

Record of a Whale Louse, *Cyamus scammoni* Dall (Crustacea: Amphipoda: Cyamidae), from the Gray Whale Strayed into Tokyo Bay, the Pacific Coast of Japan

Masatsune Takeda¹ and Michiru Ogino²

¹Department of Zoology, National Science Museum, Tokyo,
3–23–1 Hyakunincho, Shinjuku-ku, Tokyo, 169–0073 Japan
e-mail: takeda@kahaku.go.jp

²Marine Mammal Center, Japan,
30 Yokoderamachi, Shinjuku-ku, Tokyo, 162–0831 Japan
e-mail: michiru@strandingjapan.net

Abstract A whale louse species referable to *Cyamus* (*Apocyamus*) *scammoni* Dall, 1872, a crustacean ectoparasite of the gray whale, *Eschrichtius robustus* (Lilljeborg), was found in great numbers on the body surface of a young individual that strayed into Tokyo Bay in mid-April, 2005, and was found dead in a fixed net on 11 May, 2005. In the northwestern Pacific populations of *E. robustus*, the whale louse has been known only from Korean and southern Kamtchakan waters, and therefore the present record is the first from Japanese waters. The known species of the whale lice from Japanese waters are listed, with the host whale species.

Key words: Whale louse, *Cyamus*, *Apocyamus*, *Cyamus scammoni*, gray whale, *Eschrichtius robustus*, Tokyo Bay, northwestern Pacific.

In mid-April, 2005, a young gray whale strayed into Tokyo Bay and had a high popularity among the people in the metropolitan area with enthusiastic reports by the mass communications. This whale was reported to be the gray whale, *Eschrichtius robustus* (Lilljeborg) that is distributed in the northern North Pacific. The northwestern populations of this species are at present in an endangered state with the individuals less than 100. Some attempts to expel the whale from Tokyo Bay to the open sea came to nothing, and thus some researchers including one (M.O.) of the authors were afraid that the whale would starve to death because of lack of plankton to sustain nature. The whale went missing for a time, but later, on 11 May, 2005, was found dead in the fixed net laid 1 km off Tomiyama-machi, Chiba Prefecture. It is quite unfortunate that the whale was drowned in the fixed net probably on the way to the open sea.

On examination of the carcass, the whale was young, with 7.9 m in length, being definitely identified with *E. robustus* by the research group

of the National Research Institute of Far Seas Fisheries, the Institute of Cetacean Research, and the National Science Museum, Tokyo. The whale was infested with numerous whale lice of variable sizes aggregating as several big patches. A mass of the specimens collected from the inferior surface of left lobe of the flukes were kept by M. Ogino, one of the authors, and then, about half of them were transferred to the National Science Museum, Tokyo, for the taxonomic study. The results of the examination will be presented herein.

Class CRUSTACEA Order AMPHIPODA

Family Cyamidae

Genus *Cyamus* Latreille, 1796

Subgenus *Apocyamus* Margolis, McDonald
et Bousfield, 2000

Cyamus (*Apocyamus*) *scammoni* Dall, 1872

[New Japanese name: Koku-kujirajirami]

(Figs. 1, 2)

Cyamus scammoni Dall, 1872: 281. — Lütken, 1887:

318. — Margolis, 1954: 319. — Margolis, 1955: 129. — Hurley & Mohr, 1957: 353. — Leung, 1965: 135. — Leung, 1967: 282 (in key), 287 (in list), fig. 3a. *Cyamus (Apocyamus) scammoni*, Margolis *et al.*, 2000: 68 (in key), 90, figs. 13, 14.

Material examined. A total of 1,290 specimens ranging from minute juveniles (0.5–1.0 mm in length from the first to last segment) to mature individuals (about 10 mm on average, the biggest, 16.4 mm) — 830 exs (NSMT-Cr 16473), 300 exs (NSMT-Cr 16474), 140 exs (NSMT-Cr 16475), 20 exs (NSMT-Cr 16476) — From inferior surface of left fluke of *Eschrichtius robustus* (Lilljeborg), Tomiyamamachi, Chiba Prefecture, Tokyo Bay, 11 May, 2005.

Remarks. According to Margolis *et al.* (2000), this species is referred to the subgenus *Apocyamus* established by them based on the combination of such characters as the outer plate of the maxilla 1 having 7 apical spines, with its inner distal margin strongly setose, the epistome of the upper lip weakly or not developed apically, the head short, little (or not) longer than basal width, the propodi and dactyli of the peraeopods 5–7 relatively short and weak, and the propodus of the gnathopod 2 short and deep, with conical palmar and hinge teeth on the palmar margin.

This species is the largest and quite unique in the Cyamidae due to having the very broad, ovate body, especially in male, and the spirally coiled coxal gills. The peraeon segments 3 and 4 are the broadest, with the weakly convex lateral margins, being followed by the succeeding segments weakly narrowing posteriorly. The head is short, but broad posteriorly at the fused peraeon segment 1. The eyes are small, rounded and weakly pigmented. The gnathopod 1 is 6-segmented and not so heavy as usual, with the talon-like dactylus. The gnathopod 2 is stout and strong, and its hinge tooth is acute and larger than the proximal palmar tooth, with the gently curved talon-like dactylus. The peraeopods 5–7 are not very robust as a whole, and their propodi are relatively short and subovate, with the short and curved dactyli.

The female is not much different from the male in the general body form, the body being

slightly narrower, with pair of weak adhesion spines each on the peraeon segments 6 and 7. In the female the coxal gills are distinctly coiled as in the male and different from those of the other species, without accessory gills contrary to the turgid unequally paired gills in male.

In the mature specimens the outline of the body is typically ovate, but it is apparent that the juvenile and young specimens vary in their body shape, gradually widening with the advanced developmental stages; in the minute specimens each segment is rather trapezoid and separated from each other; in the juvenile smaller than ca. 1.5 mm in body length, the gills are elliptic just like those of typical caprellids, and in the specimens slightly larger than this size, the gills become thick and club-shaped. Afterward, the gills elongate and become spiral. The body color becomes darker from translucent white in the juveniles to purplish dark brown in the adults. In the photographs reproduced herein (Fig. 1), the gregarious masses of the adults and the juveniles and young on the inferior surface of the flukes are distinguished by dark and flesh tint, respectively.

The strongly adaptive life cycle of *C. scammoni* was elaborately studied and described by Leung (1976), together with two associated species, *C. ceti* (Linnaeus) and *C. kessleri* Brandt.

The specimens at hand were not compared directly with the specimens from the northeastern Pacific, but so far as we compared them with the photographs and consulted the literature for their definite identity, any differences between the two populations were not found for the intraspecific differentiation except for the remarkable variation according to developmental stages. Andrews (1914: 260) mentioned that the specimens from Korea were certainly identifiable with *C. scammoni* from California.

Distribution. This species is specific to gray whale, *Eschrichtius robustus* in the North Pacific from Korea (Andrews, 1914) and Japan (present study) through the vicinity of the Kamchatka (Zenkovitch, 1934 and 1937, without definite

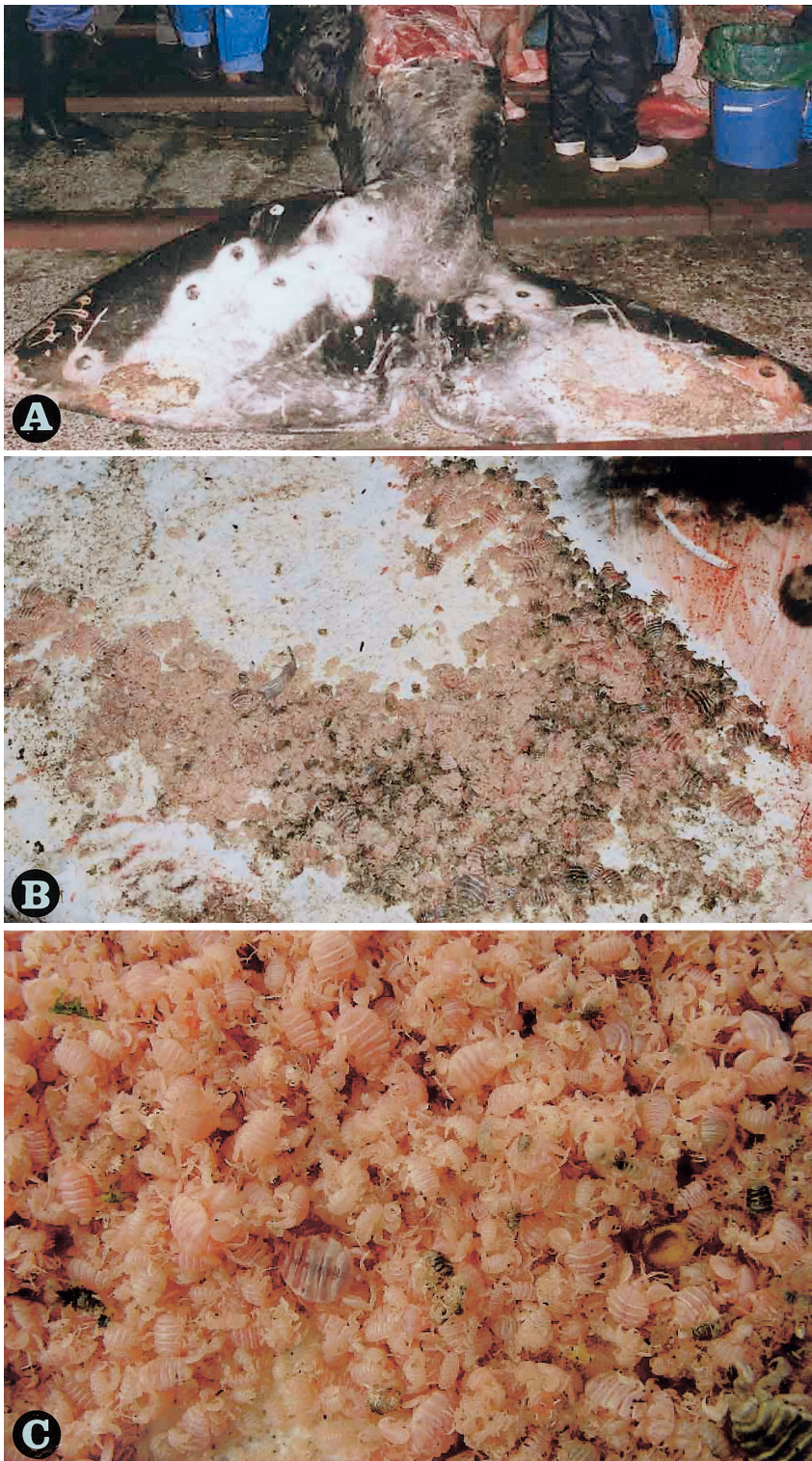


Fig. 1. A, a young gray whale, under dissection, showing inferior surface of the fluke; B, a mass of whale lice on left lobe of the fluke; C, a mass of whale lice around eye.

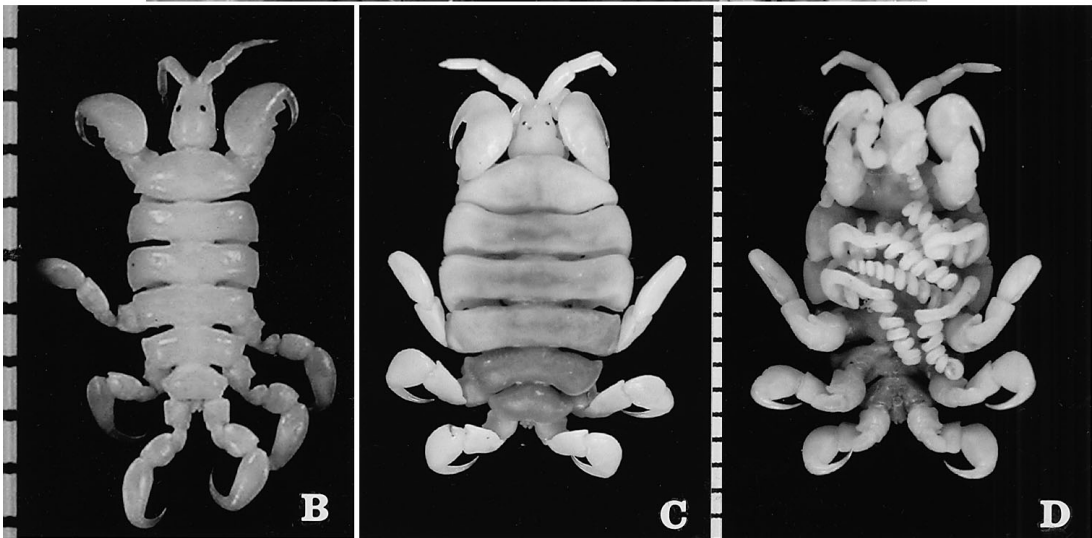


Fig. 2. Whale lice, *Cyamus scammoni* Dall, parasitic on the gray whale. A, a mass in close-up; B, a young individual in dorsal view; C, D, a medium-sized individual in dorsal (C) and ventral (D) views. (Scales in mm)

identification to the species), the Bering Sea (Margolis *et al.*, 2000), Alaska (Hurley & Mohr, 1957; Leung, 1965), and British Columbia (Margolis, 1954, 1955; Margolis *et al.*, 2000) to California (Dall, 1872; Leung, 1965, 1976; Margolis *et al.*, 2000).

Whale lice (Crustacea, Amphipoda, Cyamidae) from Japanese waters

In Japanese waters, the present species is the

fifth of the family Cyamidae. Ishii (1915) examined many specimens obtained from the Baird's beaked whale, *Berardius bairdii* Stejneger caught in the sea off Tateyama, Awa (=Chiba Prefecture), and mentioned that they are close to *Paracyamus boopis* (Lütken) and remarkably different from *Cyamus ceti* (Linnaeus). *Paracyamus boopis* is currently known as *Cyamus (Paracyamus) boopis* after Margolis *et al.* (2000). Later, Iwasa (1934) recorded *C. ovalis* Roussell de Vauzème and *C. erraticus* Roussell de Vauzème obtained

from the North Pacific right whale, *Eubalaena japonica* Lacépède (recorded as *Balaena glacialis* Bonnaterre) captured in the North Pacific, both of which are referred to the subgenus *Cyamus* s.s. by Margolis *et al.* (2000).

Hiro (1938) described a new species, *Cyamus elongatus*, based on the specimens obtained from the humpback whale, *Megaptera novaeangliae* (Borowski) from Japan. It was, however, reduced to a synonym of *C. (P.) boopis* by Margolis (1955) who definitely said that *C. elongatus* represents the juvenile stages of *C. boopis*. Hiro (1938) also mentioned, incidentally, that he examined the whale lice attached to the short-finned pilot whale, *Globicephala macrorhynchus* Gray caught off Taiji, the Kumano-Nada Sea, and that the species identified with *C. globicipitis* Lütken has never been recorded from Japanese waters. *Cyamus globicipitis* was listed in the synonymy of *Isocyamus delphinii* (Guérin-Méneville, 1836) by Leung (1967), but was retained in the genus *Isocyamus* as distinct from *I. delphinii* by Margolis *et al.* (2000).

While studying the parasite fauna of the minke whale, *Balaenoptera acutorostrata* Lacépède from the northwestern Pacific far off Hokkaido (40–52°N, 157–170°E, excluding the Russian and US 200 miles EEZ), Kuramochi *et al.* (1996) and Araki *et al.* (1997) recorded only the occurrence of *Cyamus balaenopterae* Barnard as one of the ectoparasites. Although the sea in question is administratively outside the territory of Japanese waters, the addition to the carcinological fauna may be reasonable.

The following is a list of the whale lice from Japanese waters in chronological order, with the host whale species.

Cyamus (Cyamus) ovalis Roussell de Vauzème 1834 [Maru-kujirajirami] — *Eubalaena japonica*, North Pacific right whale [Semi-kujira]
Cyamus (Cyamus) erraticus Roussell de Vauzème 1834 [Hime-kujirajirami] — *Eubalaena japonica*, North Pacific right whale [Semi-kujira]
Cyamus (Paracyamus) boopis Lütken, 1870 [Hosokujirajirami] — *Berardius bairdii*, Baird's

beaked whale [Tsuchi-kujira]; *Megaptera novaeangliae*, Humpback whale [Zatou-kujira]
Cyamus (Apocyamus) scammoni Dall 1872 [Koku-kujirajirami] — *Eschrichtius robustus*, Gray whale [Koku-kujira]
Isocyamus globicipitis (Lütken, 1873) — *Globicephala macrorhynchus*, Short-finned pilot whale [Kobire-gondou]
Cyamus (Paracyamus) balaenopterae Barnard, 1931 — *Balaenoptera acutorostrata* Lacépède [Minku-kujira]

Acknowledgments

The authors wish to thank Dr. Hidehiro Kato of the National Research Institute of Far Seas Fisheries, Fisheries Research Agency, and Dr. Hajime Ishikawa of the Institute of Cetacean Research for their support and help in collecting the whale lice specimens from the gray whale strayed into Tokyo Bay. Dr. Toshiaki Kuramochi kindly provided the authors with the information and literature of whale lice from the North Pacific.

References

- Andrews, R. C., 1914. Monographs of the Pacific Cetacea. I. — The California gray whale (*Rhachianectes glaucus* Cope). *Mem. Amer. Mus. Nat. Hist.*, (n.s.), **1**: 229–287, pls. 19–27.
- Araki, J., T. Kuramochi, M. Machida, K. Nagasawa & A. Uchida, 1997. A note on the parasite fauna of the western North Pacific minke whale (*Balaenoptera acutorostrata*). *Rep. Int. Whal. Commn.*, (47): 565–567.
- Barnard, K. H., 1931. Diagnoses of new genera and species of amphipod Crustacea collected during the 'Discovery' investigations, 1925–1927. *Ann. Mag. Nat. Hist.*, (10), **7**: 425–430.
- Dall, W. H., 1872. Descriptions of three new species of crustacean from Cetacea. *Proc. Calif. Acad. Sci.*, **4**: 281–283.
- Hiro, F., 1938. *Cyamus elongatus* n. sp., a new whale-lice from Japan. *Annot. Zool. Japon.*, **17**: 71–77.
- Hurley, D. E. & J. L. Mohr, 1957. On whale-lice (Amphipoda: Cyamidae) from the California gray whale, *Eschrichtius glaucus*. *J. Parasitol.*, **43**: 352–357.
- Ishii, H., 1915. [A cyamid obtained in the Province Awa.], *Dobutsugaku Zasshi* (=Zool. Mag.), Tokyo, **27**: 157–159. (In Japanese.)

- Iwasa, M., 1934. Two species of whale-lice (Amphipoda: Cyamidae) parasitic on a right-whale. *J. Fac. Sci. Hokkaido Imp. Univ.*, (6), **3**: 33–39, pls. 4–7.
- Kuramochi, T., M. Machida, J. Araki, A. Uchida T. Kishiro & K. Nagasawa, 1996. Minke whales (*Balaenoptera acutorostrata*) are one of the major final hosts of *Anisakis simplex* (Nematoda: Anisakidae) in the north-western North Pacific Ocean. *Rep. Int. Whal. Commn.*, (46): 415–419.
- Leung, Y. M., 1965. A collection of whale-lice (Cyamidae: Amphipoda). *Bull. S. Calif. Acad. Sci.*, **64**: 132–143.
- Leung, Y. M., 1967. An illustrated key to the species of whale lice (Amphipoda, Cyamidae), ectoparasites of Cetacea, with a guide to the literature. *Crustaceana*, **12**: 279–291.
- Leung, Y. M., 1976. Life cycle of *Cyamus scammoni* (Amphipoda: Cyamidae), ectoparasite of gray whale, with a remark on the associated species. *Sci. Rep. Whale Res. Inst.*, (28): 153–160.
- Lütken, C. F., 1870. Conspectus Cyamidarum borealium hujusae cognitarum. *Vidensk. Selsk. Forhandl. Christiania*, **13**: 279–280. (In Danish.)
- Lütken, C. F., 1873. Bidrag til Kundskab om Arterne af Slaegten *Cyamus* Latr. eller Hvallusene. *Vidensk. Selsk. Skr.*, (5), **10**: 229–284, pls. 1–4. (In Danish.)
- Lütken, C. F., 1887. Tillaeg til “Bidrag til Kundskab om Arterne af Slaegten *Cyamus* Latr. eller Hvallusene”. *Vidensk. Selsk. Skr.*, (6), **4**: 316–322, 1 pl.
- Margolis, K., 1954. Three kinds of whale lice (Cyamidae: Amphipoda) from the Pacific coast of Canada, including a new species. *J. Fish. Res. Bd. Canada*, **11**: 319–325.
- Margolis, L., 1955. Notes on the morphology, taxonomy and synonymy of several species of whale lice (Cyamidae: Amphipoda). *J. Fish. Res. Bd. Canada*, **12**: 121–133.
- Margolis, L., T. E. McDonald & E. L. Bousfield, 2000. The whale lice (Amphipoda: Cyamidae) of the north-eastern Pacific region. *Amphipacifica*, **2**: 63–117.
- Roussel de Vauzème, A., 1834. Memoire sur le *Cyamus ceti* (Latr.) de la classed des Crustaces. *Ann. Sci. Nat., Zool.*, (2), **1**: 239–255, 257–265.
- Zenkovitch, B. A. 1934. Materialy k poznaniyu kitobraznykh db morey (Seryy kaliforniyskiy kit-*Rhachianectes glaucus* Cope). *Vest. Akad. Nauk SSSR*, (10): 9–25. (In Russian.)
- Zenkovitch, B. A., 1937. Yeshche o serom kaliforniyskom kite (*Rhachianectes glaucus* Cope, 1864). *Vest. Akad. Nauk SSSR*, (23): 91–103. (In Russian.)