

Short Communication

**Geographical distribution affected by the Kuroshio of the fish parasite
Cymothoa pulchra (Isopoda: Cymothoidae) in Japanese waters**

Kazuya Nagasawa^{1*} and Daisuke Uyeno²

¹ Graduate School of Biosphere Science, Hiroshima University,

1-4-4 Kagamiyama, Higashi-Hiroshima, Hiroshima, 739-8528 Japan

² Faculty of Science, University of the Ryukyus, 1 Senbaru, Nishihira, Okinawa, 903-0213 Japan

Abstract. Specimens of *Cymothoa pulchra* Lanchester, 1902 were collected from the buccal cavity of two diodontids (*Chilomycterus reticulatus* and *Diodon holacanthus*) and one tetraodontid (*Arothron stellatus*) from Japanese waters. Based on the present and past sampling records, it is shown that, in Japanese waters, this isopod occurs in coastal areas which are strongly influenced by the Kuroshio.

Key words: *Cymothoa pulchra*, Cymothoidae, fish parasite, Kuroshio, geographical distribution

Cymothoa pulchra Lanchester, 1902 is a cymothoid isopod parasitic in the buccal cavity of tetraodontiform fishes in the central and western Pacific and the Indian Ocean (see Nagasawa & Doi, 2012 for the literature from 1902–2011). Japan is located in a northernmost region of the geographic range where this isopod occurs. Currently, eight specimens of *C. pulchra* (Fig. 1) were collected from the buccal cavity of three species of tetraodontiform fishes caught in four localities of Japan: one male and two (one female and one male) specimens from two specimens (48.4 and 45.0 cm total length [TL]), respectively, of the spotfin burrfish *Chilomycterus reticulatus* (Linnaeus, 1758) (Diodontidae) in the western North Pacific Ocean (WNPO) off Nishidomari (32°46' N, 132°43' E), Otsuki, Kochi on 8 November, 2005; one female and two male specimens from a specimen (45.9 cm TL) of *C. reticulatus* in the WNPO off Urada (30°49'N, 131°2'E), Nishinomote, Tanegashima Island, Kagoshima on 22 May, 2007; one male specimen from a specimen (fish size

not measured) of the stellate puffer *Arothron stellatus* (Anonymous, 1798) (Tetraodontidae) in the East China Sea (ECS) off Tsuya (26°23' N, 127°43' E), Yomitan, Okinawa on 9 May, 2009; and one male specimen from a specimen (15.3 cm TL) of the long-spined porcupinefish *Diodon holacanthus* Linnaeus, 1758 (Diodontidae) in the ECS off Sunabe (26°20' N, 127°44' E), Chatan, Okinawa on 28 March, 2005. Isopod specimens were fixed in 70% ethanol, sexed and measured for TL. Female and male specimens ranged from 30.1–30.7 (mean=30.4, $N=2$) and 8.7–25.4 (mean=15.5, $N=6$) mm TL, respectively. No ovigerous females were collected. Although *A. stellatus* has been reported as a host of *C. pulchra* from Vietnam (Monod, 1934), Australia (Avdeev, 1978) and French Polynesia (Galzin & Trilles, 1979), this fish is recorded herein for the first time to harbor this isopod in Japanese waters. Voucher isopod specimens are deposited in the Crustacea collection at the National Museum of Nature and Science, Tsukuba (NSMT-Cr 22195–22199). The scientific and common names of fishes used in this paper follow Froese & Pauly (2012).

Based on the localities recorded in this paper and those previously reported from Japan (Shiino, 1951;

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



Fig. 1. Adult female (left) and male (right) specimens of *Cymothoa pulchra* Lanchester, 1902 (NSMT-Cr 22195) from the buccal cavity of *Chilomycterus reticulatus* (Linnaeus, 1758) caught in the western North Pacific Ocean off Nishidomari, Otsuki, Kochi, Japan. Dorsal view. Scale bar: 10 mm.

Williams *et al.*, 1996; Kuramochi *et al.*, 2003; Nagasawa & Doi, 2012), it is clear that *C. pulchra* occurs in coastal waters which are strongly influenced by the Kuroshio (Fig. 2). This distributional pattern of *C. pulchra* is affected by the geographical range of its tetraodontiform hosts, which are the above three species, the spot-fin porcupinefish *Diodon hystrix* Linnaeus, 1758 and the black-blotched porcupinefish *D. liturosus* Shaw, 1804 (Diodontidae) in Japanese waters. These five tetraodontiform fishes are subtropical and southern temperate species, and their distributions are restricted to warm waters. On the other hand, *C. pulchra* has not been reported from coastal waters of the ECS and the Sea of Japan (SJ) off Kyushu and Honshu islands, but since these waters are affected by the Tsushima Current, a branch of the Kuroshio (Fig. 2), and *D. holacanthus* migrates to the waters (Nishimura, 1960), this isopod may be discovered from the ECS and the SJ.

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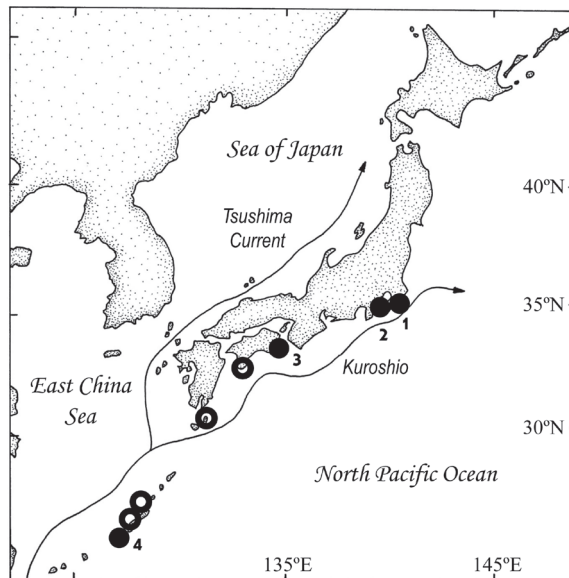


Fig. 2. A map of the Japanese Archipelago, showing the localities where *Cymothoa pulchra* was collected in the previous (closed circles) and present (open circles) studies. Localities 1–4 are based on Shiino (1951), Kuramochi *et al.* (2003), Nagasawa & Doi (2012) and Williams *et al.* (1996), respectively. The locality where Williams *et al.* (1996: fig. 5) collected *C. pulchra* is provisionally plotted on the southern coast of Okinawa-jima Island because these authors provided no detailed information on the locality in the Ryukyu Islands.

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