. No prevalence data were taken because only infected fish were sampled. The isopods collected were fixed and preserved in 70% ethanol. Voucher specimens of *C. carinata* are deposited in the Crustacea (Cr) collection of the National Museum of Nature and Science, Tsukuba, Ibaraki Prefecture, Japan (NSMT-Cr 25569 [one immature female and one male collected in July 2013] and NSMT-Cr 25570 [three ovigerous females and three males collected in July 2014]). The scientific and common names of fishes used in this paper follow Froese & Pauly (2017).

The specimens of *C. carinata* collected consisted of eight ovigerous females (Fig. 1A, 26.1–32.5 [mean 29.1] mm long \times 10.1–14.1 [11.6] mm wide), one immature female (Fig. 1B, 13.5 mm long \times 5.0 mm wide), and 10 males (5.0–14.5 [9.9] mm long \times 2.0–5.1 [3.6] mm wide). The ovigerous female of the

species is characterized by the pleotelson with a concave posterior margin (e.g., Trilles, 1972a; Nunomura, 2006; Saito, 2009; Martin *et al.*, 2013; Hadfield *et al.*, 2016; Nagasawa & Harada, 2016), which was confirmed in all of the eight ovigerous females in this study. However, the immature female examined possessed the pleotelson with a nearly straight posterior margin (Fig. 1B), which was previously found in one of the 10 ovigerous females of *C. carinata* from the present sampling location (Nagasawa & Harada, 2016). We need more information on morphological variations in the posterior margin of the pleotelson for females of the species.

Decapterus macrosoma is added herein as a new host of *C. carinata*. Of the six host species of *C. carinata* including *D. macrosoma*, five belong to the Carangidae, which implies that the isopod prefers the carangids. All of the three host species in *Decapterus* have been reported only from Japan, where the isopod may have a preference for the species of the genus. Recently, Hata *et al.* (2017) recorded an unidentified species of isopod as “*Ceratothoa* sp. 1” from Japan. Unfortunately, the morphology of this

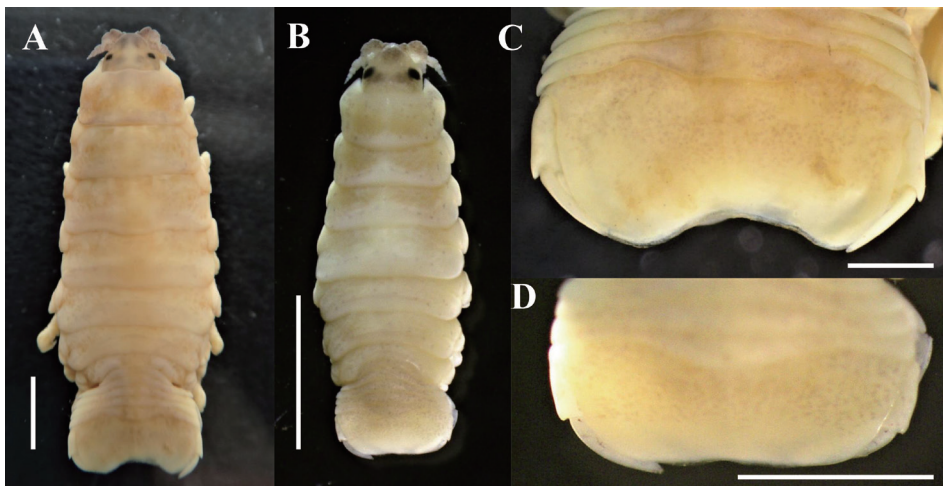


Fig. 1. Ovigerous (NSMT-Cr 25570, 29.8 mm long) and immature (NSMT-Cr 25569, 13.5 mm long) females of *Ceratothoa carinata* from the buccal cavity of *Decapterus macrosoma* in the Kii Channel and adjacent waters off Wakayama Prefecture in July 2014 and July 2013, respectively. A and C, ovigerous female and its pleotelson, dorsal view; B and D, immature female and its pleotelson, dorsal view. Scale bars: 5 mm in A and B; 2 mm in C and D.

isopod was not reported, but its specimens were collected from the buccal cavity of three carangids, *i.e.*, Japanese jack mackerel, *Trachurus japonicus* (Temminck & Schlegel, 1844), *D. maruadsi*, and *D. muroadsi*. The latter two species are known as the hosts of *C. carinata* in Japanese waters, and “*Ceratothoa* sp. 1” may be identical as *C. carinata*. As many as 59 species of carangids including seven species of *Decapterus* occur in Japanese waters (Senou, 2013), but our knowledge of the host range of *C. carinata* is still limited. Further study is necessary to clarify the host utilization by *C. carinata* based on examination of the carangids.

References

- Froese, R. & Pauly, D. (Eds), 2017. FishBase. World Wide Web electronic publication. www.fishbase.org, version (01/2017). (Accessed on 15 June 2017).
- Hadfield, K. A., Bruce, N. L. & Smit, N. J., 2016. Redescription of poorly known species of *Ceratothoa* Dana, 1852 (Crustacea, Isopoda, Cymothoidae), based on original type material. *ZooKeys*, **592**: 39–91.
- Hata, H., Sogabe, A., Tada, S., Nishimoto, R., Nakano, R., Kohya, N., Takeshima, H. & Kawanishi, R., 2017. Molecular phylogeny of obligate fish parasites of the family Cymothoidae (Isopoda, Crustacea): evolution of the attachment mode to host fish and the habitat shift from saline water to freshwater. *Mar. Biol.*, **164**: 105. DOI 10.1007/s00227-017-3138-5.
- Martin, M. B., Bruce, N. L. & Nowak, B. F., 2013. Redescription of *Ceratothoa carinata* (Bianconi, 1869) and *Ceratothoa oxyrrhynchaena* Koelbel, 1878 (Crustacea: Isopoda: Cymothoidae), buccal-attaching fish parasites new to Australia. *Zootaxa*, **3683**: 395–410.
- Nagasawa, K. & Harada, S., 2016. *Ceratothoa carinata* (Isopoda: Cymothoidae) from Japanese scad *Decapterus maruadsi* in coastal waters of the western North Pacific off central-western Japan. *Biogeography*, **18**: 67–70.
- Nagasawa, K., Fukuda, Y. & Nishiyama, M., 2014. Further record of *Ceratothoa carinata* (Isopoda: Cymothoidae) parasitic on *Decapterus maruadsi* in Japanese waters. *Biogeography*, **16**: 59–61.
- Numomura, N., 2006. Marine isopod crustaceans in the Sagami Sea, central Japan. *Mem. Natn. Sci. Mus., Tokyo*, **41**: 7–42.
- Numomura, N., 2011. Crustaceans No. 2 (Isopoda). *Spec. Publ. Toyama Sci. Mus.*, **24**: 1–133. (In Japanese with English title).
- Saito, N., 2009. Note on a cymothoid isopod parasited [sic] in the buccal cavity of the round scad, *Decapterus maruadsi* (Temminck & Schlegel, 1844). *Cancer*, **18**: 7–9. (In Japanese with English title).
- Saito, N., 2014. An additional note on *Ceratothoa* sp. (Isopoda, Cymothoidae) infected [sic] the round scad, *Decapterus maruadsi* recorded from Japan. *Cancer*, **23**: 53–54. (In Japanese with English abstract).
- Senou, H., 2013. Carangidae. In Nakabo, T. (Ed), *Fishes of Japan with Pictorial Keys to the Species. Third Edition*: 878–899. Tokai Univ. Press, Hadano. (In Japanese).
- Trilles, J.-P., 1972a. Les Cymothoidae (Isopoda, Flabellifera) du Muséum national d’Histoire naturelle de Paris. Étude critique accompagnée de précisions en particulier sur la répartition géographique et l’écologie des différentes espèces représentées. I. Les Cerathoinae Schioedte et Meinert, 1883. *Bull. Mus. Hist. Nat., Paris*, 3e sér. 91, Zool., 70: 1231–1268.
- Trilles, J.-P., 1972b. Sur quatre isopodes cymothoïdes du Pacifique (Nouvelle Calédonie). *Cah. O. R. S. T. O. M., sér. Oceanogr.*, **10**: 3–17.

(Received June 26, 2017; Accepted August 22, 2017)