Woods Hole Oceanographic Institution

Drawings and Descriptions of Some Deep-Sea Copepods Living Above the Guaymas Basin Hydrothermal Vent Field

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Technical Report

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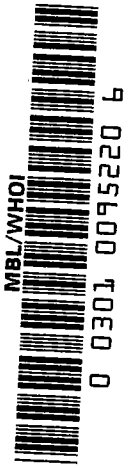

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Abstract

This report includes brief descriptions and illustrations of some of the copepods found in two bathypelagic MOCNESS samples. The MOCNESS was towed horizontally at an altitude of 100-200 m above the bottom in waters 1900 to 2000 m deep near hydrothermal vents in the southern trough of the Guaymas Basin, Gulf of California. Some copepods from one Alvin dive plankton tow collected three to four meters from the bottom in the vent field (2000 m depth) are also included.

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Introduction:

This report includes brief descriptions and figures of some of the copepods found in two MOCNESS samples taken near hydrothermal vents in the southern trough of the Guaymas Basin, Gulf of California. The samples were taken at approximately 1900 m depth, and from 100-200 m above the bottom with the MOCNESS and three to four meters from the bottom (2000 m depth) on an Alvin dive with a plankton net. Mesh size was 333 μ for all samples. Counts and analysis of the species described herein as well as other information about the samples are presented in Wiebe *et al* (1988).

MOC-GY-3 and MOC-GY-7 were both horizontal MOCNESS tows, with MOC-GY-3 passing down the length of the vent trough and MOC-GY-7 cutting across it. On each tow, eight samples were collected. Copepods in one sample from each of the tows were identified for this report. MOC-GY-3, sample 4 was selected for enumeration of all copepod individuals because it was a collection taken nearly at the middle of the hydrothermal vent field. MOC-GY-7, sample 7 was selected because it was furthest away from the vent field. Lack of funds prevented the analysis of other samples. Alvin dive 1629 was at a vent patch under the path of MOC-GY-3. Only a small portion of the sample was examined. Although Wiebe *et al* (1988) provides details on the MOCNESS sampling site and methods, some information about starting and ending times and positions of the tows used in this report follows.

tow	date	time	lat(N)	long(W)	# samples
MOC-GY-3	27 July 1985	1850	27 05.09	111 22.74	8
	-28 July 1985	0012	26 54.78	111 26.50	
MOC-GY-7	30 July 1985	1706	27 04.12	111 27.51	8
		2328	26 56.81	111 12.01	
Alvin 1629	24 August 1985	0916	27 00.7	111 24.5	1
		0948			

The following descriptions offer some information about the most important or most obvious features that will aid in their identification. The species names are given when possible, but because of the small sample size, the animals were not usually dissected, making positive identification impossible. Because the samples are from a deep, poorly studied area, some of these animals may well represent new species. No attempt to name them has been made as an exhaustive study of the available literature was not undertaken. In this case the nearest approximation of species name is given.

We have prepared this report to aid future workers on deep-sea copepods to compare the animals reported on by Wiebe *et al* (1988) with those they may collect from the Guaymas Basin or elsewhere.

Refer to Figure 1 for a summary of copepod body parts and to page 14 for abbreviations used. The species are listed by family. The symbol, @, before the species name means the animal was drawn from the Alvin dive sample. The rest are from the MOCNESS tows. Total lengths are given as measured from the tip of the rostrum to the end of the furca. At the end of each description, the numbers of females, males, and copepodites found in all three samples are listed in parentheses; individual counts by sample are given in Table 1. Counts standardized to #/1000 m^3 can be found in Wiebe *et al* (1988).

Species:

Family: *Spinocalanidae*

Spinocalanus sp. 1 (Figure 2: a-d)

Female - 2.26 mm. Head and first thoracic segments fused. Th4 and Th5 separate. A1 segment 2 is long, segments 8+9 fused. Mxpd long and slender with a spine on basipod segment 1. Mx2 has no worm-like filaments on distal segment but carries a heavy seta on each of the 4th and 5th lobes. P4 has spinules on basipod segment 1 (other segments missing). All legs broken. (57 females, 47 copepodites)

Spinocalanus sp. 2 (Figure 2: e-k)

Female - 2.40-2.50 mm. Mx2 has three short filaments on the distal lobe. Maxilliped is long. Corners of thoracic segment 5 prolonged and squared. Endopod of P1 has 1 segment; P2 has 2 segments. Exopod of P2 has 3 segments. Other endopods and exopods missing. P4 first basipod segment has one seta and hairs. No P5. (16 females, 2 copepodites)

Monacilla tenera Sars, 1907 (Figure 3: a-d)

Female - 2.20 mm. Head crested. Rostrum strongly bifurcate. Th5 rounded. Th segments 4 and 5 separate. Endopods of legs 1-4 have 1, 2, 3, 3 segments, respectively. P4 endopod has spines. Exopod of leg 3 has 3 segments. No P5. (1 female)

Drepanopsis nr. *frigidus* Wolfenden, 1911 (1988) (Figure 3: e-i)
= *Farrania oblongata* in Wiebe *et al* 1988

Female - 3.17 mm. No rostrum visible at 50X. Head and Th1 fused. Th5 corners bluntly pointed. Mx2 has no worm-like filaments on distal segment; just setae with setules. P2 has 2 segments, both with spinules on the posterior surface. Basipod 2 and Re1 also have spinules (rest of exopod is absent). P3 exopod has 4 internal setae, endopod has spinules on posterior surface (setation not readily visible on this specimen). P5 are small with two terminal spines on the third segment. (1 female)

@*Drepanopsis orbus* Tanaka, 1956b (Figure 3:j, 4:a-i)

Male - 2.78 mm. No rostrum. Thoracic segment 5 pointed. Mx1 setae are all simple. The long seta drawn is the shortest on that lobe; the rest are half again longer. Mx2 reduced to a

single small appendage with 4 setae and 4 sensory filaments. Endopods of P1-4 have 1, 2, 3, 3 segments, respectively. Exopods have 3 segments. P1 basipods 1 and 2 have fine setules. P2 Ri2 has spinules on suface. P2 and P3 basipods 1 and 2 have short, heavy spines. These are not present on P4. Re3 of P4 has 4 internal setae. P5 is biramous, all segments slender and simple. Left leg is longer with 1 endopod segment and 3 exopod segments. The distal exopod segment has fine short hairs. Right leg has 1 endopod segment and 4 exopod segments. The terminal spine on the distal segment is as long as the segment. (10 males, 1 copepodite V male)

nr. *Ryocalanus* Tanaka, 1956a sp. = sp. A in Wiebe *et al* (1988) (Figure 5:a-i, 6:a-f)

Female - 1.40 mm. Rostrum very long, simple. Body and appendages covered with scale-like design. Head and Th1 separate; fourth and fifth thoracic segments separate. Th5 corners extend to rounded point. Mx2 has a mass of sensory filaments on distal segment. This differs from *Ryocalanus* description by Tanaka (1956a, b) who finds normal setae only. Legs 1-4 have spines on posterior surface as in *Spinocalanus*; P5 absent. Endopods of legs 1-4 have 1,2,3,3 segments, respectively. All exopods have 3 segments. Leg 1 differs from *Ryocalanus* in that the Re3 has no spine on the outer margin about mid-length and Re3 has a terminal seta in addition to the 4 internal setae and 2 long outer marginal spines. The endopod agrees well with 3 internal setae, 2 apical setae, and a process on the outer proximal margin. Legs 2, 3 and 4 are as in *Ryocalanus*. Leg 2 Re3 has 5 internal setae.

Male - 1.35 mm. Similar appearance to female. P5 left with 5 segments, much longer than right. First three segments have spines on surface. Last segment 1/6 length of previous segment. One distal, external seta on third segment. The terminal seta is twice as long as last segment. The right leg has two segments (*Ryocalanus* has 5 segments on right leg); the second is covered with strong spines. (3 females, 6 males, 3 copepodites)

Family: *Aetideidae*

@*Chiridius* nr. *gracilis* Farran, 1908 (Figure 7:a-i, 8:a-g)

Female - 2.90-3.11 mm (mean = 2.975 mm). These specimens are slightly larger than previous records of *C. gracilis*. Tanaka (1957), 2.55 mm, Park (1975), 2.38-2.58 mm, Rose (1933), 2.4-2.8 mm. Rostrum consists of two fine filaments. A2 exopod is slightly shorter than endopod (*C. gracilis*' should be half the length of exopod). Mxpd is large, heavy. Endopods of legs 1 through 4 have 1, 2, 3, 3 segments, respectively. P3 endopod has spines; none on P4. Exopods of P1-4 have 3 segments. P1 exopod segments 2 and 3 have long external spines with hairs. P3 exopod has 4 internal setae. P4 has no spines on basipod segment 1. No P5.

Male - 2.39-2.42 mm. Mxpd does not have characteristic setae on 5th joint (Tanaka 1957: 1957, p.49, Figure 30e) and the setae on the basis were not found, but our figure was made from a poor specimen. Rostrum is a small point. P5 has no endopods, the left leg is shorter if the spine on the right leg is included, which is greater than two times the length of the distal segment. The spine on the end of the left leg is much shorter, about 2/3 length of distal segment. No other setae present on leg 5. No fifth segment was visible on the urosome, even at 440x. Fringe on posterior margins of segments 2 to 4 visible with compound scope.

CV,CIV - Similar general appearance but both male and female Th5 are pointed. CV has

4 abdominal segment, CIV has 3.

This species was abundant in both MOCNESS tows and found in the Alvin sample. (155 females, 4 males, 54 copepodites)

Gaidius minutus Sars, 1925. (Figure 9:a-n, 10:a-d)

Female - 3.85-4.08 mm. Larger than previous records: Tanaka (1957) TL=2.6 mm. Body is somewhat irridescent. Rostrum short with 1 point which is slightly notched at the apex. Fifth thoracic segment corners have small nubs. Tanaka (1957) found small nubs on his samples; Sars (1925) did not. Endopods 1-4 have 1, 2, 3, 3 segments. Exopods have 2, 3, 3, 3 segments. No spinules on surfaces of legs. P4 basipod segment 1 has internal hairs. No P5.

Male - 2.71 mm. Rostrum is a small point. Th5 corners are sharply pointed with the right slightly longer than the left, reaching almost to the end of the first abdominal segment. P5 biramous, asymmetrical. Two segments may be missing on right P5. Left endopod is slender, reaching 2/3 length of adjacent exopodal segment. Right endopod is leaf-like and transparent, measuring half the adjacent exopodal segment.

CVF,CVM - CVF have no P5, CVM have P5. Both have pointed 5th thoracic segments which reach to posterior margin of 1st urosomal segment. Male urosome segment 1 is longer than female. Male fifth leg is biramous and symmetrical. Endopods have 1 segment, exopods with 3 partially separated segments. Distal exopodal segments with a terminal spine and a tiny spine on each side of the terminal one.

This species was abundant in both MOCNESS tows. (171 females, 1 male, 85 copepodites)

Valdiviella sp. Steuer, 1904 (Figure 11:a-c)

Male - 7.07 mm. General appearance like Euchaeta, but rostrum bifid and left P5 Re2 does not have a serrated lamella. (1 male)

Family: *Euchaetidae*

Euchaeta Phillipi, 1843 sp. 2 (Figures 11:d-j, 12:a-d)

Female - 2.63 mm. A small *Euchaeta* species. Rostrum with two points as in *E. marina*. Mx1 has 7 setae on outer lobe. Mx2 has 2 apical setae with long, widely separated setules. Genital segment has a small process distally on ventral side when viewed on right. Innermost caudal setae turned outward and not thicker than other caudal setae. The teeth on the terminal spine are shorter on leg 4, Re3 than on leg 3. The teeth on the terminal spine are shorter on P4, Re3 than on P3, Re3. (1 female)

Family: *Phaennidae*

Xanthocalanus nr. *pinguis* Farran, 1906 (Figure 12:e-j)

Female - 3.94 mm. Literature gives sizes 4.5-7.3 mm (Tanaka, 1960, Rose) Head and Th1 separate, Th4 and Th5 separate. Th5 corners squared. Mx2 with 2 large, toothed setae on two distal lobes and endopodite has 8 sensory appendages of which 3 are bud-like filaments. All are

about the same length. *X. pinguis* has one sensory appendage much longer than the others. Anal segment visible ventrally. Furcal rami as long as wide. P5 has three segments; four setae on last segment and spinules on the middle and last segments. First segment provided with internal hairs. (2 females)

Phaennidae sp.= nr. *Amallothrix* in Wiebe *et al* (1988) (Figure 13:a-j, 14:a-d)

Female - Rostrum small, broad, single pointed. Thoracic segments 4 and 5 separate. Genital segment not projecting ventrally. Mx2 has 1 strong toothed seta on lobe 4 and a more slender toothed seta on lobe 5. Distal segment with sensory filaments. Lobes 3, 4 and 5 have spinules on surface. P1 basipod segment 2 has row of 5 spinules on posterior surface. P1 Ri has 1 segment. P2 Ri2 has large spines, and smaller ones on Ri1. P5 with 3 segments. Distal segment with a strong internal seta 1-1/2 times longer than the segment and a smaller terminal spine less than one half the length of the segment and a small external spine approximately one third the distance from the end of the segment.

Male - 1.73 mm. Similar to female in general appearance, rostrum, mouthparts, legs. A slight scar or sclerotization partially separates head from first thoracic segment. P5 slender, uniramous, asymmetrical: right leg is 1/3 length of left with 4 segments and a short terminal spine; left has 5 segments terminating in a short spine. No other setae present. (4 females, 2 males, 21 copepodites)

Family: *Tharybidae*

Undinella frontalis Tanaka, 1937 (Figure 14:e-h)

Female - 2.20-2.26 mm. Head and Th1 separate. Th5 corners asymmetrical. Furcal rami are about 2 times longer than wide. P5 asymmetrical. Both sides uniramous and three-segmented (2 free and 1 basal). Right leg is less than two times longer and more slender than left. Both legs have one external and three terminal spines. (9 females, 2 males)

Family: *Scolecithricidae*

Scaphocalanus nr. *longifurcus* (Giesbrecht) 1892 (Figure 15:a-k)

Female - 1.84-1.93 mm. Positive identification not possible because no specimens have more than P1 complete; all other legs have basipods only. Rostrum bifurcate. Th5 corners slightly projecting. Mx2 distal segment with 2 bud-like and 5 worm-like filaments. Strong toothed setae on lobes 4 and 5. P5 has basipod plus one segment with one long internal seta and one terminal seta less than 1/3 length of internal seta.

Male - ~2.50 mm, est. (body plus 1st abdominal segment=2.31 mm). Bifid rostrum with filaments. Mouthparts reduced, Mx2 with at least one sensory filament. P1 endopod with 1 segment, exopod with 3 segments. P4 basipod with 1 seta, no spines. P5 similar to *S. curtus*, right endopod missing. Second segment of right exopod has a slight process on distal margin. Left exopod is about 1/2 length of endopod. Left endopod does not have swelling near base as does *S. curtus*. (8 females, 1 male, 1 copepodite)

Scaphocalanus Sars sp. 2 (Figure 16:a-c)

Male - 2.96 mm. general appearance almost identical to *S.* nr. *longifurcus* but larger and the segments of P5 are straighter, especially the right exopod. Right exopod incomplete. P2 endopod has 2 segments. (1 male)

Scolecithricella (Amallothrix) nr. *emarginata* (Farran) 1905 (Figure 16:d-l)

Female - 4.49 mm. Bifid rostrum. A1 has 23 segments with segments 2 and 3 fused and 9 and 10 fused. Mx2 has 3 worm-like and 5 bud-like filaments on distal lobe, one worm-like sensory filament on preceeding lobe. Urosome segment 4 highly reduced. Endopods of legs 1-4 have 1, 2, 3, (3) segments (fourth leg incomplete). Exopods have 3, 3, (3, 3) segments. The first exopodal joint of leg 1 has an outer spine present. Leg 2 has spinules on both endopod and exopod. Leg five is uniramous with two segments (base plus one segment). Distal segment carries two spine-like setae, one externally and one terminally. The terminal seta is slightly longer than the outer.
(1 female)

S. nr. *marquesae* Vervoot, 1965 (Figure 17:a-f)

Female - 1.99 mm. Specimen in poor condition. This female is larger than *S. marquesae*: Vervoot, 1965 (p.79, Figure 19e) measured 1.15-1.24 mm. It was also described by Marques (*Amallothrix* sp.) who found two females measuring 1.49 and 1.55 mm. The present animal has a genital segment with no ventral process. *S. marquesae* has a ventrally protruding genital segment. Rostrum bifid. Head and first thoracic segments fused. Th5 corners are squared. Mx2 has seven sensory filaments on distal segment: 2 bud-like, 4 thick with tapered ends, 1 thick with flat end. Mx2 of *S. marquesae* appeared to have 6 filaments, 3 long with tapered ends and 3 short. P5 has one segment with a short spine on the external corner and a large straight terminal spine carrying a double row of teeth on the distal half. This leg differs from *S. marquesae* in the lack of two spinules on the right leg on the external margin just proximal to the shorter spine. The teeth on the larger spine are short on the present specimen rather than widely spaced acute spinules and the spine is straight rather than curved as in *S. marquesae*. This specimen is obviously a different species from *S. marquesae*, but after looking at literature on over forty species, *S. marquesae* is the most similar. (2 females)

Family: *Lucicutiidae*

Lucicutia bicornuta Wolfenden, 1905 (Figure 18:a-b)

Female - 7.56 mm. A1 is longer than body by about 3 segments. Furca has two segments; the first is longer than urosome segments 1+2+3+4, the second is about 3/4 the length of the first. All endopods and exopods of legs 1-5 have 3 segments. P5 exopod segment 2 has strong internal setae. (1 female)

Lucicutia sp. 1 (Figure 18:c-e)

Female - 1.44 mm. Genital segment with ventral protrusion.

Male - 1.41 mm. Similar appearance to female. (3 females, 3 males, 1 copepodite)

Family: *Heterorhabdidae*

Heterorhabdus nr. *compactus* Sars, 1925 (Figure 19:a-i)

Female - 2.72-2.92 mm. Tanaka (1964a) found two size classes: in the Arctic, measuring 3.0-3.4 mm and in the N. Atlantic, 2.3 mm. The present specimens are intermediate in size. The body of this species is more rounded than others in the genera, which are usually slender. The Mx2 is large and has one heavy seta on each of outer two lobes. Mxpd has a spine on the distal end of the first basipodal segment. All endopods and exopods of legs 1-5 have 3 segments. P5 endopod segment 3 (Ri3) has 6 setae.

Male - 2.36-2.48 mm. Smaller, more slender than female. Leg 5 is as appears in Figure 19h and i. (1 female, 2 males)

Heterostylites longicornis (Giesbrecht) 1892 (Figure 20:a-i)

Female - 4.67 mm. Tanaka (1964a) notes that this species and *H. major* are probably different forms of the same species. This specimen corresponds with the description of *H. longicornis* except for the large size (compared with 3.05 mm for *H. longicornis*). Sars (1925) found *H. major* female to be 4.7 mm. The genus *Heterostylites* can be distinguished from *Heterorhabdus* by the structure ot the mandibular teeth. The female drawn (Figures 20 b, 20g) carries a spermatophore. The lip extending over the spermatophore lies flat down on females with no spermatophore attached. The left furca is longer than the right. The median seta on mxpd segment 1 is slender. P5 exopod segment 2 has a distinctive row of spines near the third segment.

Male - 4.40 mm. Sewell, 1932 found *H. major* male 5.00 mm. P5 agrees with Tanaka's (1964a) *H. major*, 5.38 mm, which he believes is the same as *H. longicornis*: second basal segment of right leg has long slender inner marginal process, a large process with denticles on right Re2, and left B2 is produced anteriorly with a brush of hair-like spines. (9 females, 3 males, 5 copepodites)

Mesorhabdus Sars, 1905 sp. (Figure 21:a-c)

Male - 4.49 mm. Mx2 has a strong seta on each of lobes 4 and 5. Right mandible differs from the left (Figure 21b) in that it has an additional tooth between the single tooth and the adjacent group of three teeth. (1 male)

Family: *Augaptilidae*

Augaptilidae sp. 4 (Figure 21:d-k)

7.23 mm. Figured specimen is probably a CV. Two rostral filaments. A1 a little longer than body. A2 endopod about equal to exopod. Urosome with 4 segments. Only *Haloptilus* females and other *Augaptilid* males have 4 urosomal segments; other *Augaptilid* females have 3 segments. Mandible with endopod smaller than exopod, teeth are figured. Mx1 inner lobe has 3 setae; two are strong and 1 fine. Mx2 is small in comparison to other mouthparts. Mxpd is long and slender and has 9 very long setae with double row of nobs on distal third of setae. This specimen was of interest due to its large size and the unusual nobs on the maxilliped. (1 copepodite)

Family: *Arietellidae*

@*Phyllopus* nr. *bidentatus* Brady, 1883 (Figure 22:a-i)

Female - 2.45 mm. Rostrum has two filaments (*P. bidentatus'* rostrum is short and pointed; Esterly (1911) reports a short, heavy one on *P. integer,* so neither description is quite right.) Five setae on each furca. See figure for P5.

Male - 1.84 mm. Rostrum same as female. P5, as shown in Figures 22h and 22i, is a bit different from that of *P. bidentatus*, especially the left leg. (3 females, 2 male)

Family: *Candaciidae*

Candacia magna Sewell, 1932 (Figure 23:a-j)

Female - 3.58-3.66 mm. One specimen of several examined had only three external setae on P5 but the fourth was probably broken as the animal was not in perfect condition. This fourth seta was present on others. *C. magna* is confused with *C. falcifera* in the literature (Grice, 1963). The length of the terminal spine on *C. magna* is shorter than for *C. falcifera* and *C. magna* is larger (female 4.16, male 3.7 mm) than *C. falcifera* (female 3.7-3.9, male 3.3-3.8 mm). The female leg 5 in this set of samples more closely resembles *C. magna* while the size is closer to *C. falcifera.*

Male - 3.35-3.50 mm. Right A1 segments 2 and 3 fused. Segments 17, 18, 19, 20 separate. Th5 corners assymetrical, urosome segment 1 with a pointed projection on the right directed posteriorly. This projection apparently is more similar to *C. falcifera*; Sewell describes *C. magna*'s as a rounded prominence but does not draw it. P3 exopod has a straight terminal spine; the ratio of this spine to the third segment is 3:1. Fifth leg is as shown in Figures 23h-j. This agrees well with *C. magna* specimens found by Grice (1963) and Sewell (1932, p.338). (15 females, 19 males, 37 copepodites)

Family: *Bathypontiidae*

Temorites brevis Sars, 1900 (Figure 24:a-m)

Female - 1.79-1.82 mm. Rose (1933) found this species to be 1.1 mm but Tanaka's specimen was 1.71 mm. Head and Th1 separate. Th5 asymetrical; left side extends more than right. Mx2 has long, heavy, simple setae. Mxpd small. Endopods of legs 1-4 with 2, 3, 3, 3 segments. Endopodal segments of legs 1 and 2 incompletely separated. Exopod of leg 1 with 3 segments, no external spine on segments 1 or 2. Other exopods missing. P4 Ri2 has 2 setae, Ri3 has 7 setae. P5 uniramous and symmetrical with 3 segments, last segment is 4-5 times longer than previous segment and has two spines on terminal end, internal one slightly less than twice length of external spine.

Male - 1.72-1.82 mm. (Rose - 1.05 mm, Tanaka - 1.88 mm.) A1 is prehensile, quite distinct with two teeth on the jointed segment. P5 assymetrical with left shorter, simpler (figures not to scale). Left has 4 segments, hairs present on internal proximal end of third segment, a strong spine on terminal end of fourth segment almost as long as segment and a small spine adjacent and exterior. Right leg has three segments. Second segment is broad with two small processes

on the external side; one medial and one on the distal end. A long, curved claw-like spine is terminally situated. (2 females, 2 males)

Temorites sp. 1 (Figure 24:n-p)

Female - 1.96 mm. A1 has 24 segments. Corners of Th5 project to blunt points. P5 symmetrical, three segments. The last is about 2 times longer than adjacent segment and is terminated by two spines. The inner is about 2-1/2 times longer than outer. (3 females, 3 males)

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References

Brady, G. S. 1883. Report on the Copepoda. Report on the Scientific Results of the H. M. S. Challenger during the years 1873-1876, Zoology. Vol. 8(23): 1-142.

Esterly, C.C. 1911. Third report on the copepod fauna of the San Diego region. Univ. Calif. Publs. in Zool. 3(5): 313-352.

Farran G. P. 1905. Report on the Copepoda of the Atlantic Slope of Counties Mayo and Galway. Fisheries Ireland Sci. Invest., 1902-1903. Pt. 2, app. 2: 23-52.

Farran, G. P. 1906. Second report of the Copepoda of the Irish Atlantic Slope. Fisheries Ireland Sci. Invest., 1902-1903. Pt. 2, app. 2: 23-52.

Farran, G. P. 1908. Second report of the Copepoda of the Irish Atlantic Slope. Fisheries Ireland Sci. Invest., 1902-1903. Pt. 2: 1-104.

Giesbrecht 1892. Systematik und Faunistik der pelagischen Copepoden des Golfes von Neapel. Fauna und Flora des Golfes von Neapel u. d. abgrenzenden Meeresabschnitte, 19:1-831.

Grice, G. D. 1963. A revision of the genus *Candacia* (Copepoda: Calanoida) with an annotated list of the species and a key for their identification. Zoologische Mededelingen 38(10): 171-194.

Grice, G. and K. Hulsemann. 1967. Bathypelagic calanoid copepods of the western Indian Ocean. Proc. U.S. Nat. Mus. 122(3583): 167.

Marques, E. 1958. Copépodes Marinhos de Angola (2.ª campanha 1952-1953). Trabalhos da Missão de Biologia Maritima. Mem. Junta Invest. Ultramar 4:1-26.

Park, T. 1975. Calanoid copepods of the genera *Aetideopsis, Pseudaetideus,* and *Chiridius* from the Gulf of Mexico. Bull. Mar. Sci. 25(2): 272-290.

Rose, M. 1933. Faune de France. Copépodes Pélagiques. Fed. Franc. Soc. Sci. Nat.: Off. Cen. de Faun. 26: 1-374 pp.

Sars, G. O. 1900. Crustacea. Norwegian North Polar Exped. 1893-1896, Sci. Results. 1(5): 1-141.

Sars, G. O. 1905. Liste préliminaire des calanoides recuilles pendant des campagnes de S. A. S. le Prince Albert de Monaco, avec diagnoses des genres et des espèces nouvelles. Ire. partie. Bull. du Musée Ocean. de Monaco, no. 26, 22 pp.

Sars, G. O. 1907. Notes supplémentaires sur les Calanoidés de la Princesse Alice corrections te additions). Bull. Inst. Ocean. Monaco, no. 101, 27 pp.

Sars, G. O. 1925. Copépodes particulièrement bathypélagique provenant des Campagnes Scientifiques du Prince Albert de Monaco. Result. Camp. Sci. Monaco, 69, 408 pp.

Sewell, R. B. S. 1932. The Copepoda of Indian Seas. Mem. Indian Mus., 10: 223-407.

Steuer, A. 1904. Copepoden der Valdivia-Expedition. Zool. Anzweiger Jahrg. 27: 593-598.

Tanaka, O. 1937. Copepods from the deep waters of Suruga Bay. Japanese Journal Zoology 7(1): 251-271.

Tanaka, O. 1956a. Rare species of Copepoda, Calanoidea, taken from the Izu region. Mus. Comp. Anat., Breviora 64: 1-8.

Tanaka, O. 1956b. The pelagic copepods of the Izu region, Middle Japan. Systematic account II: Families *Paracalanidae* and *Pseudocalanidae*. Publ. Seto Mar. Biol. Lab. 8 (1): 367-406.

Tanaka, O. 1957. The pelagic copepods of the Izu region, Middle Japan. Systematic account III: Family *Aetideidae*. Publ. Seto Mar. Biol. Lab. 4 (1): 31-68.

Tanaka, O. 1960. The pelagic copepods of the Izu region, Middle Japan. Systematic account VI: Families *Phaennidae* and *Tharybidae*. Publ. Seto Mar. Biol. Lab. 8 (1): 85-135.

Tanaka, O. 1964a. The pelagic copepods of the Izu region, Middle Japan, systematic account X: Family *Heterorhabdidae*. Publ. Seto Mar. Biol. Lab. 12 (1): 1-37.

Tanaka, O. 1964b. The pelagic copepods of the Izu region, Middle Japan, systematic account XI: Family *Augaptilidae*. Publ. Seto Mar. Biol. Lab. 12 (1): 39-91.

Tanaka, O. 1965. The pelagic copepods of the Izu region, Middle Japan, systematic account XIII: Families *Parapontillidae, Acartiidae,* and *Tortaniidae*. Publ. Seto Mar. Biol. Lab. 12 (5): 379-408.

Vervoot, W. 1965. Pelagic Copepoda, part II: Copepoda Calanoida of the families *Phaennidae* up to and including *Acartiidae*, containing the description of a new species of *Aetideidae*. In Atlantide Report No. 8: 1-216.

Wiebe, P. H., N. J. Copley, C. Van Dover, A. Tamse and F. Manrique. 1988. Deep-water zooplankton of the Guaymas Basin hydrothermal vent field. Deep-Sea Res. 35: 985-1013.

Wolfenden, R. N., 1905. Copepoda. Plankton Studies: preliminary notes upon new or interesting species, part 1. Brit. Mus. Nat. Hist. New York. pp. 1-24.

Wolfenden, R. N., 1911. Die marinen Copepoden, II. Die pelagischen Copepoden der Westwind Drift und der südlichen Eismeers. Deutsche Süd-polar Expedition, 7(4): 181-380. Berlin.

Table 1: Species and the numbers of female (F), male (M), and copepodite (C) copepods counted in one-quarter aliquots of MOC-GY-003 sample #4 and MOC-GY-007 sample #7 and from part of a plankton tow from Alvin dive 1629. The MOC samples are not comparable in volume of water filtered to the Alvin sample; the Alvin sample was not completely sorted. Changes in identifications from Wiebe *et al* (1988) are noted by '= (old name)'. Species preceded with an asterisk are discussed and illustrated in this report.

	MOC-3 #4			MOC-7 #7			ALV #1629		
SPECIES	F	M	C	F	M	C	F	M	C
Aetideopsis sp.	0	0	0	0	0	0	0	0	3
nr. *Aetideus*	1	0	0	0	0	0	0	0	0
Augaptilidae sp.1	0	0	0	1	0	0	0	0	0
A. sp. 2	0	0	0	0	0	1	0	0	0
A. sp. 3	0	0	0	0	0	1	0	0	0
**A.* sp. 4	0	0	1	0	0	0	0	0	0
Calanus pacificus	0	0	4	0	0	2	0	0	0
**Candacia magna*	6	3	25	9	16	12	0	0	0
Centropages furcatus	0	0	0	1	0	0	0	0	0
Cephalophanes sp.	1	0	0	0	0	0	0	0	0
**Chiridius* nr. *gracilis*	30	0	17	1	0	1	124	4	36
Clausocalanus arcuicornis	1	0	0	0	0	0	0	0	0
C. furcatus	4	0	0	1	0	0	0	0	0
**Drepanopsis orbus*	0	0	0	0	0	0	0	10	1
**D.* nr. *frigidus* (=Farrania oblongata)	0	0	0	1	0	0	0	0	0
Eucalanus sp.	0	0	0	0	0	1	0	0	0
E. nr. *monachus*	2	0	0	0	0	0	0	0	0
Euchaeta sp. 1	1	0	0	1	0	0	0	0	0
**E.* sp. 2	1	0	0	0	0	0	0	0	0
E. sp. 3	0	0	0	2	0	0	0	0	0
Euchaeta spp. copepodites	-	-	36	-	-	55	-	-	0
Gaetanus spp. copepodites	-	-	2	-	-	1	-	-	0
**Gaidius minutus*	125	0	50	32	1	27	14	0	8
nr. *Gaidius*	1	0	0	0	0	1	0	0	0
Heterorhabdus nr. *abysallis*	0	0	0	2	4	0	0	0	0
**H.* nr. *compactus*	1	2	0	0	0	0	0	0	0
H. nr. *papilliger*	1	0	1	0	0	0	0	0	0
Heterorhabdus sp.	0	0	0	1	0	0	0	1	0
H. spp. copepodites	-	-	0	-	-	7	-	-	0
**Heterostylites longicornis*	2	1	1	7	2	4	0	0	0
**Lucicutia bicornuta*	0	0	0	1	0	0	0	0	0
**L.* sp. 1	3	3	1	0	0	0	0	0	0
L. sp. 2	1	0	0	0	0	0	0	0	0
L. sp. 3	0	0	0	0	1	0	0	0	0
nr. *Megacalanus*	0	0	1	0	0	0	0	0	0
**Mesorhabdus* sp.	0	0	0	0	1	0	0	0	0

Table 1 (cont.)

SPECIES	MOC-3 #4 F	M	C	MOC-7 #7 F	M	C	ALV #1629 F	M	C
Metridia macrura	0	0	0	1	0	0	0	0	0
M. sp. 1 (small)	4	0	12	4	0	80	0	0	0
M. sp. 2 (large)	2	0	2	5	1	4	0	0	0
**Monacilla tenera*	0	0	0	1	0	0	0	0	0
Nannocalanus minor	4	0	1	1	1	0	0	0	0
Pareuchaeta sp.	0	0	0	0	0	0	0	0	16
**Phaennidae* sp. (= nr. *Amallothrix)*	2	2	10	1	0	11	1	0	0
**Phyllopus* nr. *bidentatus*	0	0	0	0	0	0	3	2	0
Phyllopus sp. copepodite	-	-	0	-	-	1	-	-	0
Pleuromamma gracilis	1	2	2	0	0	0	0	0	0
Rhincalanus nasutus	3	0	2	0	0	1	1	0	0
* nr. *Ryocalanus* sp. (= sp. A)	3	6	3	0	0	0	0	0	0
**Scaphocalanus* nr. *longifurcus*	1	0	0	7	1	1	0	0	0
**Scaphocalanus* sp. 2	0	0	0	0	1	0	0	0	0
**Scolecithricella* nr. *emarginata*	1	0	0	0	0	0	0	0	0
**S.* nr. *marquesae*	1	0	0	0	0	0	1	0	0
Scolecithrix danae	0	0	1	0	0	0	0	0	0
nr. *Scottocalanus*	0	0	0	0	0	1	0	0	0
**Spinocalanus* sp.1	25	0	8	32	0	39	0	0	0
**S.* sp. 2	0	0	0	16	0	2	0	0	0
S. sp. 3	1	0	0	0	0	0	0	0	0
Temora discaudata	0	0	1	0	0	0	0	0	0
**Temorites brevis*	0	0	0	2	2	0	0	0	0
**Temorites* sp. 1	2	3	0	1	0	0	0	0	0
**Undinella frontalis*	2	2	0	7	0	0	0	0	0
Undinella? sp. 1	4	0	0	0	0	0	0	0	0
**Valdiviella* sp.	0	0	0	0	1	0	0	0	0
**Xanthocalanus* nr. *pinguis*	2	0	0	0	0	0	0	0	0
Xanthocalanus sp.	0	0	0	0	0	0	1	0	0
sp. B (stage V copepodite)	0	0	0	0	0	1	0	0	0
sp. C	1	0	0	1	1	0	0	0	0
sp. D	0	0	0	1	2	0	0	0	0
other *incerta sedis* adults:	1	0	-	0	0	-	0	0	-
	1	0	-	0	0	-	0	0	-
	1	0	-	0	0	-	0	0	-
	0	1	-	0	0	-	0	0	1
								1	
misc copepodites	-	-	12	-	-	19	-	-	0
No. species:			42			40			(13)
Total species = 66-70									not quantitative

Figure legends

Figure 1:

From Rose, 1933

(a) generalized female calanoid copepod after Giesbrecht and Schmeil
(b) swimming leg
(c) second antenna
(d) mandible
(e) first maxilla
(f) second maxilla
(g) maxilliped

Abbreviations:

A1,2 = first, second antenna
end = endopod
exo = exopod
l = left
Mx1 = first maxilla
Mx2 = second maxilla
Mxpd = maxilliped
P = pareiopod or leg
r = right
Re, Ri = exopod, endopod
Th = thoracic segment
@spp. = figure drawn from Alvin specimen

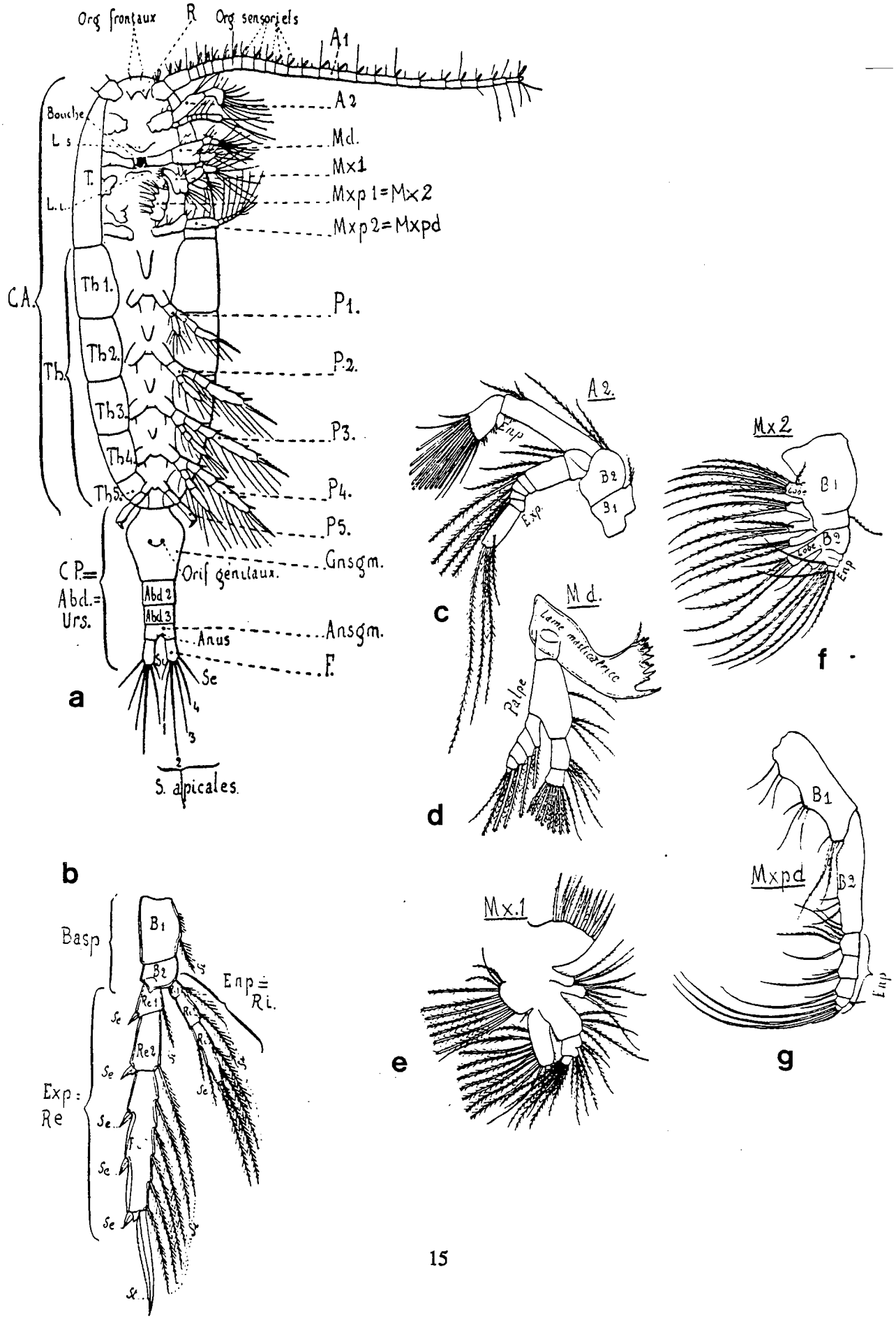
Org frontaux
R
Org sensoriels
A1
A2
Bouche
L s
T.
L. i.
Md.
Mx1
Mxp 1=Mx2
Mxp 2=Mxpd
C.A.
Th.
Th 1.
Th2.
Th3.
Th4.
Th5.
P1.
P2.
P3.
P4.
P5.
C P.=
Abd.=
Urs.
Orif genitaux.
Gnsgm.
Abd 2
Abd 3
Anus
Ansgm.
F.
Se
a
S. apicales.
b
Basp
B1
B2
Enp=
Ri.
Exp=
Re
Re1
Re2
Se
c
A2.
Enp
Exp
B2
B1
d
Md.
Lame masticatrice
Palpe
e
Mx.1
f
Mx2
Lobe
B1
B2
Enp
g
B1
Mxpd
B2
Enp

Figure 2:

(a) *Spinocalanus* sp. 1, female, dorsal
(b) lateral
(c) maxilla 2
(d) maxilliped
(e) *Spinocalanus* sp. 2, female, dorsal
(f) lateral
(g) leg 1, exopod segments 2 and 3 missing
(h) leg 2
(i) leg 4, incomplete
(j) maxilla 2
(k) maxilliped

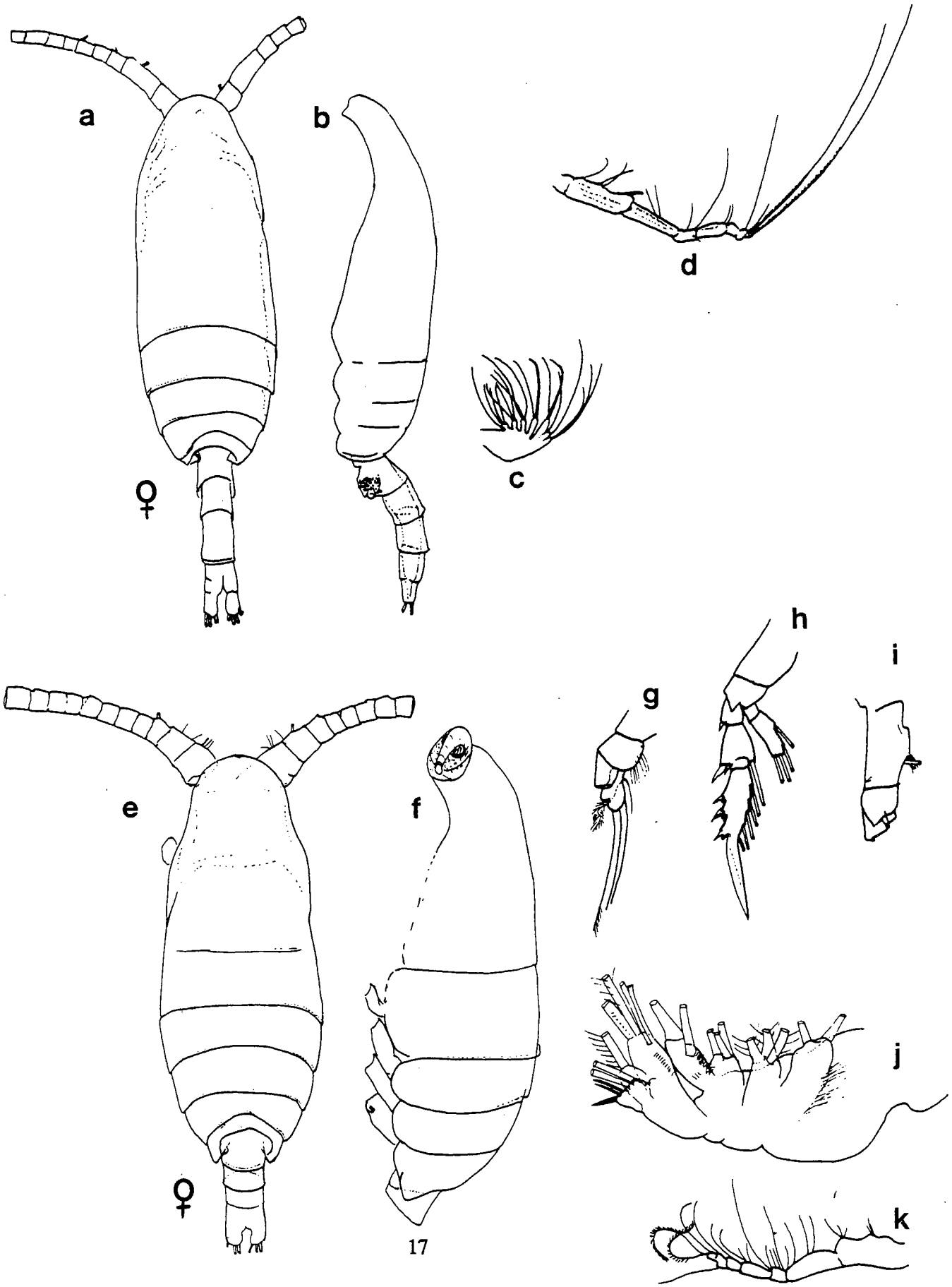
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Figure 3:

(a) *Monacilla tenera,* female, dorsal
(b) rostrum, ventral
(c) female, lateral
(d) leg 4, exopod incomplete
(e) *Drepanopsis frigidus*, female, dorsal
(f) urosome, lateral
(g) leg 2
(h) leg 3
(i) leg 5
(j) *Drepanopsis orbus*, male, dorsal

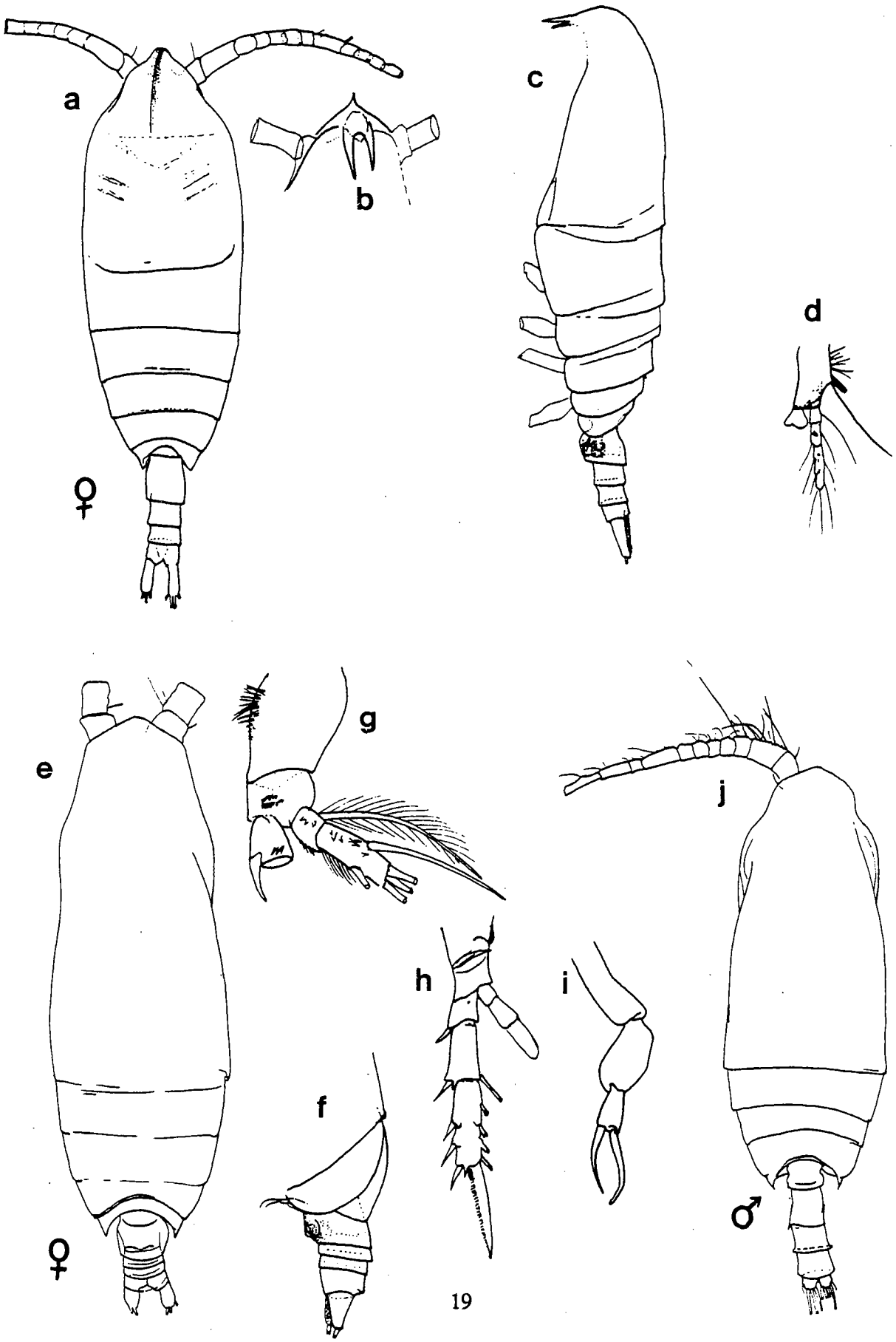
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Figure 4:

(a) *Drepanopsis orbus*, male, head, ventral
(b) urosome, lateral
(c) maxilla 1
(d) maxilla 2
(e) leg 1
(f) leg 3, incomplete
(g) leg 4
(h) leg 5, right endopod under exopod - drawn approximate size
(i) leg 5

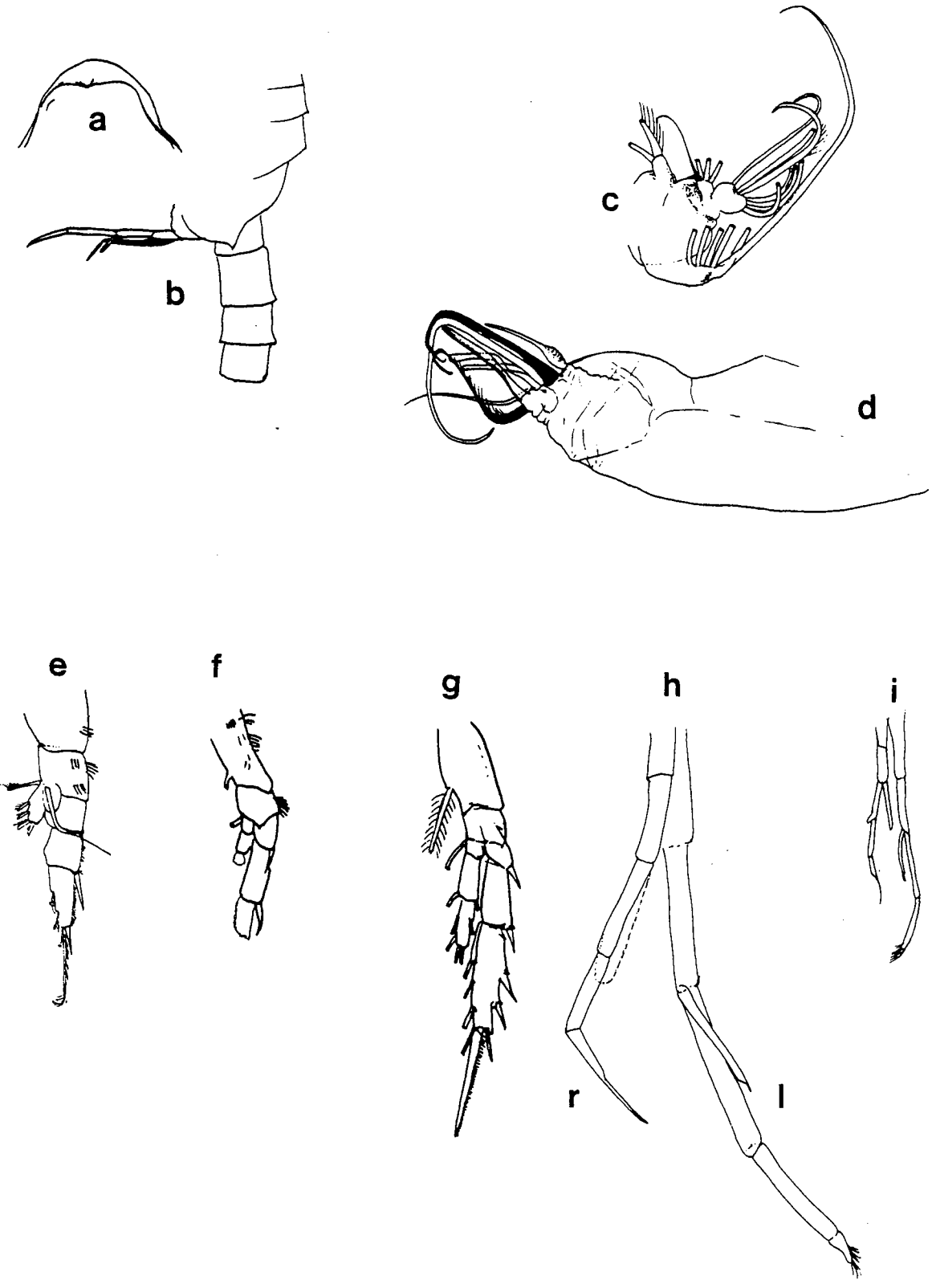
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Figure 5:

(a) nr. *Ryocalanus* sp., male, lateral
(b) rostrum, ventral view
(c) maxilla 2, distal segment
(d) maxilliped
(e) leg 1
(f) leg 1, endopod
(g) leg 2
(h) leg 5
(i) antenna 1

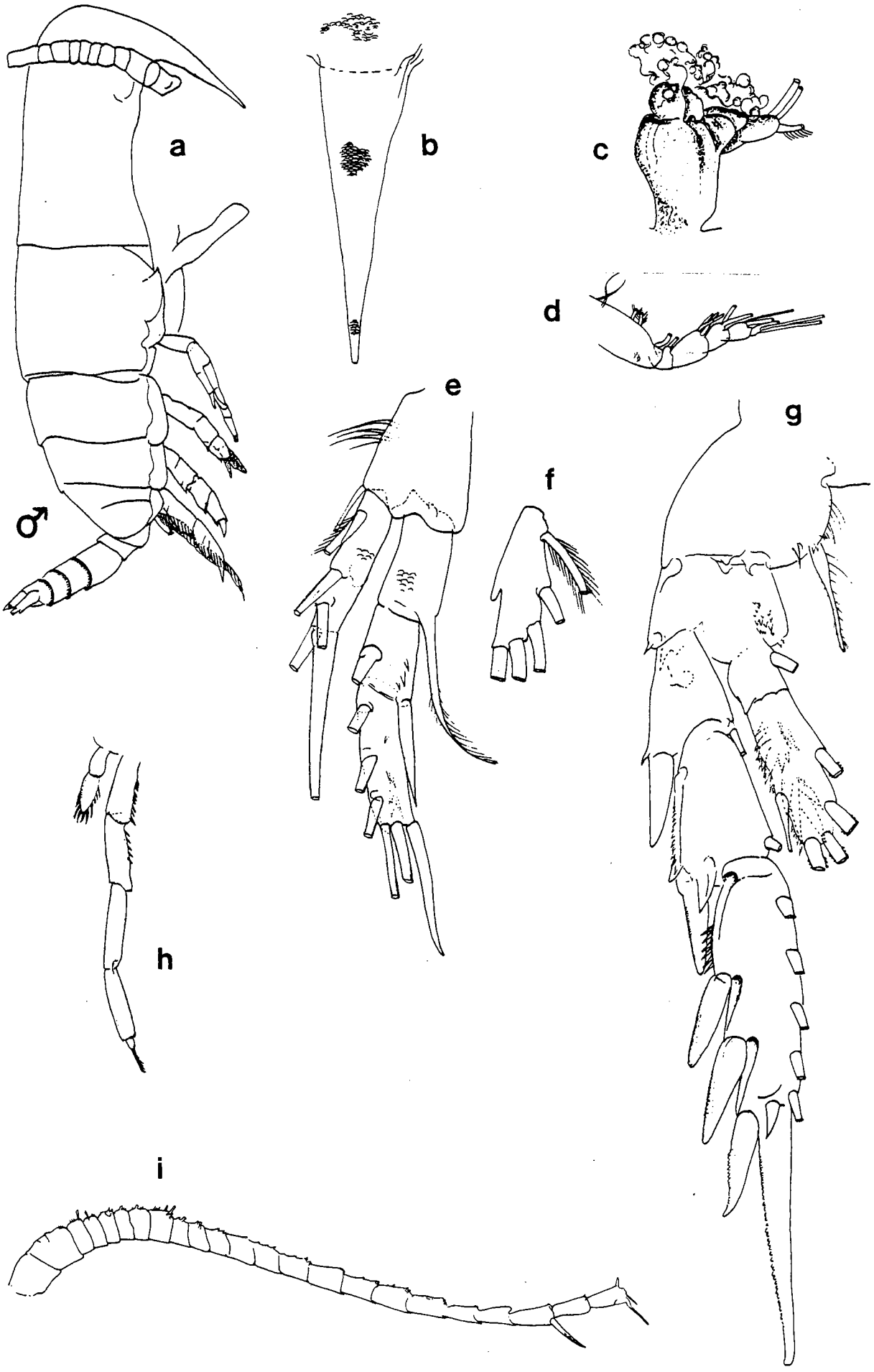
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Figure 6:

(a) nr. *Ryocalanus* sp., female, dorsal
(b) lateral
(c) rostrum, ventral
(d) leg 4, posterior
(e) genital segment, lateral
(f) urosome, ventral

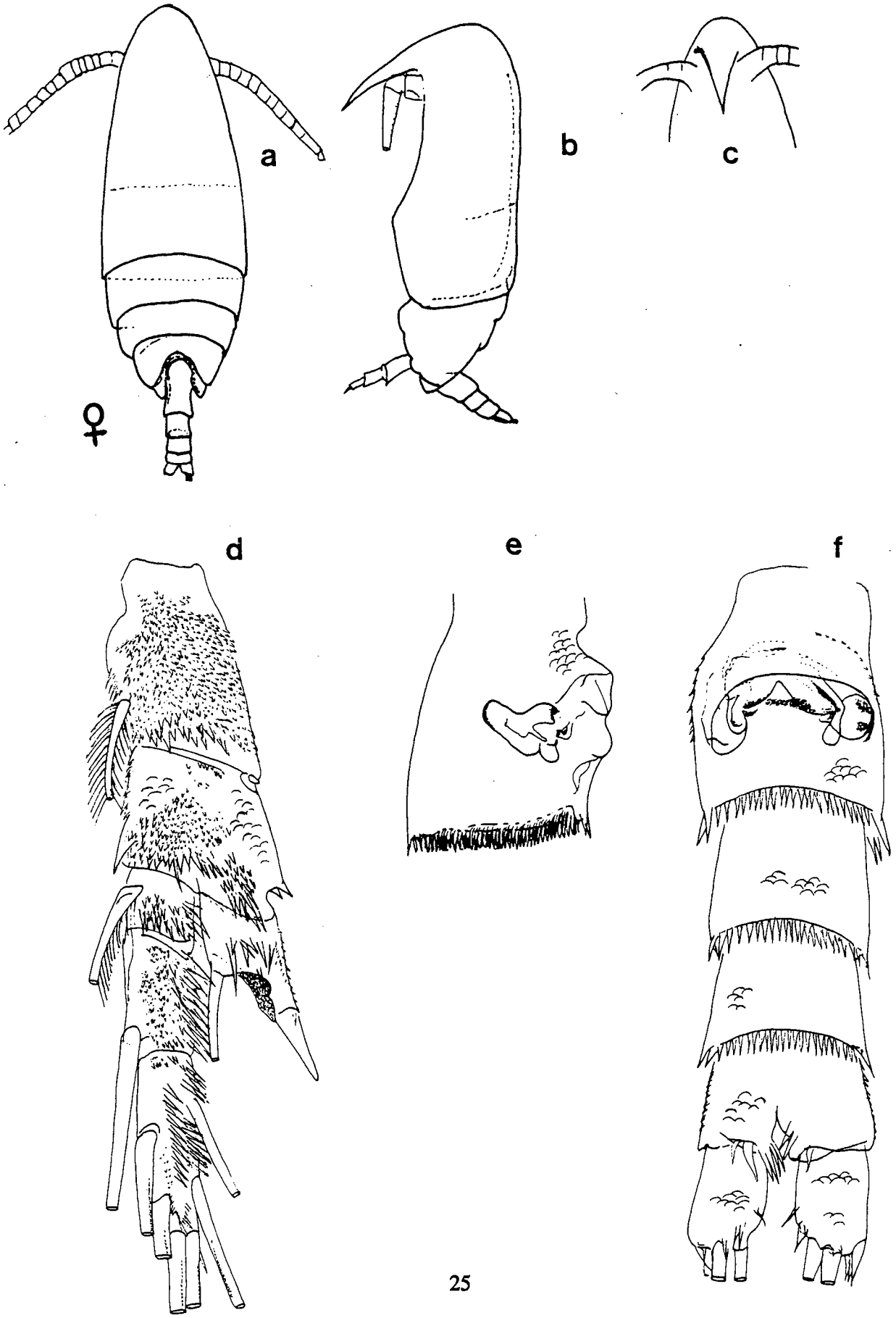
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Figure 7:

(a) *Chiridius gracilis,* female, dorsal
(b) lateral
(c) head, ventral
(d) leg 1
(e) leg 2
(f) leg 3
(g) leg 4
(h) leg 4, endopod and exopod segment 1
(i) antenna 2

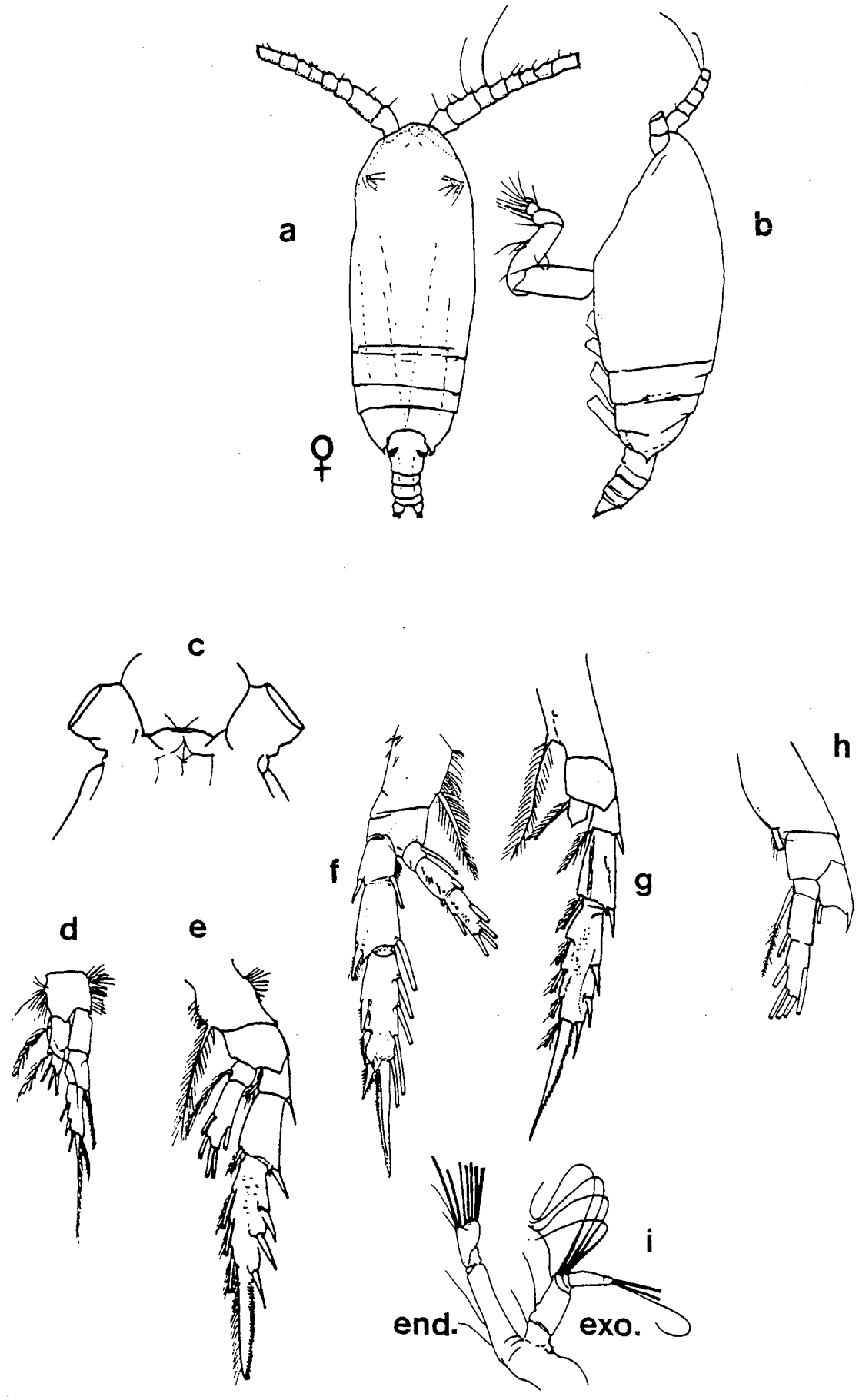
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Figure 8:

(a) *Chiridius gracilis,* male, dorsal
(b) lateral
(c) head, ventral
(d) leg 5
(e) maxilliped
(f) stage IV, dorsal
(g) stage V, dorsal

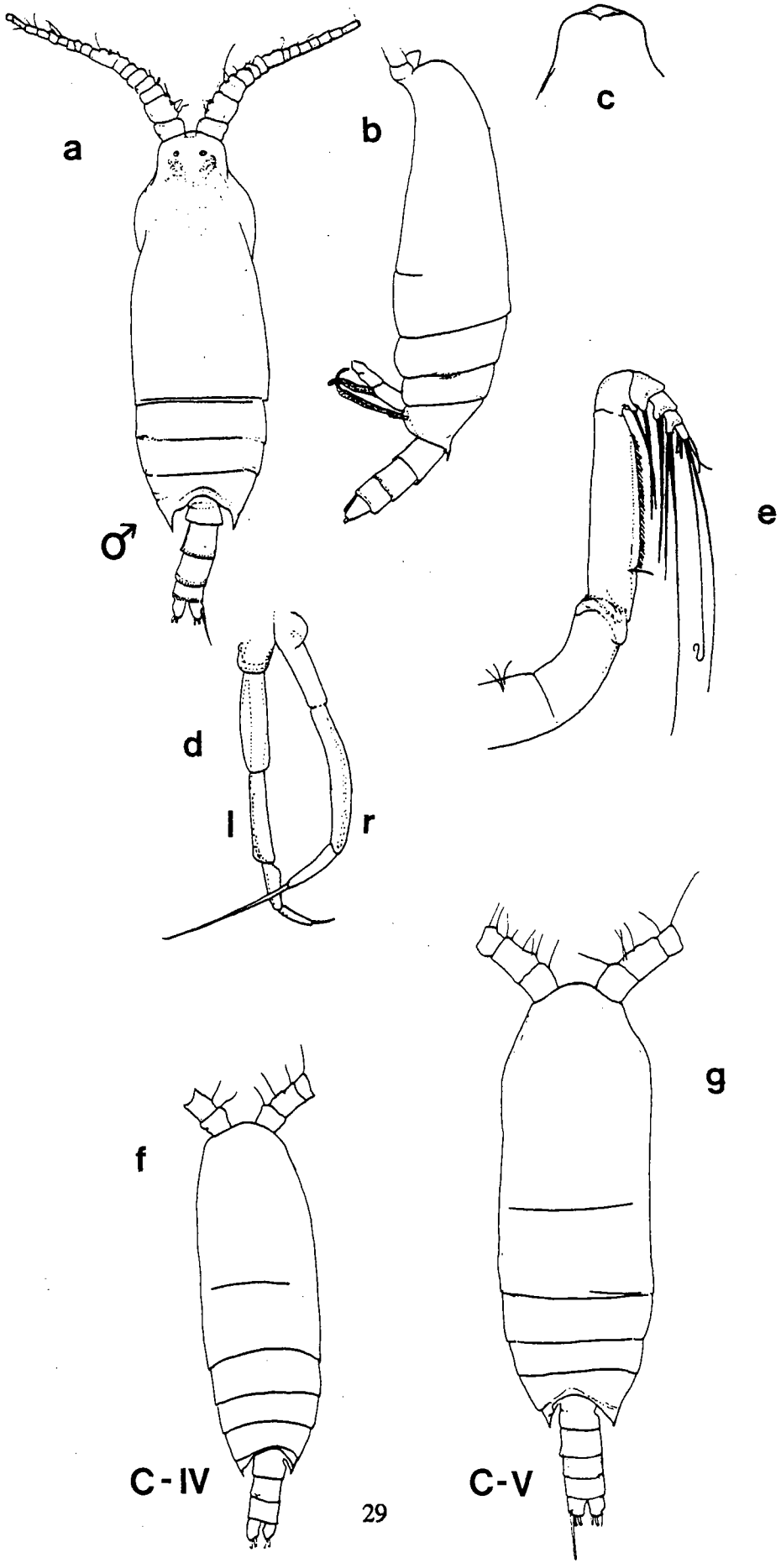
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Figure 9:

(a) *Gaidius minutus*, female, dorsal
(b) rostrum
(c) urosome, ventral
(d) urosome, dorsal
(e) urosome, lateral
(f) maxilla 2
(g) maxilliped
(h) leg 1
(i) leg 2
(j) leg 4
(k) stage V, female, dorsal
(l) stage V, male, dorsal
(m) leg 5
(n) leg 5, last 2 segments on each leg

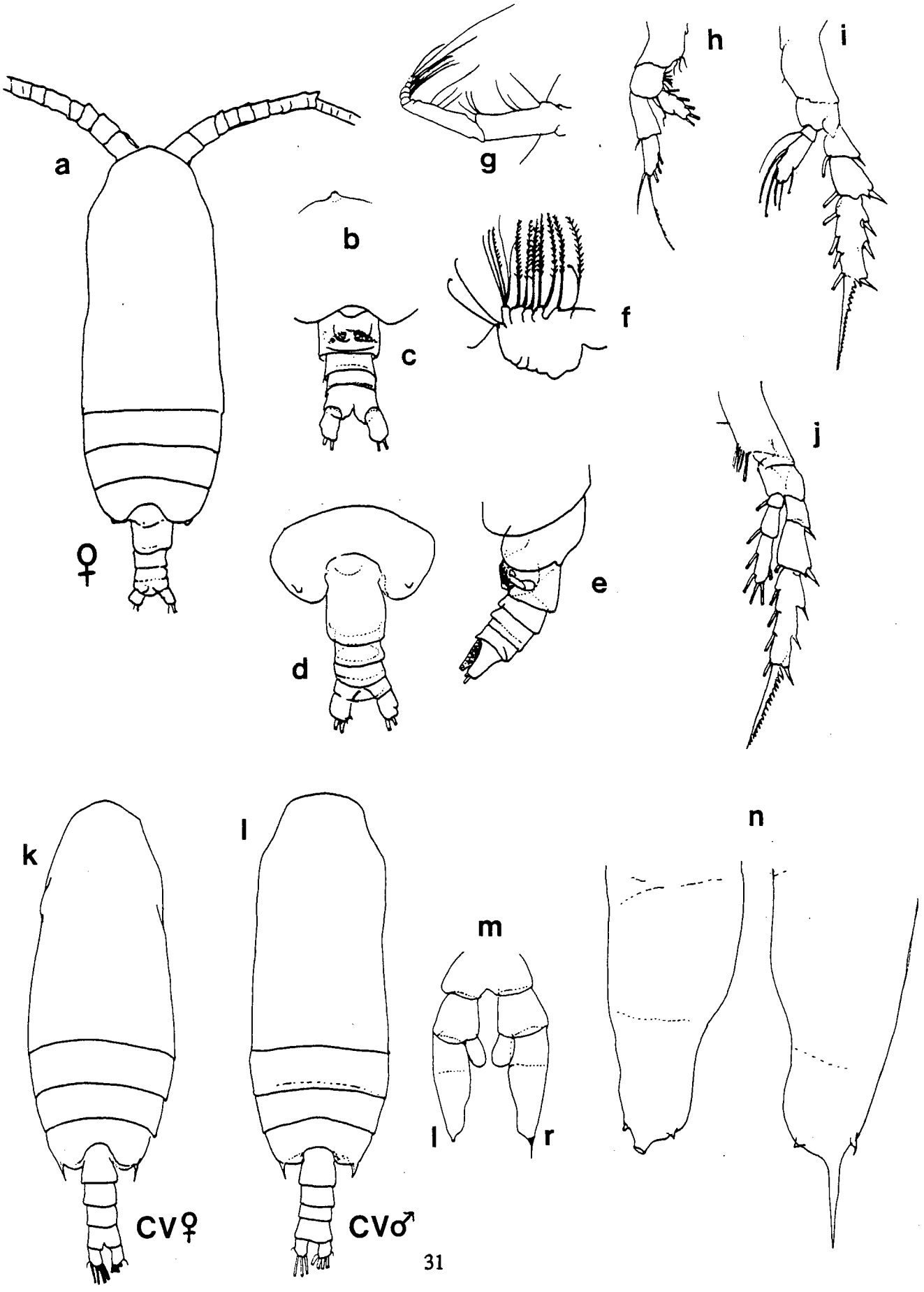
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Figure 10:

(a) *Gaidius minutus*, male, dorsal
(b) 5th thoracic segment, lateral
(c) urosome, dorsal
(d) leg 5

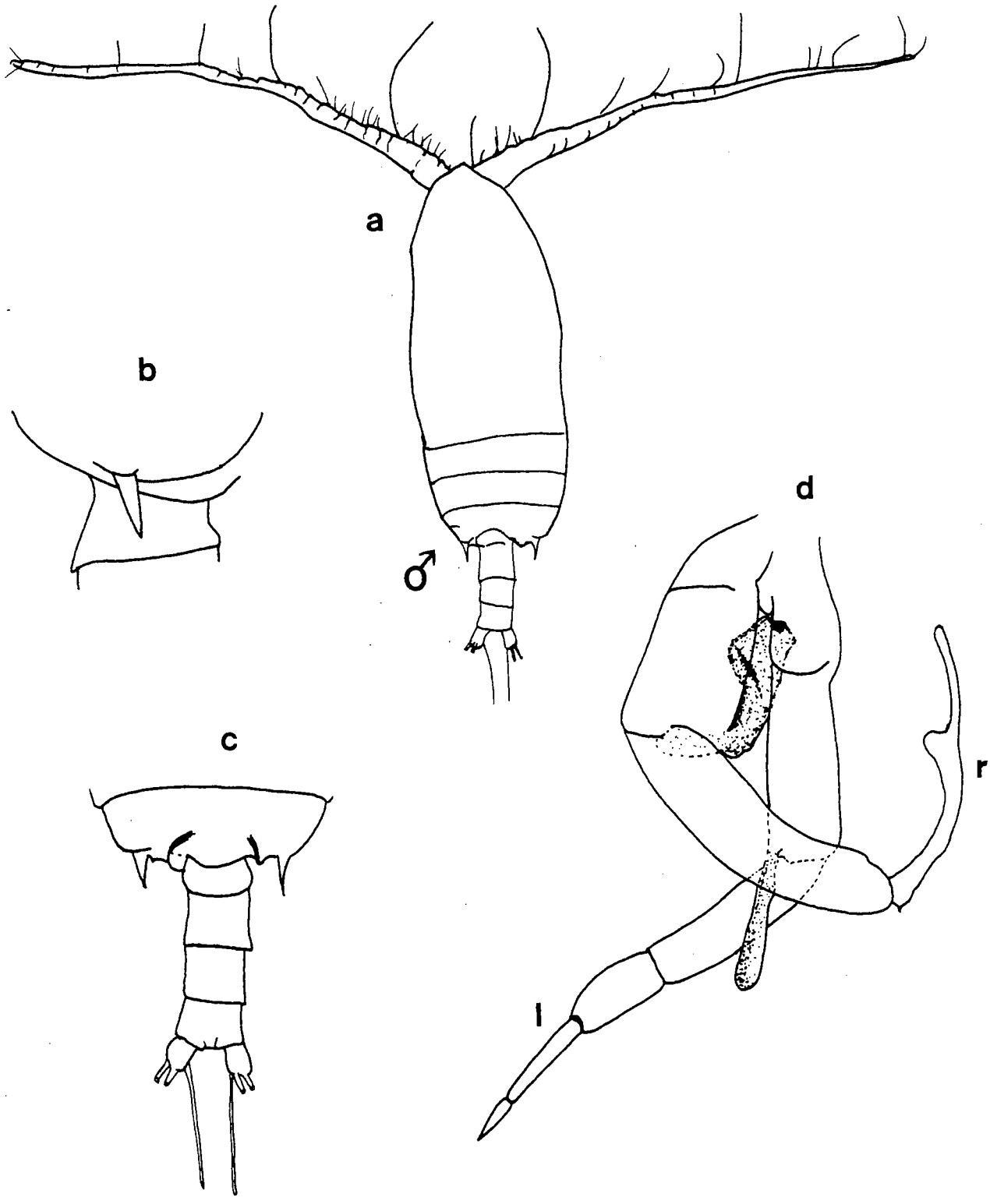
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Figure 11:

(a) *Valdiviella* sp., male, lateral
(b) rostrum, ventral
(c) leg 5, right endopod shaded
(d) *Euchaeta* sp. female, rostrum lateral
(e) body, lateral
(f) urosome, ventral
(g) urosome, right side
(h) urosome, left side
(i) maxilliped
(j) maxilla 1

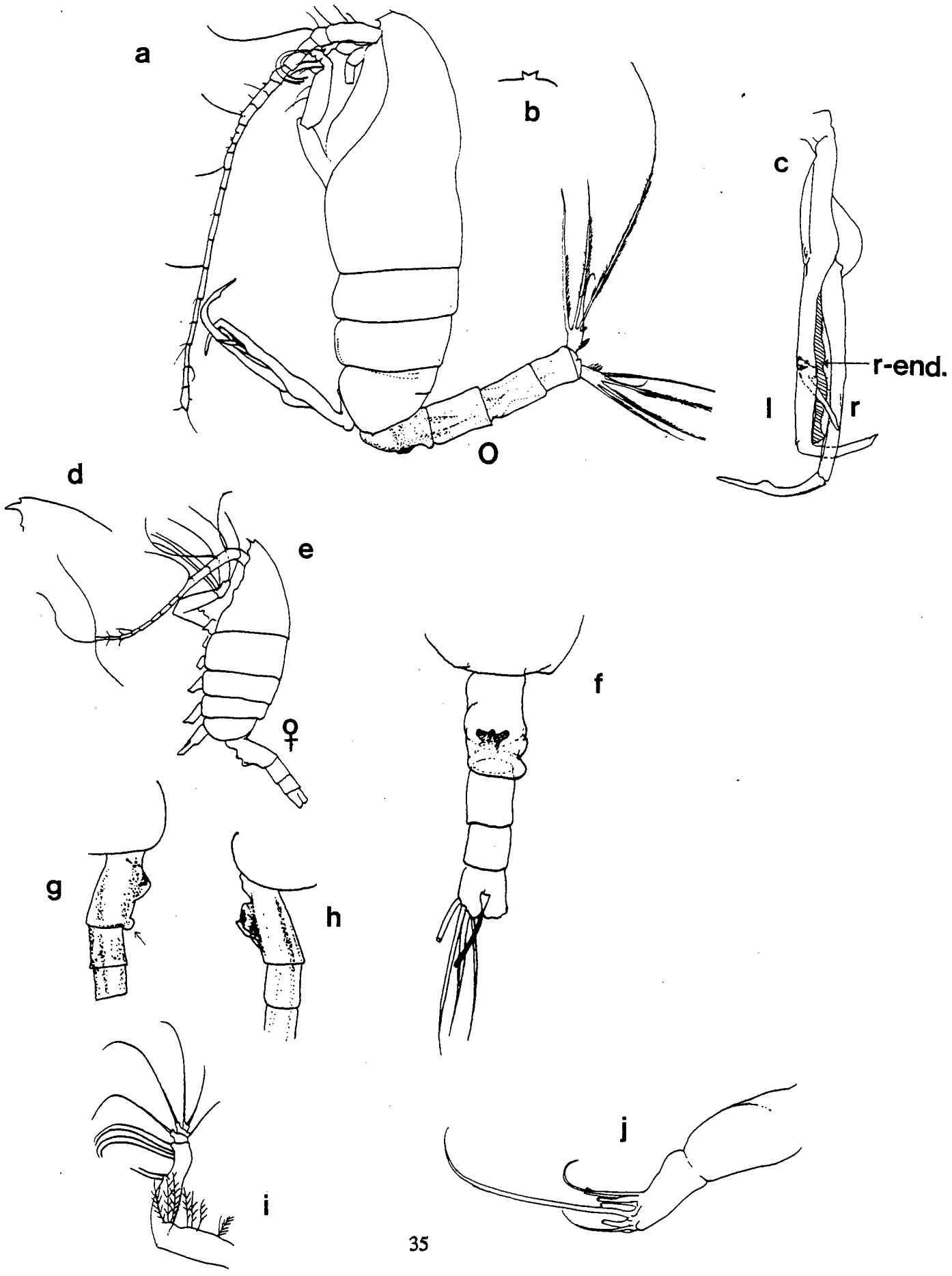
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Figure 12:

(a) *Euchaeta* sp. female, leg 1
(b) leg 2
(c) leg 3
(d) leg 4
(e) *Xanthocalanus pinquis,* female, dorsal
(f) maxilla 2
(g) maxilla 2, distal segment
(h) urosome
(i) leg 5

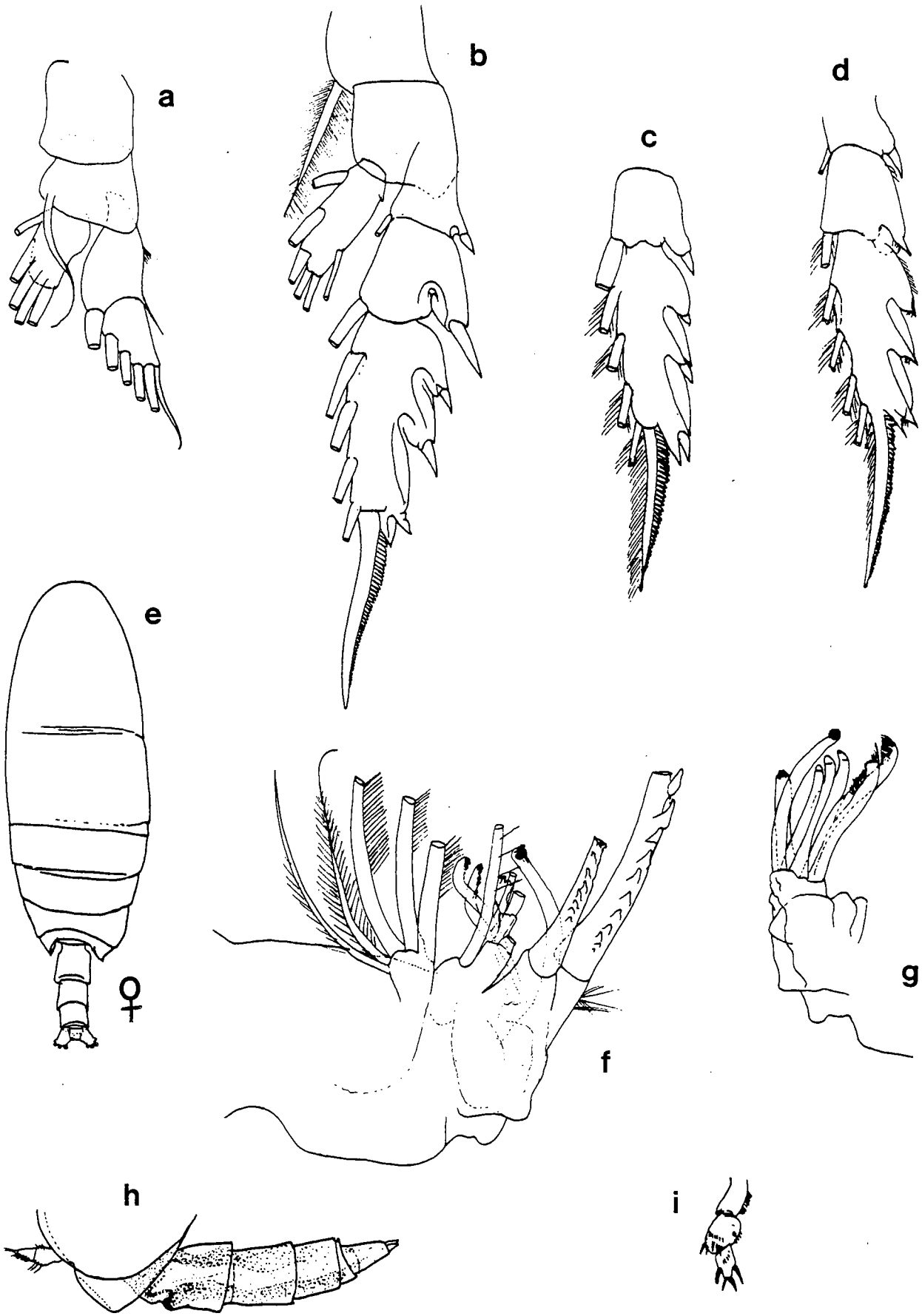
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Figure 13:

(a) *Phaennidae* sp., male, lateral
(b) dorsal
(c) rostrum, ventral
(d) lower body, lateral
(e) leg 5
(f) female urosome, lateral
(g) leg 1
(h) leg 2, segments Re2 and Re3 missing
(i) leg 5
(j) rostrum

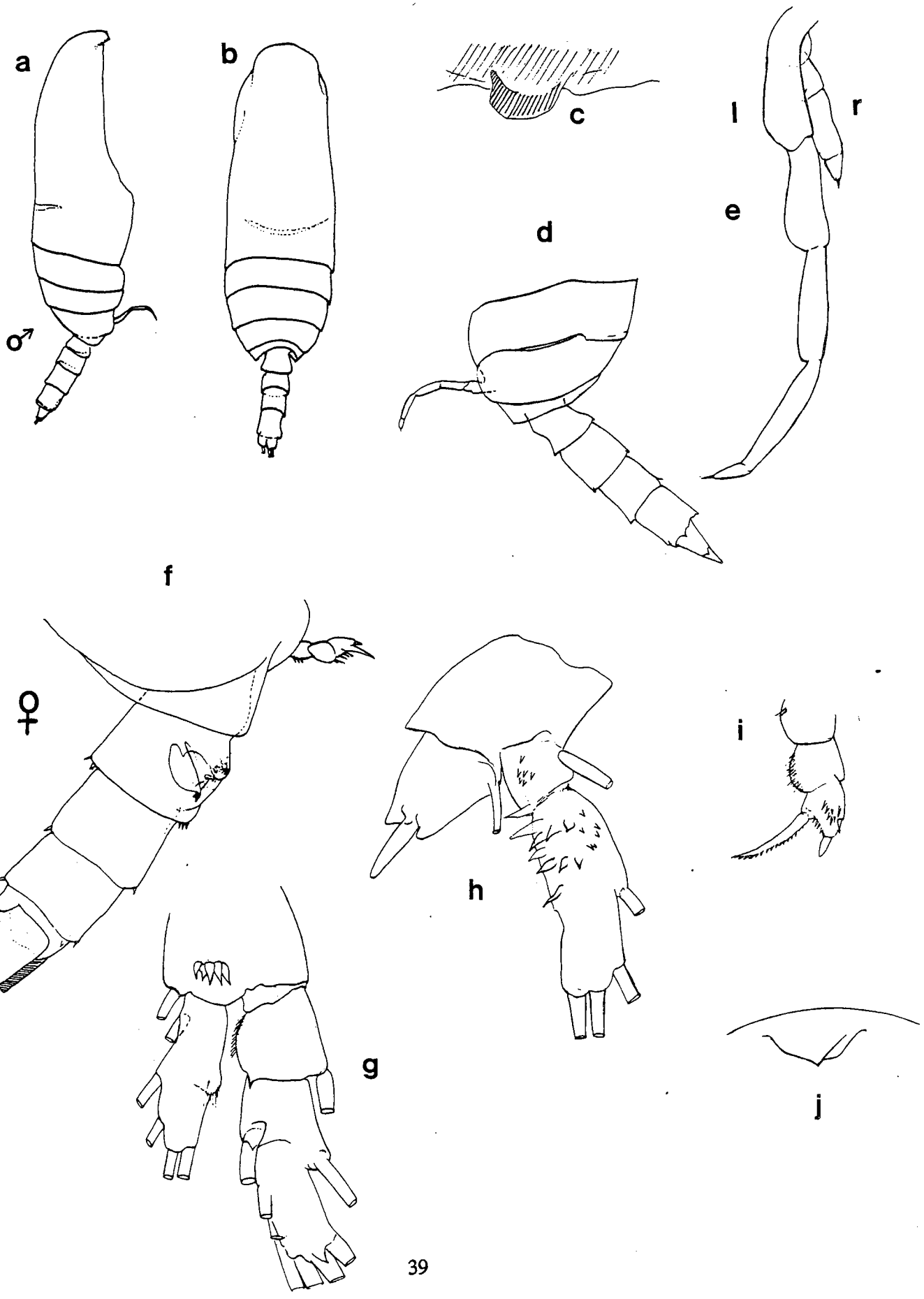
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Figure 14:

(a) *Phaennidae* sp., immature female, rostrum
(b) maxilla 2, distal portion
(c) maxilla 2
(d) leg 5
(e) *Undinella frontalis*, female, lateral
(f) dorsal
(g) urosome, lateral
(h) leg 5

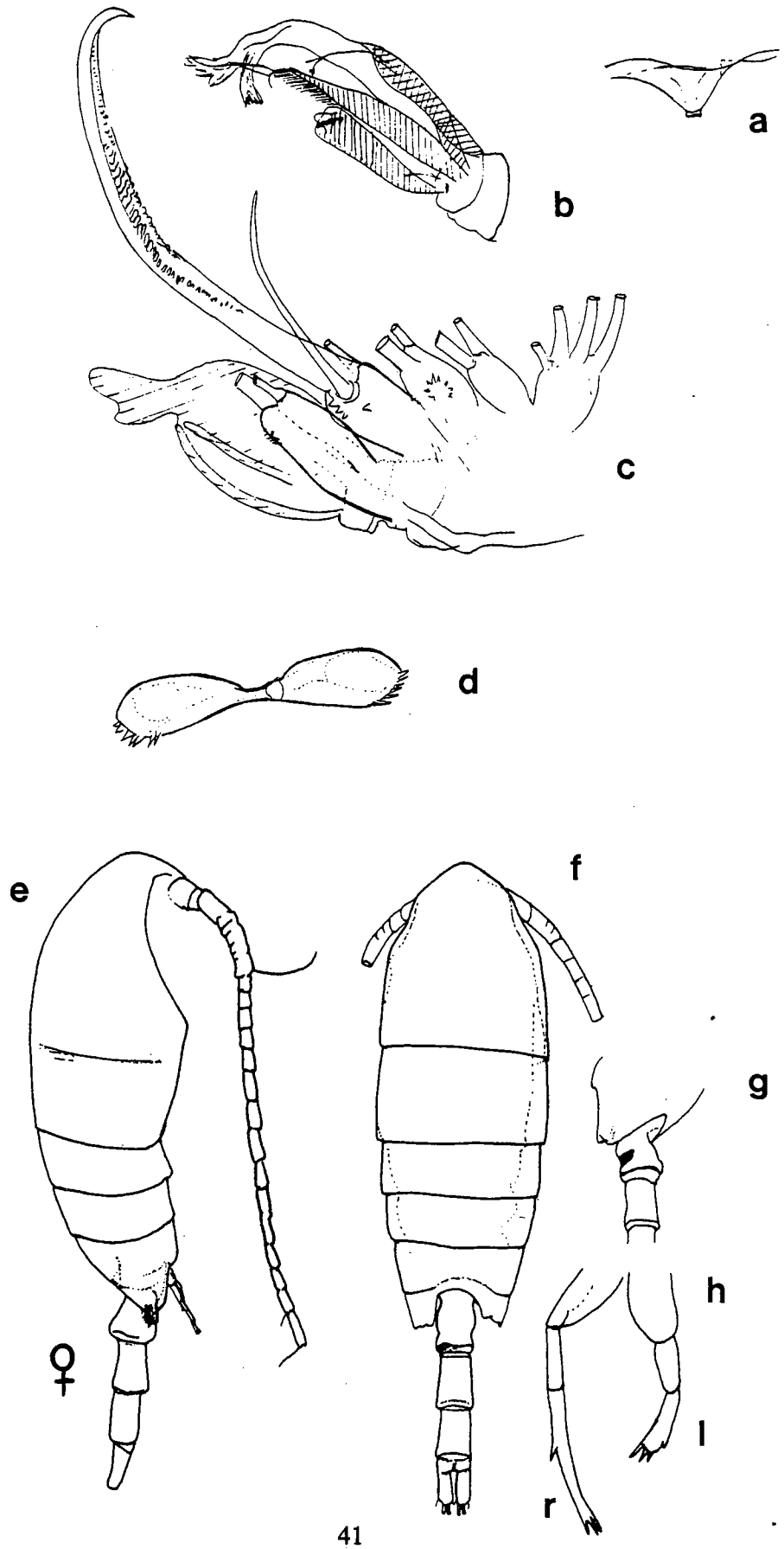
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Figure 15:

(a) *Scaphocalanus* nr. *longifurcus,* female, dorsal
(b) lateral
(c) rostrum
(d) maxilla 2
(e) maxilla 2, distal portion
(f) leg 1, exopod missing
(g) leg 5
(h) male, dorsal
(i) maxilla 2
(j) leg 5
(k) leg 5, endopods missing

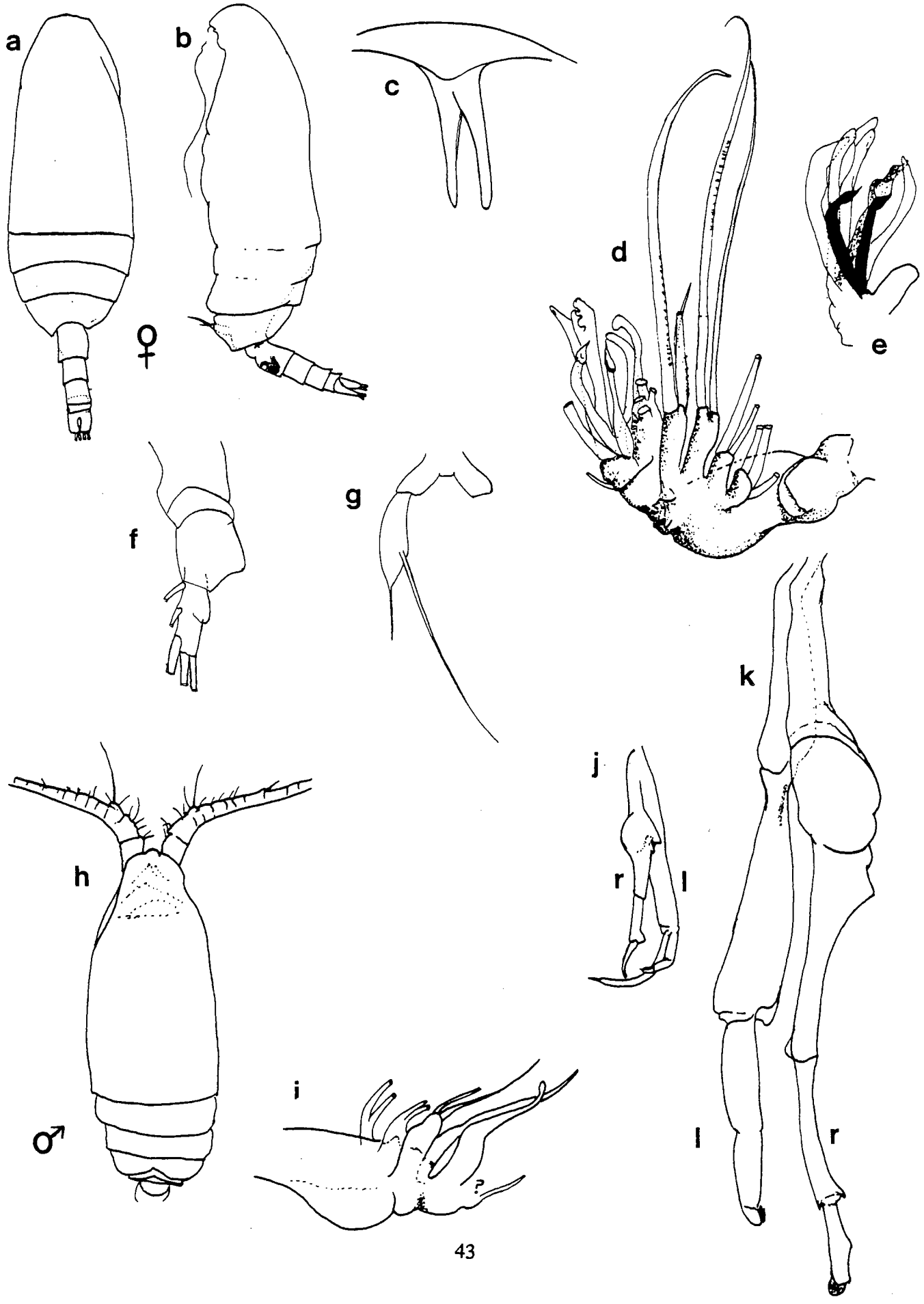
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Figure 16:

(a) *Scaphocalanus* sp. 2, male, dorsal
(b) fifth thoracic segment and leg 5
(c) leg 5
(d) *Scolecithricella* nr. *emarginata,* female, urosome, lateral
(e) body, dorsal
(f) head, ventral
(g) maxilla 2, distal segments
(h) genital segment, lateral
(i) leg 1
(j) leg 2
(k) leg 4, incomplete
(l) leg 5

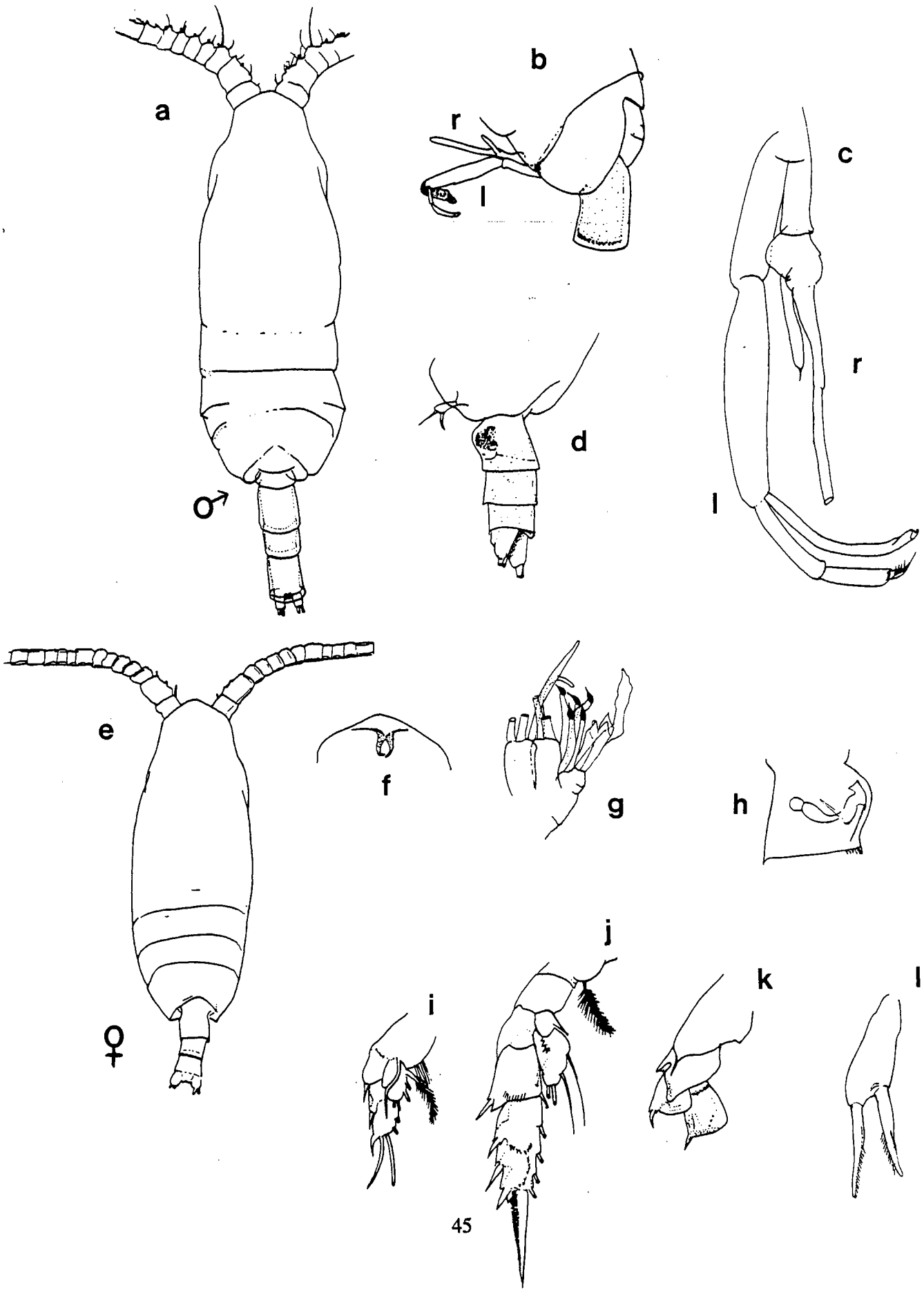
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Figure 17:

(a) *Scolecethricella* nr. *marquesae,* female, dorsal
(b) body, lateral
(c) head, ventral
(d) maxilla 2
(e) urosome, lateral
(f) leg 5

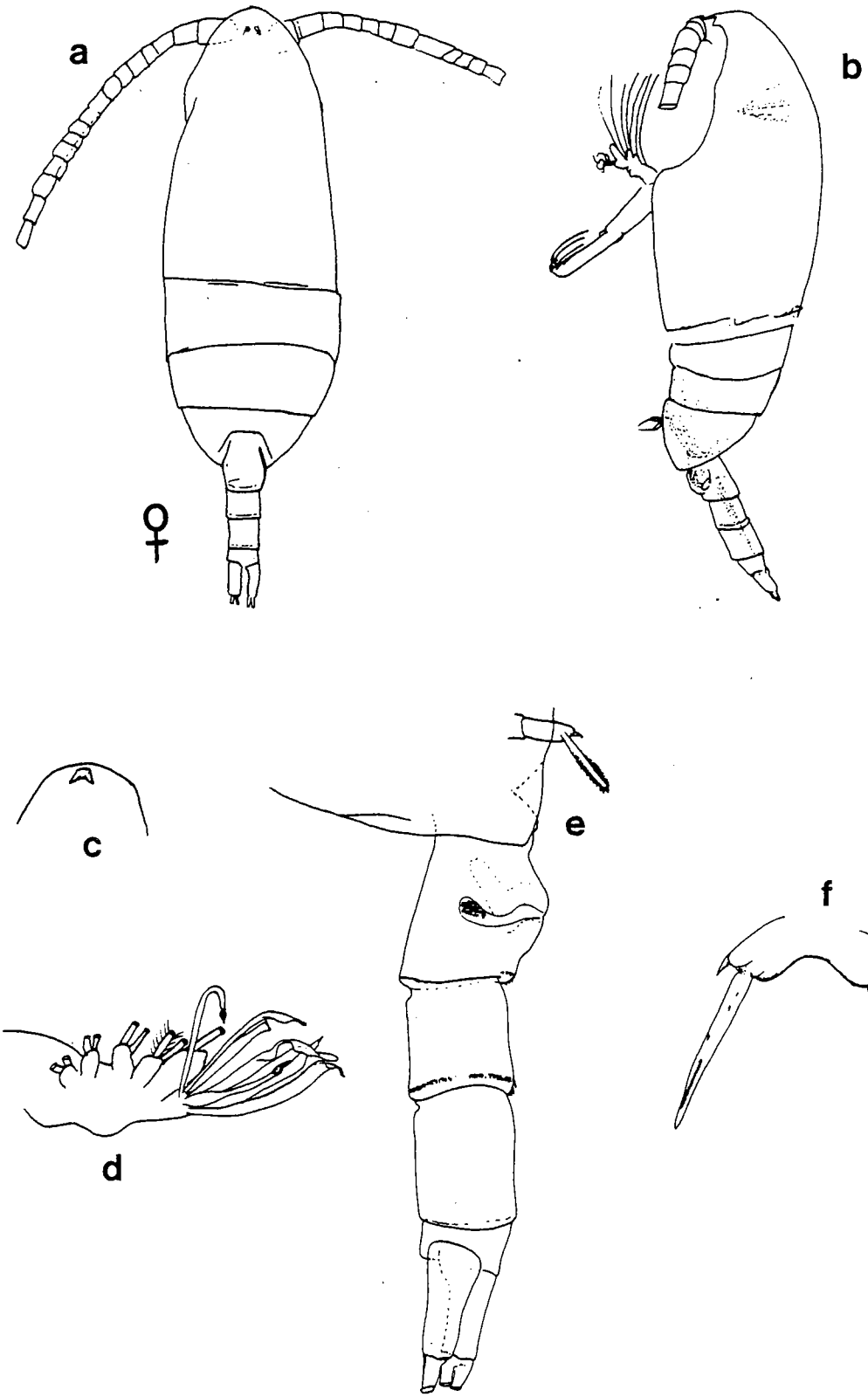
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Figure 18:

(a) *Lucicutia bicornuta,* female, lateral
(b) dorsal
(c) *Lucicutia* sp. 1, female, dorsal
(d) lateral
(e) male, dorsal

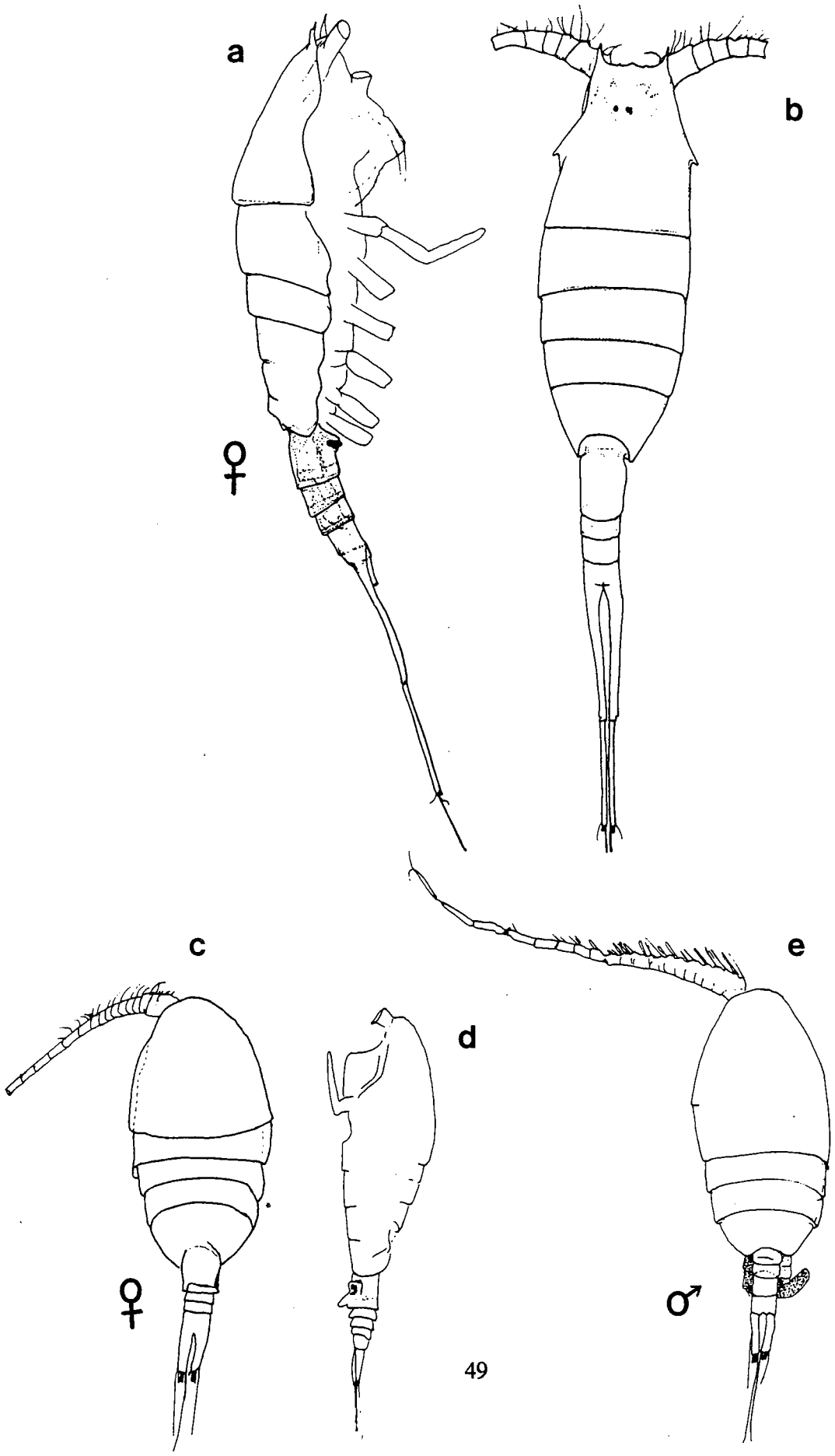
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Figure 19:
(a) *Heterorhabdus compactus*, female, lateral
(b) urosome, lateral
(c) dorsal
(d) maxilla 2
(e) maxilliped
(f) leg 5
(g) male, dorsal
(h) leg 5, left
(i) leg 5, right

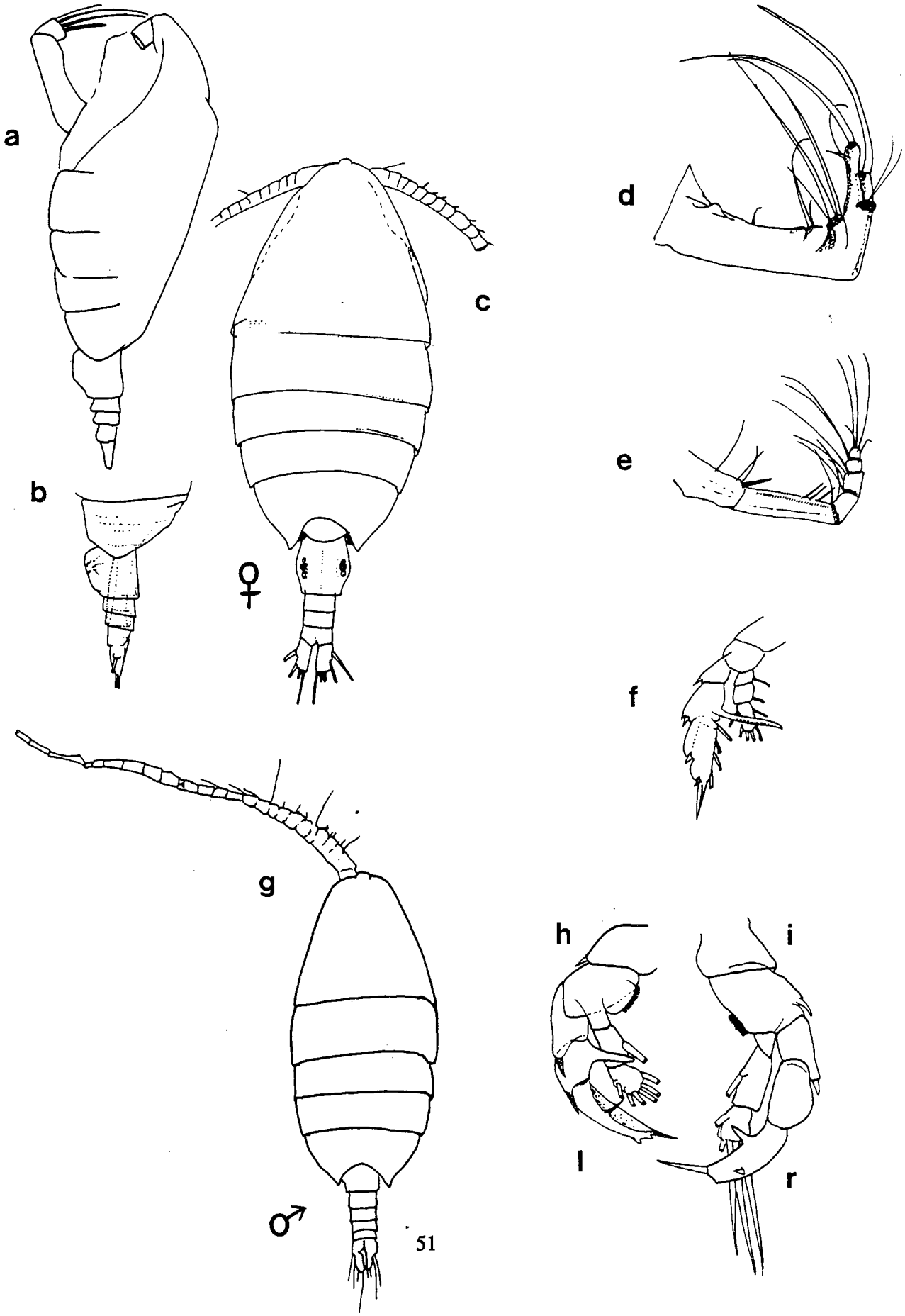
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Figure 20:

(a) *Heterostylites longicornis*, female, dorsal
(b) lateral
(c) maxilla 2
(d) left mandible
(e) leg 5
(f) maxilliped
(g) genital segment, left side
(h) male, leg 5, left
(i) leg 5, right

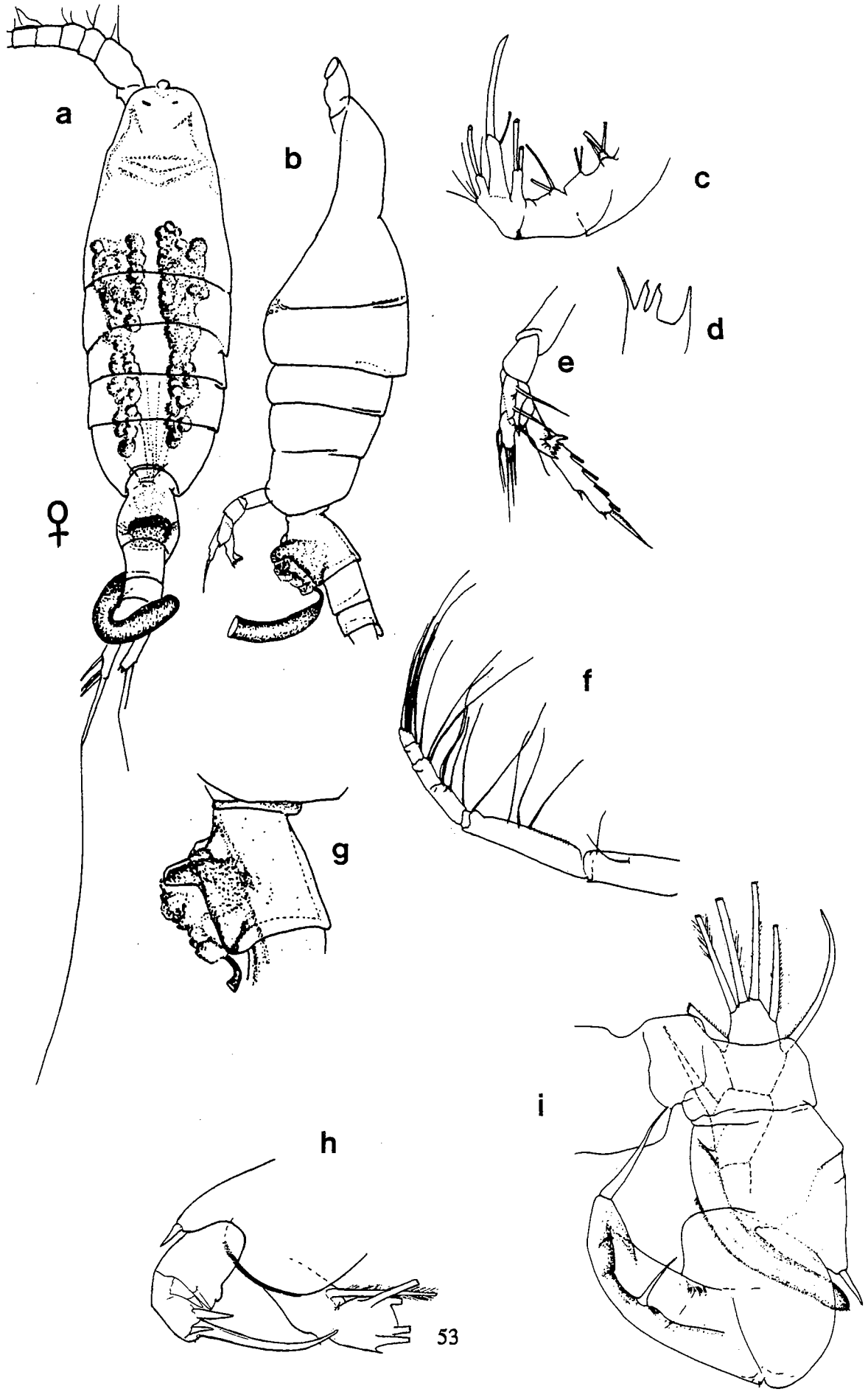
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Figure 21:

(a) *Mesorhabdus* sp., male, dorsal
(b) left mandible
(c) maxilla 2
(d) *Augaptilidae* sp., stage V?, lateral
(e) 'buttons' on setae of maxilliped
(f) rostrum, ventral
(g) urosome
(h) antenna 2
(i) maxilla 1
(j) mandible
(k) maxilliped

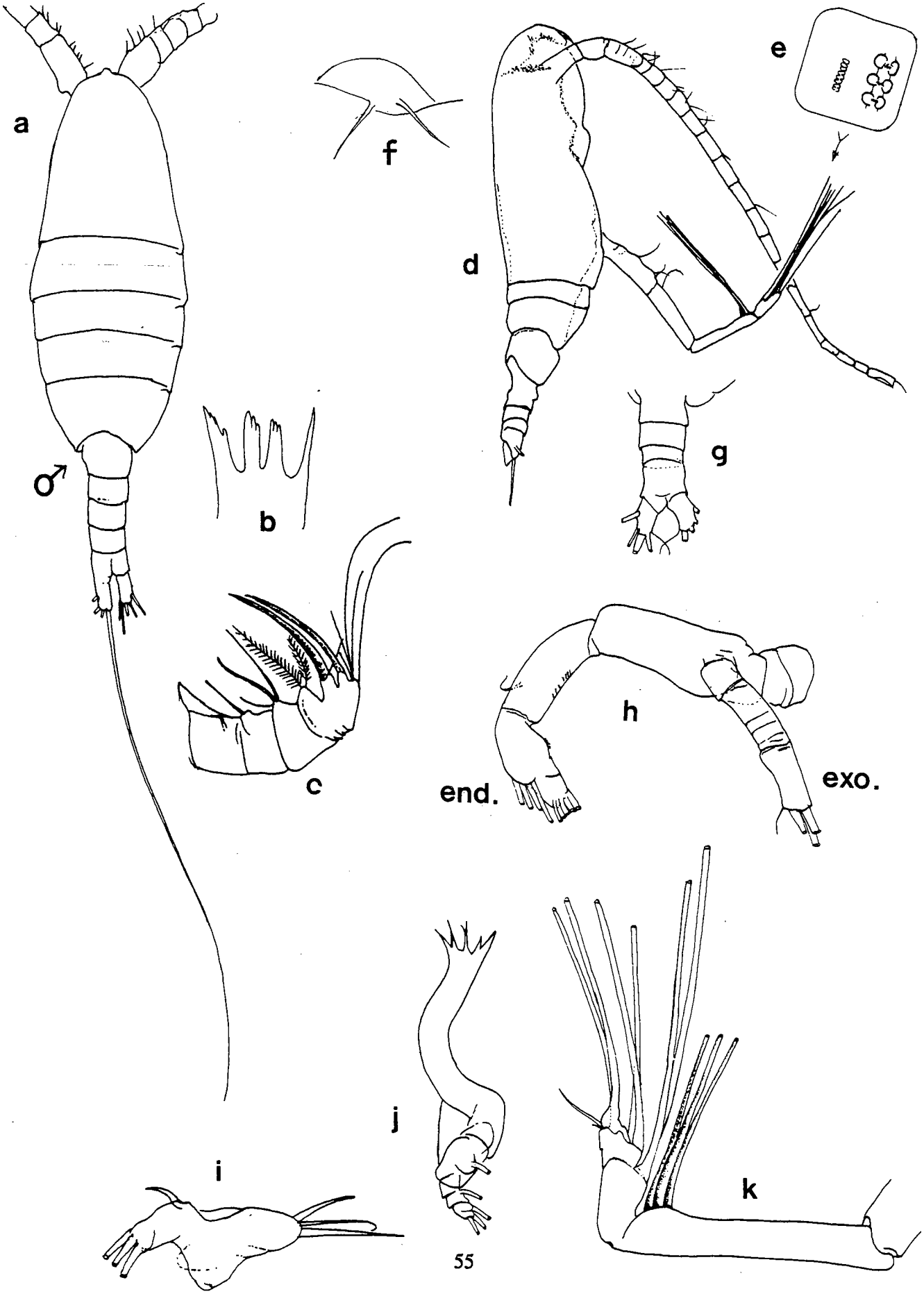
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Figure 22:

(a) *Phyllopus* nr. *bidentatus*, female, dorsal
(b) head, ventral
(c) urosome, lateral
(d) leg 5
(e) leg 5, left
(f) male, dorsal
(g) head, ventral
(h) leg 5, anterior
(i) leg 5, posterior.

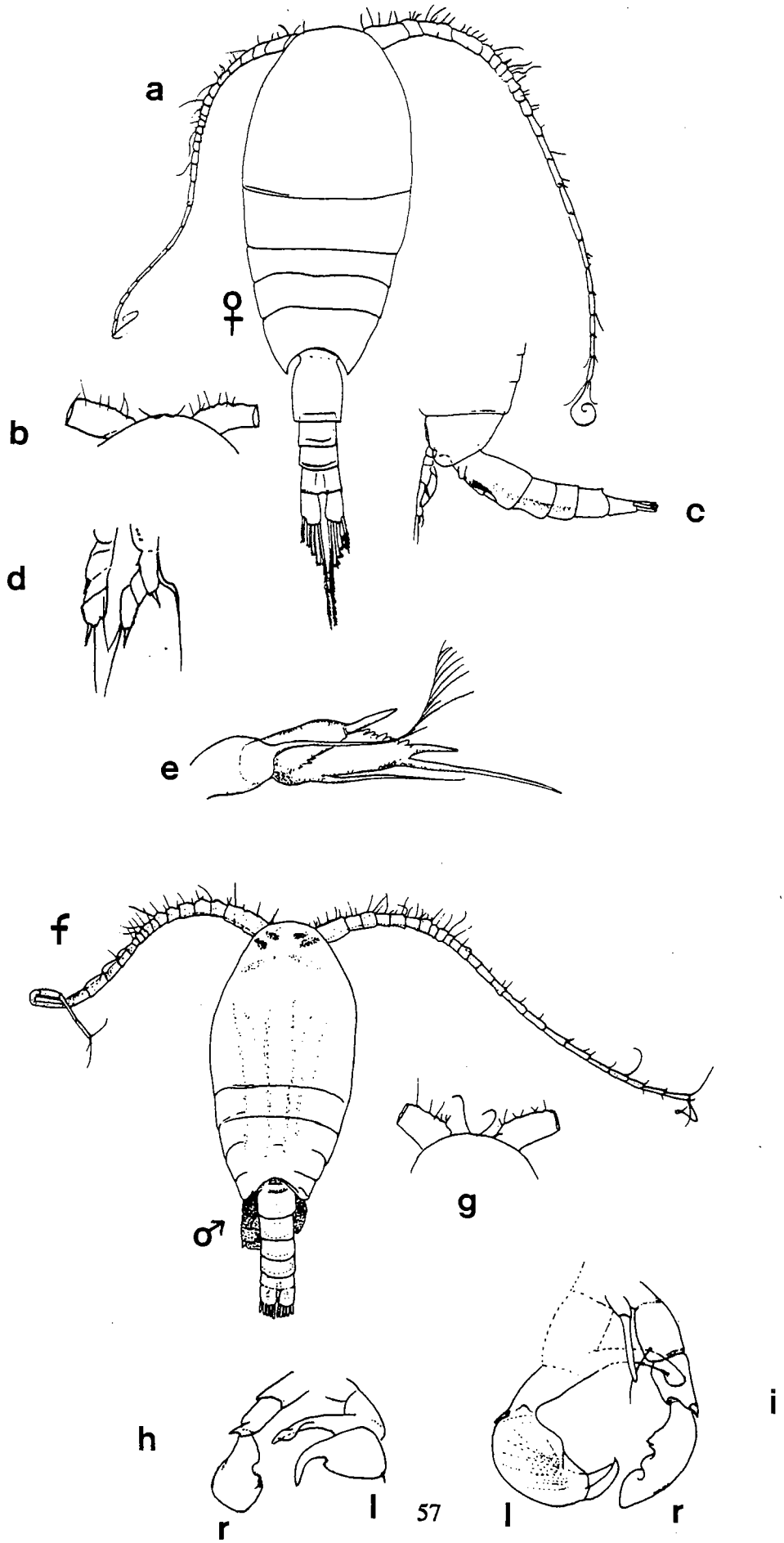
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Figure 23:

(a) *Candacia magna,* female, dorsal
(b) urosome, dorsal
(c) urosome, lateral
(d) leg 5, arrow at fourth seta - absent on one specimen
(e) male, dorsal
(f) urosome, dorsal
(g) leg 3
(h) leg 5
(i) right foot
(j) left foot

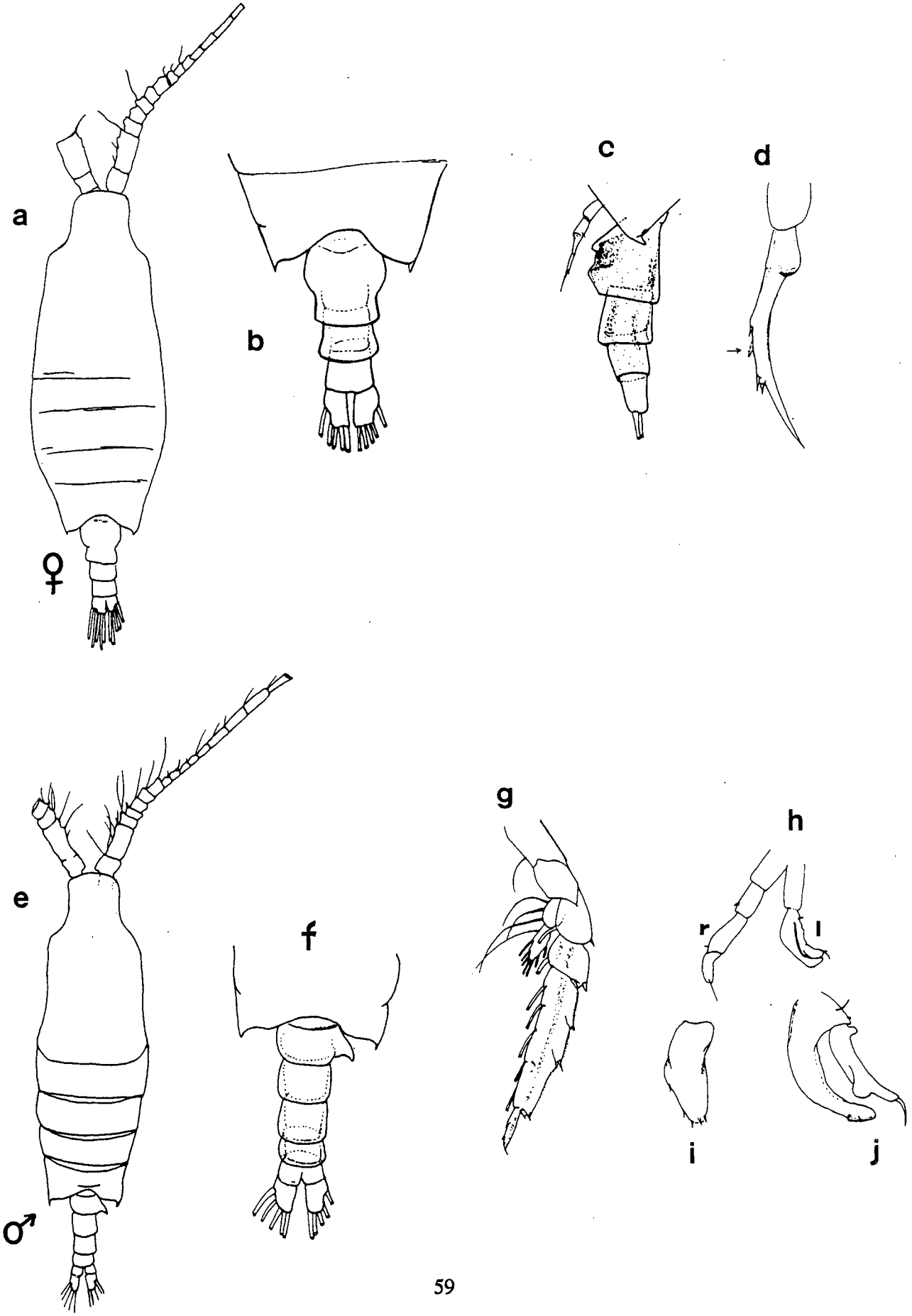
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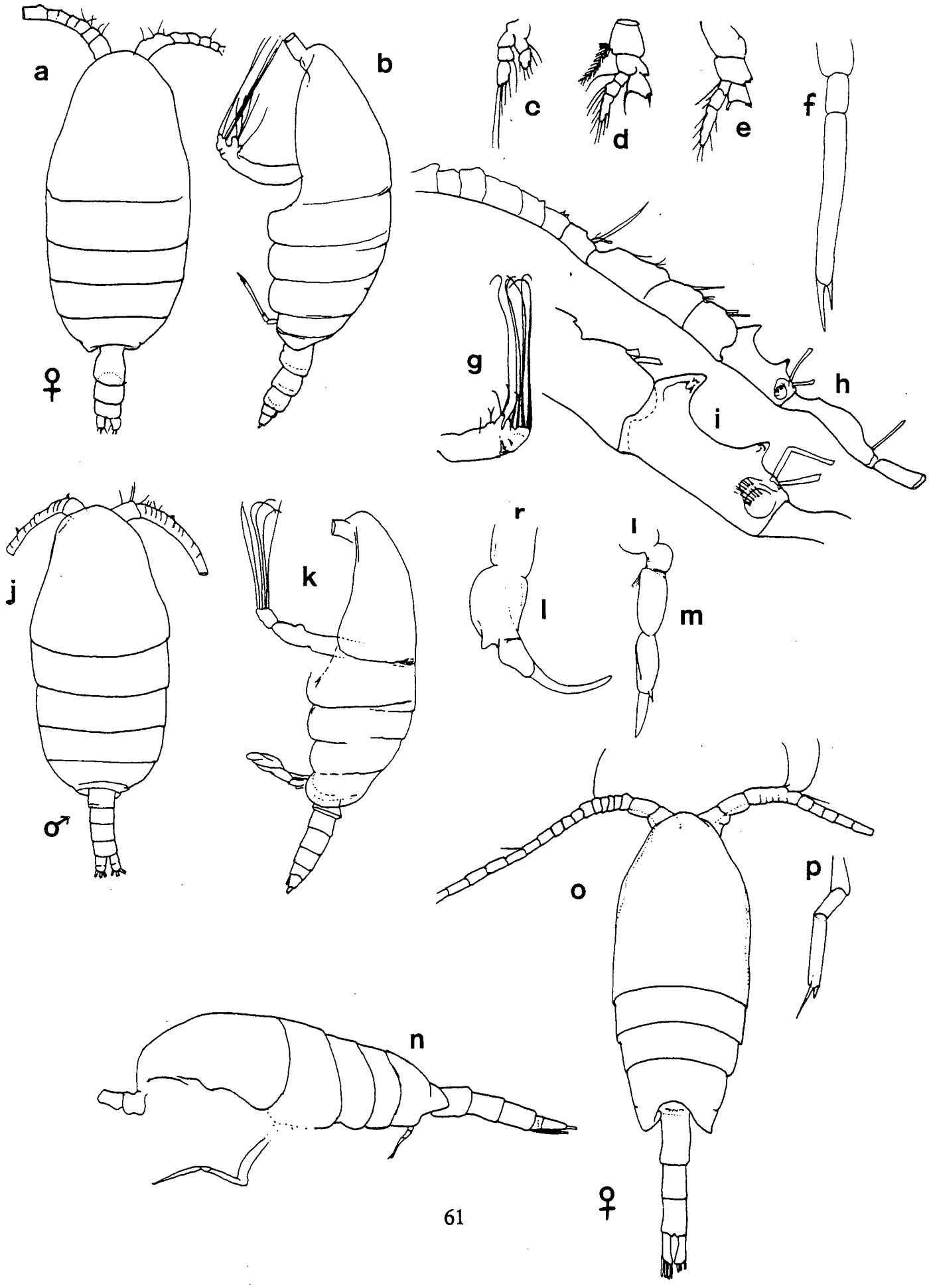
Figure 24:

(a) *Temorites brevis,* female, dorsal
(b) lateral
(c) leg 1
(d) leg 2, incomplete
(e) leg 4, incomplete
(f) leg 5
(g) maxilla 2
(h) male, antenna 1
(i) antenna 1, joint
(j) body, dorsal
(k) body, lateral
(l) leg 5, right
(m) leg 5, left *right and left legs not to scale
(n) *Temorites* sp. 1, female, lateral
(o) dorsal
(p) leg 5, left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This report includes brief descriptions and illustrations of some of the copepods found in two bathypelagic MOCNESS samples. The MOCNESS was towed horizontally at an altitude of 100-200 m above the bottom in waters 1900 to 2000 m deep near hydrothermal vents in the southern trough of the Guaymas Basin, Gulf of California. Some copepods from one Alvin dive plankton tow collected three to four meters from the bottom in the vent field (2000 m depth) are also included.

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