

AN ILLUSTRATED KEY TO THE SPECIES OF WHALE-LICE  
(AMPHIPODA, CYAMIDAE), ECTOPARASITES OF CETACEA, WITH A  
GUIDE TO THE LITERATURE

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Although whale-lice (Amphipoda, Cyamidae) are grouped into a single compact family, they are cosmopolitan. When Lütken (1873) published his monograph of the cyamids, it included 11 species. These according to present terminology, comprise only 10 species, eight of *Cyamus*, one of *Isocyamus* and one of *Platycyamus*. Lütken (1887) added supplementary remarks on *C. scammoni*, which had been described by Dall (1872), but was not included in Lütken (1873). Pouchet (1888) described *C. physeteris*, which has been transferred to a newly erected genus, *Neocyamus*, by Margolis (1955). No new species were described until Barnard (1931) described *C. balaenopterae* from blue and fin whales and Margolis (1954) added *C. catodontis* from a sperm whale. A new genus, *Syncyamus*, was created by Bowman (1955) for *S. pseudorcae* from a false killer whale. Buzeta (1963) described an additional species, *C. bahamondei*, from a sperm whale. Thus, the family currently is composed of 16 species: 12 species of *Cyamus*, and one each of the genera *Isocyamus*, *Neocyamus*, *Platycyamus* and *Syncyamus*.

Despite the fact that many elaborate papers have been published, no adequate key has yet been designed for this family. Stephensen (1942) outlined a table of the genera and keys to those species found, or which might be expected to occur, in Norwegian waters because their hosts are found there. Owing to the increasing interest in these ectoparasites in recent years, a key to the species would seem to be of value.

The key to the genera has omitted *Paracyamus*, as Margolis (1955) has shown it to be a synonym of *Cyamus* on the basis of the maxilliped palp development, which in some species is intermediate between these two genera. In *Isocyamus*, *Neocyamus*, *Platycyamus* and *Syncyamus* the maxilliped palps are characteristically absent. Because there is only one species in each of the latter four genera, the specific names are included in the key. *C. elongatus*, described by Hiro (1938), is not included because it is a synonym of *C. boopis* (cf. Margolis, 1955). *C. chelipes* Costa, 1866, and *C. pacificus* Lütken, 1873, are also excluded as their status has not been clarified. Neither is *Cyamus rhytinae* (= *Sirenocyamus rhytinae*) included. This species was originally described from the Steller sea cow,

*Hydrodamalis gigas* (= *Rhytina borealis*) which was exterminated by 1768 (Scheffer & Rice, 1963). Although no specimen of this "peculiar insect" had been preserved, J. F. Brandt (1846) proposed the name *Sirenocyamus rhytinae* solely on the basis of Steller's incomplete description of 1751 and 1753. A translation of the description by Walter and J. E. Miller also appeared in Jordan's report (1899). Alex. Brandt (1871) found a piece of dry skin to which some cyamids were attached, and he believed that these came from Steller's sea cow and named the whale-lice *C. rhytinae*. However, Lütken (1873) found them to be identical with *C. ovalis* and felt that the skin probably belonged to a right whale. He therefore considered these specimens to be *C. ovalis*.

The simplest means of separating adult females from males are by the presence of the marsupium or broodpouch on segment 3 and 4 and a pair of genital valves on segment 5 of the females. However, these structures are often difficult to recognize in juvenile specimens. The appendages referred to in the key are illustrated and labelled in fig. 1.

The table of cyamids with their hosts (table I) is based on the literature together with unpublished information. Included in the latter category is an immature *Neocyamus physteris* taken from an ocean dolphin, *Phocoenoides truei*, in the strait between Iturup and Urup Islands (Kurile Islands), and one *C. ovalis* from a sperm whale, *Physeter catodon*, at 44° 55' N 150° 15' E. These specimens were collected by Dr. S. K. Klumov of the Academy of Sciences of USSR, Moscow, and kindly presented to me by him. Another record is of two specimens of *Syncyamus* (identified by Dr. Leo Margolis) taken from a bottlenose dolphin (*Tursiops truncatus* (?) *nuuanu* Andrews, 1911) at the Tres Marias Islands, Mexico, in February, 1965, by Mr. Dale W. Rice, Biologist of the U. S. Bureau of Commercial Fisheries. This is of great interest because it supports Bowman's belief that *Cyamus chelipes* Costa, which was described from an unnamed dolphin, belongs to *Syncyamus* (Bowman, 1958).

Because numerous papers have been devoted to the characterization of each species, it seems unnecessary to reiterate the descriptions in this paper. However, the key, guide to the literature and list of references should be useful additions to our general knowledge of the family.

Acknowledgements. The writer owes profound indebtedness to Dr. Leo Margolis for his constructive suggestions and criticisms, and particularly to Prof. John L. Mohr and Mr. Steven Geiger for their valuable counsel and guidance. I express my sincere gratitude to Dr. Thomas E. Bowman for permission to use his illustration of *Syncyamus*. A listing of individuals who have lent or given specimens for study would be too long to publish; gratitude for such help will be acknowledged in another paper which is soon to be published in the Bulletin of the Southern California Academy of Sciences. This work has been carried out with the support of the National Science Foundation, the Office of Naval Research and the Arctic Institute of North America. The use of library and laboratory facilities of Allan Hancock Foundation are gratefully acknowledged.

TABLE I  
Hosts of whale-lice

HOST	WHALE-LICE
Whalebone whales (Mysticeti)	
Bowhead whale, <i>Balaena mysticetus</i> L.	<i>Cyamus ceti</i>
Gray whale, <i>Eschrichtius gibbosus</i> (Erxleben), = <i>E. glaucus</i> (Cope)	<i>C. ceti</i> <i>C. kessleri</i> <i>C. scammoni</i>
Blue whale, <i>Balaenoptera musculus</i> (L.)	<i>C. balaenopterae</i>
Fin whale, <i>Balaenoptera physalus</i> (L.)	<i>C. balaenopterae</i>
Minke whale, <i>Balaenoptera acutorostrata</i> Lacépède	<i>C. balaenopterae</i>
Humpback whale, <i>Megaptera novaeangliae</i> (Borowski)	<i>C. boopis</i>
North Pacific right whale, <i>Balaena glacialis japonica</i> Lacépède, = <i>B. g. sieboldii</i> Gray	<i>C. erraticus</i> <i>C. ovalis</i> <i>C. gracilis</i>
South right whale, <i>Balaena g. australis</i> Desmoulins	<i>C. erraticus</i> <i>C. ovalis</i> <i>C. gracilis</i>
Toothed whales (Odontoceti)	
Sperm whale, <i>Physeter catodon</i> L.	<i>C. catodontis</i> <i>C. bahamondei</i> <i>Neocyamus physeteris</i> <i>C. ovalis</i> 1)
Bottlenose whale, <i>Hyperoodon</i> sp.	<i>Platycyamus thompsoni</i>
Baird's beaked whale, <i>Berardius bairdii</i> Stejneger	<i>Cyamus</i> sp. 2) <i>Platycyamus</i> sp. 2)
Pilot whale, <i>Globicephala</i> sp.	<i>Isocyamus delphini</i>
False killer whale, <i>Pseudorca crassidens</i> (Owen)	<i>Syncyamus pseudorcae</i> <i>Isocyamus delphini</i>
Ocean dolphin, <i>Phocoenoides truei</i> Andrews	<i>Neocyamus physeteris</i> 1)
Long snouted dolphin, <i>Stenella graffmani</i> (Lönnerberg)	<i>Syncyamus</i> sp.
Common dolphin, <i>Delphinus delphis</i> L.	<i>Isocyamus delphini</i>
Risso dolphin, <i>Grampus griseus</i> (Cuvier)	<i>Isocyamus delphini</i>
Bottlenose dolphin, <i>Tursiops truncatus</i> (?) <i>nuuanu</i> Andrews	<i>Syncyamus</i> sp. 1)
Narwhal, <i>Monodon monoceros</i> L.	<i>C. monodontis</i> <i>C. nodosus</i>
White whale, <i>Delphinapterus leucas</i> (Pallas)	<i>C. monodontis</i> <i>C. nodosus</i>

1) New host for species.

2) Undescribed new species.

KEY TO THE GENERA OF CYAMIDAE

1. Gills fasciculate, divided into about 12 filiform appendages . . . *Neocyamus physeteris* (fig. 2a)
- Gills not fasciculate . . . . . 2
2. First pair of gnathopods almost as large as the second pair; first peraeon segment well separated from head . . . . . *Platycyamus thompsoni* (fig. 2b)
- First pair of gnathopods much smaller than the second pair; first peraeon segment coalesced with head . . . . . 3

3. Outwardly directed pointed process at base of each gill . . . . . *Isocyamus delphini* (fig. 2c)  
 — Outwardly directed pointed process not present at base of each gill . . . . . 4  
 4. Maxilla 2 without outer lobe; dorsal pereaeon segments 6 and 7 fused . . . . .  
 . . . . . *Syncyamus pseudorcae* (fig. 2d)  
 — Maxilla 2 outer lobe present; dorsal pereaeon segments 6 and 7 distinct . . . . . *Cyamus*

## KEY TO THE SPECIES OF THE GENUS CYAMUS

1. Gills double . . . . . 2  
 — Gills single . . . . . 3  
 2. Gills spirally coiled . . . . . *C. scammoni* (fig. 3a)  
 — Gills sausage-shaped . . . . . *C. ovalis* (fig. 3b)  
 3. Dorsal surface of segments 3-7 divided into 2-4 rugged parts . . . . . *C. nodosus* (fig. 3c)  
 — Dorsal surface smooth . . . . . 4

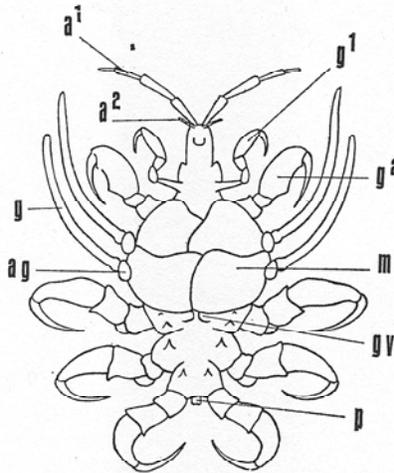


Fig. 1. Female of a whale-ouse, *Cyamus boopis* (ventral view). a<sup>1</sup>, first antenna; a<sup>2</sup>, second antenna; ag, accessory gill; g, gill; g<sup>1</sup>, first gnathopod; g<sup>2</sup>, second gnathopod; gv, genital valve; m, marsupium; p, pleon.

4. Sides of dorsal pereaeon parallel; no ventral spines on last 3 segments . . . . . *C. gracilis* (fig. 3d)  
 — Sides of dorsal pereaeon not parallel; ventral spines on last 3 segments . . . . . 5  
 5. Two pairs of accessory gills on each of segments 3 and 4 in ♂, 1 pair in ♀; ventral spines on segment 7, absent in ♀ . . . . . *C. kessleri* (fig. 4a)  
 — Only 1 pair of accessory gills on each of segments 3 and 4 in ♂; ventral spines on segment 7 present in ♀ . . . . . 6  
 6. Gills short not extending beyond head . . . . . 7  
 — Gills extending beyond head . . . . . 8  
 7. Head with parallel sides; body narrow; accessory gills in ♂ a short pointed process, absent in ♀ . . . . . *C. balaenopterae* (fig. 4b)  
 — Head not parallel-sided; body broadly ovate; no median branch on first pair of accessory gills in ♂, simple in ♀ . . . . . *C. monodontis* (fig. 4c)  
 8. Three pairs of ventral spines on segment 6 in ♂ and ♀ . . . . . *C. ceti* (fig. 4d)  
 — Only 1 or 2 pairs of ventral spines on segment 6 in ♂ and ♀ . . . . . 9  
 9. Two pairs of ventral spines on segment 6 in ♂ and ♀; accessory gills bilobate in ♂, simple and dentate in ♀ . . . . . *C. erraticus* (fig. 5a)  
 — Ventral spines on segment 6 not 2 pairs in ♂ and ♀; accessory gills not as above . . . . . 10  
 10. One pair of ventral spines on each of segments 5, 6, 7 in ♂, 2 pairs on 5 and 1 pair on 6 and 7 in ♀ . . . . . *C. boopis* (figs. 1, 5b)  
 — Ventral spines absent from segment 5 in ♂; 1 pair on each of segments 5, 6 and 7 in ♀ . . . . . 11  
 11. One pair of ventral spines on each of segments 6 and 7 in ♂; accessory gills short in ♂,

- biramous in ♀ . . . . . *C. catodontis* (fig. 5c)  
 — One pair of ventral spines on segment 6, 2 pairs on 7 in ♂; accessory gills equally bifurcated and tips round in ♂, simple and tapering at tips in ♀ . . . . . *C. bahamondei* (fig. 5d)

## GUIDE TO LITERATURE

## Cyamidae, Whale-lice

Cyamidae - Lütken, 1873: 231-246; Mayer, 1882: 186; Lütken, 1887: 317; Stebbing, 1888: 155, 419, 1647, 1648; Mayer, 1890: 146; Pouchet, 1892: 99-108; Lütken, 1893: 421; Sars, 1895: 668;

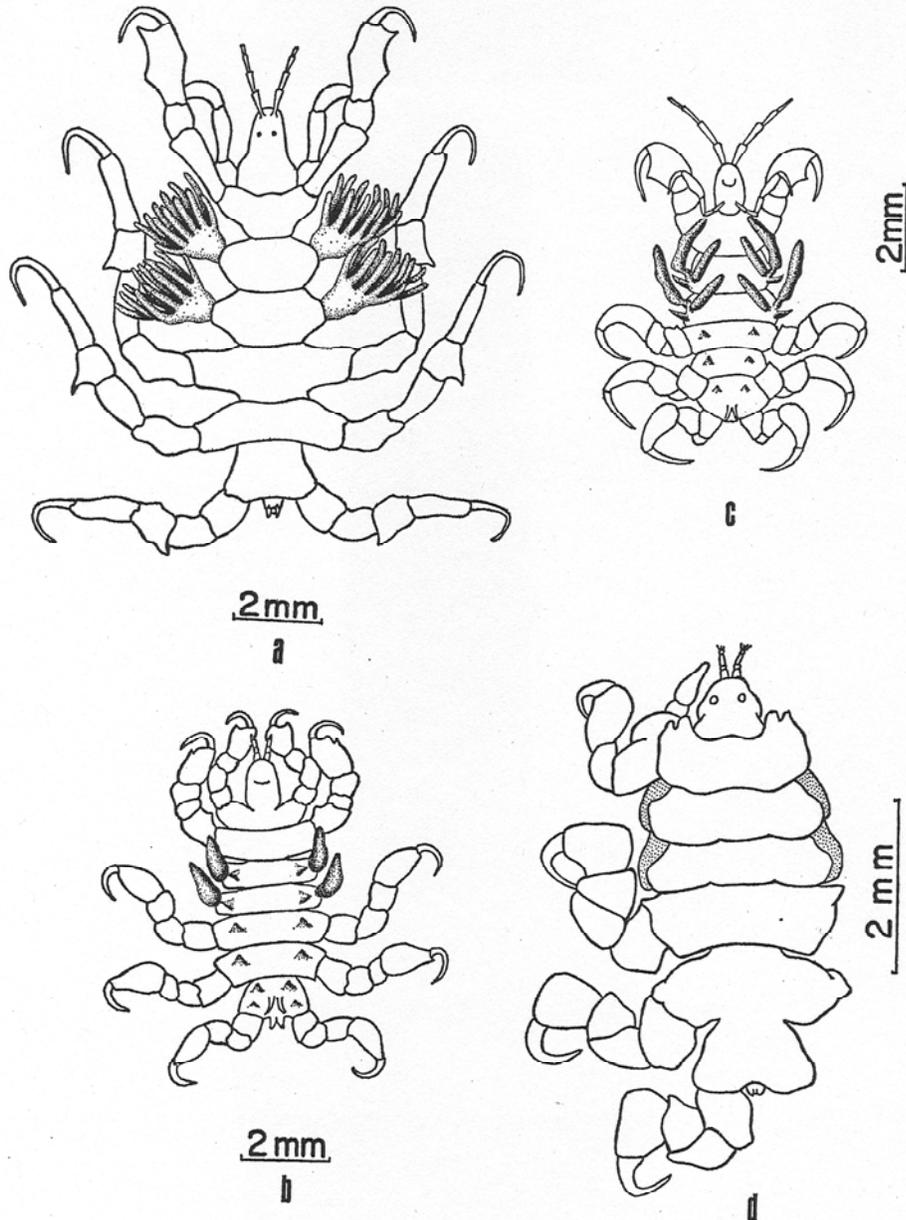


Fig. 2. a, *Neocyamus physeteris* (Pouchet, 1888) female, dorsal view; b, *Platycyamus thompsoni* (Gosse, 1855) male, ventral view; c, *Isocyamus delphini* (Guérin, 1836) male, ventral view; d, *Syncyamus pseudorcae* Bowman, 1955, female, dorsal view. (d, courtesy of Dr. Thomas E. Bowman).

Mayer, 1903: 153; Stebbing, 1910: 471; Chevreux & Fage, 1925: 461; Barnard, 1932: 307; Fage, 1932: 127; Stephensen, 1942: 443-444; Margolis, 1954a: 319; Buzeta, 1963: 127.

### Cyamus Latreille, 1796

*Cyamus* - Lütken, 1873: 231-232, 246-247; Lütken, 1887: 317; Lütken, 1893: 421; Stebbing 1910: 471; Barnard, 1932: 307; Stephensen, 1942: 446; Margolis, 1955: 121, 130-131.

*Paracyamus* Sars, 1895: 669; Barnard, 1932: 310; Stephensen, 1942: 451; Margolis, 1954a: 324

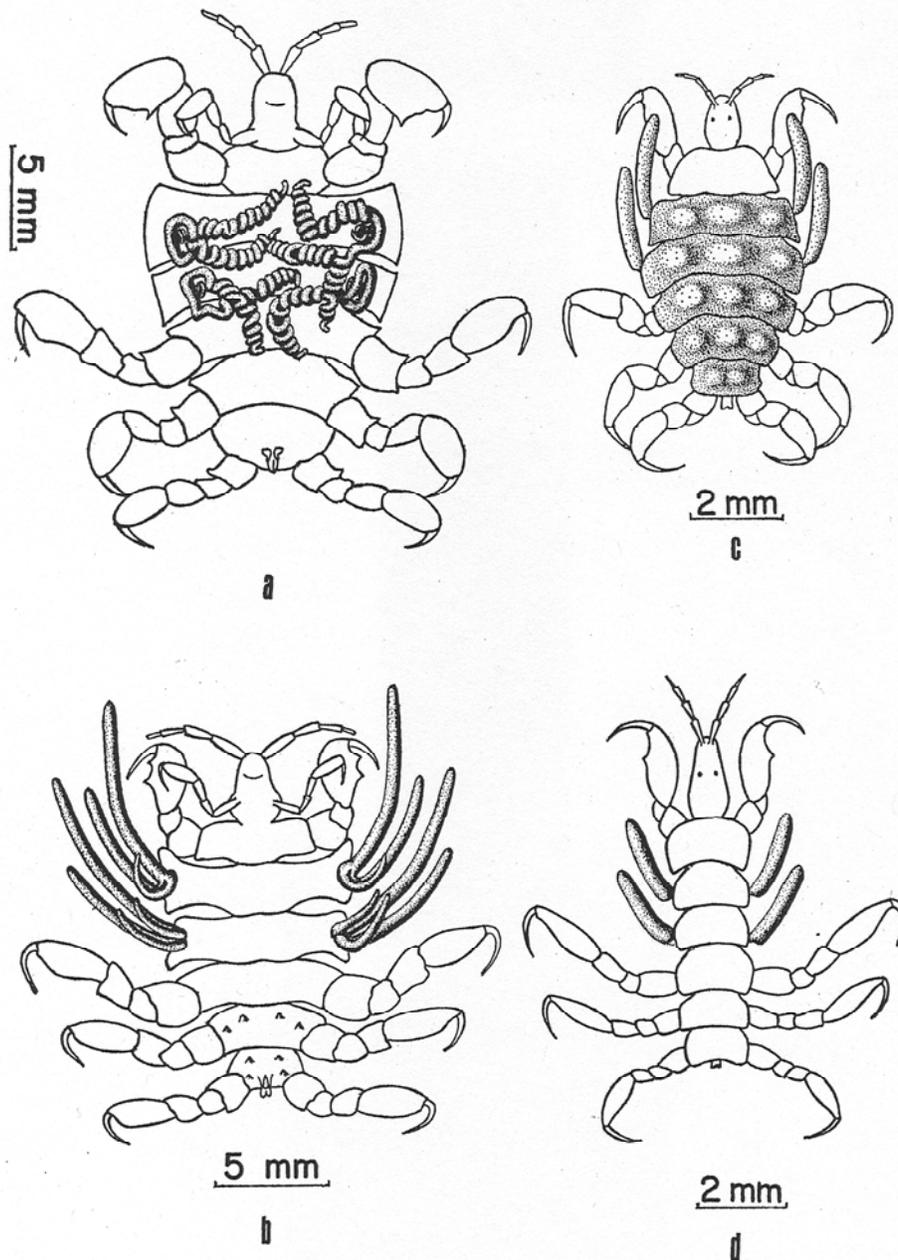


Fig. 3. a, *Cyamus scammoni* Dall, 1872, male, ventral view; b, *C. ovalis* Roussel de Vauzème, 1834, male, ventral view; c, *C. nodosus* Lütken, 1860, male, dorsal view; d, *C. gracilis* Roussel de Vauzème, 1834, male, dorsal view.

**Cyamus ceti** (Linné, 1758) Lamarck, 1801

*Cyamus ceti* - Krøyer, 1843: 474-489; Stephensen, 1942: 446-448; Margolis, 1955: 130; Hurley & Mohr, 1957: 353.

*Cyamus mysticeti* Lütken, 1860: 590; Lütken, 1870: 279; Dall, 1872; Lütken, 1873: 247, 251-256.

**Cyamus monodontis** Lütken, 1873

*Cyamus monodontis* Lütken, 1870: 279; Lütken, 1873: 247, 256-258; Stephensen, 1942: 448.

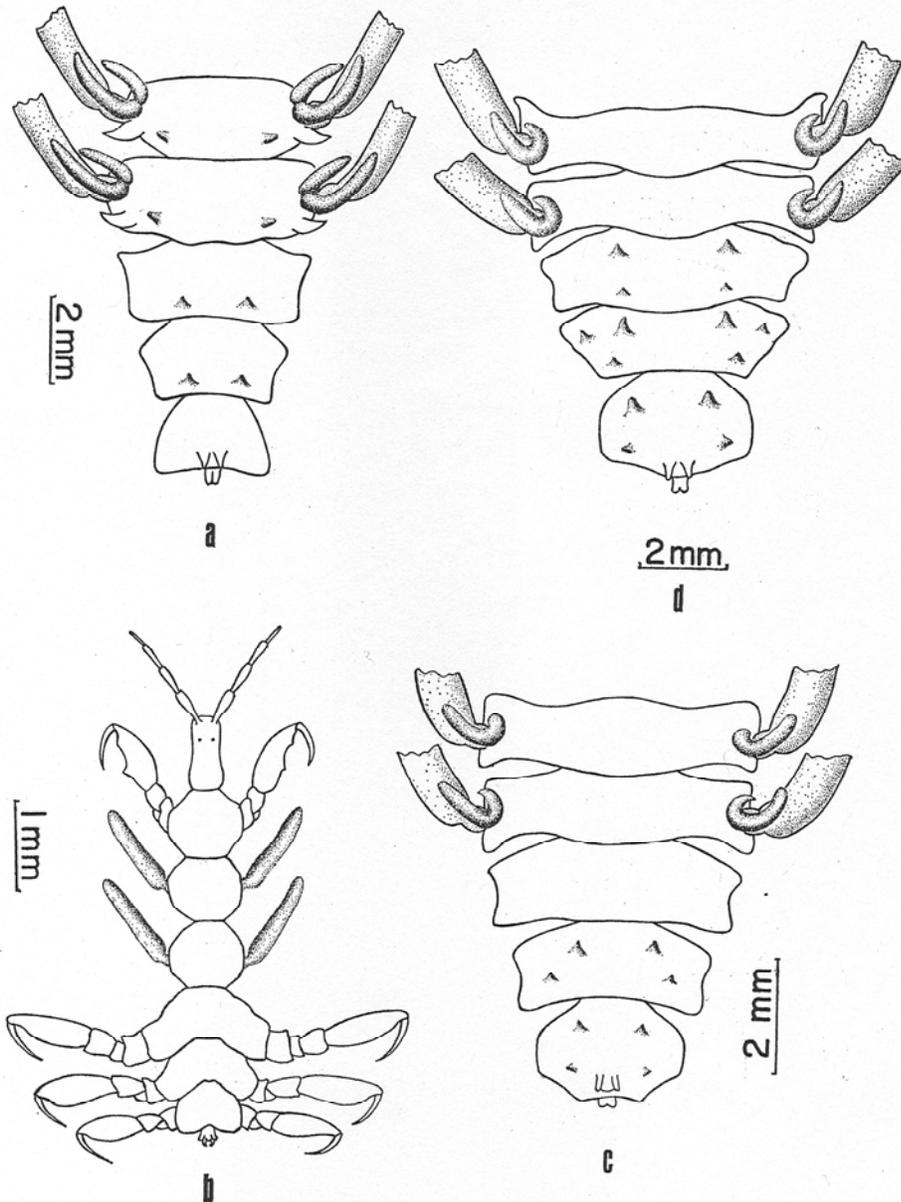


Fig. 4. a, *Cyamus kessleri* Brandt, 1872, male, ventral view; b, *C. balaenopterae* Barnard, 1931, male, dorsal view; c, *C. monodontis* Lütken, 1873, male, ventral view; d, *C. ceti* (Linné, 1758) male, ventral view. (a, c and d diagrammatic and part of gills omitted).

**Cyamus nodosus** Lütken, 1860

*Cyamus nodosus* Lütken, 1860: 591; Lütken, 1870: 280; Lütken, 1873: 249, 274-276; Margolis, 1955: 130.

*Paracyamus nodosus* - Stephensen, 1942: 451-452; Margolis, 1954b: 365.

**Cyamus ovalis** Roussel de Vauzème, 1834

*Cyamus ovalis* de Vauzème, 1834: 259; Brandt, 1871: 19-20; Lütken, 1873: 249, 267-270; Lütken, 1887: 319-320; Stebbing, 1910: 472; Barnard, 1932: 307-309; Iwasa, 1934: 34; Sawaya, 1938: 199-227, 244-245; Stephensen, 1942: 448; Margolis, 1955: 129.

*Cyamus tentator* Dall, 1874; Lütken, 1887: 317, 322.

**Cyamus balaenopterae** Barnard, 1931

*Cyamus balaenopterae* Barnard, 1931: 425-430; Barnard, 1932: 309-310; Stephensen, 1942: 449-450; Margolis, 1959: 895-897.

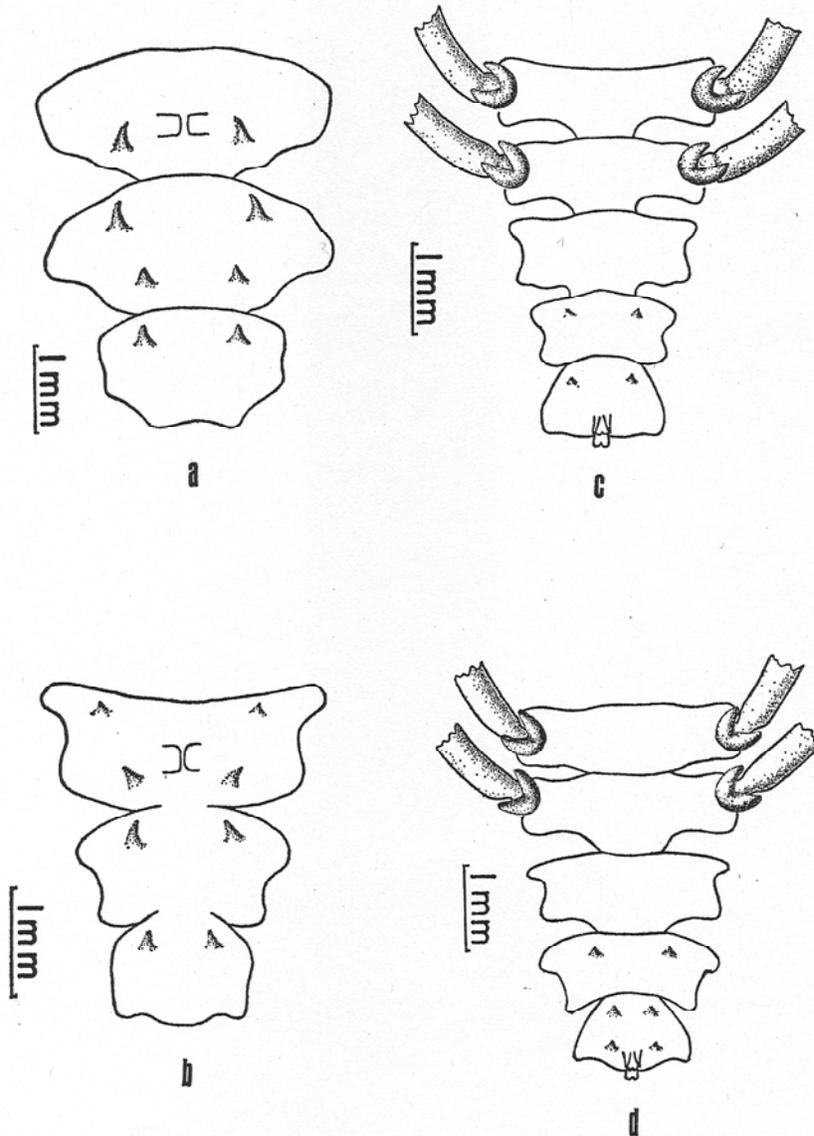


Fig. 5. Spination of ventral peraeon segments 5-7. a, *Cyamus erraticus* Roussel de Vauzème, 1834, female; b, *C. boopis* Lütken, 1870, female; c, *C. catodontis* Margolis, 1954, male; d, *C. bahamondei* Buzeta, 1963, male. (All diagrammatic and part of gills on c and d omitted).

**Cyamus gracilis** (Roussel de Vauzème, 1834)

*Paracyamus gracilis* de Vauzème, 1834: 259; Stebbing, 1910: 473; Barnard, 1932: 312-313.

*Cyamus gracilis* - Lütken, 1873: 250, 278-279; Dall, 1874; Lütken, 1887: 317; Margolis, 1955: 130.

**Cyamus kessleri** Brandt, 1872

*Cyamus kessleri* Brandt, 1872: 115-123, 675-683; Lütken, 1873: 248, 258-260; Lütken, 1887: 320; Lütken, 1893: 424, 425, 426; Hurley & Mohr, 1957: 352-357.

**Cyamus scammoni** Dall, 1872

*Cyamus scammoni* Dall, 1872a: 281; Lütken, 1887: 317-319; 1893: 423; Andrews, 1914: 260; Margolis, 1954: 319-320; Margolis, 1955: 129; Hurley & Mohr, 1957: 352-353.

**Cyamus boopis** Lütken, 1870

*Cyamus boopis* Lütken, 1870: 280; Lütken, 1873: 249, 262-264; Pouchet, 1892: 99; Lütken, 1893: 432; Margolis, 1955: 124-127.

*Paracyamus boopis* - Sars, 1895: 669; Stebbing, 1910: 473; Pesta, 1928: 79, 82; Barnard, 1932: 312; Stephensen, 1942: 452-453; Hurley, 1952: 63-68; Margolis, 1954a: 324.

*Cyamus suffusus* Dall, 1872: 281-283.

*Cyamus elongatus* Hiro, 1938: 71-77.

**Cyamus erraticus** Roussel de Vauzème, 1834

*Cyamus erraticus* de Vauzème, 1834: 259; Lütken, 1873: 248, 260-262; Stebbing, 1910: 472; Chevreux, 1913a: 183; Iwasa, 1934: 37; Sawaya, 1938: 199-207, 227-228, 245; Margolis, 1955: 123-124.

*Paracyamus erraticus* - Barnard, 1932: 310-312; Stephensen, 1942: 452.

**Cyamus catodontis** Margolis, 1954

*Cyamus catodontis* Margolis, 1954a: 319-324; Margolis, 1955: 127-129.

*Cyamus boopis* Lütken var. *physeteris* - Pouchet, 1892: 99-108.

**Cyamus bahamondei** Buzeta, 1963

*Cyamus bahamondei* Buzeta, 1963: 126-137.

**Cyamus chelipes** Costa, 1866

*Cyamus chelipes* Costa, 1866: 82-83; Barnard, 1932: 314; Bowman, 1958: 181.

**Cyamus pacificus** Lütken, 1873

*Cyamus pacificus* Lütken, 1873: 264-267.

**Cyamus rhytinae** (Brandt, 1846)

*Sirencyamus rhytinae* Steller, 1751: 289, 324, 330; Steller, 1753: 54, 97, 106; Brandt, 1846: 189-192; Brandt, 1849: 153; Lütken, 1893: 153; Jordan, 1899: 163, 184, 201.

*Cyamus rhytinae* - Brandt, 1871: 1-27; Lütken, 1873: 270-274.

**Neocyamus Margolis, 1955**

*Neocyamus* Margolis, 1955: 131.

**Neocyamus physeteris (Pouchet, 1888)**

*Cyamus physeteris* Pouchet, 1888: 698-699; Pouchet, 1892: 100; Lütken, 1893: 431.

*Cyamus fascicularis* Verrill, 1902: 21; Kunkel, 1910: 113.

*Paracyamus physeteris* - Stephensen, 1942: 453-454.

*Neocyamus physeteris* - Margolis, 1955: 131-132; Margolis, 1959: 897; Buzeta, 1963: 132-134.

**Platycyamus Lütken, 1870**

*Platycyamus* Lütken, 1870: 279; Lütken, 1873: 250; Stephensen, 1942: 455; Tomilin, 1957: 460; Tomilin, 1962: 118.

**Platycyamus thompsoni (Gosse, 1855)**

*Cyamus thompsoni* Gosse, 1855: 27-36; Bate, 1875b: 525; Bate & Westwood, 1862: 96.

*Platycyamus thompsoni* - Lütken, 1870: 279; Lütken, 1873: 279-281; Brandt, 1871: 21; Stephensen, 1942: 456; Wolff, 1958: 1-14.

**Syncyamus Bowman, 1955**

*Syncyamus* Bowman, 1955: 315; Bowman, 1958: 181.

**Syncyamus pseudorcae Bowman, 1955**

*Syncyamus pseudorcae* Bowman, 1955: 315-320; Bowman, 1958: 181.

**Isocyamus Gervais & Van Beneden, 1859**

*Isocyamus* Gervais & Van Beneden, 1859; Stebbing, 1888: 316; Barnard, 1932: 313; Stephensen, 1942: 454.

**Isocyamus delphini (Guérin-Méneville, 1836)**

*Cyamus delphini* Guérin-Méneville, 1836: 25; Milne-Edwards, 1840: 114; Stebbing, 1888: 163.

*Cyamus globicipitis* Lütken, 1873: 250, 276-278; Mayer, 1882: 186, 187; Pouchet, 1892: 100; Chevreux, 1913b: 15; Chevreux & Fage, 1925: 462-463.

*Isocyamus globicipitis* - Hiro, 1938: 71-77.

*Isocyamus delphini* - Barnard, 1932: 313-314; Stephensen, 1942: 454-455; Bowman, 1958: 181.

**RÉSUMÉ**

Les Cyames (Amphipoda) sont trouvés sur les baleines ainsi que sur les odontocètes. La famille comprend cinq genres reconnus et seize espèces, sans compter deux espèces non nommées de la Baleine de Baird (*Berardius bairdii*).

Un tableau des Cyamides et de leurs hôtes, fondé sur la littérature ainsi que sur des informations non publiées, est inclu dans ce travail, qui comporte également une clé illustrée des espèces, un guide de la littérature, et une liste de références.

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