# Whale-lice (Amphipoda: Cyamidae) recorded from The Netherlands

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Key words: Amphipoda; Cyamidae; Cetacea; The Netherlands.

Records of four species of whale-lice from Dutch waters are given. Species are figured and a diagnosis of each species is given. The relationship between whale-lice and their hosts is discussed.

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## Introduction

In the last few years several Cetacea, parasitized by whale-lice, have stranded on the Dutch coast. In checking the data of stranded Cetacea for The Netherlands, it turned out that some previous records of whale-lice had not been published. Data on the four species of whale-louse known from Dutch waters are listed below. The species are figured and of each a short diagnosis is given. Data on hosts are derived from Gruner (1975) who summarizes the literature on Caprellidea, and completed with recent records from the literature. The material is in the collections of the Nationaal Natuurhistorisch Museum, Leiden (RMNH) and the Zoölogisch Museum Amsterdam (ZMA).

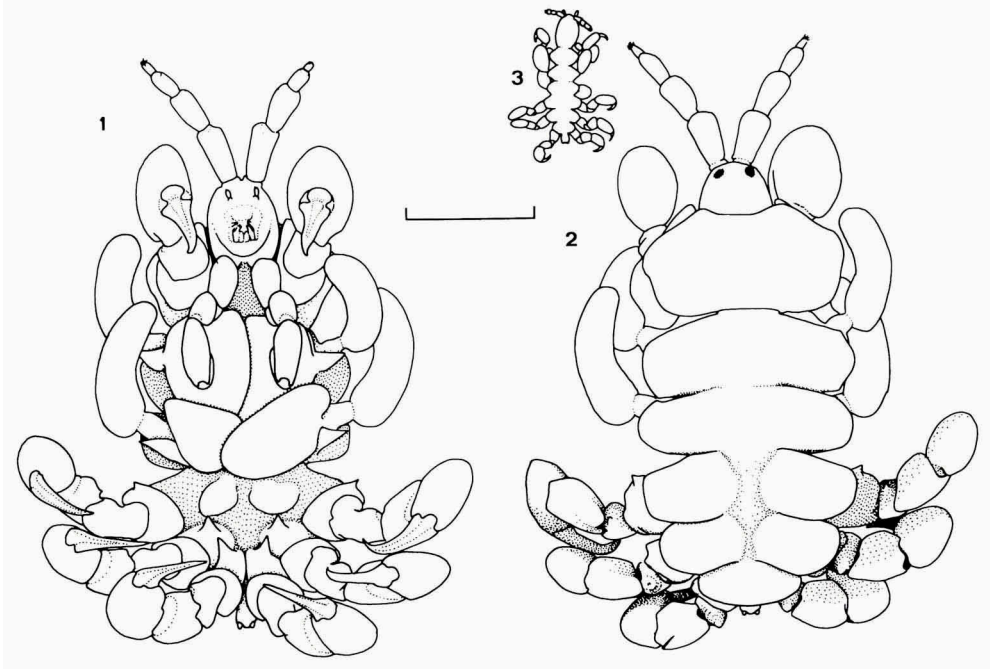
Specimens in the RMNH collection were measured from head to telson and the sex was noted. Specimens are regarded as juveniles when they are smaller than the smallest recognizable male in the sample. Four categories of females are recognized: females without a brood-pouch; females with eggs in the brood-pouch; females with juveniles in the brood-pouch; and females with empty brood-pouches. The latter category contains both females with developing brood-pouches and females with brood-pouches from which the juveniles have been released. From each species brood-pouches of several females were opened to count and measure eggs or juveniles.

## **Isocyamus delphinii** (Guérin-Méneville, 1837) (figs. 1-7)

Records.— Between 24/31.viii.1972. 101 specimens (ZMA) collected from a ♀ Harbour Porpoise *Phocoena phocoena* (ZMA 15.625) stranded between Petten and Callantsoog, province of Noord-Holland. The whale-lice were predominantly located in old, partly healed wounds, in the mouth, the genital aperture, and at the implantation of the pectoral fins (Stock, 1973a: 107-109, fig. 1, 2; 1973b: 74, fig. 1-11; Van Bree & Husson, 1974: 4, pl. 2).— 3.iv.1973. 2 ♂♂ and 1 ♀ (ZMA) from a ♀ *Phocoena phocoena* (ZMA 15.921) stranded in Het Zwin, Zeeuwsch-Vlaanderen, province of Zeeland (Stock, 1973a: 144; 1973b: 74; Van Bree & Husson, 1974: 7).— 15.xii.1973. Several specimens (ZMA) from a ♂ *Phocoena phocoena* (ZMA 16.372) stranded at Den Helder, province of Noord-Holland (Van Bree &

Husson, 1974: 8).— 25.xii.1975. 10 ♂♂, 12 ♀♀ (of which 5 with brood-pouch) (RMNH A 4262) from a ♀ *Phocoena phocoena* (RMNH 24994) stranded near Noordwijk aan Zee, province of Zuid-Holland, between beach markers nr. 82 and 83.— 24.i.1976. 1 ♂ (RMNH A 4605) from a pit in the chin of a ♂ White-beaked Dolphin *Lagenorhynchus albirostris* (RMNH 25029) stranded on the island of Schiermonnikoog, province of Friesland, near beach marker nr. 15 (Stock, 1977: 206; Van Bree & Smeenk, 1978: 14).— 28.xii.1976. 1 ♂, 1 ♀ with brood-pouch (RMNH A 4606) from a ♂ *Phocoena phocoena* (RMNH 25605) stranded near Monster, province of Zuid-Holland.— 17.x.1978. 3 ♂♂, 2 ♀♀ with brood-pouch (RMNH A 4648) from a ♀ *Phocoena phocoena* (RMNH 27281) stranded on Goeree, province of Zuid-Holland, near beach marker nr. 17.500.— 10.ii.1988. 30 ♂♂, 26 ♀♀ (of which 16 with brood-pouch) and 1 juvenile (RMNH A 4879) from an old ♂ *Phocoena phocoena* (RMNH 37944) stranded alive near Wassenaarse Slag, province of Zuid-Holland. The whale-lice were found in the numerous small and large wounds and scars in the skin of the animal.— 27.xi.1989. 51 ♂♂, 64 ♀♀ (of which 23 with brood-pouch) (RMNH A 4883) from a ♀ *Phocoena phocoena* stranded on the Brouwersdam, province of Zuid-Holland. The whale-lice were found in small and large wounds and scars in the skin of the animal.— 9.iii.1990. 26 ♂♂, 26 ♀♀ (of which 15 with brood-pouch) and 1 juvenile (RMNH A 4887) from a ♂ *Phocoena phocoena* stranded near Renesse, province of Zeeland. The whale-lice were found in small scars and in a large skin-lesion of the animal.— 5.xii.1990, 1 ♂, 2 ♀♀ with brood-pouch (RMNH A 4891) from a ♀ *Phocoena phocoena* (RMNH) from the Roompot, Oosterschelde, province of Zeeland.— 2.i.1991. 4 ♂♂, 7 ♀♀ (of which 6 with brood-pouch) (RMNH A 4888) from a ♀ *Phocoena phocoena* (RMNH) stranded on the isle of Texel, province of Noord-Holland; 1 ♂, 10 ♀♀ (all with brood-pouch) from the same porpoise in the collction of EcoMare, Texel.

Diagnosis.— First pair of gnathopods much smaller than second pair. Second pereopods four-articulate. First peraeon segment coalescent with head. Pointed process present at the base of each gill, outwardly directed. Gills not fasciculate.




Figs. 1-3. *Isocyamus delphinii* (Guérin-Méneville), (RMNH A 4879). Fig. 1. Ventral aspect of ♀ with brood-pouch. Fig. 2. Dorsal aspect of ♀ with brood-pouch. Fig. 3. Juvenile from brood-pouch. (Scale = 1 mm).

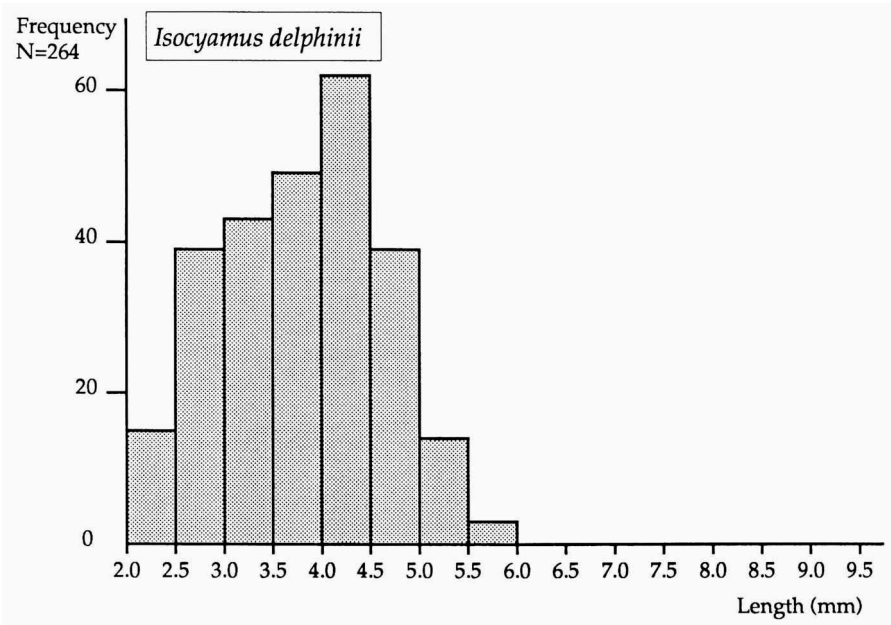



Fig. 4. Distribution of length-classes in *Isocyamus delphinii* (Guérin-Méneville) specimens based on material from RMNH A 4262, 4605, 4606, 4648, 4879, 4883, 4887 and 4888.

Hosts.— *Delphinus delphis* Linnaeus, 1758; *Pseudorca crassidens* (Owen, 1846); *Grampus griseus* (G. Cuvier, 1812); *Globicephala melas* (Traill, 1809) (cf. Raga et al., 1983: 628; 1988: 65, 67; Balbuena et al., 1989: 117); *Globicephala melas sieboldii* Gray, 1846; *Globicephala macrorhynchus* Gray, 1846 [= *scammonii* Cope, 1869]; *Steno bredanensis* (Lesson, 1828); *Tursiops gillii* Dall, 1873 (cf. Greenwood & Taylor, 1979: 24); *Lagenorhynchus albirostris* (Gray, 1846) (cf. Stock, 1977: 206; Van Bree & Smeenk, 1978: 14); *Phocoena phocoena* (Linnaeus, 1758) (cf. Stock, 1977: 206; Rappé, 1985: 63; 1991: 121-122. present records); *Mesoplodon europaeus* (Gervais, 1855) (cf. Mead, 1989: 416).

Remarks.— The distribution of length-classes in the total sample of *Isocyamus delphinii* as given in fig. 4 is similar to that found in each separate population on one individual of*Phocoena phocoena*. The low frequency of the lowest length-class could be an effect of selective sampling (large specimens are more conspicuous than smaller ones), or of a relatively rapid growth of the first stages.

The length-class distribution of both males and females is similar to the general pattern, as can be seen in fig. 5. This same figure shows that the minimum size of females with a brood-pouch is 3.5-4.0 mm. The number of females without a brood-pouch and longer than 4.0 mm is very small.

Fig. 6 illustrates that females with eggs appear in a smaller length-class than females with juveniles; the same length-class shows a relatively high frequency of females with empty brood-pouches.

The maximum number of eggs recorded in a brood-pouch was 24, the maximum number of juveniles 23. Juveniles in the brood-pouch measure 1.0 mm, which is the same length as the smallest specimens found outside the brood-pouch.

Some of the characteristic features of the genus are not prominent in the juvenile

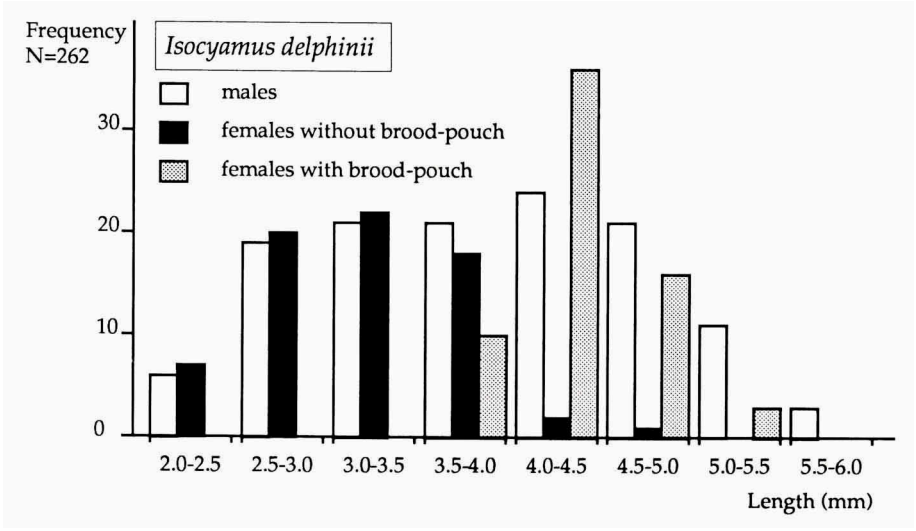



Fig. 5. Distribution of length-classes in *Isocyamus delphinii* (Guérin-Méneville) ♂♂, ♀♀ without brood-pouch, and ♀♀ with brood-pouch; based on material from RMNH A 4262, 4605, 4606, 4648, 4879, 4883, 4887 and 4888.

specimens. Accessory gills and the outwardly directed, pointed process at the base of each gill are poorly developed. The juveniles already possess the claws for attachment to the host, which lends evidence to the idea that the species has its complete life-cycle on the host.

It is assumed that whale-lice can change host when the latter comes into contact with another individual of the same species, for instance during social interactions, sexual intercourse, at birth, or when a female nurtures her young.

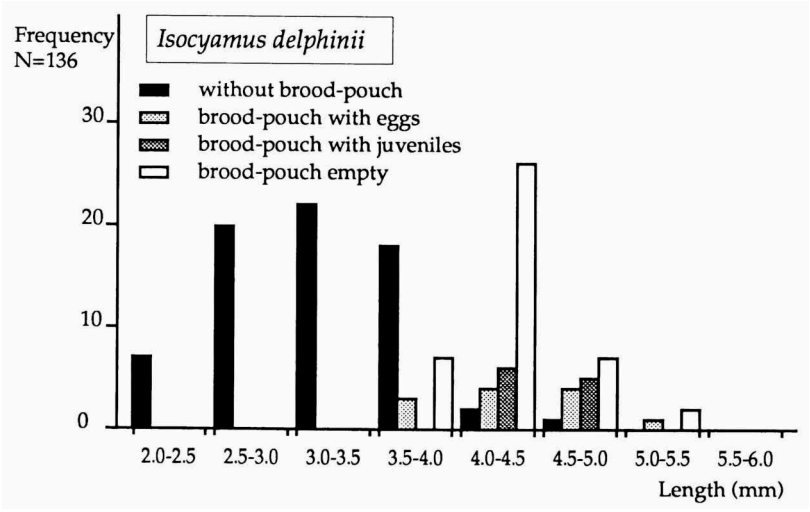



Fig. 6. Distribution of length-classes in *Isocyamus delphinii* (Guérin-Méneville) ♀♀ without brood-pouch, with brood-pouch with eggs, with brood-pouch with juveniles, and with empty brood-pouch; based on material from RMNH A 4262, 4606, 4648, 4879, 4883, 4887 and 4888.

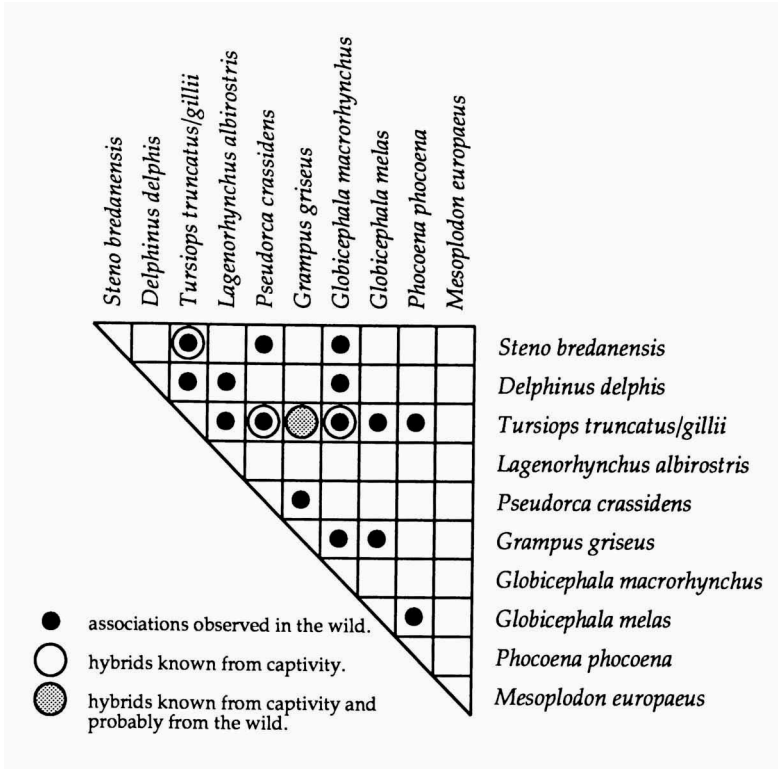



Fig. 7. Associations and hybridizations between the various host species of *Isocyamus delphinii* (Guérin-Méneville) recorded so far.

It is more difficult to explain how *Isocyamus delphinii* has been able to spread among so many host species. In the wild, bodily contact between different dolphin species appears to be uncommon, or at least has not been described. However, several species from time to time occur in close association, often forming mixed herds, though within these each species shows a tendency to keep apart. Nevertheless, interspecific physical contact probably cannot always be avoided and, seen in an evolutionary perspective, there may have been several opportunities for the parasite to "colonize" other dolphin species. The associations between the various host species recorded so far are shown in fig. 7. The data are based on Norris & Prescott (1961), Evans (1980), Watson (1981), Leatherwood et al. (1982), Leatherwood & Reeves (1983) and R.L. Pitman in Balcomb III (1987). Note that *Tursiops truncatus* (Montagu, 1821) and *T. gillii* are considered conspecific by most authors; nonetheless, it is remarkable that *I. delphinii* has not yet been found on the relatively well-known *T. truncatus* s.s. However, most species have only recently been identified as hosts of *I. delphinii*, and it seems likely that *I. delphinii* will eventually be discovered on more species: social interactions between several other dolphin species are known. Only few field observations have been made of *Steno bredanensis* and *Pseudorca crassidens*, and none of *Mesoplodon europaeus*.

In this context it may be significant that many dolphins indulge in various kinds of so-called epimeletic or care-giving behaviour, in particular supporting behaviour

(see Caldwell & Caldwell, 1966). One or more members of a group will assist an animal in distress, pushing it to the surface or helping it to get away from danger. Even dead animals may for some time be accompanied and touched by other members of a school. There are indications that this kind of behaviour may also be displayed toward other species, cf. the observation by Brown (1960) of several *Lagenorhynchus obliquidens* Gill, 1865 swimming with a *Globicephala macrorhynchus* (*scammonii*) that had been ensnared by people catching animals for a dolphinarium. Even the behaviour of dolphins coming to the "rescue" of swimming humans, of which there are many well-documented cases, probably derives from this epimeletic behaviour. If such interspecific interactions are indeed widespread, then physical contact between various dolphin species would not be so rare.

Apart from *Phocoena phocoena* (Phocoenidae) and *Mesoplodon europaeus* (Ziphiidae), all known host species belong to the family Delphinidae. Taxonomists nowadays agree that the members of this family are closely related, and the idea of splitting the Delphinidae into three subfamilies or even families has largely been abandoned. Several intergeneric hybrids are known from captivity, involving species belonging to the three putative (sub)families (fig. 7; see Sylvestre & Tasaka, 1985), and all of these are hosts of *I. delphinii*. It is especially noteworthy that there is also strong evidence of hybridization in the wild between *Tursiops truncatus* and *Grampus griseus*; the anomalous dolphins studied by Fraser (1940) are now generally regarded as the products of such hybridization. If this is true, the presence of *I. delphinii* on both parent species becomes easier to explain.

Despite this, one may wonder whether what we call *Isocyamus delphinii* is in fact one species, and if so, whether the populations living on various host species differ to any extent. To solve this problem, the external morphology and perhaps DNA structure of *I. delphinii* from different hosts should be compared.

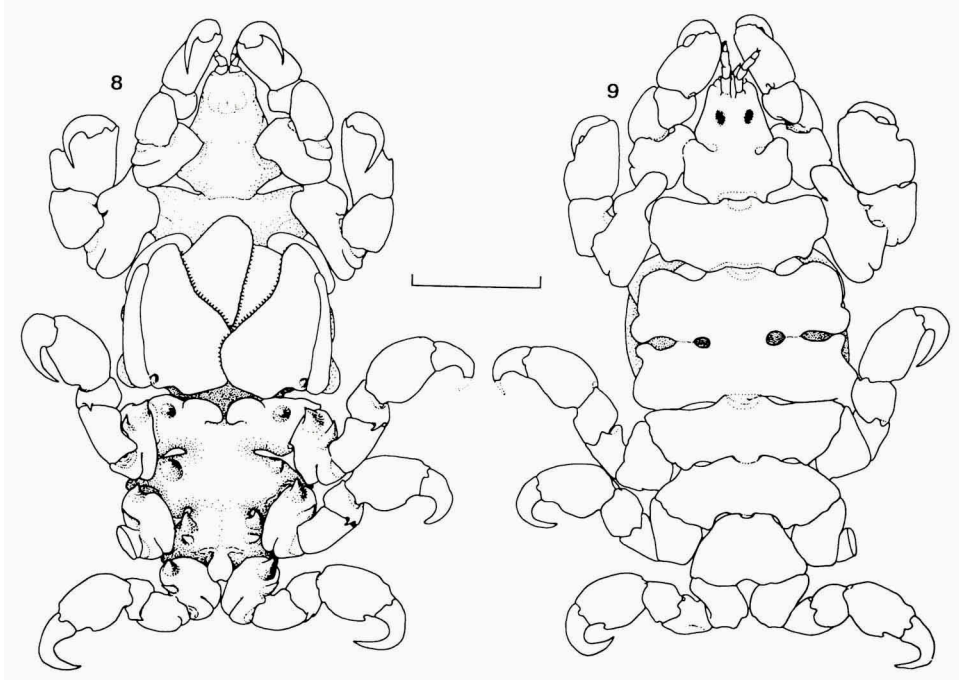
## **Platycyamus thompsoni** (Gosse, 1855)
(figs. 8-10)

Records.— 16.xi.1931. 2 specimens (ZMA), 2 ♀♀ with brood-pouch (RMNH A 185) collected from a ♂ Bottle-nosed Whale *Hyperoodon ampullatus* (RMNH 2019) stranded alive near Waarde, province of Zeeland (cf. Stock & Bloklander, 1952: 8; Stock, 1973a: 108; 1973b: 73).— 10.ix.1984. 11 ♂♂, 12 ♀♀ (RMNH A 4864) from a ♂ *Hyperoodon ampullatus* (RMNH 36661) stranded alive near Breskens, province of Zeeland (cf. Rappé, 1985: 65; De Smet, 1986: 14, Smeenk, 1989: 167, fig. 3).

Diagnosis.— First pair of gnathopods almost as large as second pair. Second pereopods four-articulate. First peraeon segment well separated from head. Small, ventrally directed process present at the base of each gill. Gills not fasciculate.

Hosts.— *Hyperoodon ampullatus* (Forster, 1770) (cf. Rappé, 1985: 65; De Smet, 1986: 14; Smeenk, 1989: 167, fig. 3); *Hyperoodon planifrons* Flower, 1882 (cf. Berzin & Vlasova, 1982: 158; doubtful record, undocumented).

Remarks.— The distribution of length-classes in the material of RMNH A 4864 is rather narrow (fig. 10). No females with brood-pouches are present. From these facts it can be hypothesized that the population on the *Hyperoodon* from Breskens originated from colonization by a single female or by females in the same phase of their life-cycle.




Figs. 8-9. *Platycyamus thompsoni* (Gosse) (RMNH A 185). Fig. 8. Ventral aspect of ♀ with brood-pouch. Fig. 9. Dorsal aspect of ♀ with brood-pouch. (Scale = 1 mm).

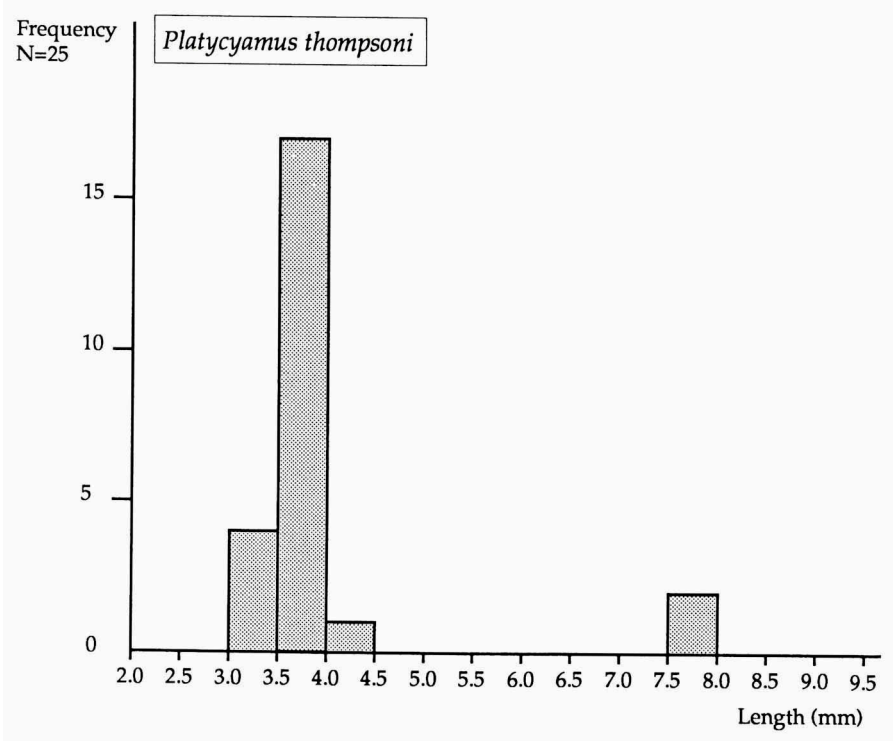



Fig. 10. Distribution of length-classes in *Platycyamus thompsoni* (Gosse) specimens in the material of RMNH A 185 and 4864.

The two females with empty brood-pouches (RMNH A 185) are 7.8 and 7.9 mm long.

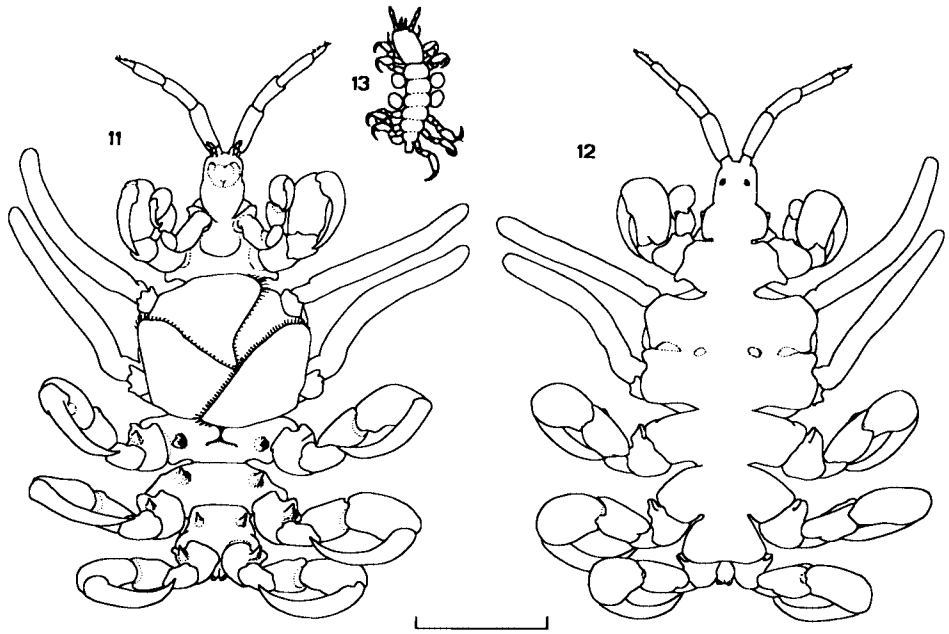
## **Cyamus catodontis** Margolis, 1954
(figs. 11-16)

Records.— 27.ii.1937. 63 ♂♂, 56 ♀♀ (of which 42 with brood-pouch) (RMNH A 249) collected from a ♂ Sperm Whale *Physeter macrocephalus* (RMNH) stranded alive near Terneuzen, province of Zeeland (Boschma, 1938: 33 [as *Paracyamus boöpis*]; Stock, 1973a: 108; 1973b: 74, fig. 12-13).

Diagnosis.— First pair of gnathopods much smaller than second pair. Second pereopods four-articulate. First peraeon segment coalescent with head. Dorsal peraeon segments 6 and 7 distinct. Dorsal surface of segments 3-7 smooth. One pair of ventral spines present on segment 5 in females, absent in males, present on segment 6 and 7 in both females and males. Gills not fasciculate, single, extending beyond the head. One pair of short accessory gills present on segments 3 and 4 in males.

Host.— *Physeter macrocephalus* Linnaeus, 1758.

Remarks.— The species is very close to or maybe synonymous with *C. bahamondei* Buzeta, 1963. Peraeon 7 in the male of *C. bahamondei* has two pairs of spines, against one pair in the male of *C. catodontis* (Leung, 1967: fig. 5c, d). Both species have the same host, *Physeter macrocephalus*. Stock (1973b: 74) discusses the similarity between the species concerning the accessory gills but does not comment upon the




Figs. 11-13. *Cyamus catodontis* Margolis (RMNH A 249). Fig. 11. Ventral aspect of ♀ with brood-pouch. Fig. 12. Dorsal aspect of ♀ with brood-pouch. Fig. 13. Juvenile from brood-pouch. (Scale: 2 mm for 11 and 12; 1 mm for 13).

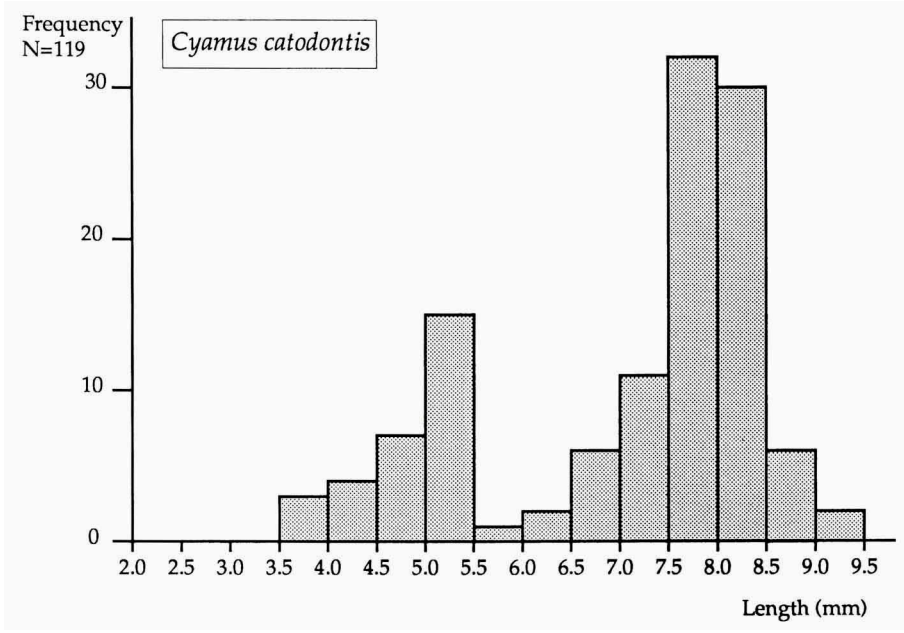



Fig. 14. Distribution of length-classes in *Cyamus catodontis* Margolis specimens in the material of RMNH A 249.

other differences given by Buzeta (1963). Only few records of C. *catodontis* are known. More material is needed to solve the problem of the identity of these putative species.

The length distribution of the specimens shows a distinct dip at 5.5 mm, increasing again towards 7.5-8.0 mm (fig. 14). One may hypothesize that after colonization

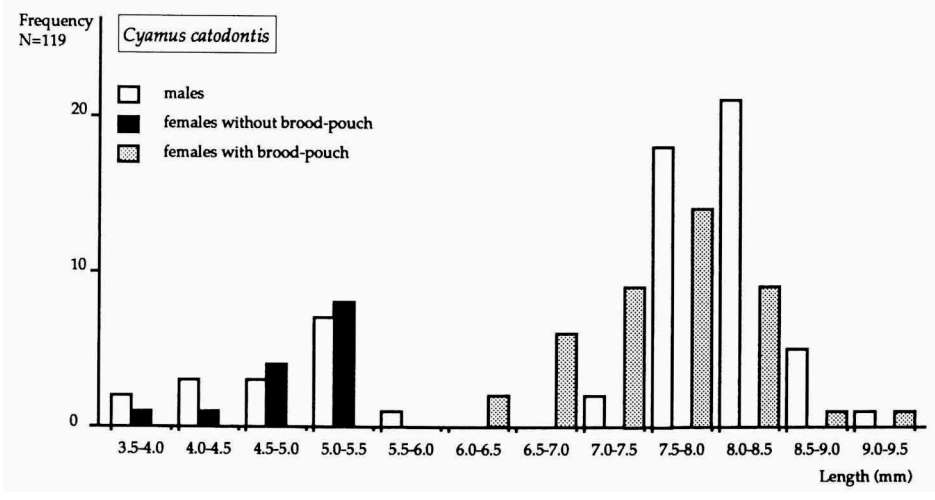



Fig. 15. Distribution of length-classes in *Cyamus catodontis* Margolis ♂♂, ♀♀ without brood-pouch, and ♀♀ with brood-pouch, in the material of RMNH A 249.

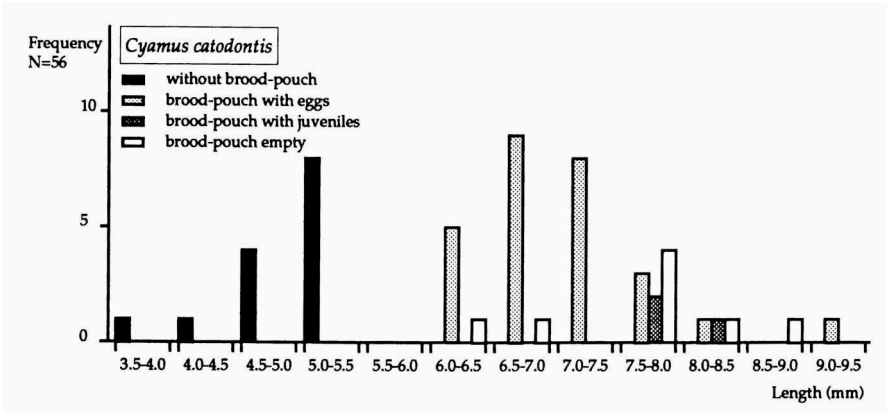



Fig. 16. Distribution of length-classes in *Cyamus catodontis* Margolis ♀♀ without brood-pouch, with brood-pouch with eggs, with brood-pouch with juveniles, and with empty brood-pouch, in the material of RMNH A 249.

the life-cycles of the individuals remain synchronous for some time and that two generations are represented here.

From fig. 15 it can be concluded that brood-pouches develop when females reach a length of 5.0-6.0 mm; all females above that length have brood-pouches. Fig. 16 illustrates that females with eggs are present in a smaller length-class than females with juveniles. The only female with a length of 9.0-9.5 mm was carrying eggs and could have developed a second brood.

In one brood-pouch both eggs and juveniles were present. The maximum number of eggs counted in one brood-pouch was 92. The juveniles in the brood-pouch measure 1.0 mm.

## **Scutocyamus parvus** Lincoln & Hurley, 1974
(figs. 17-20)

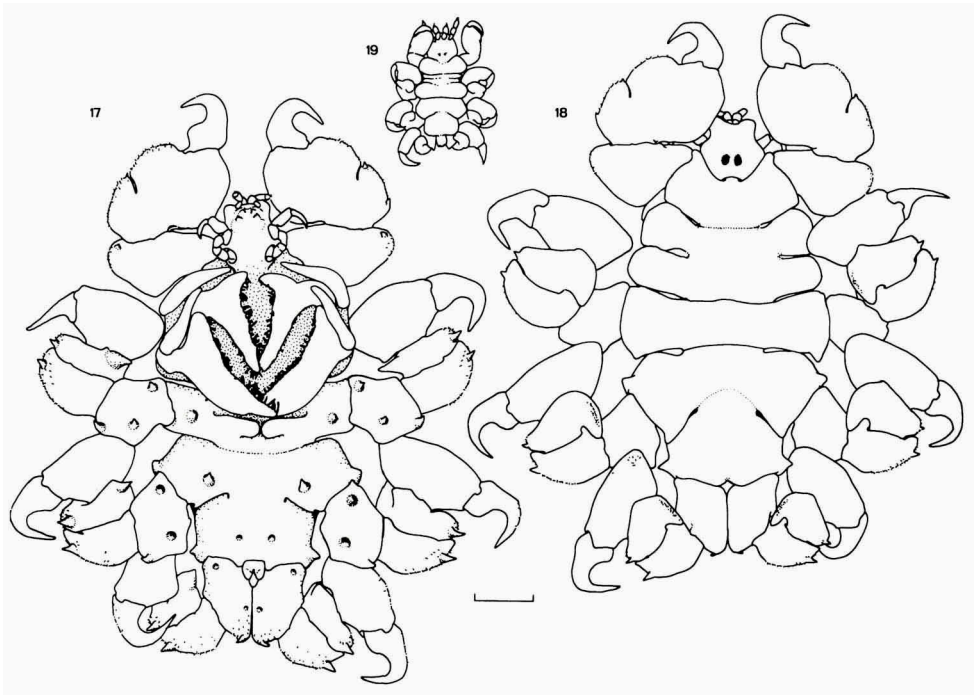
Records.— 29.x.1972. 2 ♂♂, 5 ♀♀ (ZMA) collected from a ♀ White-beaked Dolphin *Lagenorhynchus albirostris* (ZMA 16.251) stranded near De Cocksdorp on the island of Texel, province of Noord-Holland (Husson & Van Bree, 1976: 27).— 26.i.1990. 1 ♀ with brood-pouch (RMNH A 4884) from a ♀ *Lagenorhynchus albirostris* (RMNH 37081) stranded on the island of Vlieland, province of Friesland.— 27.i.1990. 5 ♂♂, 5 ovigerous ♀♀ (RMNH A 4885) from a ♀ *Lagenorhynchus albirostris* (RMNH 37178) stranded at West-Terschelling, province of Friesland.

Diagnosis.— First pair of gnathopods much smaller than second pair. Second pereopods three-articulate. Peraeon 3-4 and 6-7 fused. Males without accessory gills.

Host.— *Lagenorhynchus albirostris* (Gray, 1846) (cf. Stock, 1977: 206; present records).

Remarks.— The species is only known from four records, all from the North Sea (Lincoln & Hurley, 1974; Stock, 1977; present data). One other species in the genus, *S. antipodensis* Lincoln & Hurley, 1980, is known from New Zealand, occurring on *Cephalorhynchus hectori* (Van Beneden, 1881) (cf. Lincoln & Hurley, 1980).

Fig. 20 illustrates the small size of the species. The maximum number of eggs found in one brood-pouch is 11. Juveniles in the brood-pouch measure 0.75 mm.




Figs. 17-19. *Scutocyamus parvus* Lincoln & Hurley (RMNH A 4885). Fig. 17. Ventral aspect of ♀ with empty brood-pouch. Fig. 18. Dorsal aspect of ♀ with empty brood-pouch. Fig. 19. Juvenile from brood-pouch. (Scale: 1 mm for 17 and 18; 0.4 mm for 19).

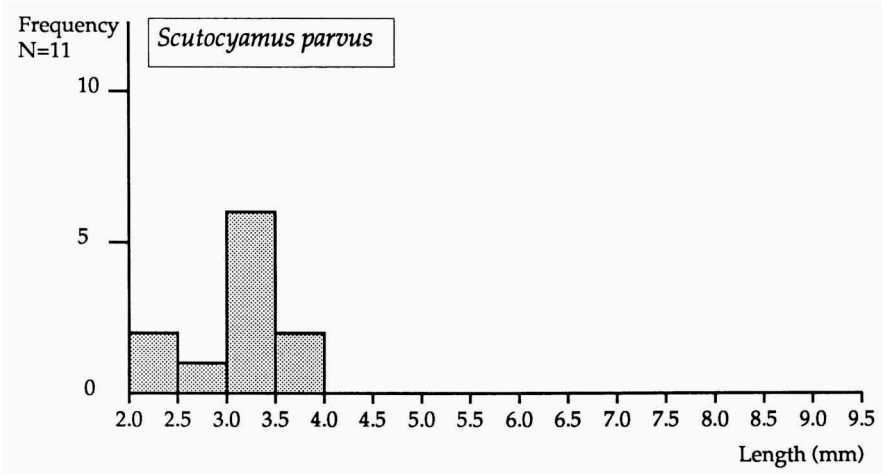



Fig. 20. Distribution of length-classes in *Scutocyamus parvus* Lincoln & Hurley specimens based on the material of RMNH A 4884 and 4885.

## Acknowledgements

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