
Report

Ovigerous females of *Cymothoa pulchra* (Crustacea: Isopoda: Cymothoidae) collected from the Japanese parrotfish *Calotomus japonicus* (Perciformes: Scaridae) at Izu Oshima Island, Japan

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Abstract

Cymothoa pulchra (Crustacea: Isopoda: Cymothoidae) was collected from the Japanese parrotfish *Calotomus japonicus* (Perciformes: Scaridae) at Izu Oshima Island, Tokyo, Japan. Ovigerous females of *C. pulchra* were collected from the Japanese parrotfish, indicating that *C. pulchra* actually are able to parasitize and to actually breed on Japanese parrotfish.

Key words: fish, host specificity, Japan, Pacific Ocean, parasite

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Cymothoa pulchra Lanchester, 1902 is a cymothoid isopod which is parasitic in the buccal cavity of tetraodontiform fishes in the central and western Pacific and the Indian Ocean (Nagasawa and Uyeno, 2012; Nagasawa and Doi, 2012).

The host fishes of *C. pulchra* were classified by Nagasawa and Doi (2012), and *C. pulchra* was shown to be a parasite of tetraodontiform fishes (order Tetraodontiformes). Since ovigerous females of *C. pulchra* were collected from tetraodontiform fishes (Nagasawa and Doi, 2012), it is thought that the females use the fishes as hosts to reproduce. Later, Hata et al. (2017) recorded *C. pulchra* from five host species including two new hosts other than the order Tetraodontiformes (the Japanese parrotfish *Calotomus japonicus* (Valenciennes, 1840) (Perciformes: Scaridae) and the little spinefoot *Siganus spinus* (Linnaeus, 1758) (Perciformes: Siganidae)). Table 1 shows host records of *C. pulchra* based on the literature. Only one specimen of *C. pulchra* was recorded from each Japanese parrotfish and little spinefoot in Hata et al. (2017). In addition, Hata et

al. (2017) did not state sex, developmental stage, and body size of cymothoid isopods. Therefore, it was unclear whether *C. pulchra* actually parasitized fishes other than the order Tetraodontiformes, or whether the records were cases of accidental parasitism.

In recent years, we collected 21 samples of cymothoid isopods from the buccal cavity of the Japanese parrotfish *C. japonicus* at Izu Oshima Island, Tokyo, Japan. Examined specimens were as follows: 1 male (19.5 mm total length), Keikai, Izu Oshima Island, 7 May 2016, coll. T. Kuroda; 1 male (15.5 mm), Keikai, Izu Oshima Island, 10 May 2016, coll. T. Kuroda; 3 males (13.0, 12.0, 10.0 mm), Keikai, Izu Oshima Island, 15 May 2016, coll. T. Kuroda; 1 female (27.5 mm), 1 ovig. female (28.0 mm), Goishi-Hama, Izu Oshima Island, 7 Jul. 2016, coll. T. Kuroda; 3 ovig. females (37.0, 36.0, 34.5 mm), Keikai, 7m depth, Izu Oshima Island, 11 Dec. 2016, coll. T. Kuroda; 2 ovig. females (30.5, 29.5 mm), 2 females (27.0, 21.5 mm), 7 males (14.5, 13.5, 12.0, 11.0, 10.5, 10.0, 10.0 mm), Izumi-Hama, 5m depth, Izu Oshima Island, 29 May 2017, coll. T. Kuroda. All

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Fig 1. A live *Cymothoa pulchra* in the buccal cavity of the Japanese parrotfish *Calotomus japonicus* from Aki-no-Hama, Izu Oshima Island, 10 m depth, 16 May 2017, photo by O. Hoshino.

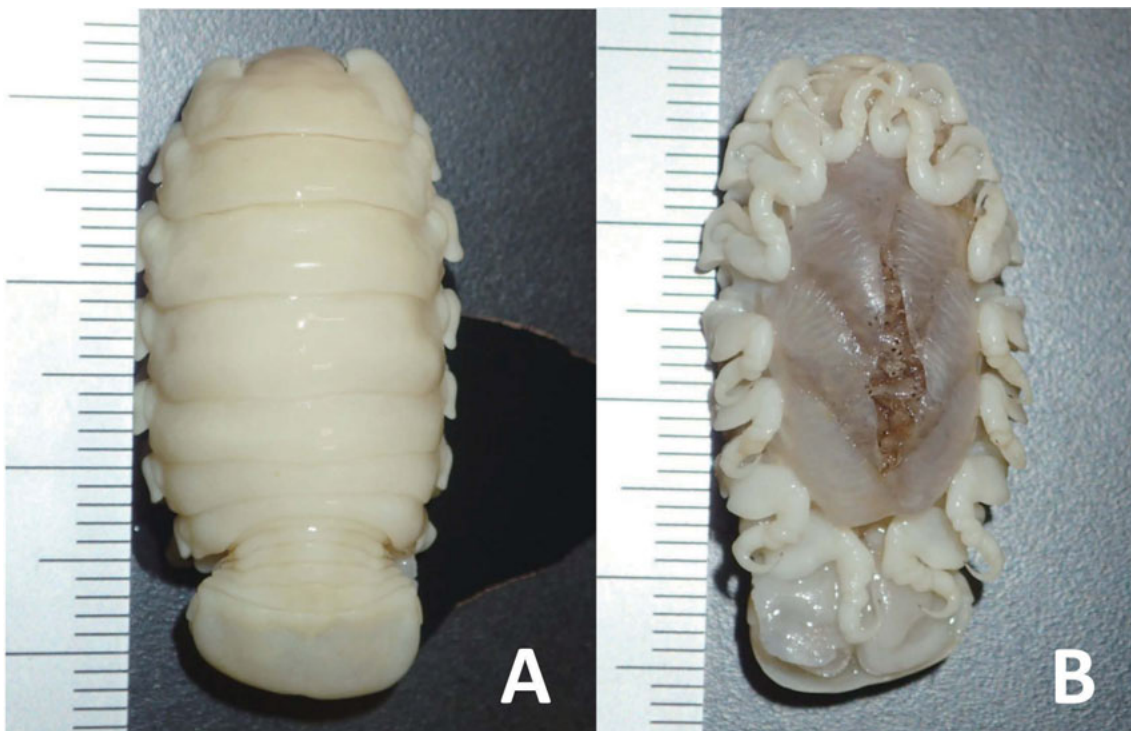


Fig 2. *Cymothoa pulchra* ovigerous female (36.0 mm) collected on Dec. 11, 2016. A, habitus, dorsal; B, same, ventral. Scale in mm.

Table 1. Host records of *Cymothoa pulchra*.

		Host		References
Order	Family	Species		
Perciformes	Carangidae	<i>Caranx</i> sp.		Monod (1924)
Perciformes	Scaridae	<i>Calotomus japonicus</i> (Valenciennes, 1840)		Hata et al. (2017)
Perciformes	Siganidae	<i>Siganus spinus</i> (Linnaeus, 1758)		Hata et al. (2017)
Tetraodontiformes	Tetraodontidae	<i>Arothron stellatus</i> (Bloch and Schneider, 1801), as <i>Tetraodon stellatus</i> Bloch and Schneider, 1801 or <i>Arothron alboreticulatus</i> (Tanaka, 1908)		Monod (1934); Avdeev (1978); Galzin and Trilles (1979)
Tetraodontiformes	Tetraodontidae	<i>Arothron meleagris</i> (Lacepède, 1798)		Galzin and Trilles (1979)
Tetraodontiformes	Diodontidae	<i>Chilomycterus reticulatus</i> (Linnaeus, 1758)		Nagasawa and Doi (2012); Hata et al. (2017)
Tetraodontiformes	Diodontidae	<i>Diodon holacanthus</i> Linnaeus, 1758		Shiino (1951); Williams et al. (1996); Kuramochi et al. (2003); Hata et al. (2017)
Tetraodontiformes	Diodontidae	<i>Diodon hystrix</i> Linnaeus, 1758		Galzin and Trilles (1979); Williams et al. (1996); Hata et al. (2017)
Tetraodontiformes	Diodontidae	<i>Diodon liturosus</i> Shaw, 1804		Williams et al. (1996)

Japanese parrotfishes above-mentioned were captured by harpoon. In many cases, the host size is unknown, but Japanese parrotfishes from which cymothoid isopods were collected on May 10 and July 7, 2016 were approximately 30 cm TL (total length). On May 16, 2017, one of us (OH) succeeded in photographing a cymothoid isopod living in the buccal cavity of a swimming Japanese parrotfish (Fig. 1).

The isopods were removed from the fishes and fixed in 70% ethanol. Observations of morphological characters were made under a binocular microscope. The material examined in this study will be deposited in the Museum of Nature and Human Activities, Hyogo, Japan. The common and scientific names of fishes follow those recommended by Froese and Pauly (2020).

The morphology and measurements of the specimens correspond to those of *C. pulchra* reported by Shiino (1951), Kuramochi et al. (2003), and Nagasawa and Doi (2012) from Japan, and by Galzin and Trilles (1979) from French Polynesia.

Ovigerous females of *C. pulchra* (Fig. 2) were collected from Japanese parrotfish, indicating that *C. pulchra* definitely uses Japanese parrotfish as hosts to reproduce. Namely, *C. pulchra* are able to parasitize and breed on non-tetraodontiform fishes.

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References

- Avdeev, V. V. (1978) Notes on the distribution of the marine Cymothoidae (Isopoda, Crustacea) in the Australian–New Zealand region. *Folia Parasitologica (Prague)*, **25**, 281–283.
- Froese, R. and Pauly, D. (eds.) (2020) FishBase. World Wide Web electronic publication. Available from: <http://www.fishbase.org/> (latest access: 10 June 2020)
- Galzin, R. and Trilles, J. P. (1979) Sur la présence de *Cymothoa pulchrum* Lanchester, 1902 (Isopoda, Flabellifera, Cymothoidae) en Polynésie française. *Crustaceana*, **36**, 257–267.
- Hata, H., Sogabe, A., Tada, S., Nishimoto, R., Nakano, R., Kohya, N., Takeshima, H., and 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. *Marine Biology*, **164**, 105. DOI 10.1007/s00227-017-3138-5.
- Kuramochi, T., Ikeda, H. and Watanabe, M. (2003) On some records of *Cymothoa pulchra* (Crustacea, Isopoda) from Sagami Bay, central Japan. Science Report of the Yokosuka City Museum, **50**, 69–70 (in Japanese with English title).
- Monod, T. (1924) On a few isopods from Ceylon. *Spolia Zeylanica*, **13**: 97–101, 2 pls.
- Monod, T. (1934) Isopodes marins des campagnes du “de Lanessan”. *Notes de l’Institut Oceanographique de l’Indochine, Saigon*, **23**, 1–22, pls. 1–45.

- Nagasawa, K. and Doi, H. (2012) The spotfin burrfish (*Chilomycterus reticulatus*), a new host record for *Cymothoa pulchra* (Isopoda, Cymothoidae). *Crustaceana*, **85**: 893–896.
- Nagasawa, K. and Uyeno, D. (2012) Geographical distribution affected by the Kuroshio of the fish parasite *Cymothoa pulchra* (Isopoda: Cymothoidae) in Japanese waters. *Biogeography*, **14**, 151–153.
- Shiino, S. M. (1951) On the cymothoid Isopoda parasitic on Japanese fishes. *Bulletin of the Japanese Society of Scientific Fisheries*, **16**, 81–89 (in Japanese with English abstract).
- Williams, E. H. Jr., Bunkley-Williams, L. and Dyer, W. G. (1996) Metazoan parasites of some Okinawan coral reef fishes with a general comparison to the parasites of Caribbean coral reef fishes. *Galaxea*, **13**, 1–13.

ブダイに寄生していたフグノエ抱卵雌

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フグノエ *Cymothoa pulchra* (等脚目：ウオノエ科) は、主にフグ類の口腔内に寄生する種であり、これまでに9種（フグ目6種、スズキ目3種）の魚類から記録されていた。フグノエがフグ目以外の魚類を真に宿主として利用しているのか、あるいは偶発的に寄生していただけなのかは定かでなかった。

2016～2017年に、伊豆大島において、ブダイ *Calotomus japonicus* (スズキ目：ブダイ科) の口腔内に寄生していたフグノエ21個体が採集された。採集されたフグノエには6個体の抱卵雌が含まれていたことから、フグノエがブダイを真に宿主として利用して繁殖していることが明らかとなった。

キーワード：魚類，宿主特異性，日本，太平洋，寄生虫

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