

A case of infestation by *Limnotrachelobdella okae* (Hirudinida: Piscicolidae) on Japanese Amberjack *Seriola quinqueradiata* cultured in Kyushu, Japan

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Abstract Two leeches, identified as *Limnotrachelobdella okae* (Moore, 1924), were found attached to the skin of a Japanese amberjack *Seriola quinqueradiata* Temminck and Schlegel, 1845 (Perciformes: Carangidae) cultured in Tsukumi Bay, the northwestern Bungo Channel, off Youra, Tsukumi, Oita Prefecture, Japan in January 2001. Although a survey of fish diseases was conducted for 21 years from 1984–1986 and from 1990–2007 in the coastal seawaters of Oita Prefecture, this finding was the first and only case of leech infestation of marine fishes cultured in the region. Since the infested fish was transported from a fish farm in the central Seto Inland Sea in December 2000, it is highly likely that the leeches found were introduced to the culture site in Tsukumi Bay together with the transported fish.

Key words: *Limnotrachelobdella okae*, fish leech, Piscicolidae, amberjack, *Seriola quinqueradiata*, fish disease

INTRODUCTION

Much information has been accumulated on the parasites of marine fishes cultured in Japan, but leeches are exceptional and have been very poorly studied. The lack of research on fish leeches in Japan is due to the fact that few scientists have worked with this group (Nagasawa *et al.*, 2008b). The piscicolid leech *Limnotrachelobdella okae* (Moore, 1924) is only known to occur on the following marine fishes cultured in Japan: Japanese amberjack *Seriola quinqueradiata* Temminck and Schlegel, 1845 (Perciformes: Carangidae), bastard halibut *Paralichthys olivaceus* (Temminck and Schlegel, 1846) (Pleuronectiformes: Paralichthyidae), and Japanese pufferfish *Takifugu rubripes* (Temminck and Schlegel, 1850) (Tetraodontiformes: Tetraodontidae) (Mizuno, 1989, 2006; Izumikawa, 1999; Nagasawa *et al.*, 2009). As for the infestation by this leech on Japanese amberjack, the sources of our knowledge are only two notes by Mizuno (1989, 2006). These notes are found each as a single page in the books entitled ‘Atlas of Fish Diseases’ (Hatai *et al.*, 1989) and ‘New Atlas of Fish Diseases’ (Hatai and Ogawa, 2006) and the later note is a little modified from the first one. The notes contained important information on the ecology of *L. okae*, but the accounts were very brief because of the limited space of the page in each book.

In January 2001, two specimens of Japanese amberjack *S. quinquerediata* were brought by a fish farmer to the Oita Institute of Marine and Fisheries Center (OIMFC) (currently the Fisheries Research Institute, Oita Prefectural Agriculture, Forestry and Fisheries Research Center), Kamiura, Oita Prefecture, Kyushu for bacterial and parasitological examination. One of these fish was found infested by *L. okae*. On this occasion, we had an opportunity to observe this leech infestation. The results of the observation are presented here.

MATERIALS AND METHODS

Two Japanese amberjack *Seriola quinquerediata* were sampled at a net cage in the coastal waters of Tsukumi Bay, the northwestern Bungo Channel, off Youra (33°04'14"N, 131°59'05"E), Tsukumi, Oita Prefecture, on January 25, 2001. The sea surface temperature at sampling site was 15.0°C. Within a day of capture, these fish were brought to OIMFC, weighed for body weight (BW), and examined for pathogenic bacteria and parasites. Two leeches were found, photographed, and then fixed in 70% ethanol. These leeches were observed for external morphological characters under a stereoscopic microscope. The specimens are deposited in the annelid (An) collection at the National Museum of Nature and Science, Tokyo, Japan (NSMT-An 395). The fish names used in this paper follow Froese and Pauly (2008).

RESULTS

One of the two fish was found infested by two leeches, which were identified as *Limnotrachelobdella okae*. The fish examined were 3700 g and 2950 g each in BW and the larger one was infested. One leech was attached to the anus of the fish by the caudal sucker (Fig. 1A) and another leech inserted the caudal sucker into the lateral musculature of the fish just posterior to the right pectoral fin (Fig. 1B).

The two leech specimens consisted of a large (76.8 mm in total length [TL], including the suckers, and 15.1 mm in maximum body width [MBW]) and a small (53.3 mm TL, 7.2 mm MBW) individuals. Color is black (in fresh) (Fig. 1) or whitish yellow (in 70% ethanol) (Fig. 2). The body is composed of two parts: trachelosome and urosome. The trachelosome is subcylindrical and slightly

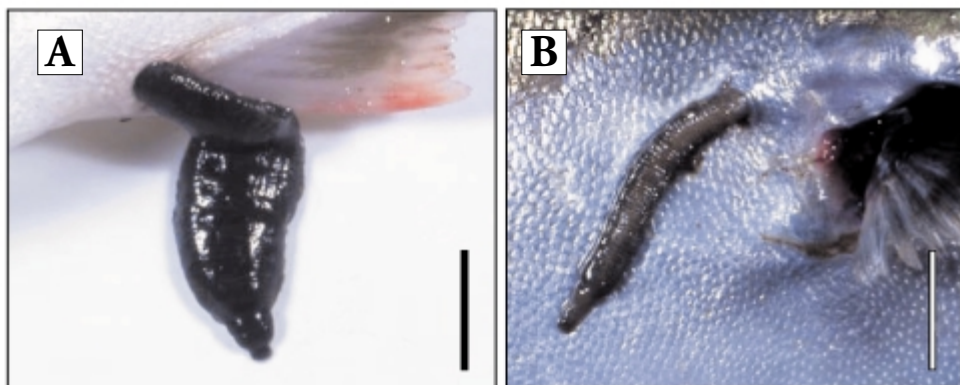


Fig. 1. *Limnotrachelobdella okae* found on a Japanese amberjack *Seriola quinquerediata* cultured in Tsukumi Bay, Kyushu, Japan. A. a leech attached to the anus of the fish, B. a leech attached to the body surface of the fish. Scale bars: 20 mm in A, 10 mm in B.

widens toward the urosome, which is much larger, wrinkled, and dorsoventrally flattened. The number of pairs of pulsatile vesicles is not exactly counted. The caudal sucker is much larger (7.4 and 6.6 mm in diameter, respectively) than the oral sucker (3.6 and 1.9 mm): both suckers are deeply cupped and face laterally.

No hemorrhage was observed at attachment sites (Fig. 1). Pathogenic bacteria *Lactococcus garvieae* were isolated from the two fish examined.

DISCUSSION

Limnotrachelobdella okae is known as a parasite of Japanese amberjack *Seriola quinqueradiata* cultured in Japan (Ogawa and Yokoyama, 1998) but the actual records of this leech from farmed Japanese amberjack are only Mizuno's (1989, 2006) brief notes. The present report represents the first documented case of infestation by *L. okae* on cultured Japanese amberjack.

Limnotrachelobdella okae is widely distributed along the coast of Far East Asia, including Japan, China, and Russia (Nagasawa *et al.*, 2008a). In Japan, this species is known to occur on the coast of Hokkaido, Honshu, and Shikoku (Oka, 1910; Mizuno, 1989, 2006; Izumikawa, 1999; Furiness *et al.*, 2007; Nagasawa *et al.*, 2008a) but has never been reported from Kyushu to date. Our collection constitutes the first record of *L. okae* from Kyushu.

The external morphology of a large specimen (117 mm TL) of *L. okae* was currently described (Nagasawa *et al.*, 2008a). The ratio of caudal sucker diameter to total length in this specimen is lower (0.07) than those (0.10 and 0.12) in our, much smaller specimens (76.8 and 53.3 mm TL). A study on proportions of various body parts of the species is desirable to exactly identify individuals of various sizes.

According to the fish farmer who requested us fish examination, the fish examined had been

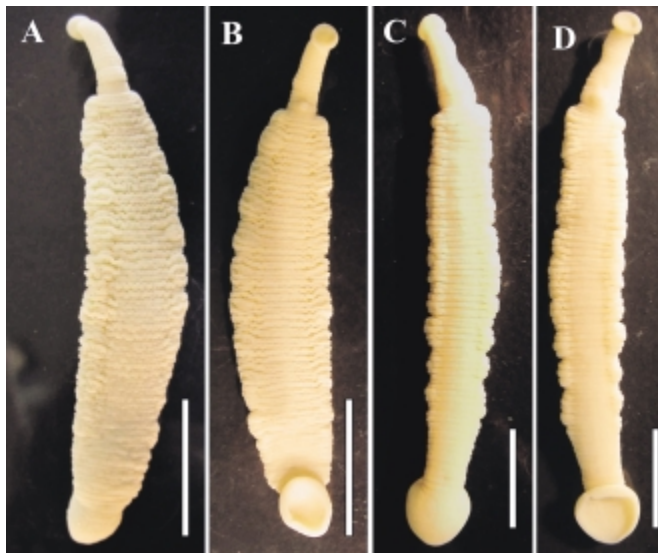


Fig. 2. *Limnotrachelobdella okae* (fixed specimens) from a Japanese amberjack *Seriola quinqueradiata* cultured in Tsukumi Bay, Kyushu, Japan. A. a large specimen, dorsal view, B. same, ventral view, C. a small specimen, dorsal view, D. same, ventral view. Scale bars: 20 mm in A and B, 10 mm in C and D.

transported from a fish farm on the coast of Nao Island (34°27'35"N, 133°59'08"E), Kagawa Prefecture, in the central Seto Inland Sea on December 22, 2000 (one month before our examination). The fish farmer also stated that Japanese amberjack from this island had been infested by leeches on several occasions. Nao Island is geographically very close to the two localities, Kurashiki and Tamano, in which *L. okae* was previously found on cultured bastard halibut *Paralichthys olivaceus* and Japanese pufferfish *Takifugu rubripes* (Izumikawa, 1999; Nagasawa *et al.*, 2009). In addition, while one (YF) of the present authors was engaged in a survey of fish diseases in the coastal seawaters of Oita Prefecture for 21 years from 1984-1986 and from 1990-2007 and examined about 14,000 specimens of Japanese amberjack (see Fukuda, 1999), he had never discovered leech infestation, except for the present case. Therefore, it is highly likely that the leeches found had been introduced from the fish farm in the central Seto Inland Sea to the culture site in Tsukumi Bay together with the transported fish. Since parasites are easily brought to other areas by live fish transportation, it is important to examine the fish before transportation to prevent the parasites from spreading.

The two fish examined in this study were infected by pathogenic bacteria *Lactococcus garvieae* but the leeches were found on only one fish, suggesting that the leeches did not induce a secondary bacterial infection in the present case. On the other hand, when large individuals of *L. okae* infest the fish, scars and hemorrhaging are found at feeding sites (Mizuno, 1989, 2006; Nagasawa *et al.*, 2008a, 2009). The leeches found in this study were much smaller (76.8 and 53.3 mm TL) than those previously reported (e.g., 117 mm TL, Nagasawa *et al.*, 2008a) and the impact of such small leeches on the fish may be weak.

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九州で養殖されていたブリに見られたヒダビルの寄生

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要 旨 2001年1月に大分県津久見市四浦地先の津久見湾で養殖されていたブリ *Seriola quinqueradiata* の体表にヒダビル *Limnotrachelobdella okae* の寄生を認めた。1984～1986年と1990～2007年の21年間に実施された大分県沿岸の海産魚の魚病診断で14,000尾以上のブリが検査されたが、本例が唯一のヒダビル寄生であった。また、寄生を受けていたブリは2000年12月に瀬戸内海中央部にある養魚場から搬入されたものであった。これらのことから、ヒダビルはブリの移動に伴って津久見湾に持ち込まれたと推測された。

キーワード：ヒダビル, *Limnotrachelobdella okae*, ウオビル類, ブリ, *Seriola quinqueradiata*, 魚病