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Leptostraca, Mysidacea, Cumacea, Isopoda, Amphipoda

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Order LEPTOSTRACA

(223)*

by

V. A. Yashnov

Of the small order Leptostraca, which includes four genera, only one species is encountered in the northern seas of the USSR.

Family N e b a l i i d a e Sars

Genus N e b a l i a Leach

Nebalia bipes (Fabricius) (Fig. 27)

A bivalved carapace encloses the head, thorax and part of the abdomen. A large rostrum is located on the anterior part of the carapace. The thorax consists of eight segments bearing the same number of biramous thoracic appendages with large epipodites. The abdomen has seven segments. The pleopods of the first four abdominal segments are large, biramous and are used for swimming; the pleopods of the next two segments are small, vestigial. The last abdominal segment is connected to the telson which bears the long setaceous rami of the furca. The eyes are stalked. The antennules carry an unsegmented appendage on the fourth segment, as well as a long flagellum. Length approximately 10 mm.

*The numbers in the right-hand margin are the pages of the Russian text - translator

N. bipes is encountered in the Barents Sea, off the coast of Murman, Novaya Zemlya and Spitsbergen, sometimes in large numbers.

Another species, N. typhlops Sars, which is distinguished by the absence of eyes, is encountered off the coast of Norway.

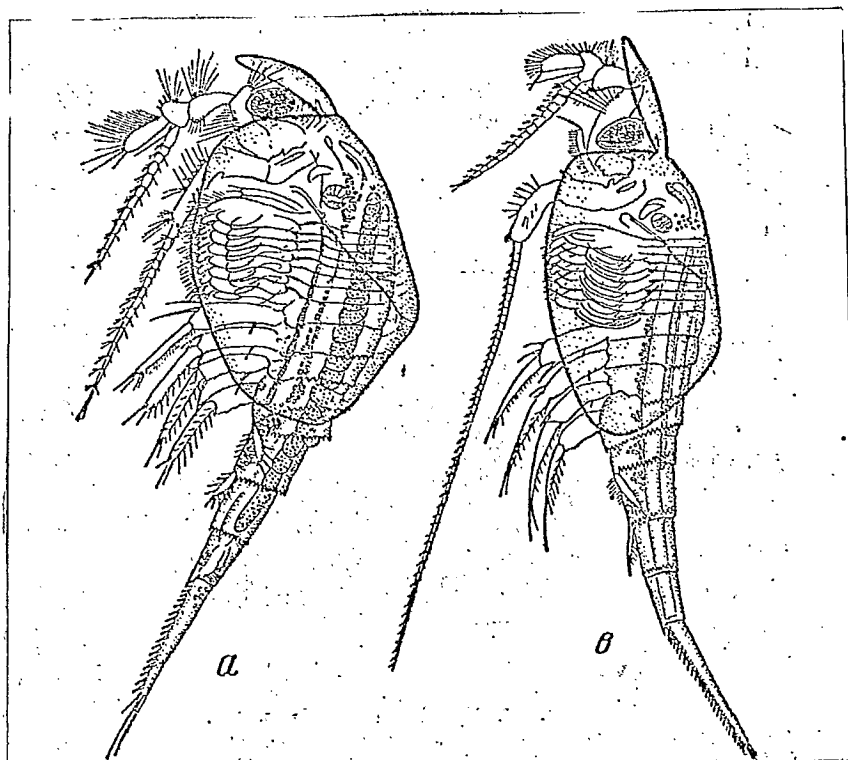


Fig. 27: Nebalia bipes.

a - female;
b - male.

Order MYSIDACEA

(224)

by

V. A. Yashnov

Most of the members of the order Mysidacea inhabit seas, primarily leading a planktonic mode of life, though there are species belonging to the group of benthic organisms.

The body of mysids is divided into the head, thorax and abdomen (Fig. 28). The thorax is covered by a well-developed carapace fused on the dorsal side with one, two or three anterior segments of the thorax and lying free on the remaining segments. The carapace usually has a depression on its posterior portion, and because of this does not cover the last thoracic segments, at any rate down the middle. The eyes are usually stalked; in certain species they are reduced. The antennules (=first antennae) consist of a triarticulate peduncle and two multiarticulate flagella; the third segment of the peduncle of the male antennules bears a highly setaceous appendage at its distal end. The antennae (=second antennae) consist of a triarticulate protopodite, a characteristic exopodite called the scaphocerite or Iscule, and one endopodite consisting in turn of a basal portion in three or four segments and a multiarticulate flagellum; the protopodite and basal part of the endopodite form the peduncle of the antenna. The thoracic ^{limbs}, which are eight in number, bear exopodites and also an epipodite on each of the first pair. The first two pairs of thoracic ^{limbs} are modified as maxillipeds. The posterior two (less commonly three) pairs of thoracic ^{limbs} in females have processes (oostegites) which (225) form a brood chamber, in mature individuals containing the eggs and embryos. The abdomen carries pleopods which are usually less developed in females than in males. The males use them for swimming; in a number of species the third, but more commonly the fourth pleopod in males is very long and modified to form special organs which attain full development only in mature individuals. The caudal fin consists of a telson and one pair of uropods. The endopodites of the uropods in species of the family Mysidae are distinguished by the presence of statocysts with a distinct statolith; this

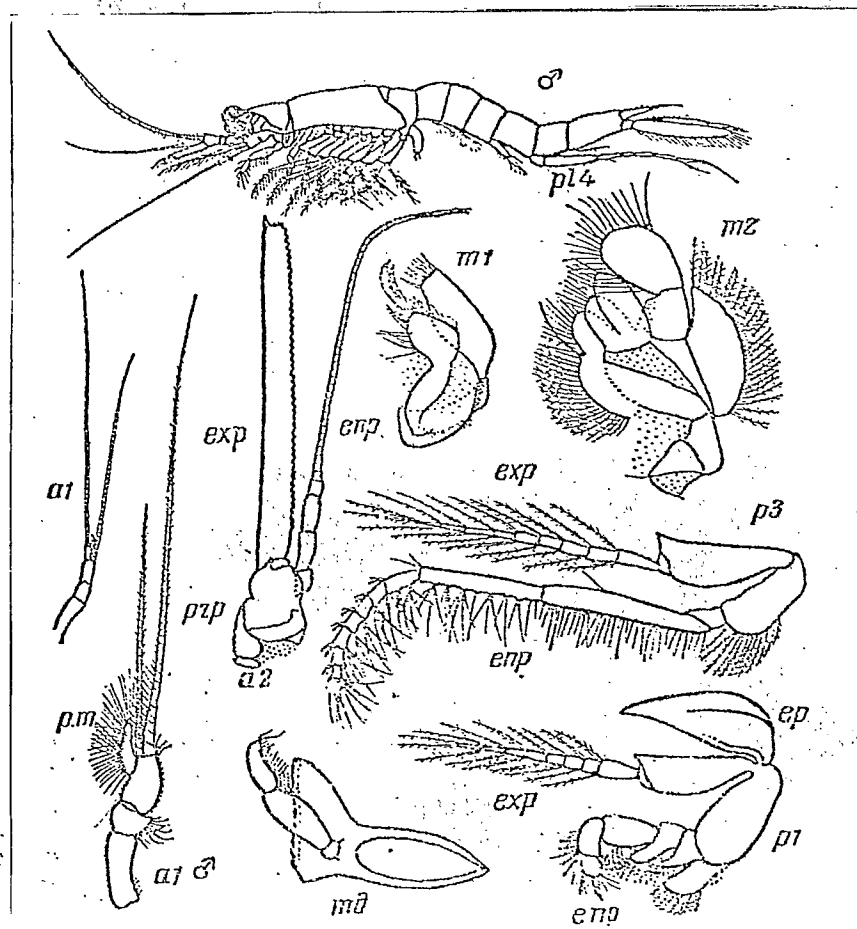


Fig. 28: Mysidacea (Mysis mixta).

- ♂ - side view of male;
- a1 - female antennule;
- a1♂ - male antennule;
- a2 - antenna;
- m1 - maxillula;
- m2 - maxilla;
- md - mandible;
- enp - endopodite;
- ep - epipodite;
- exp - exopodite;
- p1 - thoracic limb of first pair;
- p3 - thoracic limb of third pair;
- pl4 - pleopod of fourth pair;
- pm - processus masculinus;
- prp - protopodite.

characteristic feature makes it easy to distinguish them from the members of other orders which are similar in appearance; the absence of gills also distinguishes them from Euphausiacea (gills are present in the species of only one suborder not encountered in the northern seas of the USSR). Development takes place in the brood chamber; the young individuals leaving the chamber are on the whole similar to mature organisms.

Key to genera of the order Mysidacea encountered
in northern seas of the USSR

- | | | |
|----|---|----------------------|
| 1 | (4) Eyes reduced, without optic elements | 2 |
| 2 | (3) Eyes flattened and fused together, resembling a lamella | <u>Pseudomma</u> |
| 3 | (2) Eyes flattened, but not fused | <u>Amblyops</u> |
| 4 | (1) Eyes well developed | 5 |
| 5 | (12) Posterior end of telson lacking notch | 6 |
| 6 | (9) Scaphocerite of antennae setaceous along both edges | 7 |
| 7 | (8) Long and narrow scaphocerite of antennae with sharp tip | <u>Neomysis</u> |
| 8 | (7) Scaphocerite of antennae not pointed at apex | <u>Stilomysis</u> |
| 9 | (6) Outer edge of scaphocerite of antennae not setaceous, smooth or crenate | 10 |
| 10 | (11) Telson trapeziform | <u>Erythroops</u> |
| 11 | (10) Telson triangular, with truncate apex | <u>Parerythroops</u> |
| 12 | (5) Posterior end of telson with more or less deep notch | 13 |
| 13 | (14) Scaphocerite of antennae setaceous along both edges | <u>Mysis</u> |
| 14 | (13) Outer edge of scaphocerite of antennae lacking setae, smooth | <u>Praunus</u> |

Family M y s i d a e Sars

Genus E r y t h r o o p s Sars

Key to species of Erythroops encountered in
northern seas of the USSR

- 1 (2) Outer edge of scaphocerite of antennae smooth . . . E. erythrophthalma
 2 (1) Outer edge of scaphocerite of antennae crenate 3
 3 (4) Terminal tooth of outer edge of scaphocerite of antennae overlaps
 its apex E. serrata
 4 (3) Terminal tooth of outer edge of scaphocerite of antennae far from
 apex E. abyssorum

Erythropro erythrophthalma (Goës)

(Plate LIV, 1)

Carapace with obtuse projection on anterior part. Bases of compound eyes contiguous. Scaphocerite of antennae longer than stem of antennules, its length four times greater than width. Telson trapeziform, with four spines and two thin, plumose setae between them at its tip. Exopodites of uropods longer than endopodites. Pleopods in males biramous, adapted for swimming. Whitish with some red. Length up to 10 mm.

Encountered in the Barents, White and Kara seas, on the bottom and in the water mass.

Erythropro serrata (Sars)

(226)

(Plate LIV, 2)

Last abdominal segment equal to total length of two preceding segments. Outer edge of scaphocerite of antennae carries 7-8 strong teeth; cusp of last tooth overlaps top of scaphocerite, length of scaphocerite greatest from the base to the cusp of the terminal tooth. Thoracopods long. Posterior edge of telson straight, with four spines and two thin setae between them. Exopodite of uropods $\frac{1}{4}$ longer than endopodite. Pale pink in colour. Length approximately 11 mm.

Boreal species. Encountered in western part of the Barents Sea.

Erythropro abyssorum Sars

(Plate LIV, 3)

Distinguished from previous species by the fact that terminal tooth of outer edge of scaphocerite of antennae does not reach apex, length of scaphocerite greatest from its base to tip of anterior edge. Posterior end of telson slightly convex.

Observed in the Kara Sea.

Genus Parerythros Sars

Key to species of Parerythros encountered
in northern seas of the USSR

- 1 (2) Telson more than $1\frac{1}{2}$ times longer than last abdominal segment P. robusta
- 2 (1) Telson equal in length to last abdominal segment or only slightly longer 3
- 3 (4) Lateral edges of telson almost straight P. obesa
- 4 (3) Lateral edges of telson distinctly concave P. abyssicola

Parerythros obesa (Sars)

(Plate LIV, 4)

Eyes large, protrude insignificantly from edge of carapace. Third segment of peduncle of antennules equal to total length of first two segments. Scaphocerite of antennae only slightly longer than peduncle of antennules, length 3 times greater than width. Telson triangular, with almost straight lateral edges, with four spines and two thin setae between them at its end. First pair of pleopods in males reduced, others biramous. Light-red in colour. Length 13-14 mm.

Boreal species. Encountered in the Barents Sea.

Parerythros abyssicola Sars

(Plate LIV, 5)

Very similar to previous species, distinguished by small eyes and structure of telson, lateral edges of which are distinctly concave. Length approximately 12 mm.

Encountered in the western part of the Barents Sea.

Parerythropros (Meterythropros) robusta (Smith)

(Plate LIV, 6)

Eyes protrude to the sides. Third segment of peduncle of antennules slightly shorter than total length of first two segments. Scaphocerite of antennae approximately $\frac{1}{4}$ longer than pedicel of antennules. Telson triangular, its base equal to half its length. All pleopods in males of a natatory type. Light-red in colour, with two yellow spots on top of the last thoracic segment. Length up to 23 mm.

Encountered in the Barents and Kara seas.

Genus P s e u d o m m a Sars

(227)

Key to species of Pseudomma encountered in
northern seas of the USSR

- 1 (2) Spine on outer edge of scaphocerite of antennae located at its
apex P. thééli
- 2 (1) Spine on outer edge of scaphocerite of antennae located far below
apex 3
- 3 (4) Posterior edge of telson straight P. truncatum
- 4 (3) Posterior edge of telson rounded P. roseum

Pseudomma truncatum Smith

(Plate LIV, 7)

Eyes lacking facets and pigment, fused together, forming broad lamella with rounded anterior edge. Width of scaphocerite of antennae 3 times smaller than length; length of smooth outer edge (up to tooth) equal to approximately $\frac{3}{4}$ length of entire scaphocerite. Telson resembles oblong triangle with obtuse apex; lateral edges of telson bear 8 small spines on each side, posterior edge with four long spines and two thin setae between them. Pleopods in males biramous, natatory. Body transparent with tiny red spots scattered over it. Length approximately 15 mm.

Bathypelagic species. Encountered in the Barents, White and Kara seas, and in the Bering Sea.

Pseudomma roseum Sars

(Plate LIV, 8)

Distinguished from previous species by the following features: Width of scaphocerite 4 times less than length; length of smooth outer edge equal to approximately two-thirds of the entire length of scaphocerite. Telson triangular, with rounded apex; lateral spines gradually increase in size toward posterior end of telson where the largest spines are located. Light-red in colour. Length approximately 15 mm.

Encountered in the Barents Sea.

Pseudomma thééli Ohlin

(Plate LIV, 9)

Extremely rare species. Observed in the vicinity of Franz Josef Land.

Genus A m b l y o p s Sars

Amblyops abbreviata (M. Sars)

(Plate LIV, 10)

Eyes modified as two immovable lamellae, each with a protuberance on anterior edge; facets lacking. Tongue-like telson in posterior half bears numerous spinules. Pink in colour. Length up to 18 mm.

Encountered in western part of the Barents Sea. Belongs to deep-sea species.

Genus S t i l o m y s i s Norman

Stilomysis grandis (Goës)

(Plate LV, 1)

Eyes large. Scaphocerite of antennae twice longer than peduncle of antennules, setaceous along both edges. Tongue-like telson bears numerous

spinules along its entire length, with two long and two short spines at its end. Fourth pair of pleopods in males with long exopodites extending to telson. Body transparent with yellow or brown spots. Length up to 27 mm.

Widely distributed species, encountered on the bottom and in the water mass, in the Barents, Bering and Okhotsk seas.

Genus P r a u n u s Leach

(228)

Key to Praunus species encountered in northern seas of the USSR.

- 1 (2) Scaphocerite of antennae almost $2\frac{1}{2}$ times longer than **stem** of antennules P. flexuosus
- 2 (1) Scaphocerite of antennae $1\frac{1}{3}$ times longer than **stem** of antennules P. inermis

Praunus inermis (Rathke)

(Plate LV, 2)

Anterior lateral corners of carapace pointed. Large eyes strongly protrude to the sides. Length of scaphocerite of antennae approximately 4 times greater than width; external edge smooth. Telson with deep and narrow **notch** on end; up to 16 spines along edges on each side, **notch**

with numerous tiny spines with two large spines on end. Fourth pair of pleopods in males with very long exopodites. Diverse in colour. Keep to mud or stones, dark-coloured; light-coloured individuals encountered on sand. Length approximately 18 mm.

Littoral, boreal species. Encountered in the Barents Sea and strait of White Sea.

Praunus flexuosus (Müller)

(Plate LV, 3)

Distinguished from previous species by the following. Scaphocerite of antennae linear, its length approximately 8-9 times greater than its

width. Lateral edges of telson bear close to 26 spines on each side. Yellowish-brown with black spots. Length up to 26 mm.

Littoral, boreal species. Encountered in the western part of the Barents Sea.

Genus M y s i s Latreille

Key to Mysis species encountered in northern seas of the USSR

- 1 (2) Scaphocerite of antennae pointed on end M. mixta
 2 (1) Scaphocerite of antennae rounded on end 3
 3 (4) Notch on end of telson deep and narrow M. oculata
 4 (3) Notch on end of telson shallow and wide . . . M. oculata var. relicta

Mysis oculata (Fabricius)

(Plate LV, 4)

Front of carapace protrudes anteriorly in the form of a triangular process. Eyes large, protrude from body. Scaphocerite of antennae lanceolate, rounded on end, setaceous along both edges; length approximately 6 times greater than width. Telson oblong with 20-30 spines along edges on each side; notch in telson narrow, with numerous spinules. Fourth pair of pleopods in males with long exopodites. Colour varies from light to greyish brown and almost black. Length 24-39 mm.

Widely distributed species, inhabits coastal regions. Encountered in all northern seas of the USSR.

Mysis oculata var. relicta Loven

(Plate LV, 5)

Distinguished from typical form by structure of telson: notch shallow and wide, its edges forming almost a right angle. Body transparent with black pigment. Length 16-25 mm.

Encountered in freshened regions of the White Sea (mouth of the Severnaya Dvina River) and Siberian coast; also encountered in certain fresh bodies of water.

Mysis mixta Lilljeborg

(Plate LV, 6; Fig. 28)

Scaphocerite of antennae elongate-lanceolate, with sharp end; length approximately 9 times greater than width. Lateral edges of telson bear up to 30 spines on each side. Notch on telson deep and narrow, with numerous spinules. Fourth pair of pleopods in males with very long exopodites. Dark-brown. Length up to 30 mm.

(229)

Encountered in the Barents and White seas.

Genus N e o m y s i s Czerniavsky

Members of this genus are encountered in Far Eastern seas.

Order CUMACEA

by

V. A. Yashnov

The majority of species of the order Cumacea belong to the group of marine organisms, several species are encountered in fresh waters, and some in brackish water bodies.

The body of Cumacea has a distinctive appearance because of its long and narrow abdomen which sharply differs from the anterior part of the body in width (Fig. 29). In most cases the carapace covers the first three thoracic segments, and is fused with them; the lateral folds of the carapace enclose the branchial* chamber which is located between them and the sides of the body. The respiratory organ consists frequently of complex gills which are the epipodites of the first pair of maxillipeds. In many species the carapace has two anterior-lateral extensions which swing together in front of the animal to form the so-called pseudorostrum. The slit between the two pseudorostral extensions posteriorly separates into two slits which

*The word "respiratory" is used in the Russian text - translator

laterally envelop the frontal lobe on which the eyes are located. The eyes are almost always fused into a single unpaired eye. The abdomen consists of six segments which are highly flexible vertically. The telson in many species is completely fused with the last abdominal segment, in others it is well developed. The antennules usually have two short flagella. The antennae in females are reduced, in mature males they have long flagella which lie under the folds of the carapace and epimera of the thorax and often reach a length equal to that of the entire body. Behind the mouth appendages there are three pairs of maxillipeds; the first pair has large epipodites which are the gills. The five pairs of pereopods do not differ much in structure; not a single pair has chelae. The anterior two (less commonly three or four) pairs of pereopods bear exopodites; the number of limbs with exopodites in males is usually greater than in females. The brood chamber in females is formed by oostegites which stem from the third pair of maxillipeds and from the first two or three pairs of pereopods. (230) Pleopods are lacking in females; males usually have several pairs of them. The uropods consist of a long, rod-shaped basal segment and two rami, of which the external one always has two segments, while the internal one consists of one, two or three segments.

All Cumacea are dioecious. Development takes place in the brood chamber; the emerging organisms, which do not yet have the last pair of pereopods, undergo 4-5 moults before reaching maturity.

Members of the order Cumacea are bottom dwellers, burying themselves with the help of the last three pairs of limbs. Some species prefer sand, but the majority live in mud. At night, particularly when mating, many of the species swim to the surface in swarms; the swimming is accomplished with the help of the abdomen or exopodites of the pereopods; in males the pleopods are also used. Frequently swarming in large numbers, the Cumacea can temporarily serve as an important item in the diet of certain fishes.

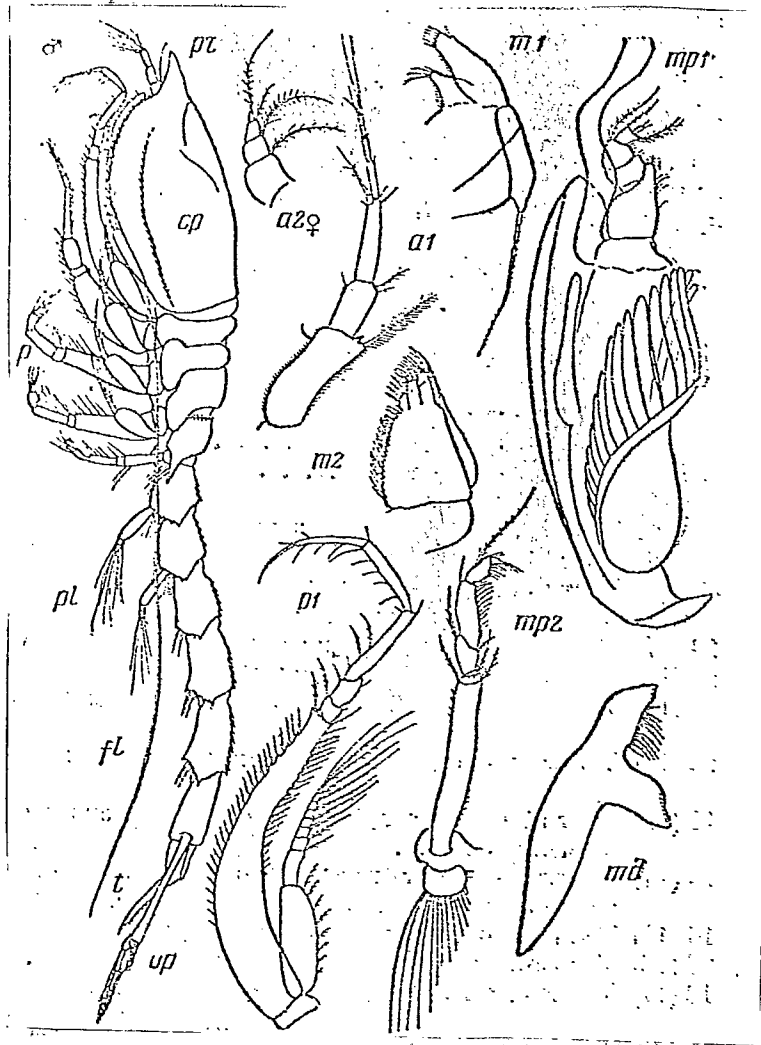


Fig. 29: Cumacea (Diastylis rathkei).

- ♂ - side view of male;
- a1 - antennule;
- a2♀ - female antenna;
- cp - carapace;
- fl - flagellum of male antenna;
- m1 - maxillula;
- m2 - maxilla;
- md - mandible;
- p - thoracopods; (thoracic limbs)
- p1 - first thoracopod;
- pl - pleopods;
- pr - pseudorostrum;
- mp1 - first maxilliped;
- mp2 - second maxilliped;
- t - telson;
- up - uropods.

The order Cumacea includes seven families; the members of five of them are encountered in northern seas of the USSR. Due to their comparatively small size, the Cumacea are not always easily detected, and so it is not excluded that there are several more species in USSR waters.

Key to genera of the order Cumacea encountered
in northern seas of the USSR

- | | | |
|----|--|------------------------|
| 1 | (6) Telson lacking | 2 |
| 2 | (3) Endopodites of uropods consisting of one segment | <u>Campylaspis</u> |
| 3 | (2) Endopodites of uropods in two segments | 4 |
| 4 | (5) Pseudorostrum present | <u>Leucon</u> |
| 5 | (4) Pseudorostrum lacking | <u>Eudorella</u> |
| 6 | (1) Telson present | 7 |
| 7 | (10) Telson small, without spines | 8 |
| 8 | (9) Third last segment of first pair of pereopods narrow | <u>Pseudocuma</u> |
| 9 | (8) Third last segment of first pair of pereopods broad, width
considerably exceeds length of second last segment | <u>Petalosarsia</u> |
| 10 | (7) Telson well developed, with spines | 11 |
| 11 | (16) Telson with one pair of apical spines | 12 |
| 12 | (13) Telson with one pair of apical and one pair of lateral spines
. | <u>Leptostylis</u> |
| 13 | (12) Telson with one pair of apical and several pairs of lateral
spines | 14 |
| 14 | (15) Third segment of thorax not much longer than second and fourth
segments | <u>Diastylis</u> |
| 15 | (14) Third segment of thorax ribbon-like along dorsal side, considerably
shorter than second and fourth segments | <u>Brachydiastylis</u> |
| 16 | (11) Telson with three or more apical spines | 17 |
| 17 | (18) Telson with five apical spines | <u>Lamprops</u> |
| 18 | (17) Telson with three, six or eight apical spines | <u>Hemilamprops</u> |

Family L e u c o n i d a e SarsGenus L e u c o n KröyerKey to Leucon species encountered in
northern seas of the USSR

- 1 (2) End of last segment of endopodites on uropods acuminate . L. pallidus
- 2 (1) Last segment of endopodites on uropods approximately rectangular
in shape 3
- 3 (4) Endopodites of uropods considerably shorter than exopodites . . .
. L. acutirostris (231)
- 4 (3) Endopodites of uropods approximately equal to or longer than
exopodites 5
- 5 (6) Both segments of endopodites of uropods approximately equal in
length L. fulvus
- 6 (5) First segment of endopodites on uropods considerably longer than
second segment 7
- 7 (8) Outer edge of both segments of endopodites on uropods with long
setae L. nasica
- 8 (7) Outer edge of endopodites on uropods smooth (only one seta on each
distal end of segments) 9
- 9 (10) Each side of frontal lobe bears three spines; median ridge
extends to end of carapace L. nasicooides
- 10 (9) Each side of frontal lobe bears one spine; median ridge extends
to middle of carapace L. nathorsti

Leucon nasica (Kröyer)

(Plate LVI, 1)

Median ridge of female carapace extends beyond its midline, another
several teeth present near posterior margin of carapace. Pseudorostrum large.
Eyes lacking. First three pairs of pereopods with exopodites. Endopodites

of uropods with numerous spines of different size along inner edge, with long setae along outer edge. Males distinguished by absence of median ridge and presence of long antennal flagella and two pairs of pleopods. Whitish in colour. Length of females up to 12 mm. length of males up to 10 mm.

Most common form for muddy bottoms; females bury themselves, males swim rapidly with the help of pleopods and exopodites of pereopods. Widely distributed species. Encountered in Barents and Kara seas and in vicinity of New Siberian Islands.

Leucon nasicooides Lilljeborg

(Plate LVI, 2)

Similar to previous species. Median ridge of female carapace extends to posterior margin. Frontal lobe carries three spines on each side. Endopodites of uropods without setae on outer edge, inner edge of terminal segment bears six spines increasing in size toward end of segment. Whitish. Length of female and male up to 6 mm.

Encountered in Barents, White and Bering seas.

Leucon nathorsti Ohlin

Second (longest) segment of first pair of pereopods with two spines on distal end; sixth segment only slightly shorter than fifth segment (in L. nasicooides second segment of first pair of pereopods with one spine; sixth segment $1\frac{1}{2}$ times shorter than fifth segment).

Encountered in the vicinity of Spitsbergen and Novaya Zemlya, in the Kara Sea and near the New Siberian Islands.

Leucon fulvus (Sars)

(Plate LVI, 3)

Distinguished from L. nasica by structure of uropods: endopodites consist of two segments equal in length, setae lacking on outside. Living

organisms bright reddish-yellow. Length of females 5 mm, length of males 5.5 mm.

Arctic species. Encountered in Barents Sea, near Spitsbergen and New Siberian Islands.

Leucon pallidus Sars

(Plate LVI, 4)

Carapace of female and male with median ridge extending to its posterior end. Endopodites of uropods considerably shorter than exopodites, pointed. Whitish in colour. Length of females 4 mm, length of males 4.5 mm.

Encountered in the Barents and Kara seas.

Leucon acutirostris Sars

(232)

(Plate LVI, 5)

Female carapace with median ridge extending only to its middle; ridge lacking in male. Whitish in colour. Length of female 3 mm, length of male 3.5 mm.

Encountered in the Barents Sea and in the vicinity of the New Siberian Islands.

Genus E u d o r e l l a Bate

Key to Eudorella species encountered in
northern seas of the USSR

- 1 (2) Anterior margin of carapace with one large (♀) or small (♂) crescent-shaped **notch** on each side E. emarginata
- 2 (1) Anterior margin of carapace with two small **notches** (♀) or lacking **notches** (♂) on both sides E. truncatula

Eudorella emarginata (Kroyer)

(Plate LVI, 6)

Carapace smooth, anterior lobes rounded. Pseudorostrum lacking. Lower part of anterior margin of carapace with crescent-shaped **notch**

on each side, which terminates in a sharp tooth below. Endopodites of uropods longer than exopodites. Males distinguished by presence of long antennal flagella. Whitish in colour. Length of females and males up to 12 mm.

Most common form for muddy bottoms. Encountered in Barents and Kara seas, and in vicinity of New Siberian Islands.

Eudorella truncatula (Bate)

(Plate LVI, 7)

Second last segment of first pair of pereopods equal to total length of two preceding segments. Length 5 mm.

Encountered in western part of Barents Sea.

Family C a m p y l a s p i d a e Sars

Genus C a m p y l a s p i s Sars

Key to Campylaspis species encountered in
northern seas of the USSR

- 1 (2) Carapace smooth C. rubicunda
2 (1) Carapace with several pairs of ridges C. costata

Campylaspis rubicunda (Lilljeborg)

(Plate LVI, 8)

Carapace smooth. First two pairs of pereopods in females with exopodites, only last pair of pereopods lacking exopodites in males. Terminal segment of second pair of pereopods longer than two preceding segments combined. Body red. Length of female 5 mm, length of male 6 mm.

Encountered in Barents and Kara seas.

Campylaspis costata Sars

(Plate LVI, 9)

Carapace with ridges. Length of female 5 mm. length of male 6.5 mm.

Encountered in western part of Barents Sea.

Family *P s e u d o c u m i d a e* SarsGenus *P s e u d o c u m a* Sars*Pseudocuma longicornis* (Bate) (= *P. cercaria* Beneden)

(Plate LVII, 1)

Carapace with two pairs of costae. Telson small, semispherical, without spines. Length of female up to 4 mm.

Encountered in western part of Barents Sea.

Genus *P e t a l o s a r s i a* Stebbing

(233)

Petalosarsia declivis (Sars)

(Plate LVII, 2)

Carapace with one pair of costae. All segments of endopodites (except the last two) of the first pair of pereopods highly expanded. Telson small, without spines. Length of female 4 mm, length of male 5 mm.

Encountered in Barents Sea.

Family *L a m p r o p i d a e* SarsGenus *L a m p r o p s* Sars

Key to *Lamprops* species encountered in
northern seas of the USSR

- 1 (2) End of telson with five spines of more or less equal length
 *L. fuscata*
- 2 (1) End of telson with three long and two short spines . . . *L. fasciata*

Lamprops fuscata Sars

(Plate LVII, 3)

Eye present. First two pairs of pereopods with well developed exopodites, following two pairs with vestigial exopodites. Telson with five apical and two pairs of lateral spines; outer apical spines in females longer than inner ones, median spine in males shorter than others. Males distinguished by presence of antennal flagella which only slightly exceed

length of carapace, flagella divided into two parts according to structure of segments; pleopods lacking. Body dark-coloured. Length of female 6 mm, length of male 5 mm.

Common form in the Barents Sea.

Lamprops fasciata Sars

(Plate LVII, 4)

Distinguished from previous species by obtuse anterior margin of carapace and armature of telson, the end of which carries three long spines and two short ones between them. Antennal flagella in males equal to $\frac{1}{2}$ length of body. Body segments with dark-violet stripes. Length of females up to 9 mm.

Encountered in western part of Barents Sea.

Genus Hemilamprops Sars

Key to Hemilamprops species encountered in northern seas of the USSR

- | | |
|---|----------------------|
| 1 (2) Eye large, with eight facets | <u>H. rosea</u> |
| 2 (1) Eye small, without facets | 3 |
| 3 (4) Telson with one pair of lateral spines | <u>H. assimilia</u> |
| 4 (3) Telson with several pairs of lateral spines | <u>H. uniplicata</u> |

Hemilamprops rosea (Norman)

(Plate LVII, 5)

Telson with eight apical and two pairs of lateral spines. Body with crimson-coloured spots. Length of female 6 mm, length of male 7 mm.

Encountered in western part of Barents Sea.

Hemilamprops assimilis Sars

(Plate LVII, 6)

Telson with six apical and one pair of lateral spines. Body semitransparent, without pigment. Length of female 5 mm, length of male 6 mm.

Encountered in western part of Barents Sea.

Hemilamprops uniplicata Sars

(234)

(Plate LVII, 7)

Length 7 mm. Encountered in Kara Seas.

Family D i a s t y l i d a e Bate

Genus D i a s t y l i s Say

Key to Diastylis species encountered in
northern seas of the USSR

- | | | |
|----|---|----|
| 1 | (6) Median part of carapace with paired transverse ridges (group of
<u>D. scorpioides</u>) | 2 |
| 2 | (3) Postanal part of telson more than twice longer than preanal part
. <u>D. scorpioides</u> | |
| 3 | (2) Postanal part of telson less than twice the length of preanal
part | 4 |
| 4 | (5) Last thoracic segment with sharply defined dorsal odontoid
process <u>D. lepechini</u> | |
| 5 | (4) Last thoracic segment lacking sharply defined dorsal process . .
. <u>D. edwardsi</u> | |
| 6 | (1) Median part of carapace lacking transverse ridges | 7 |
| 7 | (8) Top of carapace with numerous obtuse convexities <u>F. nodosa</u> | |
| 8 | (7) Top of carapace lacking convexities | 9 |
| 9 | (12) Thoracic segments with spines | 10 |
| 10 | (11) Telson with 7-8 pairs of lateral spines <u>D. spinulosa</u> | |
| 11 | (10) Telson with three pairs of lateral spines <u>D. echinata</u> | |
| 12 | (9) Thoracic segments without spines | 13 |
| 13 | (14) Telson with 3-4 pairs of lateral spines <u>D. lucifera</u> | |
| 14 | (13) Telson with more than four pairs of lateral spines | 15 |
| 15 | (16) Last thoracic segment with rounded posterior corners (viewed
from the top); entire body covered with setae <u>D. goodsiri</u> | |

- 16 (15) Last thoracic segment drawn out into cuspidate processes
 (group of D. rathkei) 17
- 17 (20) Pseudorostrum obtuse 18
- 18 (19) Frontal lobe with numerous spines D. rathkei
- 19 (18) Frontal lobe with only one transverse row of spines . . . D. sulcata
- 20 (17) Pseudorostrum sharp 21
- 21 (22) Anterior part of carapace with numerous spines on the top . .
 D. oxyrhyncha
- 22 (21) Top of anterior part of carapace smooth or with small number
 of spines D. glabra

Diastylis rathkei (Kroyer)

(Plate LVII, 8; Fig. 29)

Females. Anterior part of body comparatively narrow, pomegranate-shaped, with almost parallel lateral margins. Pseudorostrum conical. Spines on frontal lobe arranged in two transverse rows. Last thoracic segment with lateral, cuspidate, dorsally directed processes, extending almost to end of first abdominal segment. Abdomen without spines. Eye small. Antennules with two flagella of different length. Antennae in four segments. Uropods long; last segment of endopodites with three spines along inner edge. Telson considerably longer than main segment of uropods, distal part with approximately 10 spines on each side, apical spines do not differ from lateral ones. Males distinguished by presence of long antennal flagella. Whitish. Length of females 10-18 mm, length of males 10-19 mm.

D. rathkei belongs to the group of widely distributed species.

Inhabits muddy bottoms in which it is able to rapidly bury itself. Mature males encountered rarely.

Above-described variety Diastylis rathkei sarsi (Norman) encountered in the Barents and White seas. D. rathkei typica Zimmer and D. rathkei belgica Zimmer, which have a somewhat different structure, are encountered along the western coast of Europe. Prior to 1926 this species was often (235) confused with D. sulcata, D. glabra and D. oxyrhyncha.

Diastylis oxyrhyncha Zimmer

(Plate LVII, 9)

Distinguished from D. rathkei by presence of rather long rostrum with pointed end and large number of spines arranged not only in the form of two longitudinal rows on upper surface of frontal lobe, but also on entire anterior part of carapace. First segment of peduncle of antennules longer than following two segments combined (in D. rathkei sarsi approximately equal to total length of indicated segments). Length approximately 14 mm.

Psychrophilic form. Encountered in the Barents and Kara seas.

Diastylis glabra Zimmer

(Plate LVII, 10)

Similar to D. rathkei in appearance. Greatest differences in the presence of elongated and sharp pseudorostrum, as well as in the presence of longitudinal, but not transverse rows of spines on frontal lobe, or the complete absence of them.

D. glabra, a widely distributed species, falls into a number of geographic races, three typical of the Atlantic, one of the Pacific and two of northern seas of the USSR.

The typical form, D. glabra typica, is encountered in the Barents Sea and along the entire Siberian coast from the Kara Sea to Bering Strait. The carapace of mature females (oostegites do not form marsupium) are completely devoid of spines; the carapace of young females, as well as those

in brooding dress (oostegites form marsupium) and males in nuptial array bears spines on its anterior portion. The largest of all species similar to D. rathkei. Length of females 18-28 mm, males slightly larger.

Variety D. glabra minor Zimmer encountered in the White Sea. Distinguished from typical form by smaller body size and the presence of a small number of spines on the carapace of mature individuals. Length 14-18 mm.

Diastylis sulcata Calman

(Plate LVIII, 1)

Body narrow. Transverse ridge intersects anterior part of frontal lobe and bears approximately six spines. End of basal segment of uropods does not extend to end of telson. Length up to 14 mm.

Encountered in White Sea, eastern part of Barents Sea and along entire Siberian coast from Kara Sea to Bering Strait.

Variety Diastylis sulcata stuxbergi Zimmer (Plate LVIII, 2) encountered in vicinity of Dickson Island. Distinguished by different body shape, as well as longer basal segment of uropods, end of which considerably overlaps end of telson. Length up to 11 mm.

Diastylis lucifera (Kröyer)

(Plate LVIII, 3)

Top of carapace covered with spinules. Telson considerably shorter than basal segment of uropods, with 3-4 spines on each side; apical spines longer than lateral ones. Males distinguished by presence of long antennal flagella and absence of spines on surface of carapace (only three spines along anterior margin). Length of females up to 6 mm. length of males up to 8 mm.

Encountered in western part of Barents Sea.

Diastylis goodsiri (Bell)

(Plate LVIII, 4)

Largest form among Cumacea. Body covered on all sides with numerous setae. Surface of carapace without spines. Abdominal segments with cuspidate processes along sides. Telson shorter than basal portion of uropods, bears approximately 20 setae on each side, apical setae short. Mature males encountered rarely. Length up to 35 mm.

D. goodsiri belongs to the group of common Arctic species. Encountered in sublittoral of Barents and Kara seas and around the New Siberian Islands.

Diastylis spinulosa Heller

(236)

(Plate LVIII, 5)

Top of carapace covered with large sharp spines curved anteriorly. Top of each of the first four thoracic segments carries two spines; last thoracic segment with one spine in the middle and with cuspidate lateral processes. Telson considerably longer than basal segment of uropods, with approximately eight spines on each side; apical spines thicker than lateral ones. Length up to 18 mm.

Encountered in sublittoral of Barents and Kara seas and near the New Siberian Islands.

Diastylis echinata Bate

(Plate LVIII, 6)

Top of carapace covered with spines. Thoracic segments with two spines. Telson with three lateral spines on each side, apical spines not thicker than lateral ones. Length up to 10 mm.

Encountered in western part of Barents Sea, in the vicinity of Spitsbergen and in the Kara Seas.

Diastylis scorpioides (Lepechin)

(Plate LVIII, 7)

Females. Top of carapace with five transverse ridges on each side, first two ridges short, last three long, fused at edge of carapace. Teeth located in middle of carapace slightly below last pair of ridges form isolated group. Last thoracic segment with sharply defined dorsal odontoid extension. Telson approximately equal in length to basal segment of uropods, with 13-15 pairs of lateral spines; apical spines larger than lateral ones. Antennal flagella in males shorter than in other species, extend only to end of carapace. Length of females 10 mm, length of males 11 mm.

Belongs to group of common species. Encountered in Barents, White, Kara and Laptev seas.

Diastylis edwardsi (Kröyer)

(Plate LVIII, 8)

Similar to preceding species. Teeth located in middle of carapace between last pair of ridges form one transverse row. Last thoracic segment smooth or with poorly defined extension. Postanal part of telson shorter than in preceding species, with 10-11 pairs of lateral spines. Length 10-13 mm.

Encountered in Barents and Kara seas and in vicinity of New Siberian Islands.

Diastylis lepechini Zimmer

(Plate LVIII, 9)

Similar to D. scorpioides. Transverse ridges on carapace more strongly defined than in two preceding species. Teeth located in middle of carapace between last pair of ridges form one transverse row. Postanal part of telson less than twice longer than preanal part. Length 8-11 mm.

Encountered in Barents and Kara seas and in vicinity of New Siberian Islands.

Diastylis nodosa Sars

(Plate LVIII, 10)

Encountered in vicinity of Spitsbergen.

Genus Brachydiastylis StebbingBrachydiastylis (Diastylopsis) resima (Kröyer)

(Plate LVIII, 11)

Females. Top of carapace with two rows of small approximated spines. Pseudorostrum large, curved upward and bearing long plumose setae. Last thoracic segments with large rounded epimera. Telson with cylindrical proximal part and narrowed distal part, with four thin spines on each side; apical spines thin. Grey in colour. Males distinguished by presence of long antennal flagella and small smooth setae on pseudorostrum. Length of females 5 mm, length of males 6 mm.

Belongs to Arctic species. Encountered in Barents and Kara seas and in vicinity of New Siberian Islands.

Genus Leptostylis Sars

(237)

Key to Leptostylis species encountered in
northern seas of the USSR

- 1 (2) Basal segment of uropods considerably longer than fifth abdominal segment L. longimana
- 2 (1) Basal segment of uropods shorter or equal in length of fifth abdominal segment 3
- 3 (4) Length of carapace equal to maximum width; surface of carapace thickly pubescent L. villosa
- 4 (3) Length of carapace exceeds maximum width 5
- 6 (5) Abdomen narrow and long; length of fifth abdominal segment approximately four times greater than width L. macrura
- 5 (6) Abdomen comparatively broad; length of fifth abdominal segment approximately twice greater than width L. ampullacea

Leptostylis macrura Sars

(Plate LVIII, 12)

Abdomen considerably longer than anterior part of body. Last segment of uropodal endopodites longer than first segment. Margins of carapace in males serrate, antennal flagella overlap end of thorax. Length approximately 5 mm.

Encountered in western part of Barents Sea and in vicinity of Spitsbergen.

Leptostylis longimana Sars

(Plate LVIII, 13)

Length 5.5 mm. Encountered along Nowegian coast and in vicinity of New Siberian Islands.

Leptostylis ampullacea (Lilljeborg)

(Plate LVIII, 14)

Abdomen slightly longer than anterior part of body. Last segment of uropodal endopodites shorter than first segment. Length 6 mm.

Encountered in western part of Barents Sea.

Leptostylis villosa Sars

(Plate LVIII, 15)

Carapace pubescent; anterior margin almost of regular semispherical shape. Length 5 mm.

Encountered in western part of Barents Sea.

Order ANISOPODA

by

V. A. Yashnov

The small order Anisopoda (Tanaidacea), earlier treatment as a special group of the order Isopoda, consists exclusively of marine organisms.

The body in Anisopoda is made up of the head, which is formed by the fusion of the head segments with two thoracomeres, the thorax and the abdomen (Fig. 30). Small folds of the carapace, which cover the branchial chamber, extend from the head on each side; the inner surface of these folds and the epipodites of the maxillipeds serve as respiratory organs. The last abdominal segment is fused with the telson, forming the pleotelson. The eyes are sessile, without stalks. The antennules consist of a triarticulate ~~peduncle~~ and one or two flagella. The antennae consist of a peduncle in two segments, a small exopodite (may be lacking) and a flagelliform endopodite. Apart from the mouth parts, the head carries one pair of maxillipeds which are frequently fused at the bottom and have a highly developed epipodite on each side, and one pair of chelate appendages, usually with **true** chelae. All six pairs of pereopods lack exopodites; only the first pair in certain species has small exopodites. In females one or several pairs of pereopods bear oostegites. The pleopods are usually biramous. The uropods are small, uni- or biramous.

All Anisopoda are dioecious. In most cases the males are distinguished from the females by longer pleopods and antennal flagella, as well as by the structure of the antennules; mature males of the family Tanaidae are encountered rarely. Anisopoda live buried in mud or on algae, certain species construct tubes from plant particles or a substance secreted by species glands.

(238)

The Anisopoda encountered in northern seas of the USSR have been very poorly studied. Due to their small size they are often able to avoid the scrutiny of the researcher; because of their size, they are also able to easily escape through the mesh of bottom-sampling nets. There is no doubt that the number of species in USSR waters will considerably increase with time.

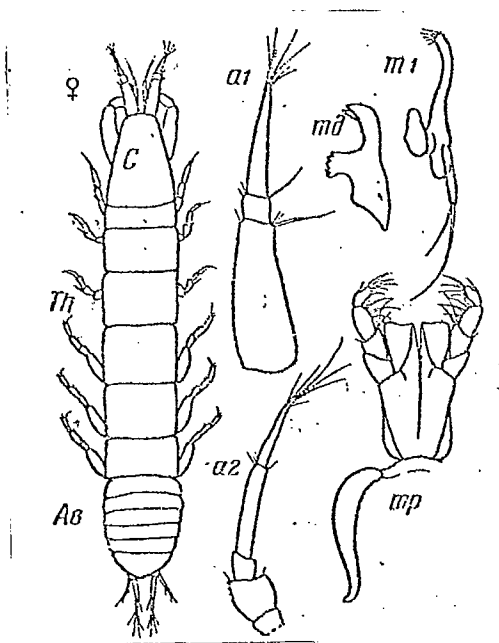


Fig. 30: Anisopoda (Typhlotanais tenuimanus).

♀ - female viewed from the top;
 Ab - abdomen;
 C - head;
 Th - thorax;
 a1 - antennule;
 a2 - antenna;
 m1 - maxillula;
 md - mandible;
 mp - maxillipeds.

Key to genera of the order Anisopoda encountered
in northern seas of the USSR

(All keys for the order Anisopoda are based on
 female characteristics)

- | | | |
|---|---|------------------|
| 1 | (4) Antennules with two flagella | 2 |
| 2 | (3) Antennae with exopodite | <u>Apseudes</u> |
| 3 | (2) Antennae lacking exopodite | <u>Sphyrapus</u> |
| 4 | (1) Antennules with one flagellum | 5 |
| 5 | (8) Antennules triarticulate | 6 |

- 6 (7) Fourth and fifth thoracic segments large, sharply differ in length from first three segments Pseudotanaia
- 7 (6) Fourth and fifth throacic segments do not differ in length from second and third segments Typhlotanaia
- 8 (5) Antennules in four segments 9
- 9 (10) Four pairs of oostegites on thorax; pleopods usually well developed Leptognathia
- 10 (9) Only one pair of oostegites on thorax (on fourth pair of pereopods); pleopods vestigial Cryptocope

Family A p s e u d i d a e Sars

Genus A p s e u d e s Leach

Apseudes spinosus (M. Sars)

(Plate LIX, 1)

Flagellum of antennules in 15-22 segments; accessory flagellum in 7-10 segments. Pleotelson equal to abdomen in length. Uropods half the length of body; exopodite of uropods in 12 segments, endopodite in 30 segments. Males distinguished from females by larger chelipeds and a larger first pair of pereopods. Whitish. Largest species encountered in USSR seas; length of female up to 14 mm, length of male up to 12 mm.

Encountered in western part of Barents Sea.

Genus S p h y r a p u s Norman and Stebbing

Sphyrapus anomalus (Sars)

(Plate LIX, 2)

Eyes lacking. Flagellum of antennules in five segments accessory flagellum triarticulate. First pair of pereopods in females slightly longer than other legs, in males extends to end of body. Exopodite of uropods triarticulate, endopodite in ten segments. White. Length of females 4 mm, length of males 5 mm.

Encountered in Barents and Kara seas.

Family T a n a i d a e Sars

(239)

Genus L e p t o g n a t h i a Sars

Of the approximately 30 species of this genus, only three species have so far been observed in northern seas of the USSR.

Key to Leptognathia species encountered
in northern seas of the USSR

- 1 (2) Exopodites of uropods in one segment, not separated from basipodites
 L. brevimana
- 2 (1) Exopodites of uropods **in** two segments 3
- 3 (4) Pleotelson with small, sharp, triangular, anteriorly directed
 process on each side L. sarsi
- 4 (3) Pleotelson smooth along sides L. gracilis

Leptognathia sarsi Hansen (= L. longiremis
 Sars, non Lilljeborg) (Plate EIX, 3)

Females. Abdomen $4\frac{1}{2}$ times shorter than entire body, ends with rounded pleotelson bearing cuspidate processes along sides. Eyes lacking. Antennules in four segments; first segment longer than following two segments combined. Upper surface of chela with 7-8 teeth arranged in a row. Five pairs of pleopods well developed. Length 3.8 mm.

Males. Abdomen approximately $2\frac{1}{2}$ times shorter than entire body; pleotelson acuminate. Antennules in seven segments, with two highly expanded basal segments. Length 2.6 mm.

Encountered in White Sea.

Leptognathia gracilis Hanses

(Plate LIX, 4)

Distinguished from preceding species by absence of row of teeth on chela and by smooth outer edges of pleotelson. Length of females 2.2 mm.

Encountered in Barents and Kara seas.

Leptognathia brevimana (Lilljeborg)

(Plate LIX, 5)

Females characterized by structure of uropods, single-segment endopodite of which is basipodite process. Length of females 2.8 mm.

Encountered in western part of Barents Sea.

Genus C r y p t o c o p e Sars

Cryptocope arctica Hansen (Plate LIX, 6)

Carapace considerably longer than first three thoracic segments combined. Uropods short. Pleopods vestigial, each ramus with small setae on end. Length 2.0 mm.

Encountered in Barents and Kara seas.

Genus P s e u d o t a n a i s Sars

Key to Pseudotanaïs species encountered in
northern seas of the USSR

- | | |
|--|-----------------------|
| 1 (4) Pleopods present | 2 |
| 2 (3) Exopodites of uropods only slightly exceed length of first segment
of endopodites | <u>P. macrocheles</u> |
| 3 (2) Exopodites of uropods extend to middle of terminal segment of
endopodites | <u>P. affinis</u> |
| 4 (1) Pleopods lacking | 5 |
| 5 (6) Eyes present | <u>P. lilljeborgi</u> |
| 6 (5) Eyes lacking | <u>P. forcipatus</u> |

(240)

Pseudotanaïs forcipatus Lilljeborg

(Plate LIX, 7)

Fourth and fifth thoracic segments sharply differ in length from first three. Antennules triarticulate. Chelipeds large, pincer-like; immovable ~~finger~~ of chela almost cylindrical. Pleopods lacking in females, present in males. Pleotelson in males with ~~notch~~ on end. Length of females 1.4 mm, length of males 1.0 mm.

Encountered in Barents Sea and in vicinity of Franz Josef Land.

Pseudotanaeis lilljeborgi Sars

(Plate LIX, 8)

Distinguished from preceding species by presence of vestigial eyes and the usual, non-pincer-like chelae. Length of females 2.0 mm.

Arctic species. Encountered in Barents Sea.

Pseudotanaeis macrocheles Sars

(Plate LIX, 9)

Distinguished from preceding species by presence of pleopods in females. Antennules longer than cephalothorax. Exopodites of uropods slightly longer than endopodites. Length of females 1.5 mm.

Encountered in western part of Barents Sea.

Pseudotanaeis affinis Hansen [=P. crassicornis Hansen (immature male)] (Plate LIX, 10)

Very similar to preceding species, distinguished by structure of uropods. Length of female 2.2 mm, length of male 1.4 mm.

Encountered in Kara Seas.

Genus T y p h l o t a n a i s Sars

Of the numerous (over 30) species of the genus Typhlotanaeis, only three species have so far been detected in northern seas of the USSR.

Key to Typhlotanaeis species encountered in northern seas of the USSR

- 1 (2) Segments of thorax vary in width T. irregularis
- 2 (1) Segments of thorax of equal width 3
- 3 (4) Anterior margin of head lacking rostral process . . . T. finmarchicus
- 4 (3) Anterior margin of head with sharp rostral process T. cornutus

Typhlotanaeis finmarchicus Sars

(Plate LIX, 11)

Female body cylindrical, all segments of thorax equal to width; middle segments of thorax in males narrower than outside ones. Eyes lacking. Antennules of females triarticulate, with large conical first segment; male antennules in six segments, with very massive first segment. Five pairs of pleopods well developed. Uropods with ~~2-segmented~~ rami, inner ones considerably thicker than outer ones. Length of female 2 mm, length of male 1.5 mm.

Encountered in Barents Sea and in vicinity of Franz Josef Land.

Typhlotanais irregularis Hansen

(Plate LIX, 12)

Distinguished from preceding species by structure of thorax, segments gradually narrow from first to last segment (first segment approximately twice wider than last one), as well as by longer uropods. Length of female 1.9 mm.

Encountered in Kara Sea.

Typhlotanais cornutus Sars

(241)

(Plate LIX, 13)

Distinguished from other species by broader body, the width of which is only $4\frac{1}{2}$ times smaller than length, and by presence of well defined rostral process. Length of female 1.7 mm.

Encountered in western part of Barents Sea.

Order ISOPODA

by

V. A. Yashnov

The overwhelming majority of Isopoda belong to the group of typically marine organisms; a comparatively small number of species live in fresh water or on land. The major habitat of Isopoda is the bottom of water bodies. Some species lead a planktonic mode of life, and others parasitize fish and invertebrates.

The body of isopods is made up of the head, thorax and abdomen (Fig. 31). A carapace is lacking. The entire body is covered with soft chitin, a hard external skeleton being comparatively rare (in members of the family Gnathiidae). The head, which is formed by the fusion of all the head segments with one, less commonly two, thoracomeres, bears sessile, stalkless eyes, antennules, antennae and the mouth parts. The antennules consist of a triarticulate peduncle and a multiarticulate flagellum. The antennae, which in some species attain great length, consist of a peduncle in five segments and usually one flagellum. The mouth parts are of a structure typical for Malacostraca (Fig. 31). In many species the mandibles carry a mandibular palp in 1-3 segments, as well as an accessory movable plate near the sharp end of the mandible. As a result of the fusion of the first thoracomere with the head, the corresponding pair of appendages are modified to form maxillipeds which are fused together at midline and consist of a basal portion, paired palps and epipodites. In members of the suborder Gnathiidae the head appendages also include a pair of polypods which are in the form of wide plates covering the mouth parts from below. A typical thorax is made up of seven segments; however they are often fewer in number because of the fusion of some of them with each other; the last thoracic segment is frequently fused with the first abdominal segment. Each thoracic segment carries a pair of uniramous appendages lacking exopodites; therefore, there are seven pairs of pereopods in all, except that in members of the family Gnathiidae this number diminishes to five due to the modification of the first pair to form polypods and the complete reduction of the last pair of legs. The coxopodites of the pereopods are modified as wide and flat coxal plates which are freely articulated with the thoracomeres; only in members of the order Asellota are the coxopodites not expanded. As a rule, the first pair of coxal plates is fused with the first thoracic segment; in

some species of the family Idotheidae all of them are completely fused, without any traces of a suture, with the thoracic segments. In females all or some of the pereopods bear wide processes directed anteriorly and fringed with setae; these processes are called oostegites and form the brood chamber (marsupium) in which the development of deposited eggs takes place. The abdomen usually has five pairs of biramous pleopods, which are modified mainly for gas exchange, and one pair of uropods. In members of the suborder Asellota one pair of pleopods is fused at midline, forming an operculum which covers the other pleopods from below; the operculum in females usually has the form of a spherical plate, in males it is elongated and bears setae and processes. The telson in almost all Isopoda is fused with the last abdominal segment, forming with it the so-called pleotelson or terminal segment. The structure of the parasitic species is highly variable. In extreme cases the organisms completely lose their segmentation and acquire a sac-like form, the limbs are modified to form uncinatae appendages or are completely reduced. All Isopoda, with the rare exception, are dioecious. Sexual dimorphism is usually weakly defined, sharp differences between females and males being observed only in members of the family Gnathiidae and suborder Epicaridea. In most cases the entire development process takes place within the eggs which are carried by the females in the brood chamber. Larval stages are observed only in members of the family Gnathiidae. Parasitic species, which belong to the suborder Epicaridea, are characterized by regressive metamorphosis.

(242)

Of the seven suborders of Isopoda, five are encountered in northern seas of the USSR.

Suborder Asellota. Seven pairs of pereopods. Five pairs of pleopods serve as respiratory organs in males, four in females (first pair lacking). Characterized by presence of thin operculum covering remaining pleopods on

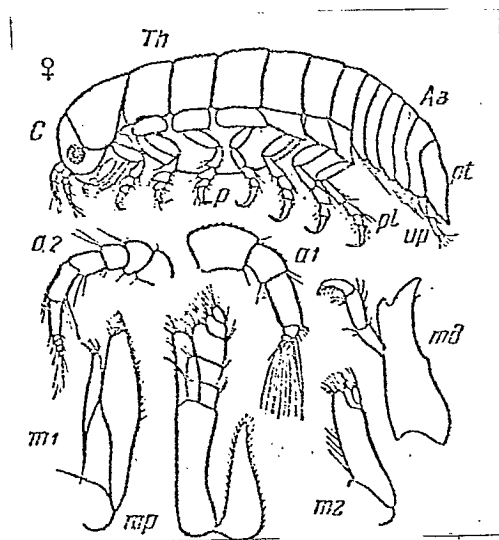


Fig. 31: Isopoda (Limnoria lignorum).

- ♀ - female viewed from the top;
- Ab - abdomen;
- C - head;
- Th - thorax;
- a1 - antennule;
- a2 - antenna;
- m1 - maxillula;
- m2 - maxilla;
- md - mandible;
- mp - maxilliped;
- p - thoracopods;
- pl - pleopods;
- pt - pleotelson;
- up - uropods.

ventral side of last abdominal segment. Uropods attached to posterior end of pleotelson.

Suborder Flabellifera. Seven pairs of pereopods. Pleopods serve as organs of locomotion and respiration. Characterized by presence of caudal fin formed by expanded rami of uropods and pleotelson located between them. Aside from free-living species, parasitic and semiparasitic species are also encountered.

Suborder Valvifera. Seven pairs of pereopods. The most characteristic feature is the structure of the uropods which serve as a valve-like cover for the pleopods, used mainly for gas exchange and sometimes for swimming.

Suborder Epicaridea. Includes parasites of various crustaceans (Ostracoda, Mysidacea, Decapods). In species less affected by parasitism, limbs are present and body preserves segmentation; however, many species lose these features and their relation to Isopoda is established by the history of their development, as well as by the males which are frequently encountered on them and which always preserve the structural features of Isopoda. Two larval stages are observed in the development of Epicaridea: the globular form of epicaridium and elongated form of cryptoniscium.

Suborder Gnathiidea. Female body spindle-shaped, with small head; male body flattened with very large head and mandibles projecting forward. Abdomen distinctly separated from thorax. Six pairs of pereopods, first pair attached to head and modified as opercula, covering mouth parts from below. Development accompanied by metamorphosis.

Key to genera of the order Isopoda encountered
in northern seas of the USSR

- 1 (42) Body symmetrical on both sides, distinct segmentation; mouth parts and pereopods of usual structure 2
- 2 (23) Uropods attached to posterior end of pleotelson 3
- 3 (12) All pereopods narrow, not modified as natatory appendages 4
- 4 (5) Uropods closely approximated and located in **notch** of pleotelson Jaera
- 5 (4) Uropods separated from each other, pleotelson lacking **notch** . . . 6
- 6 (9) Uropods long, considerably overlap posterior end of pleotelson . . . 7
- 7 (8) Uropods biramous Janira

- 8 (7) Uropods uniramous Katianira
- 9 (6) Uropods short, do not overlap posterior end of pleotelson 10
- 10 (11) Head broad, lateral parts of anterior thoracic segment do not
encompass it from the sides; eyes usually present Munna
- 11 (10) Head small, set deeply, sides of first thoracic segment encompass
head from the sides; eyes lacking Pleurogonium
- 12 (3) Three posterior pairs of pereopods natatory; their distal seg- (243)
ments expanded to form plates with plumose setae 13
- 13 (16) Uropods uniramous 14
- 14 (15) Both segments of uropods cylindrical; some segments of antennae and
pereopods considerably exceed length of body Munnopsis
- 15 (14) Main segment of uropods sharply differs from terminal ones in
width Ilyarachna
- 16 (13) Uropods biramous 17
- 17 (20) Rami of uropods stem from posterior end of basal segment; pleo-
telson semicircular 18
- 18 (19) End of mandibles with small movable plate and row of setae under
it Eurycope
- 19 (18) End of mandible lacking movable plate Munnopsurus
- 20 (17) Rami of uropods stem from outer edge of highly expanded basal
segment 21
- 21 (22) Mandibles with thin triarticulate mandibular palp; thoracic seg-
ments lacking spines Aspidarachna
- 22 (21) Mandibles lacking mandibular palp; anterior edges of first four
thoracic segments with long spines Echinozone
- 23 (2) Uropods attached to last abdominal segment along sides 24
- 24 (33) Valve-like uropods cover pleopods from below 25
- 25 (28) Body narrow, elongated; antennae longer than entire body 26

- 26 (27) Fourth thoracic segment considerably longer than others . . . Astacilla
- 27 (26) Fourth thoracic segment only slightly longer than others . . . Arcturus
- 28 (25) Body more or less flattened; thoracic segments approximately
equal in length 29
- 29 (30) Palp of maxillipeds in five segments; eyes located on upper side
of head or lacking; abdomen consists of four segments . . . Mesidothea
- 30 (29) Palp of maxillipeds consists of less than five segments; eyes
located on sides of head; abdominal segments fewer in number . . . 31
- 31 (32) Palp of maxillipeds in four segments; abdomen consists of three
segments Idothea
- 32 (31) Palp of maxillipeds triarticulate; abdomen consists of one
segment Synidothea
- 33 (24) Uropods form caudal fin with pleotelson 34
- 34 (35) Abdomen narrow, slightly demarcated from broader thorax . . . Gnathia
- 35 (34) Abdomen not significantly broader than thorax 36
- 36 (37) Body very narrow, cylindrical Calathura
- 37 (36) Body spherical-oval, flattened 38
- 38 (39) Eyes very large, reniform, sometimes almost contiguous along
middle Aega
- 39 (38) Eyes small, located along sides of head 40
- 40 (41) Rami of uropods wide, almost equal in length Cirolana
- 41 (40) Rami of uropods narrow, outer ramus shorter than inner one . Limnoria
- 42 (1) Female body frequently asymmetrical, sometimes unsegmented,
limbs reduced; male body segmented, elongated, small (1-3 mm).
Parasitize crustaceans 43
- 43 (46) Pereopods lacking in females; body saccular 44
- 44 (45) Ventral side of female body bears longitudinal groove with five
pairs of rounded lobes along edges Parapodascon

- 45 (44) Ventral side of female body with six transverse grooves . . .
 Clypeoniscus
- 46 (43) Pereopods present in females 47
- 47 (48) Female body symmetrical; segmentation visible only from dorsal
 side Dajus
- 48 (47) Female body asymmetrical, segmented 49 (244)
- 49 (50) Four pairs of leaf-shaped pleopods present Phryxus
- 50 (49) Pleopods lacking Bopyroides

Suborder Asellota

Family J a n i r i d a e Sars

Genus J a e r a Leach

Jaera albifrons Leach (= J. marina Sars)

(Plate LX, 1)

Body oval. Pleotelson semicircular, end with **notch** in which small biramous, closely approximated uropods are attached. Colour varies greatly from grey to yellowish with black spots or almost black. Length 4-5 mm.

Boreal species, enters USSR seas with warm waters. Inhabits littoral zone, found on algae and under stones; endures very fresh waters. Encountered in Barents (up to Chesha Bay) and White seas.

Genus J a n i r a Leach

Key to Janira species encountered in northern seas of the USSR

- 1 (2) Thoracic segments lacking sharp lateral processes; rostrum lacking
 J. maculosa
- 2 (1) Thoracic segments with sharp lateral processes; rostrum present . . 3
- 3 (4) Pleotelson with sharp lateral processes J. laciniata
- 4 (3) Pleotelson rounded on sides J. tricornis

Janira maculosa (Plate LX, 2)

Body broadly oval. Eyes well developed. Edges of pleopods above uropods serrate. Yellowish. Length 6-7 mm.

Encountered in western part of Barents Sea (up to Kola Gulf).

Janira laciniata (Sars) (Plate LX, 3)

Head, thoracic segments and pleotelson with large sharp processes. Length 7-10 mm.

Encountered in western part of Barents Sea.

Janira tricornis (Kröyer) (Plate LX, 4)

First four thoracic segments with double, sharp lateral processes.

Encountered in vicinity of Spitsbergen and Franz Josef Land.

Genus K a t i a n i r a HansenKey to Katianira species encountered in northern seas of the USSR

- 1 (2) Lateral processes of head and thorax with teeth along edges K. biloba

 2 (1) Indicated processes smooth K. cornigera

Katianira biloba Gurjanova (Plate LX, 5)

Encountered in vicinity of Spitsbergen.

Katianira cornigera Gurjanova (Plate LX, 6)

Encountered in vicinity of Spitsbergen.

Family M u n n i d a e Sars

(245)

Genus M u n n a KröyerKey to Munna species encountered in northern seas of the USSR

- 1 (8) Eyes well developed 2
 2 (3) Uropods with triangular process directed interiorly . . . M. fabricii
 3 (2) Uropods with setae 4

- 4 (5) Pleotelson with 7-8 thin spines on each side . . . M. spitzbergensis
- 5 (4) Pleotelson lacking thin spines 6
- 6 (7) Pleotelson with 4-5 fairly long setae on each side . . . M. pellucida
- 7 (6) Pleotelson with 1-2 spines on each side M. minuta
- 8 (1) Eyes highly reduced or lacking 9
- 9 (10) Eyes highly reduced M. hanseni
- 10 (9) Eyes lacking 11
- 11 (12) Thoracic segments with spines on top M. acanthifera
- 12 (11) Thoracic segments lacking spines on top M. caeca

Munna fabricii Kröyer (non Sars 1899)

(Plate LX, 7)

Body short, with convex dorsal side. First four thoracic segments differ from last three in structure. Head broad. Abdomen regularly oval. Uropods very thick and strong, curved, with sharp process directed posteriorly. Eyes well developed. Length 3-4 mm.

Encountered in Barents and Kara seas.

Similar species M. kröyeri Goodsir (occurrence in Barents Sea yet to be confirmed) distinguished by presence of four sturdy spines along sides of pleotelson and by uropods of differing structure.

Munna minuta Hansen (= M. fabricii Sars)

(Plate LX, 8)

Distinguished from preceding species by following features. Abdomen rounded, expanded at midline; uropods weak, setaceous. Dark-brown. Length 2-5 mm.

Encountered in Barents Sea.

Munna pellucida Gurjanova (Plate LX, 9)

Distinguished from all other species by transparent body, small number of eye facets and weak uropods bearing two setae.

Encountered off Murman Coast.

Munna hanseni Stappers (Plate LX, 10)

Eyes highly reduced; dorsal surface of thoracic segments hairy; pleotelson with four pairs of long spines. Length 3 mm.

Encountered in Barents Sea (near Novaya Zemlya).

Munna acanthifera Hansen (Plate LX, 11)

Munna spitzbergensis Gurjanova (Plate LX, 12)

Munna caeca Gurjanova (Plate LX, 13)

All three species encountered in vicinity of Spitsbergen.

Genus Pleurogonium Sars

(246)

Key to Pleurogonium species encountered
in northern seas of the USSR

- 1 (2) Thoracic segments smooth, without processes P. inerme
 2 (1) Thoracic segments with processes 3
 3 (4) Processes of thoracic segments smooth, cylindrical . . . P. rubicundum
 4 (3) Processes of thoracic segments prickly, triangular . P. spinosissimum

Pleurogonium inerme Sars (Plate LX, 14)

First four thoracic segments highly expanded, last three narrow. Head small, set deeply in **notch** formed by lateral parts of first thoracic segment. All thoracic segments smooth. Eyes lacking. Greyish. Length 2 mm.

Encountered in Barents Sea.

Pleurogonium rubicundum (Sars) (Plate LX, 15)

All thoracic segments with smooth, cylindrical processes along sides. Red. Length 1.5 mm.

Encountered in western part of Barents Sea.

Pleurogonium spinosissimum (Sars) (Plate LX, 16)

First four thoracic segments with double processes, last three with single ones. Red. Length 3 mm.

Encountered in Barents and Kara seas.

Family M u n n o p s i d a e Sars

Genus I l y a r a c h n a Sars

Key to Ilyarachna species encountered in
northern seas of the USSR

- 1 (2) Head wider than first thoracic segment I. hirticeps
2 (1) Head narrower than first thoracic segment I. bergendali

Ilyarachna hirticeps Sars (Plate LX, 17)

Body narrows posteriorly. Thorax separates into two parts; segments of posterior half differ in size. Head wider than first thoracic segment and bears tiny spines on surface. Eyes lacking. Last three pairs of pereopods natatory. Uropods uniramous, in two segments; basal segment highly expanded, with plumose setae along edges. Greyish-white. Length up to 10.5 mm.

Encountered in sublittoral of Barents Sea and in Kara Sea.

Ilyarachna bergendali Ohlin (Plate LX, 18)

Segments of posterior part of thorax of equal size.

Encountered in vicinity of Spitsbergen and in Kara Sea.

Genus E c h i n o z o n e Sars

Echinozone coronata Sars (Plate LX, 19)

Anterior edges of first four thoracic segments with long spines.

Abdomen with pointed lateral processes. Length 5 mm.

Encountered in western part of Barents Sea.

Genus A s p i d a r a c h n a Sars

Aspidarachna clypeata (Sars) (Plate LX, 20)

Front of posterior part of body overlies anterior part. Length 4 mm.

Encountered in western part of Barents Sea.

Genus M u n n o p s u r u s RichardsonMunnopsurus giganteus (Sars) (Plate LX, 21)

Thorax separates into two parts; three posterior segments with lateral parts directed posteriorly. Width of abdomen greater than length. Eyes lacking. Mandibles without movable plates. Antennae several times longer than body. Last three pairs with long segments. Length up to 33 mm.

Encountered in Barents, Kara, Laptev and East Siberian seas at great depths.

Genus E u r y c o p e SarsKey to Eurycope species encountered in northern seas in the USSR

- 1 (2) Fifth and sixth thoracic segments fused, without suture on dorsal side E. mutica
- 2 (1) All thoracic segments free 3
- 3 (4) Anterior part of rostrum drawn out in form of tongue, bifurcate on end E. producta
- 4 (3) Anterior part of rostrum narrow 5
- 5 (6) Lobe of first segment of antennules shorter than segment itself E. cornuta
- 6 (5) Lobe of first segment of antennules longer than segment itself E. hanseni

Eurycope cornuta Sars (Plate LXI, 1)

Lower margin of head straight; rami of uropods of equal length.

Light reddish-brown. Length 4 mm.

Encountered in Barents and Kara seas.

Eurycope hanseni Ohlin

Inner ramus of uropods shorter than outer one. Length 10 mm.

Encountered in Kara Sea.

Eurycope producta Sars (Plate LXI, 2)

Inner ramus of uropods considerably thicker than outer ramus.

Yellowish. Length 3 mm.

Encountered in western part of Barents Sea.

Eurycope mutica Sars (Plate LXI, 3)

Outer ramus of uropods considerably smaller than inner one. Dark-Brown. Length 1.5 mm.

Encountered in Barents Sea.

Genus M u n n o p s i s M. SarsMunnopsis typica M. Sars (Plate LXI, 4)

Body elongated. Three narrow posterior thoracic segments fused with each other bear natatory pereopods with broad terminal segments fringed with setae; two pairs of pereopods and antennae very long, several times longer than body. One pair of pointed tubercles on upper side of head. Uropods rod-shaped. Light reddish-brown. Length up to 18 mm. (248)

Widely distributed species. Encountered in Barents, Kara, Laptev and East Siberian seas.

Suborder Flabellifera

Family C y m o t h o i d a e SarsGenus C i r o l a n a LeachCirolana microphthalma Hock (Plate LXI, 5)

Eyes small. Pleotelson triangular, with straight posterior edge. Length 10 mm.

Encountered in western part of Barents Sea.

Genus A e g a Leach

Parasitic organisms, usually attach themselves to skin of fish, though free-living.

Key to Aega species encountered in
northern seas of the USSR

- 1 (2) Inner ramus of uropods with deep notch on distal end of external margin Ae. psora
- 2 (1) Inner ramus of uropods without notch Ae. ventrosa

Aega psora (Linné) (Plate LXI, 6)

Body oval, convex dorsally. Pleotelson with pointed end. Light reddish-brown. Length up to 50 mm.

Parasitizes fish, mainly cod. Encountered in Barents Sea.

Aega ventrosa M. Sars (Plate LXI, 7)

Body broadly oval. Pleotelson triangular, with crenature, spines and setae on end. Yellowish. Length up to 33 mm.

Parasitizes fish. Encountered in Barents and Kara seas.

Apart from these species, two more may possibly be encountered in USSR seas:

Aega crenulata Lütken

Entire surface of body with tiny spots (depressions). Length up to 50 mm.

Aega arctica Lütken

Pleotelson with triangular notch on end.

Both species also parasitize fish.

Family A n t h u r i d a e Sars

Genus C a l a t h u r a Norman and Stebbing

Calathura brachiata (Stimpson) (= C. norvegica Sars)

(Plate LXI, 8)

Body long, vermiform, cylindrical, with lateral ridges on each thoracic segment. Mouth parts drawn out anteriorly and pointed. Pleotelson tongue-shaped, concave on dorsal side. Greyish-brown. Length up to 53 mm.

Encountered in Barents and Kara seas, usually in sublittoral.

Family S p h a e r o m i d a e Sars

(249)

Genus L i m n o r i a Leach

Limnoria lignorum (Rathke) (Plate LXI, 9; Fig. 31)

Body elongated-oval. Head short with small rounded eyes. Anterior edge of first thoracic segment overlies head posteriorly. Pleotelson broad, oval, setaceous on posterior edge. Uropods biramous, outer ramus considerably shorter than inner one, uncinata; outer edge of basal segment with rough crenation. Light greyish-brown. Length 5 mm.

Widely distributed, boreal species. Encountered in Barents and White seas. Tunnels through wood and causes extensive damage to docks and pilings.

Suborder Valvifera

Family I d o t h e i d a e Sars

Genus I d o t h e a Fabricius

Key to Idothea species encountered in northern seas of the USSR

- 1 (2) Posterior edge of pleotelson concave, with small notch in middle I. emarginata
- 2 (1) Posterior edge of pleotelson rounded or triangularly acuminate . . . 3
- 3 (4) Posterior edge of pleotelson rounded I. pelagica
- 4 (3) End of pleotelson drawn out in form of triangular obtuse tooth with rounded top 5
- 5 (6) Posterior-lateral corners of pleotelson lacking, median tooth imperceptibly turns into lateral edges of pleotelson . . I. granulosa
- 6 (5) Posterior-lateral corners of pleotelson clearly defined, median tooth highly pronounced 7
- 7 (8) Posterior-lateral corners of pleotelson sharp, end of pleostelson three-toothed I. baltica
- 8 (7) Posterior-lateral corners of pleotelson obtuse, posterior edge of pleotelson straight along sides of median tooth I. viridis

Idothea baltica (Pallas) (Plate LXI, 10)

Body elongated-oval, narrow. Abdomen consists of three segments, two of them separated, third fused with pleotelson. Eyes well developed, located on each side of head. Palp of maxillipeds in four segments. Extended antennules almost reach posterior edge of third thoracic segment; flagellum in 16-22 segments. Flat uropods covering pleopods from below uniramous. Posterior end of pleotelson three-toothed, median tooth considerably longer than lateral ones. Colour varies from greenish to brown. Length up to 44 mm.

Widely distributed, boreal species. Encountered as far as western Murman in Barents Sea. Found mainly on algae in the littoral zone, as well as on floating objects.

Idothea granuloas Rathke (=I. neglecta Sars)

(Plate LXI, 11)

Distinguished from preceding species by following features. Extended antennules barely reach posterior edge of second thoracic segment, flagellum in 8-10 segments. Median tooth of pleotelson imperceptibly turns into lateral edges. Light red or yellowish brown. Length up to 25-30 mm.

Encountered in Barents Sea up to strait of White Sea. Keeps to overgrowths of fucus algae.

Idothea emarginata (Fabricius) (Plate LXI, 12)

(250)

Distinguished from other species by form of pleotelson, posterior edge notched in middle. Extended antennae barely reach end of second thoracic segment. Dark brown. Length up to 30 mm.

Encountered in Barents Sea up to eastern Murman. Keeps to fucus algae.

Idothea pelagica Leach (Plate LXI, 13)

Distinguished from other species by thick and short antennae which barely reach posterior edge of first thoracic segment, and by form of pleotelson having rounded posterior edge with barely perceptible tooth in middle. Dark brown. Length up to 13 mm.

Encountered in Barents Sea up to eastern Murman. Keeps to surf areas of littoral zone.

Idothea viridis Slabber (Plate LXI, 14)

Distinguished from other species by following features. Length of body 4 times greater than width. Extended antennae reach middle of third thoracic segment. Pleotelson, unlike that of I. granulosa, with almost straight posterior edge along sides of median tooth. Greenish. Length 13 mm.

Rare species. Encountered off Murman Coast.

Genus M e s i d o t h e a Richardson

Key to Mesidothea species encountered in northern seas of the USSR

- | | |
|--|--------------------|
| 1 (4) Eyes present | 2 |
| 2 (3) Coxal plates of pereopods with diagonal ridges; dorsal ridges lacking on thoracic segments | <u>M. sibirica</u> |
| 3 (2) Coxal plates of pereopods flat; longitudinal ridges on first 3-4 thoracic segments | <u>M. entomon</u> |
| 4 (1) Eyes lacking | 5 |
| 5 (6) Pleotelson distinctly pentagonal | <u>M. sabini</u> |
| 6 (5) Pleotelson cuspidate | <u>M. megalura</u> |

Mesidothea entomon (Linné) (Plate LXI, 15)

Sides of head elongated anteriorly, forming bilobed processes. Coxal plates of all pereopods flat and, except for first pair, distinctly separated from segments of thorax; posterior corners of first pair rounded, pointed

laterally in subsequent pairs, and downward in the very last pairs. Abdomen consists of four segments, three of them separated and fourth fused with pleotelson. Pleotelson long, almost triangular. Eyes located on upper side of head. Palp of maxillipeds in five segments. Flagellum of antennae in 12 segments. Length of females up to 62 mm, length of males up to 93 mm.

Widely distributed, brackish-water organism, also encountered in fresh bodies of water. Found in estuaries of large rivers of all northern and Far Eastern seas of USSR. Forms several races.

Mesidothea sibirica (Birula) (Plate LXI, 16)

Distinguished from preceding species by following features. Coxal plates of pereopods rhomboid with diagonal ridges; posterior corners of first pair pointed; peaks directed downward in all subsequent pairs. Pleotelson distinctly pentagonal, with rounded tubercle on dorsal side at base. Flagellum of antennae in nine segments. Length up to 95 mm.

Encountered in large numbers in freshened areas from Kara Sea to Bering Strait.

Mesidothea sabini (Kröyer)

(251)

Body narrower than in preceding species. Eyes lacking. Two varieties differing greatly only in mature state encountered.

M. sabini (Kröyer) var. sabini Gurjanova

(Plate LXII, 2)

Pleotelson with highly drawn out acuminate end. Extended antennae reach middle of second thoracic segment.

Encountered in Barents Sea and northern part of Laptev Sea.

M. sabini (Kröyer) var. robusta Gurjanova

(Plate LXII, 1)

Pleotelson shorter and obtuse. Extended antennae barely reach middle of first thoracic segment. Length of females up to 75 mm, length of males up to 84 mm.

Encountered in Kara, Kaptev and East Siberian seas; in Barents Sea found only in straits of Novaya Zemlya.

Mesidothea megalura (Sars) (Plate LXII, 3)

Length up to 56 mm. Deep-sea, rare species. Encountered in vicinity of Spitsbergen.

Genus S y n i d o t h e a Harger

Key to Synidothea species encountered in northern seas of the USSR

- 1 (2) End of pleotelson with small notch S. bicuspada
 2 (1) End of pleotelson acuminate 3
 3 (4) Body covered with spines S. muricata
 4 (3) Body without spines S. nodulosa

Synidothea bicuspada (Owen) (Plate LXII, 4)

Coxal plates completely fused with segments of thorax, without traces of suture. Abdomen consists of one segment, others fused with pleotelson; latter with small notch on end; palp of maxillipeds triarticulate. Length up to 32 mm.

Encountered in Barents Sea and along entire Siberian coast.

Synidothea nodulosa (Kröyer)

Distinguished from preceding species by presence of longitudinal median row of tubercles of dorsal surface of thoracic segments. Length up to 25 mm.

Belongs to high-arctic species. Encountered in Barents Sea and along entire Siberian coast. Forms several races.

Synidothea muricata (Harford)

Body elongated. Four tubercles forming rhomb on head between eyes. Body covered with spines.

Encountered in Kara Sea.

Family A r c t u r i d a e SarsGenus A r c t u r u s LatreilleArcturus baffini (Sabine) (Plate LXII, 5)

Upper side of head, thoracic and abdominal segments each with two large spines. Surface of body covered with small tubercles. Length up to 40 mm.

Encountered in vicinity of Spitsbergen.

Genus A s t a c i l l a Cordiner

(252)

Astacilla longicornis (Sowerby)

Body cylindrical, covered with tubercles. Pleotelson smooth. Length 25 mm.

Encountered in western part of Barents Sea.

Suborder Epicaridea

Family B o p y r i d a eGenus B o p y r o i d a e StimpsonBodyroides hippolytes (Kröyer) (Plate LXII, 6)

Parasitizes various species of Spirontocaris. Length of female up to 12 mm.

Encountered in Barents, White, Kara and Bering seas.

Genus P h r y x u s RathkePhryxus abdominalis (Kröyer) (Plate LXII, 7)

Parasitizes Spirontocaris, Eualus and Pandalus, attaching itself to lower side of abdomen. Length of female up to 11 mm.

Encountered in Barents, White, Kara, Laptev and Bering seas.

Family D a j i d a eGenus D a j u s KröyerDajus mysidis Kröyer (Plate LXII, 8)

Parasitizes Mysis. Length of female up to 4 mm.

Encountered in Barents, Kara and Laptev seas.

Family C r y p t o n i s c i d a e

Genus C l y p e o n i s c u s Giard et Bonnier

Clypeoniscus meinerti Giard et Bonnier (Plate LXII, 9)

Parasitizes Synidothea in brood chamber.

Encountered in straits of Novaya Zemlya.

Genus P a r a p o d a s c o n Hansen

Parapodascon stebbingi Giard et Bonnier

(Plate LXII, 10)

Parasitizes Onisimus in brood chamber.

Encountered in vicinity of Franz Josef Land.

Suborder Gnathiidea

Family G n a t h i i d a e

Genus G n a t h i a Leach

Key to Gnathia species encountered in northern seas of the USSR

(Key based on characteristics of males)

- 1 (2) Eyes lacking G. stygia
- 2 (1) Eyes present 3
- 3 (4) Proximal part of upper edge of mandibles bears several teeth . . .
 G. robusta
- 4 (3) Proximal part of upper edge of mandibles bears one tooth 5 (253)
- 5 (6) Fourth thoracic segment divided into two parts separated by
 longitudinal membranous area G. elongata
- 6 (5) Fourth thoracic segment whole G. arctica

Gnathia elongata (Kröyer) (Plate LXII, 1)

Male. Head and segments of thorax covered with short hairs. Fourth thoracic segment divided into two rectangular parts. Last three segments of thorax with oval **notches** on dorsal side. Pleotelson triangular, with two apical setae on end. Length 4-5 mm.

Female. Last three segments of thorax form oblong, almost cylindrical part of body. Head small. Length 4-5 mm.

Arctic species. Encountered in Barents and Kara seas.

Gnathia arctica Gurjanova (Plate LXII, 2)

Three apical setae on end of pleotelson. Length 7 mm.

Encountered around Novaya Zemlya.

Gnathia robusta (Sars) (Plate LXII, 13)

Two apical and two lateral setae on end of pleotelson. Length 7 mm.

Encountered in Barents and Kara seas.

Gnathia stygia Sars (Plate LXII, 14)

Eyes lacking. Margins of head and thoracic segments crenate along sides. Length 10 mm.

Encountered in Barents and Kara seas.

Order AMPHIPODA

by

V. A. Yashnov

Amphipoda are among the most common marine organisms, inhabiting all the layers from the surface of sea to the greatest depths. A vast majority of species is benthic, found on seaweed, hydroids or right on the bottom; some species are burrowers, others construct tubes of various material. With the help of well-developed appendages amphipods can not only move along the bottom, but also swim for some time, sometimes rising high above the bottom. Finally, there is a comparatively small number of species which are typical planktonic organisms.

The body of Amphipoda is usually laterally compressed and consists of a head, thorax and abdomen (Fig. 32). The head may vary in form. Some species have a small or well-developed rostrum in front; many species have anteriorly extended lateral lobes on the sides of the head, on which the eyes

are located. The head carries six pairs of appendages: antennules (a1), antennae (a2), mandibles (md), maxillulae (ml), maxillae (m2) and maxillipeds (mp). The antennules consist of a triarticulate peduncle (rarely with any other number of segments) and two flagella, one of which is usually long and multiarticulate and the other (accessory flagellum) short and with a small number of segments; in many species the accessory flagellum is reduced to a small appendage consisting of one segment, or else is altogether absent. The typical antennae consist of a peduncle in five segments and a multiarticulate flagellum; there may be fewer segments in the peduncle due to their fusion; the antennae in males are usually much longer than in females. The antennules and antennae may bear special sense organs (ästhetasken) which resemble thin-walled, rod-shaped formations, and calceoli (plate LXXVIII, 12 clc) which are small, flask-shaped, short-stemmed organs. The mandibles usually have a triarticulate palp. The maxillipeds are fused at the base; the second and third segments carry interiorly directed lobes; the terminal segments form a palp. The labrum is located in front of the mouth opening, and the labium behind it. A number of species have an epistom in the middle of the labrum, which resembles a ridge of various shape; the difference in the structure of the epistom is of taxonomic significance in certain cases. The labium is deeply lacinate. (254)

The thorax, which consists of seven segments, carries seven pairs of pereopods (except for members of the suborder Caprellidea). The pereopods consists of seven segments, namely a coxopodite, basipodite, ischiopodite, meropodite, carpopodite, propodite and dactylopodite (Fig. 32).

The coxopodite or coxal plate, which in most cases is highly expanded and flattened, is a continuation of the thoracic segment; the coxal plates of the first four pairs of pereopods are usually large, frequently higher than the thoracic segments themselves, and usually differ sharply in size

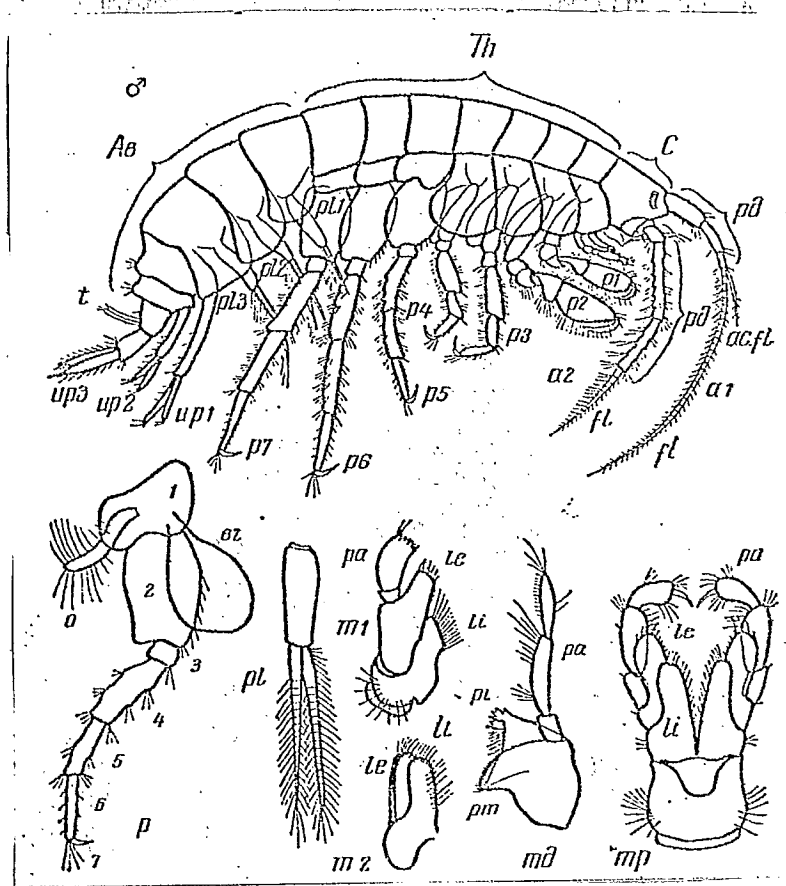


Fig. 32: Amphipoda (Gammarus locusta).

- | | | | |
|--------|------------------------------|---|-----------------------------|
| ♂ | - side view of male; | 1 | - coxopodite (coxal plate); |
| Ab | - abdomen; | 2 | - basipodite; |
| C | - head; | 3 | - ischiopodite; |
| Th | - thorax; | 4 | - meropodite; |
| a1 | - antennule; | 5 | - carpopodite; |
| a2 | - antenna; | 6 | - propodite; |
| ac. fl | - accessory flagellum; | 7 | - dactylopodite. |
| br | - gill; | | |
| fl | - flagellum; | | |
| le | - external lobe; | | |
| li | - internal lobe; | | |
| m1 | - maxillula; | | |
| m2 | - maxilla; | | |
| md | - mandible; | | |
| mp | - maxilliped; | | |
| o | - oostegite; | | |
| pa | - palp; | | |
| pd | - peduncle; | | |
| pi | - incisive process; | | |
| pm | - molar process; | | |
| p1-p7 | - 1st-7th pair of pereopods; | | |
| pl1-3 | - 1st-3rd pair of pleopods; | | |
| t | - telson, | | |
| up 1-3 | - 1st-3rd pair of uropods; | | |

from the less developed coxal plates of the last three pairs of legs. The basipodite of the first four pairs of pereopods is not attached to the end of the coxal plate, but rather to the upper part of its interior. The pereopods are divided into two groups according to their structure. The first two pairs of pereopods which are in most cases (unlike the other pairs) modified for prehension and frequently referred to as gnathopods, end in more or less well developed chelae. The latter may be **true** or false. A **true** chela (chela) is formed by two parallel **fingers**, of which the immovable **finger** is in most cases a continuation of the sixth segment of the leg, and the movable **finger** formed by the dactylopodite (Plate LXIV, 3 pl). A false chela (subchela) consists of the expanded sixth segment of the leg (palma), toward the distal (palmar) edge of which bends the movable dactylopodite that is usually attached to the corner of the palmar edge; the dactylopodium may be located either perpendicularly or more or less obliquely to the longitudinal axis of the sixth segment (Plate LXIV, 2p2). The first two pairs of pereopods in males are usually more developed than in females. The second group of appendages includes all the other pairs of pereopods, of which the last pairs are directed posteriorly (when in their natural position). They may differ in structure, but only in exceptional cases do they terminate in chelae. Thin-walled gills, as well as oostegites (in females) resembling broad, oval plates fringed with setae and forming the brood chamber (marsupium) into which the eggs are deposited, are attached to the inside of the coxal plates of the pereopods. The abdomen is divided into two parts according to its structure and the structure of the corresponding appendages. The first part (pleon) consists of three segments; their lateral parts form the epimera, the structure of which, particularly on the last segment, is of great taxonomic importance. The natatory appendages (pleopods) which stem from the first three abdominal segments typically consist of a

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basal segment and two multiarticulate rami bearing natatory setae. The pleopods are used not only for swimming, but also to create a current of water alongside the gills. The posterior part of the abdomen (urus) also consists of three segments, sometimes partially or completely fused together. Each segment carries a pair of saltatorial limbs called uropods; in most cases the uropods are biramous, short, sturdy and spined. Between the last pair of uropods there is usually a very small telson resembling a plate with a smooth posterior edge or more or less laciniate. The abdomen of Caprellidea is highly reduced.

All amphipods are dioecious. The males are distinguished from the females by their size, by their longer and more numerous segmented antennules and antennae which frequently carry calceoli, and by the form and degree of development of the first two pairs of pereopods. The eggs are deposited into the brood chamber where the entire process of development takes place. The young individuals emerging from the brood chamber have the appearance of mature organisms.

The order Amphipoda falls into three suborders.

Suborder Hyperidea. Seven thoracic segments; maxillipeds lacking palp; eyes occupy almost entire surface of head; coxal plates of pereopods very small or fused with thoracic segments (p. 255).

Suborder Gammaidea. Seven thoracic segments; maxillipeds with palps in 2-4 segments; eyes usually small; coxal plates of pereopods usually large (p. 258).

Suborder Caprellidea. Six thoracic segments; usually fewer than seven pairs of thoracic appendages; abdomen reduced (p. 323).

Many species of Amphipoda are encountered in large numbers. The most common species of Themisto, together with pelagic Euphausiacea, form

accumulations of krill on the sea surface, which serve as food for fish and whales. Large concentrations of Amphipoda also accumulate on sandy beaches and muddy soil, their numbers amounting to thousands per square metre.

Fucus algae along the seacoast also abound in various species of amphipods (e.g. Gammarus locusta). It is only natural that such large concentrations of amphipods would play a highly important role in the nutrition of various commercial animals. They serve as food for fish, pelagic (herring) and benthic species (cod, flounder, etc.), whales, seals and even birds.

The Amphipoda of the northern seas of the USSR are presently much better known than the fauna of many other groups. However, despite the large number of known species, we shall undoubtedly encounter many more as time goes by. Therefore, when classifying Amphipoda, it is necessary to carefully verify the absence of differences between the characteristics of the organisms under study and those listed in the keys and brief descriptions of the species. In certain cases it is necessary to single out certain appendages, in which case one should apply the instructions given in "determination techniques" in the section devoted to the order Copepoda. Due to insufficient space, detailed descriptions are given only for the most frequently encountered species.

Suborder Hyperiidea

The suborder Hyperiidea consists exclusively of pelagic organisms; only certain species are semiparasitic and are capable of temporarily attaching themselves to other floating organisms (jellyfish and salps). The eyes in most cases are highly developed and occupy the greater part of the head; in some species they are small or lacking altogether. The coxal plates are poorly developed. The last two abdominal segments are almost always fused together. The antennules do not have an accessory flagellum. The antennae in females are short or lacking; in males they are usually long.

The maxillipeds have no palps. There are seven pairs of pereopods, in females four of them carry oostegites. The telson is small and whole.

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Key to genera of the suborder Hyperiidea encountered in northern seas of the USSR

- 1 (6) Eyes large, occupy greater part of head 2
- 2 (3) Last three pairs of pereopods considerably longer than third and fourth pairs of pereopods Themisto
- 3 (2) Pereopods do not differ significantly in length 4
- 4 (5) First two pairs of pereopods with well developed chelae Hyperoche
- 5 (4) First pair of pereopods lacking chelae (may be present only on second pair of pereopods) Hyperia
- 6 (1) Eyes small or lacking 7
- 7 (8) Antennules long, rod-shaped Scina
- 8 (7) Antennules short Lanceola

Family H y p e r i i d a e Sars

Genus H y p e r o c h e Bovallius

Hyperoche medusarum (Kröyer) (=H. kröyeri Bovallius)

(Plate LXIII, 1)

Dorsum smooth. Eyes very large. Well developed chelae on first two pairs of pereopods. Posterior edges of fifth segments of third and fourth pairs of pereopods finely crenate. Antennules and antennae in females short, in males with very long flagella. Females reddish, males greyish. Parasitizes jellyfish. Length up to 9-15 mm.

Encountered in the Barents and White seas and in the Polar basin.

Genus H y p e r i a Latreille

Key to Hyperia species encountered in northern seas of the USSR

- 1 (2) Abdominal epimera rounded H. spinigera
- 2 (1) Abdominal epimera acuminate posteriorly 3

- 3 (4) Fifth segments of first two pairs of pereopods with processes H. galba
- 4 (3) Fifth segments of first pair of pereopods without processes, those of second pair with processes H. medusarum

Hyperia galba Montagu (Plate LXIII, 2)

Female body short and thick, with highly expanded thorax; male thorax slightly expanded. Dorsum smooth. Eyes very large. Antennules and antennae in females very short, in males with long flagella. Abdominal epimera acuminate posteriorly. Process of fifth segment of first pair of pereopods equal to approximately one-third length of sixth segment; the same process of second pair of pereopods equal to approximately $\frac{1}{2}$ of sixth segment. Reddish to yellow in colour. Temporary parasite of jellyfish (Aurelia, Cyanea). Length of females up to 20 mm, length of males up to 12 mm.

Encountered in Barents, White, Kara, Laptev and East Siberian seas, as well as in the Sea of Japan.

Hyperia medusarum (Müller) (Plate LXIII, 3)

Distinguished from preceding species by structure of first two pairs of pereopods: fifth segment of first pair lacking process, the same segment of second pair of pereopods with process equal to approximately one-third length of sixth segment; last segments of first two pairs of pereopods covered with thick hairs. Dark reddish-brown. Length up to 15 mm.

Encountered in Barents and White seas.

Hyperia spinigera Bovallius (Plate LXIII, 4)

Encountered in vicinity of Spitsbergen.

Genus Themisto Guérin

Key to Themisto species encountered in northern seas of the USSR

- 1 (2) Dorsal surface bears teeth Th. compressa
 2 (1) Dorsal surface smooth 3
 3 (4) Fifth pair of pereopods considerably longer than following two
 pairs Th. libellula
 4 (3) Fifth pair of pereopods not longer than following two pairs . .
 Th. abyssorum

Themisto (Euthemisto) libellula Mandt

(Plate LXIII, 5)

Dorsum smooth. Eyes very large. Antennules of females shorter than antennae. Fifth segment of second pair of pereopods with long process, almost equal in length to sixth segment. Fifth pair of pereopods about $1\frac{1}{2}$ times longer than other legs. Anterior edge of highly elongated and narrow sixth segment of these appendages bears sturdy setae spaced at equal intervals, as well as thick short setae in addition to these on distal half of segment; last segment (dactylopodite) carries bundle of setae. Body translucent, with dark red spots. Length 10-60 mm.

Widely distributed Arctic species. Encountered, frequently in vast numbers, in Barents, White and Kara seas and in Polar basin. Serves as food for fish and seals.

Themisto abyssorum (Boeck) (=Parathemisto
oblivia Kröyer) (Plate LXIII, 6)

Distinguished from preceding species by following characteristics. Fifth pair of pereopods do not differ in length from following pairs of pereopods. Antennae in females equal in length to antennules. Fifth segments of third and fourth pairs of pereopods with almost parallel anterior and posterior edges. Length 10-22 mm.

Belongs to most common species of pelagic Amphipoda, frequently encountered in large numbers. Together with other members of Hyperiidæ, as

well as Euphausiacea, form so-called krill. Encountered in all northern seas of USSR, as well as in Sea of Japan.

Themisto compressa Goës

Distinguished from preceding species by presence of teeth and unciniate antennules on dorsal side. Two forms are distinguished.

Themisto compressa f. compressa Goës

(Plate LXIII, 7)

Teeth on dorsal side of last two thoracic and first two abdominal segments curved upward. Fifth segment of third pair of pereopods widest at middle. Setae (except long, single ones) on distal end of sixth segment of fifth pair of pereopods considerably smaller than width of segment.

Themisto compressa f. bispinosa Boeck

(Plate LXIII, 8)

Teeth on dorsal side of thoracic (and sometimes abdominal) segments not curved upward. Fifth segment of third pair of pereopods widest at base. Length of setae on distal end of sixth segment of fifth pair of pereopods equal to width of segment.

Both forms translucent, with red spots. Length up to 15-25 mm.

Boreal species. Encountered in Barents Sea.