

Greater Amberjack *Seriola dumerili*, a New Host of *Limnotrachelobdella okae* (Hirudinida, Piscicolidae) in Japanese Mariculture

Kazuya Nagasawa^{1*} and Makiko Hirai²

¹ Graduate School of Biosphere Science, Hiroshima University,
1-4-4 Kagamiyama, Higashi-Hiroshima, Hiroshima, 739-8528 Japan
² Ehime Fisheries Research Center, Uwajima, Ehime, 798-0087 Japan

Abstract. A specimen of *Limnotrachelobdella okae* (Moore, 1924) was found on the skin near the base of the dorsal fin of a greater amberjack *Seriola dumerili* cultured in coastal waters of the Bungo Channel (western North Pacific Ocean) off Ehime Prefecture, Shikoku Island, Japan in February 2009. This finding represents a new host record for *L. okae*, and *S. dumerili* is the fourth fish host of the leech in Japanese mariculture. Although many juvenile greater amberjack including the fish examined were cultured at the sampling site after imported from near Xiamen, China in January 2009, the leech found is thought to have infested the fish in Japan because it is distributed in the nearby Seto Inland Sea and is known to be parasitic on Japanese amberjack *Seriola quinqueradiata* cultured near the site.

Key words: *Limnotrachelobdella okae*, *Seriola dumerili*, greater amberjack, leech, parasite, new host, mariculture.

Introduction

Currently our knowledge of the piscicolid leech *Limnotrachelobdella okae* (Moore, 1924) has increased, including information on the hosts, pathogenicity, and geographical distribution in Japan (Furiness *et al.*, 2007; Yamauchi *et al.*, 2008; Nagasawa & Fukuda, 2008; Nagasawa *et al.*, 2008a, b, 2009; Nagasawa, 2009; Nagasawa & Sakaoka, 2009). Since this leech shows a low degree of host specificity, it has been suggested that the species can be found from a wide variety of fishes including wild and farmed fishes (Nagasawa *et al.*, 2009). In February 2009, we found an infestation by *L. okae* on a greater amberjack *Seriola dumerili* (Risso) cultured in coastal waters off Ehime Prefecture, Shikoku Island, Japan. The present note reports on this case of infestation with a new host record.

Materials and Methods

A single specimen of greater amberjack *Seriola dumerili* was sampled by a fish farmer from a net cage in coastal waters of the Bungo Channel (western North Pacific Ocean) near Shioko Island (33°02'02" N, 132°27'10"E), Ainan, Ehime Prefecture, Shikoku Island and brought to the Ehime Fisheries Research Center, Uwajima, for diagnosis of fish diseases on February 10, 2009. In the laboratory, the fish was weighed and examined for parasites. A leech was found and fixed in 10% formalin after relaxed in 5% ethanol. This specimen was later transported to the laboratory of Hiroshima University, where it was preserved in 5% formalin, examined, and photographed. The leech specimen is deposited in the annelid (An) collection at the National Museum of Nature and Science, Tokyo (NSMT-An 396). The English and scientific names of fishes follow Froese & Pauly (2008).

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



Fig. 1. *Limnotrachelobdella okae* (a recently fixed specimen) from the dorsal skin of a greater amberjack *Seriola dumerili* cultured in coastal waters off Ehime Prefecture, Shikoku Island, Japan. Ventral view. Scale bar: 10 mm.

Results

One leech was found attached to the skin near the base of the dorsal fin of the fish (body weight=650 g) and identified as *Limnotrachelobdella okae* (Fig. 1). There was a feeding scar but no hemorrhage was observed at the attachment site.

The leech is slightly contracted, measuring 55.7 mm in total length (including the suckers) and 17.7 mm in maximum body width. The body consists of the trachelosome and the larger, dorsoventrally flattened urosome. The trachelosome tapers toward the oral sucker. Many deep wrinkles are present on the surface of the urosome. Pulsatile vesicles do not develop. The oral sucker is deeply cupped (3.6 mm in diameter). The caudal sucker, with 6.7 mm in diameter, is larger than the oral sucker, muscular, and faces ventrally. Color is black (excluding the whitish caudal sucker) in fresh but whitish yellow in formalin.

Discussion

Limnotrachelobdella okae is a piscicolid leech infesting coastal marine fishes in Far East Asia, including Japan, China, and Russia (Nagasawa *et al.*, 2008a, 2009). In this region, the species has so far been reported from 11 species in 7 families (Acipenseridae, Cyprinidae, Salmonidae, Lateolabracidae, Carangidae, Paralichthyidae, Tetraodontidae) and 6 orders (Acipenseriformes, Cypriniformes, Salmoniformes, Perciformes, Pleuronectiformes, Tetraodontiformes) (Nagasawa *et al.*, 2009 for a detailed host list). Of these fishes, three species [Japanese amberjack *Seriola quinqueradiata* Temminck & Schlegel, bastard halibut *Paralichthys olivaceus* (Temminck & Schlegel), Japanese pufferfish *Takifugu rubripes* (Temminck & Schlegel)] are cultured in Japan, on which the leech is known to occur (Mizuno, 1989, 2006; Izumikawa, 1999; Nagasawa & Fukuda, 2008; Nagasawa *et al.*, 2009). The present finding of *L. okae* from the greater amberjack *Seriola dumerili* (Perciformes: Carangidae) represents a new host record, and *S. dumerili* is the fourth fish host for the leech in Japanese mariculture.

Our specimen of *L. okae* was found to be parasitic on the fish in February 2009. It has been suggested that the leech occurs on marine fishes during the winter and spring months (December to April) (Nagasawa *et al.*, 2009). The species likely feeds on the host's blood during the period of low water temperatures.

Currently numerous juveniles of greater amberjack are imported from China as mariculture seedlings in Japan. From those fish cultured in Japan after being imported from China, the benedenid monogenean *Neobenedenia girellae* (Hargis, 1955) and the anisakid nematode *Anisakis pegreffii* Campana-Rouget & Biocca, 1955, have been reported and regarded as the species of Chinese origin (Ogawa *et al.*, 1995; Yoshinaga *et al.*, 2006). The fish we examined was one of those juveniles that had been cultured at the sampling site since January 19, 2009 when they were imported from near Xiamen, China, but our specimen of *L. okae* is thought to have infest-

ed the fish in the cage because the leech is distributed in the nearby Seto Inland Sea (Izumikawa, 1999; Nagasawa *et al.*, 2009) and because, before starting massive importation of the host species, it is also known to occur on Japanese amberjack *Seriola quinqueradiata* cultured in Mikame Bay (Mizuno, 1989, 2006) near our sampling site.

Acknowledgments

We thank the staff of the Ehime Fisheries Research Center for their support during the study. This work was in part supported by a Grant-in-Aid for Scientific Research (B) (No. 18380116) from the Japan Society for the Promotion of Science.

References

- Froese, R. & Pauly, D. (Eds), 2008. FishBase. World Wide Web electronic publication. Available from URL: www.fishbase.org, version (12/2008).
- Furiness, S., Williams, J. I., Nagasawa, K. & Bureson, E. M., 2007. A collection of fish leeches (Hirudinida: Piscicolidae) from Japan and surrounding waters, including redescriptions of three species. *J. Parasit.*, **93**: 875–883.
- Izumikawa, K., 1999. A leech infecting Japanese pufferfish. *Suishi-dayori*, **244**: 1–2 (in Japanese).
- Mizuno, Y., 1989. *Trachelobdella* infection. In Hatai, K., Ogawa, K. & Hirose, H. (Eds), *Atlas of Fish Diseases*: 20. Midori Shobo Publishing, Tokyo. (In Japanese).
- , 2006. *Limnotrachelobdella* infection (Limnotrachelobdellosis). In Hatai, K. & Ogawa, K. (Eds), *New Atlas of Fish Diseases*: 163. Midori Shobo Publishing, Tokyo. (In Japanese).
- Nagasawa, K., 2009. Limnotrachelobdellosis of marine fishes. *Yoshoku*, **46**(1): 102 (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. Biosp. Sci., Hiroshima Univ.*, **47**: 29–34.
- Nagasawa, K. & Sakaoka, K., 2009. First record of *Limnotrachelobdella okae* (Hirudinida, Piscicolidae) as prey for fishes: a case of heavy predation by *Oncorhynchus masou ishikawae* (Teleostei, Salmonidae). *Biogeography*, **11**: 13–16.
- Nagasawa, K., Izumikawa, K., Yamanoi, H. & Umino, T., 2009. New hosts, including marine fishes cultured in Japan, of *Limnotrachelobdella okae* (Hirudinida: Piscicolidae). *Comp. Parasit.*, **76**: 127–129.
- Nagasawa, K., Ueno, Y., Ishito, Y. & Yamauchi, T., 2008a. *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., Yamauchi, T. & Umino, T., 2008b. Synopsis of leeches of the families Piscicolidae and Ozobranchidae (Annelida, Rhynchobdellida) in Japan (1895–2008). *Bull. biogeogr. Soc. Japan*, **63**: 151–171 (in Japanese with English abstract).
- Ogawa, K., Bondad-Reantaso, M. G., Fukudome, M. & Wakabayashi, H., 1995. *Neobenedia girellae* (Hargis, 1955) Yamaguti, 1963 (Monogenea: Capsalidae) from cultured marine fishes of Japan. *J. Parasit.*, **81**: 223–227.
- Yamauchi, T., Itoh, T., Yamaguchi, K. & Nagasawa, K., 2008. Some leeches (Annelida: Hirudinida: Piscicolidae, Glossiphonidae) in the Hii River system, Shimane Prefecture, Japan. *Laguna*, (15): 19–23.
- Yoshinaga, T., Kinami, R., Hall, K. A. & Ogawa, K., 2006. A preliminary study on the infection of anisakid larvae in juvenile greater amberjack *Seriola dumerili* imported from China to Japan as mariculture seedlings. *Fish Path.*, **41**: 123–126.

(Accepted March 27, 2009)