

New Host Records for *Lernaea cyprinacea* (Copepoda), a Parasite of Freshwater Fishes, with a Checklist of the Lernaeidae in Japan (1915-2007)

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Abstract The lernaeid copepod *Lernaea cyprinacea* Linnaeus, 1758, was found attached to three species of freshwater fishes, the barbell steed *Hemibarbus labeo* (Pallas) (Cyprinidae), the dark chub *Zacco temminckii* (Temminck and Schlegel) (Cyprinidae), and the Amur catfish *Silurus asotus* Linnaeus (Siluridae) from Hiroshima Prefecture in Japan. The findings from *Hemibarbus labeo* and *Zacco temminckii* represent new host records for *L. cyprinacea*, while *Silurus asotus* is a new host in Japan. Based on the literature published for 93 years from 1915 to 2007, a checklist of three species of lernaeid copepods (*Lernaea cyprinacea*, *Lernaea parasiluri*, *Lamproglena chinensis*) from Japan is given, including information on the synonym(s), host(s), site(s) of infection, and distribution. The checklist shows that in Japan *L. cyprinacea* has been reported from 33 or 34 species and subspecies of fishes belonging to 17 families in 10 orders and also from 2 species of amphibians from 2 families in 2 orders.

Key words: *Lamproglena chinensis*; *Lernaea cyprinacea*; *Lernaea parasiluri*; Lernaeidae; parasites; new hosts

INTRODUCTION

The lernaeid copepod *Lernaea cyprinacea* Linnaeus, 1758, often called the anchor worm, is a parasite of freshwater fishes in various regions of the world (Kabata, 1979; Lester and Hayward, 2006). The anterior part of the body of metamorphosed adult female is embedded in the host tissue, whereas the remaining body protrudes in the water. The species has nine stages in the life cycle, including three free-living naupliar stages, five copepodid stages, and one adult stage (Grabda, 1963). After male and female adults mate on the fish host and then males die, females metamorphose, insert their anterior body into the host tissue and then produce eggs. The copepod is known as a pathogen of cultured and aquarium fishes (Shariff et al., 1986; Lester and Hayward, 2006).

In Japan, various studies on the biology of *L. cyprinacea* have been conducted to date since the work of Ishii (1915) who recorded it as *Lerneocera cyprinacea*. The species was later described by Leigh-Sharpe (1925) as a new species, *Lernaea elegans* from the Japanese eel *Anguilla japonica* in central Japan, which was subsequently regarded by Harding (1950) as a junior synonym of *L. cyprinacea*. The copepod has been reported from a variety of host species including wild, aquarium, and cultured fishes and even amphibians in the country.

The present note deals with new host records for *L. cyprinacea* and provides a checklist of three

species of lernaeid copepods (*L. cyprinacea*, *Lernaea parasiluri*, *Lamproglena chinensis*) in Japan based on the literature (mostly written in Japanese) published between the years 1915 and 2007. Since *L. elegans* has been currently regarded as a valid species (see Kabata, 1979), it may be better to use this scientific name for the Japanese anchor worm. Following Harding (1950), however, we tentatively use *L. cyprinacea* in this note because we have not yet enough data to say whether both taxa are conspecific or not.

MATERIALS AND METHODS

The fishes infected with *L. cyprinacea* were collected in the Ashida River, Fukuyama, and the Kurose River, Higashi-Hiroshima, in Hiroshima Prefecture in October 2006 and June 2007, respectively. In the laboratory, the copepods were carefully removed from the hosts and preserved in 70% ethanol. They were examined whole on an Olympus microscope. Drawings were made with the aid of a drawing attachment.

RESULTS AND DISCUSSION

One young adult female (Fig. 1A) and 10 copepodids (Fig. 1B) of *Lernaea cyprinacea* were found attached to the gills of the barbell steed *Hemibarbus labeo* (Cyprinidae) (1 infected/22 examined) and the Amur catfish *Silurus asotus* (Siluridae) (1 infected/1 examined) from the Ashida River, respectively. The adult female was not ovigerous. The body was slender and 2.54 mm long. The cephalic holdfast comprised a pair of unbranched ventral processes and a pair of larger, slightly branched dorsal processes. The

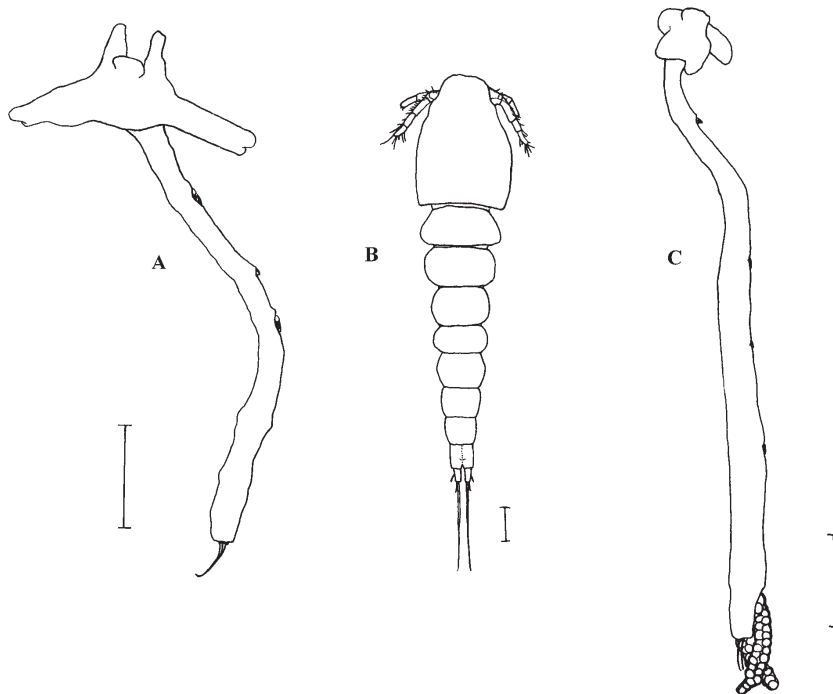


Fig. 1. *Lernaea cyprinacea* from freshwater fishes in Japan. A, a young adult female from the gills of *Hemibarbus labeo* from the Ashida River, habitus, dorsolateral; B, a copepodid V from the gills of *Silurus asotus* from the Ashida River, habitus, dorsal; C, a young adult female from the dorsal fin of *Zacco temminckii* from the Kurose River, habitus, dorsolateral. Scale bars: 0.5 mm in A and C; 0.1 mm in B.

copepodids were 0.70-1.15 (mean 0.93) mm long and all were at fifth stage.

One young adult female with egg sacs (Fig. 1C) of *L. cyprinacea* was collected from the dark chub *Zacco temminckii* (Cyprinidae) (1 infected/1 examined) in the Kurose River. The female was attached to the dorsal fin. The body was slender and 3.46 mm long. The cephalic holdfast was not well developed.

Lernaea cyprinacea is not host-specific and has a wide host range (Kabata, 1979; Shariff et al., 1986). According to Kabata (1979), the species has been recorded from over 100 fish species from 25 families in 10 orders. Even each in China and Japan, about 30 species of fishes are known as hosts of the copepod (see below). Nevertheless, the two cyprinid species, *Hemibarbus labeo* and *Zacco temminckii* are herein recorded as new hosts for *L. cyprinacea*. Also, *Silurus asotus* is a new host for the copepod in Japan, where the fish is also known as a host for a related species *Lernaea parasiluri* (Yamaguti, 1939).

Lernaea cyprinacea is found in other East Asian countries as well. In Korea, the species infects *Misgurnus anguillicaudatus*, *Carassius auratus*, *Pseudorasbora parva*, *Zacco platypus*, *Lepomis macrochirus*, *Channa argus* (as *C. arga*), *Cyprinus carpio*, *Micropterus salmoides* and *Hemiculter eigermani* (Honta, 1939; Kim and Choi, 2003). In Taiwan, it occurs on *Cyprinus carpio* and *Carassius auratus* (Ho, 1961; Chien, 1994). In China, the copepod has been reported from many freshwater fishes, including *Cyprinus carpio*, *C. megalophthalmus*, *Carassius auratus*, *Mylopharyngodon piceus*, *Hypophthalmichthys molitrix*, *Aristichthys nobilis*, *Culter erythropterus*, *Hemiculter leucisculus*, *Anabarrilius songmingensis*, *Megalobrama terminalis*, *M. amblycephala*, *Ochetobius elongatus*, *Opsariichthys uncirostris bidens*, *Pseudorasbora parva*, *Acrossocheilus yunnanensis*, *Sinocyclocheilus malacopterus*, *Barbodes daliensis*, *Garra orientalis*, *Rhodeus* sp., *Puntius semifasciolatus*, *Silurus asotus*, *Siniperca chuatsi*, *Oryzias latipes*, *Tilapia mossambica*, *Fugu* sp., *Ophiocephalus* (= *Channa*) *argus*, *Mastacembelus aculeatus*, *Macropodus chinensis*, *Misgurnus anguillicaudatus* and Salmonidae gen. sp. (as Salmon sp.) (Yin, 1962; Yin et al., 1963; Wang, 1964; Chen, 1973; Kuang and Qian, 1991). In Far Eastern Russia, the copepod was reported from *Cyprinus* sp. and *Perccottus* sp. in the Amur River (Dogiel and Akhmerov, 1952).

A CHECKLIST OF THE LERNAEIDAE IN JAPAN

Three species of lernaeid copepods (*Lernaea cyprinacea*, *Lernaea parasiluri*, *Lamproglena chinensis*) so far have been reported from Japan. The following checklist is compiled based on the literature (including this paper) on these three species in this country published during a period from 1915 to 2007. The *synonyms* listed herein are those that have been used in establishing records of the species in Japan. The *site of infection* is the habitat of the copepod found on its host. The *distribution* in Japan of the copepod is indicated by prefecture (boundaries shown in Fig. 2), in geographical order from northeast to southwest. The authors responsible for the *record(s)* are listed in chronological order: each reference is followed by the locality or localities given in two parts, first the prefecture and then the detailed collection locality or localities from which the copepod was reported. For references in which a locality record was not given, the geographical locality is shown by a dash (-). The scientific names of the fishes listed below are mainly those recommended in Nakabo (2002). For the ornamental goldfish, *Carassius auratus* is used as its scientific name.

Family Lernaeidae Coddold, 1879 (イカリムシ科)

Genus *Lernaea* Linnaeus, 1758 (イカリムシ属)

***Lernaea cyprinacea* Linnaeus, 1758 (イカリムシ)**

Synonyms: *Lerneocera cyprinacea* (Linnaeus, 1758); *Lernaea elegans* Leigh-Sharpe, 1925; *Lernaea* (*Lerneocera*) *elegans* Leigh-Sharpe, 1925

Includes: *Lernaea* sp. of Anonymous, 2002

Hosts (*: non-native species; **: non-native ornamental fish kept in aquaria)

Osteichthyes (硬骨魚類)

Lepisosteiformes (ガー目)

Lepisosteidae (ガー科)

**Lepisosteidae gen. sp. (gar, 「ガーパイク」) [17]

Osteoglossiformes (アロワナ目)

Ostegoglossidae (アロワナ科)

***Arapaima gigas* (arapaima, ピラルクー) [17]

Anguilliformes (ウナギ目)

Anguillidae (ウナギ科)

Anguilla japonica (Japanese eel, ウナギ) [2, 3, 5, 6, 9, 10, 11, 12, 14, 15, 17]

Cypriniformes (コイ目)

Cyprinidae (コイ科)

Acheilognathinae gen. sp. (bitterling, 「タナゴ」) [15, 17]

**Aristichthys nobilis* and/or **Hypophthalmichthys molitrix* (bighead carp and/or silver carp, 「レンギョ」: コクレン・ハクレン) [17]

Carassius auratus (goldfish, キンギョ) [3, 5, 6, 9, 13, 14, 15, 21]

Carassius auratus langsdorffi (silver crucian carp, ギンブナ) [22]

Carassius auratus subsp. (as *Carassius auratus*) (crucian carp, 「フナ」) [1, 2, 3, 5, 6, 15, 23]

Carassius cuvieri (Japanese crucian carp, ゲンゴロウブナ) [19]

**Ctenopharyngodon idellus* (grass carp, ソウギョ) [15, 17]

Cyprinus carpio (common carp, コイ) [2, 3, 5, 6, 8, 11, 13, 14, 15, 17, 20, 23]

Gnathopogon elongatus elongatus (field gudgeon, タモロコ) [23]

Gnathopogon elongatus suwae (Suwa gudgeon, スワモロコ) [9]

Hemibarbus labeo (barbell steed, コウライニゴイ) [26]

Pseudorasbora parva (topmouth gudgeon, モツゴ) [2, 3, 5]

Tribolodon hakonensis (Japanese dace, ウグイ) [17, 20]

Zacco temminckii (dark chub, カワムツ) [26]

Cobitidae (ドジョウ科)

Misgurnus anguillicaudatus (Oriental weatherfish, ドジョウ) [2, 3, 5]

Siluriformes (ナマズ目)

Bagridae (ギギ科)

Pseudobagrus tokiensis (as *Pseudobagrus aurantiacus*) (cuttailed bulhead, ギバチ) [9]

Siluridae (ナマズ科)

Silurus asotus (Amur catfish, ナマズ) [26]

Salmoniformes (サケ目)

Plecoglossidae (アユ科)

Plecoglossus altivelis altivelis (as *Plecoglossus altivelis*) (ayu, アユ) [3, 5]

Salmonidae (サケ科)

**Oncorhynchus mykiss* (as *Salmo gairdneri*) (rainbow trout, ニジマス) [15, 17, 18, 20]

- *Salmonidae gen. sp. (trout, 「マス類」) [15]
 Gasterosteiformes (トゲウオ目)
 Gasterosteidae (トゲウオ科)
Pungitius pungitius (as *Pungitius pungitius pungitius*) (ninespine stickleback, イバラトミヨ) [20]
 Cyprinodontiformes (カダヤシ目)
 Poeciliidae (カダヤシ科)
 *Poeciliidae gen. sp. (livebearer, 「卵胎生メダカ科」) [17]
 Beloniformes (ダツ目)
 Adrianichthyidae (メダカ科)
Oryzias latipes (Japanese rice fish, メダカ) [3, 5, 6, 11, 14, 15, 16, 17]
 Perciformes (スズキ目)
 Centrarchidae (サンフィッシュ科)
 **Lepomis macrochirus* (bluegill, ブルーギル) [24, 25]
 **Micropterus salmoides* (largemouth bass, ブラックバス) [15]
 Cichidae (カワスズメ科)
 ***Pterophyllum scalare* (freshwater angelfish, エンゼルフィッシュ) [17]
 Gobiidae (ハゼ科)
Chaenogobius macrognathos (edohaze, エドハゼ) [3]
Gymnogobius laevis (as *Chaenogobius laevis*) (jyuzukakehaze, ジュズカケハゼ) [20]
Tridentiger obscurus (dusky tripletooth goby, チチブ) [15]
 Channidae (タイワンドジョウ科)
 **Channa argus* (snakehead, カムルチー) [15]
 Unknown fish [7]
 Amphibia (両生類)
 Caudata (有尾目)
 Salamandridae (イモリ科)
Cynops pyrrhogaster (as *Diemictylus pyrrhogaster*) (Japanese fire belly newt, アカハライモリ) [4]
 Anura (無尾目)
 Ranidae (アカガエル科)
 **Rana catesbeiana* (as *Rana catesbiana*) [tadpole] (American bullfrog, ウシガエル幼生) [4]
 Sites of infection: skin, fins, buccal cavity, gills
 Distribution (Fig. 2): Hokkaido, Ibaraki, Gunma, Chiba, Tokyo, Kanagawa, Nagano, Shizuoka, Toyama, Gifu, Aichi, Shiga, Mie, Nara, Osaka, Hyogo, Okayama, Shimane, Hiroshima, Yamaguchi, Kagawa, Nagasaki, Miyazaki
 Records: 1. Ishii 1915 (Tokyo: Fukagawa-Fuyuki); 2. Leigh-Sharpe 1925 (Aichi: Kitajima near Toyohashi); 3. Nakai 1927 (Tokyo: Shimo-oi); 4. Okada 1927 (Tokyo: Imperial University of Tokyo); 5. Matsui and Kumada 1928 (Ibaraki: -; Tokyo: -; Kanagawa: -; Shizuoka: -; Aichi: near Toyohashi; Mie: -; Shiga: -; Hyogo: -); 6. Nakai and Kokai 1931 (Chiba: -; Tokyo: Komatsugawa); 7. Gurney 1933 (-); 8. Hokkaido Salmon Hatchery 1937 (Hokkaido: Atsubetsu); 9. Yamaguti 1939 (Gunma: -; Nagano: Lake Suwa; Shizuoka: -); 10. Harding 1950 (-); 11. Kasahara 1957 (-); 12. Kasahara 1958 (Shizuoka: -; Aichi: Toyohashi; Mie: -); 13. Imori 1959 (-); 14. Kasahara 1959 (-); 15. Kasahara 1962 (Ibaraki: -; Chiba: -; Tokyo: -; Kanagawa: Enoshima Aquarium; Nagano: Lake Suwa; Shizuoka: -; Toyama: -; Gifu: -; Aichi: Toyohashi, Atsumi, Isshiki; Mie: -; Nara: -; Osaka: -; Hyogo: -; Okayama: -; Shimane: -;

Yamaguchi: -; Kagawa: Takamatsu; Miyazaki: -; 16. Suzuki 1965 (-); 17. Tsutsumi 1978 (-: aquarium); 18. Otaki and Yamashita (Shizuoka: Fuji Trout Culture Laboratory); 19. Miyashita 1989 (Osaka: fish farms); 20. Nagasawa et al. 1989 (see also Nagasawa 1994) (Hokkaido: Lake Shirarutoro, Kikonai River); 21. Yoshikoshi and Kô 1991 (Nagasaki: -); 22. Takeda et al. 2000 (Tokyo: Imperial Palace); 23. Anonymous 2002 (Gifu: a tributary of the Kiso River); 24. Urawa 2004 (-); 25. Grygier 2004 (Shiga: Lake Biwa); 26. This paper (Hiroshima: Ashida River, Kurose River)

Remarks: Leigh-Sharpe (1925: 251) reported "*Pseudorasbora angullicaudatus*" as one of the hosts for *L. cyprinacea* (as *L. elegans*) in Japan. However, the scientific name of this host was definitely an error: the names of two different fish species, *Pseudorasbora parva* and *Misgurnus anguillicaudatus*, were mistakenly combined. Similarly, Matsui and Kumada (1928: 102) made the same mistake in reporting the host species in the English abstract of their paper although these authors clearly separated the two fish species in the Japanese text.

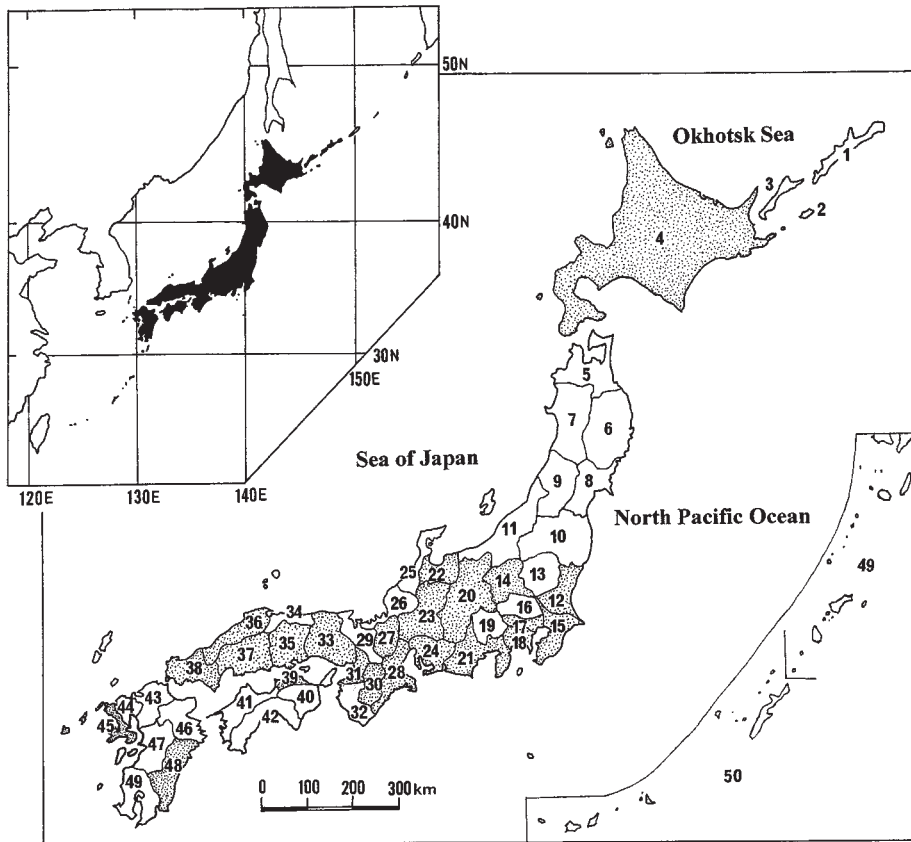


Fig. 2. Map of Japan showing the distribution of *Lernaea cyprinacea*. The copepod has been recorded from 23 prefectures (stippled). Prefectural names are arranged in alphabetical order: Aichi-24; Akita-7; Aomori-5; Chiba-15; Ehime-41; Etorofu Island-1; Fukui-26; Fukuoka-43; Fukushima-10; Gifu-23; Gunma-14; Hiroshima-37; Hokkaido-4; Hyogo-33; Ibaraki-12; Ishikawa-25; Iwate-6; Kagawa-39; Kagoshima-49; Kanagawa-18; Kochi-42; Kumamoto-47; Kunashiri Island-3; Kyoto-29; Mie-28; Miyagi-8; Miyazaki-48; Nagano-20; Nagasaki-45; Nara-30; Niigata-11; Oita-46; Okayama-35; Okinawa-50; Osaka-31; Saga-44; Saitama-16; Shiga-27; Shikotan Island-2; Shimane-36; Shizuoka-21; Tochigi-13; Tokushima-40; Tokyo-17; Tottori-34; Toyama-22; Wakayama-32; Yamagata-9; Yamaguchi-38; and Yamanashi-19.

There is no record of *L. cyprinacea* in the northern part of Honshu, the main island of Japan (Fig. 2). This is because there have been few surveys on the parasitic copepods of freshwater fishes in this region and also because the culture of warm-water fishes is not common there.

***Lernaea parasiluri* Yü, 1938** (ナマズイカリムシ：新称)

Synonym: *Lernaea parasiluri* Yamaguti, 1939

Host: *Silurus asotus* (as *Parasilurus asotus*) (Amur catfish, ナマズ)

Site of infection: gills

Distribution: Nagano

Record: Yamaguti 1939 (Nagano: Lake Suwa)

Remarks: Yamaguti (1939) described *Lernaea parasiluri* as a new species from the Amur catfish *Silurus asotus* from Lake Suwa without knowing the description of the same species by Yü (1938) from the same host species in China. Hu (1948) regarded both taxa as conspecific. In China, the species has been recorded by some other scientists as well (Yin, 1962; Wang, 1964; Kuang and Qian, 1991). Ho (1961) reported intraspecific morphological variations in the holdfast processes of the species from Taiwan. The copepod is known to occur in the Amur River basin, Far Eastern Russia (Dogiel and Akhmerov, 1952; Markevich, 1956; Gusev, 1987) but there has been no record from Korea to date (Kim, 1998; Kim and Choi, 2003). In Japan, Yamaguti's (1939) paper is the only published work and we need more research into the biology of the species.

Genus *Lamproglena* von Nordmann, 1832 (ヒメイカリムシ属：新称)

***Lamproglena chinensis* Yü, 1937** (ヒメイカリムシ：新称)

Synonym: *Lamproglena ophiocephali* Yamaguti, 1939

Host: *Channa argus* (as *Ophiocephalus argus*) (snakehead, カムルチャー)

Site of infection: gills

Distribution: Gifu, Shiga, Kyoto

Records: 1. Yamaguti 1939 (Kyoto: Kizu River); 2. Anonymous (Gifu: a tributary of the Kiso River); 3. Grygier and Urabe 2003 (Shiga: Lake Biwa)

Remarks: As in the case of *Lernaea parasiluri*, Yamaguti (1939) described *Lamproglena ophiocephali* as a new species from the snakehead *Channa argus* (as *Ophiocephalus argus*) from the Kizu River (as River Kizu) without referring to the description of *Lamproglena chinensis* by Yü (1937) from the same host species in China. There are some other records of the latter species from China (Sproston et al., 1950; Yin, 1962; Wang, 1964; Chen, 1973; Kuang and Qian, 1991). Both taxa were synonymised by Sproston et al. (1950) although Yamaguti (1963) listed them as independent species in his monograph. We herein regard *L. ophiocephali* to be a junior synonym of *L. chinensis* because there are no substantial differences in the morphology of the specimens described by Yü (1937), Sproston et al. (1950) and Yamaguti (1939). In Japan, there has been no further description of the species since the work of Yamaguti (1939) and in the current records (Anonymous, 2002; Grygier and Urabe, 2003) there is only information on the host and locality. Therefore, a redescription of the species using newly collected specimens from Japan is desired. In East Asia, it has also been reported from Far Eastern Russia (Amur River basin) (Dogiel and Akhmerov, 1952; Markevich, 1956; Smirnova, 1971;

Gusev, 1987) and Korea (Kim, 1998; Kim and Choi, 2003). *Channa argus* was introduced into Japan from Korea around 1923-1924 (Nakamura, 1939; Maehata, 1989); it is highly likely that the copepod was also introduced into Japan on *C. argus* (Grygier and Urabe, 2003).

Future Research into *Lernaea cyprinacea* in Japan

The above checklist shows that *L. cyprinacea* has been reported in Japan from 33 or 34 species and subspecies of fishes belonging to 17 families in 10 orders and also from 2 species of amphibians from 2 families in 2 orders. Due to its low host specificity, the copepod may be found on some other freshwater fishes in Japan. The species is known to infect frogs and their tadpoles in China (Yin et al., 1963) and U.S.A. (Tidd and Shields, 1963; Wellborn and Lindsey, 1970) as well as Japan.

The taxonomy of the Japanese *L. cyprinacea* needs further research in relation to *L. elegans*. Although Harding (1950) regarded these two species as identical, there is an opinion, based on the experiments made in Russia (Poddubnaya, 1973, 1974), that *L. elegans* is a different species from *L. cyprinacea* (see Kabata, 1979: 142-155). Since *L. elegans* was originally described from Japan (Leigh-Sharpe, 1925), detailed morphological study of copepods is strongly desired using specimens from this country and from experimental infections. The descriptions of the European *L. cyprinacea* (Grabda, 1963; Kabata, 1979; Boxshall et al., 1997) may be useful in reconsidering the taxonomic status of *L. cyprinacea* and/or *L. elegans* in Japan.

Because of its importance as a pathogen, various studies have been conducted in Japan on the species infecting important cultured fishes, such as the common carp *Cyprinus carpio* and the Japanese eel *Anguilla japonica*, and much knowledge on the biology and control has been accumulated (Nakai, 1927; Matsui and Kumada, 1928; Nakai and Kokai, 1931; Kasahara, 1962). However, there is yet very limited information on the ecology of the species occurring in wild fish populations in rivers and lakes. Much remains to be studied in natural waters on the host utilization, population dynamics, and differences in infection level related to environmental factors.

Lernaea cyprinacea has potential as an experimental animal because a population of the species can be easily maintained in a small tank with small fish like the Japanese rice fish *Oryzias latipes* (Kasahara, 1962). It is thus highly expected that information on its biology is obtained through experimental works.

There are some reviews on the biology and control of *L. cyprinacea* in Japan (e.g., Nakai and Kokai, 1930; Kasahara, 1965; Shiino, 1966; Egusa, 1978; Ogawa, 1983).

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日本におけるイカリムシの新宿主と日本産イカリムシ科 カイアシ類の目録 (1915~2007年)

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要 旨 広島県芦田川産コウライニゴイ *Hemibarbus labeo* とナマズ *Silurus asotus*, また同県黒瀬川産カワムツ *Zacco temminckii* よりイカリムシ *Lernaea cyprinacea* を採集し, その形態を簡単に記載した。コウライニゴイとカワムツはイカリムシの新宿主であり, ナマズはわが国における新宿主である。コウライニゴイ (寄生部位: 鰓) とカワムツ (背鰭) から得られたイカリムシは成体雌, ナマズ (鰓) から得られた個体はコペポデイド5期であった。1915~2007年の93年間に出版された文献に基づいて, わが国におけるイカリムシ科カイアシ類3種 (イカリムシ, ナマズイカリムシ [新称] *Lernaea parasiluri*, ヒメイカリムシ [新称] *Lamproglena chinensis*) に関する情報 (シノニム, 宿主, 寄生部位, 地理的分布) を整理し, 目録として示した。この整理により, イカリムシはわが国では10目17科に属する33~34種 (亜種を含む) の魚類と2目2科に属する2種の両生類から記録されていることが明らかになった。また日本産イカリムシの分類学的再検討を含む今後の研究課題を示した。上記の新標準和名に加えて, *Lamproglena* 属に対してヒメイカリムシ属の新標準和名を提唱する。

キーワード: *Lamproglena chinensis*; *Lernaea cyprinacea*; *Lernaea parasiluri*; イカリムシ; 寄生虫; 新宿主