

A piscicolid leech *Limnotrachelobdella okae* (Hirudinida) infesting a Japanese eel, *Anguilla japonica*, in Japan

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Abstract. A specimen of the piscicolid leech *Limnotrachelobdella okae* (Moore, 1924) was collected from the labium of a Japanese eel, *Anguilla japonica* Temminck & Schlegel, 1847, in brackish waters of the lower Katsura River, Oita Prefecture, Kyushu, western Japan. This represents a new host record for *L. okae* and the third record of the species in Kyushu. Hemorrhage was observed at the attachment and feeding sites of the leech.

Key words: *Anguilla japonica*, fish parasite, Japanese eel, leech, *Limnotrachelobdella okae*, new host, Piscicolidae

The piscicolid leech *Limnotrachelobdella okae* (Moore, 1924) is a parasite of coastal marine fish in Far East Asia, including Japan, China, and Russia (Nagasawa *et al.*, 2008, 2009). This species is also found in fresh waters because infested anadromous fish, such as salmonids, migrate from marine waters to rivers (Nagasawa *et al.*, 2010). This note reports on infestation of *L. okae* on a Japanese eel, *Anguilla japonica* Temminck & Schlegel, 1847 (Anguilliformes: Anguillidae), in western Japan.

In total, 30 specimens of *A. japonica* were collected from October 2013 to March 2014 in brackish waters of the lower Katsura River at Kuresaki (33°34'24"N, 131°25'53"E) with eel pots and an eel trap called “unagi-kura” and in coastal marine waters near the mouth of this river off Kanaya (33°36'46"N, 131°27'11"E) using a set net in Bungotakada City, Oita Prefecture, Kyushu, western Japan. These

eels were transported alive to the laboratory at the Fisheries Research Division of the Oita Prefectural Agriculture, Forestry and Fisheries Research Center, where they were measured for total length (TL) in millimeters and examined for body coloration, stomach contents, and maturity. During this examination, a single individual of *L. okae* was found infesting one (592 mm TL) of the four eels (354–592 [mean 485] mm TL) caught in March 2014 (Fig. 1A), but no infestation was found on the other eels (357–797 [514] mm TL, n=25) examined from October 2013 to February 2014. The infested eel was caught in the brackish waters of the Katsura River. The leech was carefully taken from the eel and transported alive in a plastic bag containing brackish waters to the laboratory at Hiroshima University, Higashi-Hiroshima City, Hiroshima Prefecture, where it was fixed in 70% ethanol with relaxation. It is deposited in the Annelida (An) collection of the National Museum of Nature and Science, Tsukuba City, Ibaraki Prefec-

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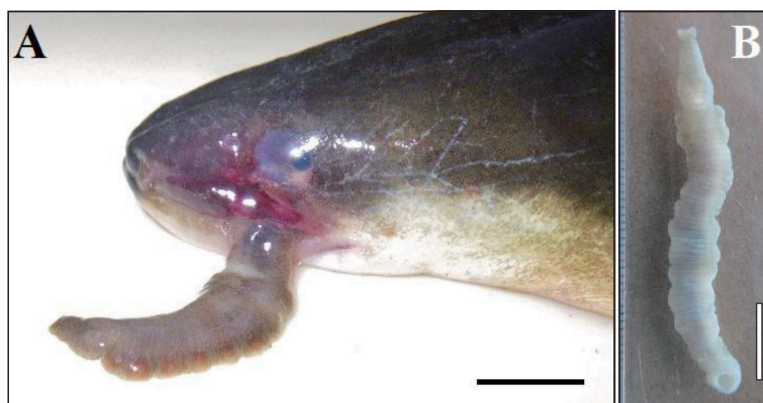


Fig. 1. *Limnotrachelobdella okae* (Moore, 1924) infesting the posterior part of the labium of *Anguilla japonica* Temminck & Schlegel, 1847 (A), and an alcohol-fixed specimen of *L. okae*, NSMT-An 496, ventral view (B). Scale bars: A, 20 mm; B, 10 mm.

ture, Japan (NSMT–An 496).

The specimen of *L. okae* (Fig. 1B) measured 44.0 mm in total length (including the suckers) and 6.5 mm in maximum width: body dorsoventrally flattened, wrinkled; trachelosome distinctly separated from urosome; 11 pairs of pulsatile vesicles on lateral margins of urosome; caudal sucker larger than oral sucker; and both suckers deeply cupped. The specimen was dark brown when alive (Fig. 1A) but milky or yellowish white in 70% ethanol (Fig. 1B).

The present finding of *L. okae* from *A. japonica* is a new host record and the third record of this leech in Kyushu, where it was previously found on the Japanese amberjack *Seriola quinqueradiata* Temminck & Schlegel, 1845 (Perciformes: Carangidae) (Nagasawa & Fukuda, 2008) farmed in Oita Prefecture and the Japanese seabass *Lateolabrax japonicus* (Cuvier, 1828) (Perciformes: Lateolabracidae) caught in a cove, Miyazaki Prefecture (Yamauchi *et al.*, 2010).

Anguilla japonica had been believed to be a freshwater fish, spending its majority of life in fresh waters (e.g., Matsui, 1972). Recently, however, using the otolith microchemistry analysis, the species of Japan has been reported to have three groups, i.e., river eels, estuarine eels, and sea eels (Tsukamoto & Arai, 2001). Based on such current knowledge

of the species, the samples examined in this study are regarded to be estuarine eels or sea eels. These eels are known to inhabit brackish or coastal marine waters in central and western Japan (Tsukamoto & Arai, 2001), and the Japanese eel reported in this paper is likely to have acquired the leech infestation during its residence in salt waters. To date, only one species of wild fish (*Lateolabrax japonicus*) has been reported to serve as the host of *L. okae* in Kyushu (Yamauchi *et al.*, 2010), and the host range and utilization of the leech is poorly understood in this region. We need more work on the hosts and other aspects of the biology of *L. okae* in coastal marine waters of various locations of Kyushu.

In this study, the leech was found attached tightly to the posterior part of the eel's labium by the posterior sucker (Fig. 1A). Hemorrhage was observed at the attachment site and more distinctly at the feeding site (i.e. the labrum and adjacent skin) of the leech. A similar hemorrhage was reported for a cherry salmon *Oncorhynchus masou masou* (Brevoort, 1856) (Salmoniformes: Salmonidae) infected by the same leech species (Nagasawa *et al.*, 2008). Nevertheless, the impact of *L. okae* on an infested host still remains unstudied, and it is desirable to conduct a detailed study of the leech's pathogenicity.

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References

- Matsui, I., 1972. [Eel biology–biological study]. Kouseisha Kouseikaku, Tokyo: 283 pp. (In Japanese).
- Nagasawa, K. & Fukuda, Y., 2008. A case of infestation by *Limnotrachelobdella okae* (Hirudinida: Piscicolidae) on Japanese amberjack *Seriola quinqueradiata* cultured in Kyushu, Japan. *J. Grad. Sch. Biosph. Sci., Hiroshima Univ.*, **47**: 29–34.
- Nagasawa, K., Ueno, Y., Ishito, Y. & Yamauchi, T., 2008. *Limnotrachelobdella okae* (Hirudinida, Piscicolidae) from cherry salmon *Oncorhynchus masou masou* in neritic deep waters of the western North Pacific Ocean. *Biogeography*, **10**: 33–39.
- Nagasawa, K., Izumikawa, K., Yamamoi, H. & Umino, T., 2009. New hosts, including marine fishes cultured in Japan, of *Limnotrachelobdella okae* (Hirudinida: Piscicolidae). *Comp. Parasitol.*, **76**: 127–129.
- Nagasawa, K., Kikuchi, M. & Arakane, Y., 2010. Transportation of the coastal marine leech *Limnotrachelobdella okae* (Hirudinida, Piscicolidae) to a river by adult sockeye salmon *Oncorhynchus nerka*. *Biogeography*, **12**: 21–23.
- Tsukamoto, K. & Arai, T., 2001. Facultative catadromy of the eel *Anguilla japonica* between freshwater and seawater habitats. *Mar. Ecol. Prog. Ser.*, **220**: 265–276.
- Yamauchi, T., Doi, H., Wada, M. & Nagasawa, K., 2010. Records of *Limnotrachelobdella okae* (Hirudinida, Piscicolidae) from the coastal sea around Kyushu, Japan. *Humans. Nature*, **21**: 133–136. (In Japanese with English abstract).

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