

Some thoracic barnacles
(Crustacea: Cirripedia)
of Manila Bay

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Five species and 8 subspecies representing 5 families and 7 genera are included in this paper. Two species, *Lepas anserifera* and *Octomeris sulcata*, and 2 subspecies, *Balanus amphitrite krugeri* and *B. a. kondakovi*, are reported for the first time as occurring in Philippine waters.

The cirripeds within Manila Bay area have never been worked out extensively except for some species reported (1) from Dr. Th. Mortensen's Pacific Expedition in 1914-16. The present paper is an initial attempt to add more information to the group inhabiting Manila Bay in connection with the work on the Philippine Cirripedian Fauna.

Five families represented by 7 genera, 5 species and 8 subspecies are included in this paper. Two species and 2 subspecies are reported here for the first time from Philippine waters; these are *Lepas anserifera*, *Octomeris sulcata*, *Balanus amphitrite krugeri* and *B. a. kondakovi*.

The animals covered by this paper preserved and/or mounted are deposited in the Department of Zoology, College of Arts and Sciences, University of the Philippines as part of its

crustacean collections. The number that they bear are those of the collection.

This is the sixth paper in a series dealing with cirripeds found in Philippine waters (2,3). Two papers, "A new tetracitellid from the Philippines (Cirripedia Thoracica)" and "On two less well-known balanids (Cirripedia Thoracica) from Sulu Archipelago, Philippines", are in press, *Crustaceana*, E.J. Brill, The Netherlands. Another one, "Some barnacles (Cirripedia Thoracica) of Puerto Galera found in the vicinity of the U.P. Marine Biological Station", has been accepted for publication in the U.P. Natural Science Applied Bulletin.

The following is the list of species and subspecies obtained in the Manila Bay area:

1. *Pollicipes mitella* (Linne, 1817)
2. *Ibla cumingi* Darwin, 1854
3. *Lepas anserifera anserifera* Linne, 1767
4. *Chthamalus stellatus stellatus* (Poli, 1791)
5. *Ch. antennatus* Darwin, 1854
6. *Ch. withersi* Pilsbry, 1916
7. *Octomeris sulcata* Nilsson-Cantell, 1932
8. *Balanus amphitrite amphitrite* Darwin, 1854
9. *B. a. hawaiiensis* Broch, 1922
10. *B. a. krugeri* Nilsson-Cantell, 1932
11. *B. a. kondakovi* Tarasov and Zevina, 1957
12. *B. variegatus cirratus* Darwin, 1854
13. *Tetraclita squamosa squamosa* Darwin, 1854

Systematic account

Order Thoracica Darwin, 1854

Suborder Lepadomorpha Pilsbry, 1916

Family Scalpellidae Pilsbry, 1916

Genus *Pollicipes* Leach, 1817

1. *Pollicipes mitella* Linne, 1817

Occurrence: Common on coastal rock crevices of tidal and supratidal level. Found attached to the capitulum and/or ped-

uncle were *Chthamalus caudatus*, *Ibla cumingi*, and a juvenile *B. a. amphitrite* (= *B. a. communis*).

Locality: On a rocky promontory east of the present wharf of Corregidor Island. Approximately 120° 30' 6" E. long., 14° 20' 5" N. lat.

Remarks: For description and illustrations refer to Rosell (2).

Distribution: Japan, Philippines, Java, Indian Ocean, Malagasy, and Atlantic Ocean.

Crust. Coll. No. 157a (Rosell, 11-24-68).

Family Iblidae Leach, 1825

Genus *Ibla* Leach, 1825

2. *Ibla cumingi* Darwin, 1851

Occurrence: Several specimens were found attached to *P. mitella*, *Ostreae* sp. and directly on rocks in sufficiently shaded areas.

Locality: On a rocky promontory east of existing wharf of Corregidor Island. Approximately 120° 30' 6" E. long., 14° 20' 5" N. lat.

Remarks: Like the preceding species refer to Rosell (2), for description and illustrations.

Distribution: Japan, Hongkong, Philippines, Borneo, Sunda Islands, Gulf of Oman, and Red Sea.

Crust. Coll. No. 157b (Rosell, 11-24-68).

Family Lepadidae Darwin, 1851

Genus *Lepas* Linne, 1758

Subgenus *Lepas* Linne, 1758

3. *Lepas anserifera anserifera* Linne, 1767

Fig. 1, a-e.

Lepas anserifera Darwin, 1851, (4) p. 81-85, pl. I, fig. 4; Hoek, 1883, (5) p. 39-40, pl. I, 4; Annandale, 1907, (6) p. 75-76, fig. 2; Hiro, 1937, (7) p. 390-470, textfig. 3, b. *Lepas anserifera anserifera* Newman, 1972, (8) p. 31-34, textfig. 1, J-L.

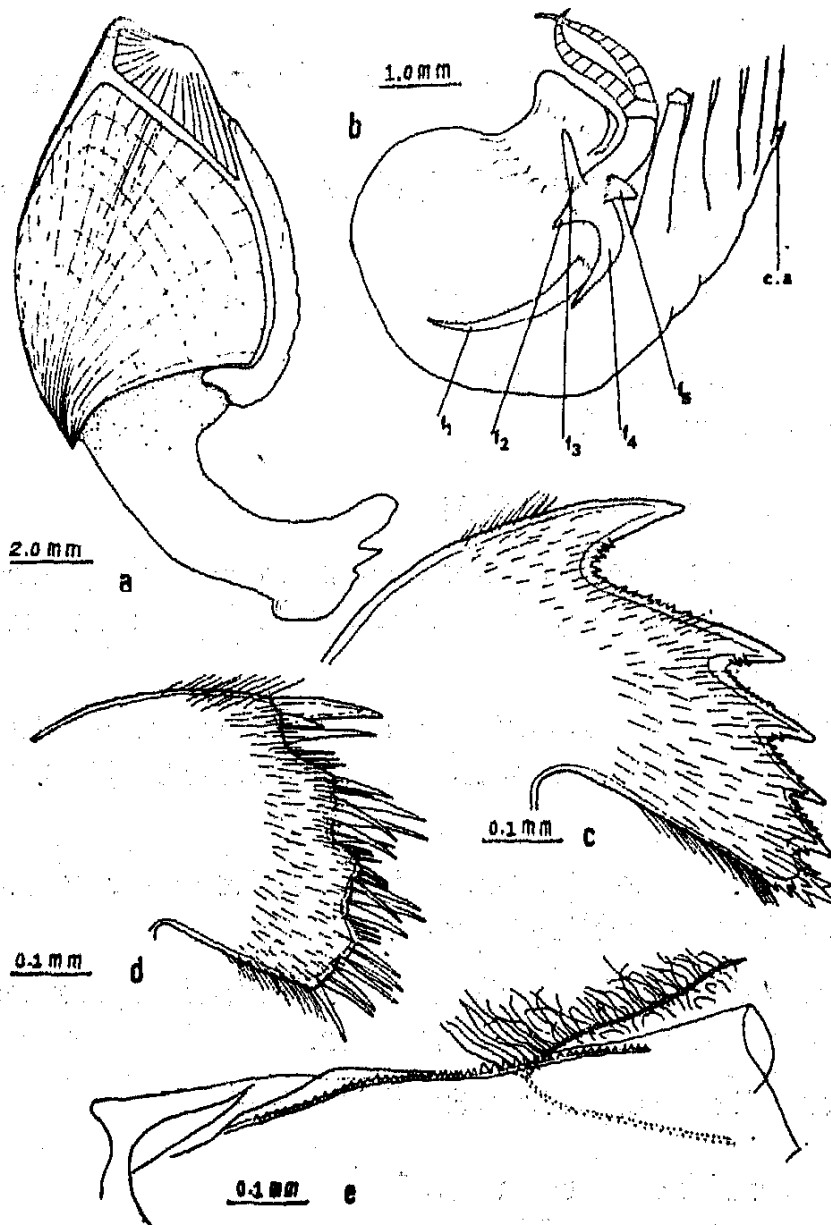


Fig. 1. *Lepas anserifera anserifera* Linne, 1767. a, animal external view; b, body showing filamentary appendages; c, mandible; d, maxilla I; e, labrum and palpus.

Occurrence: Several specimens were found attached to a floating bamboo, *Bambusa blumeana* Schultes (9) stranded on boulders of a breakwater.

Locality: Manila South Habor. Approximately 126° 57' 30" E. long., 14° 34' 15" N. lat.

Diagnosis: Capitulum of 5 well developed white plates (Fig. 1, a); scuta finely furrowed, apicoumbonal ridge prominent; terga with distinct fine furrows; margin of carina either smooth or finely denticulate. There are 5 filamentary appendages on each side, 4 at base of cirrus I and 1 on prosoma (Fig. 1, b).

The numbers of segments of the cirri:

	I		II		III		IV		V		VI	
	a	p	a	p	a	p	a	p	a	p	a	p
Right row	16	15	20	21	23	23	25	27	27	28	30	26
Left row	16	14	20	23	23	25	26	26	29	28	29	29

Intermediate segments of posterior cirri supports 4 or 5 pairs of subequal finely pinnate setae with spinules between bases. Caudal appendage talon form.

Mouth parts: Labrum (Fig. 1, e) centrally slightly convex, margin with numerous triangular denticles. Mandible (Fig. 1, c) with 5 pointed teeth, margins between teeth pectinated, inferior angle supporting trident spine, middle one largest and longest. Maxilla I (Fig. 1, d) terraced, cutting edge supporting numerous spines.

Distribution: Cosmopolitan, attached to floating objects.

Crust. Coll. No. 229 (Rosell, 8-15-70).

Suborder Balanomorpha Pilsbry, 1916

Family Chthamalidae Darwin, 1854

Subfamily Chthamalinae Utinomi, 1968 (*non* Darwin, 1854)

Genus *Chthamalus* Ranzani, 1817

4. *Chthamalus stellatus stellatus* (Poli, 1791)

Occurrence: Numerous specimens were found attached to breakwater rocks together with *Chthamalus antennatus*, and *B. a. hawaiiensis*. Also to a driftwood in common with *B. a. ha-*

waiiensis stranded on same breakwater boulders. To coastal volcanic rocks in common with *B. a. hawaiiensis*.

Localities: Manila South Harbor, approximately 126° 57' 30" E. long., 14° 34' 15" N. lat.; Puting Bato, Limay, Bataan, approximately 120° 30' 2" E. long., 14° 40' 4" N. lat.

Remarks: For description and illustrations refer to Rosell, "Some barnacles (Cirripedia Thoracica) of Puerto Galera found in the vicinity of the U.P. Marine Biological Station".

Distribution: England, Ireland, Cape de Verde, Mediterranean, Red Sea, Indonesia, Philippines, Korea, California, and West Indies.

Crust. Coll. No. 228-4a; 230a-1; 235a-2-5 (Rosell, 4-17-10).

5. *Chthamalus antennatus* Darwin, 1854

Occurrence: Numerous specimens were found attached to coastal rocks together with *Ch. stellatus* and *B. a. hawaiiensis*.

Locality: Puting Bato, Limay, Bataan. Approximately 120° 30' 2" E. long., 14° 40' 4" N. lat.

Remarks: For detailed description and illustrations of parts refer to Rosell, "Some barnacles (Cirripedia Thoracica) of Puerto Galera found in the vicinity of the U.P. Marine Biological Station".

Distribution: New Zealand, Australia, and Philippines.

Crust. Coll. No. 235a-1 (Rosell, 8-15-70).

6. *Chthamalus withersi* Pilsbry, 1916

Occurrence: Numerous specimens were found attached to sedimentary rocks piled along the seashore as breakwater. Very common toward the lee side, on top, walls and underside of boulders together with *B. a. hawaiiensis*.

Locality: Cavite City, approximately 120° 52' 35" E. long., 14° 27' 36" N. lat.

Remarks: Similarly this form had been described and illustrated locally (Rosell, "Some barnacles (Cirripedia Thoracica) of Puerto Galera found in the vicinity of the U.P. Marine Biological Station") additional information not necessary anymore.

Distribution: Kororu Islands, Philippines, Sumatra, Australia, and Malagasy.

Crust. Coll. No. 238b (Rosell, 8-19-70).

Genus *Octomeris* Sowerby, 1825

7. *Octomeris sulcata* Nilsson-Cantell, 1932

Fig. 2, h-l; Fig. 3, m-q.

Octomeris sulcata Nilsson-Cantell, 1932, (10) p. 8-14, textfigs. 3, a-n and 4, a-q; Hiro, 1939, (11) p. 254-257, textfigs. 5, a and 6, c, d; Utinomi, 1970, (12) p. 345-347, pl. 28, figs. 3-4, textfigs. 3, a-j and 4, a-c.

Occurrence. Three specimens collected were found attached to a coastal sedimentary rock on a rocky promontory east of the present wharf.

Locality: Corregidor Island. Approximately 120° 30' 6" E. long., 14° 20' 5" N. lat.

This species was first described (11) from Kobe, Japan. Hiro (11) reported the same species from Formosa (Takao) which since then was the southernmost limits of the species. Its presence in Philippine waters extends its distribution further south by about 2,000 miles, its northern limits is about 35° N. lat.

Shell with 8 plates, depressed conical, light brownish-white, outer paries with prominent longitudinal granulated ribs (Fig. 2, h), sutures between compartmental plates smooth. Orifice broad and toothed. Rostrum and rostrolaterals concrescent, although in some specimens external sutural line distinct. Internally whitish-brown, upper part smooth, near basal margin with small tubercles (Fig. 2, j); sheath not free or projecting. Sutures between rostrum and rostrolaterals distinct, these features are similar to Hiro's (11) illustrations textfigs. 6, c and d. Basis entirely membranous. Orifice, carino-rostral diameter, 4 to 5 mm; carino-rostral basal diameter, 7 to 9 mm; height, 2.4 to 2.8 mm. Opercular valves (Fig. 2, i & k) very similar to those of Nilsson-Cantell's (10) form, textfig. 3, b and d.

Mouth parts: Labrum (Fig. 2, l) without a central notch but medially depressed, its margin fringed with minute hairs and a row of 26 triangular denticles toward its inner side. Mandible (Fig. 3, m) with 3 teeth, upper margin of third tooth with minute pectinations, margin between third tooth and inferior angle pectinated, followed by a moderate spine and 2 smaller ones seated at inferior angle. Maxilla I (Fig. 3, n)

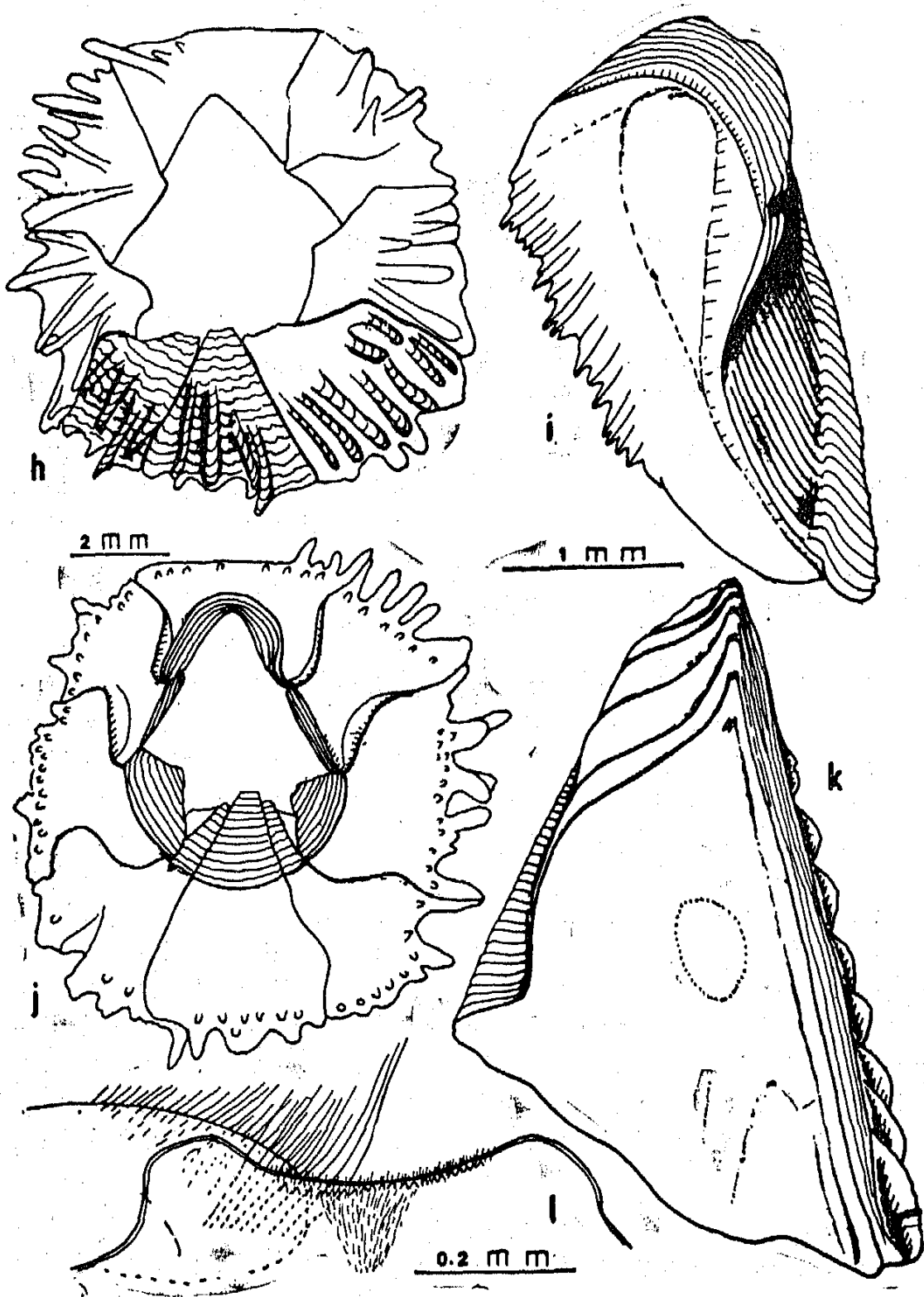


Fig. 2. *Octomeris sulcata* Nilsson-Cantell, 1932. h, shell plates, outer side view; i, tergum, inner side view; j, shell plates, inner side view; k, scutum, inner side view; l, labrum and palpus.

cutting edge with 2 notches more or less dividing spines into 3 groups, upper notch more prominent than lower one. Maxilla II (Fig. 3, o) fan-shaped, frontal margin with a small part devoid of setate, apex narrow, margin rounded and setose.

The numbers of segments of the cirri:

	I		II		III		IV		V		VI		c.a.
	a	p	a	p	a	p	a	p	a	p	a	p	
Right row	7	9	7	11	13	15	12	18	18	19	20	19	12
Left row	7	8	7	11	12	14	16	18	21	18	20	21	11

Posterior angle of basal segments of anterior rami supports a well developed spine (Fig. 3, p), either only the first segment or as many as 5 segments bearing this type of spine. However, some segments may have some additional 1 or 2 spines along its posterior margin or may have only this type of spine and none on its posterior distal corner (Fig. 3, q). Frontal margin of rami of cirrus I slightly protuberant, densely fringed with pinnate setae. Intermediate segments of posterior cirri bears 4 pairs (rarely 3 pairs) of subequal setae with spinules between bases, proximal pair minute.

Caudal appendage (Fig. 3, q) multiarticulate (11 and 12 segments), distal margin of each segment bearing short fine setae. Penis slender and tapering, of moderate length, annulated, bearing fine hairs, tip of organ furnished with a bunch of fine short hairs. No basi-dorsal point.

Remarks: Ross (13) in his key to genera of living *Chthamulidae* and Newman, Zullo and Withers (14) stated that genus *Octomeris* lacks caudal appendages. The specimens of Nilsson-Cantell (10), Hiro (11) and the present material are undoubtedly an *Octomeris* having caudal appendages. The present form is an inhabitant of intertidal zone, a related group genus *Pachylasma* possessing a caudal appendage is a deep sea form. As Nilsson-Cantell has pointed out (Hiro, 1939) "this species holds the intermediate position between the genera *Octomeris* and *Pachylasma*". A position similarly occupied by *Chthamalus caudatus* which, so far, is the only member too of genus *Chthamalus* having a caudal appendage. In this regard, I fully subscribed to the view of Hiro (11) not to regard the absence of the caudal appendages as a generic characteristic of genus *Octomeris* and that its presence, among some members of fa-

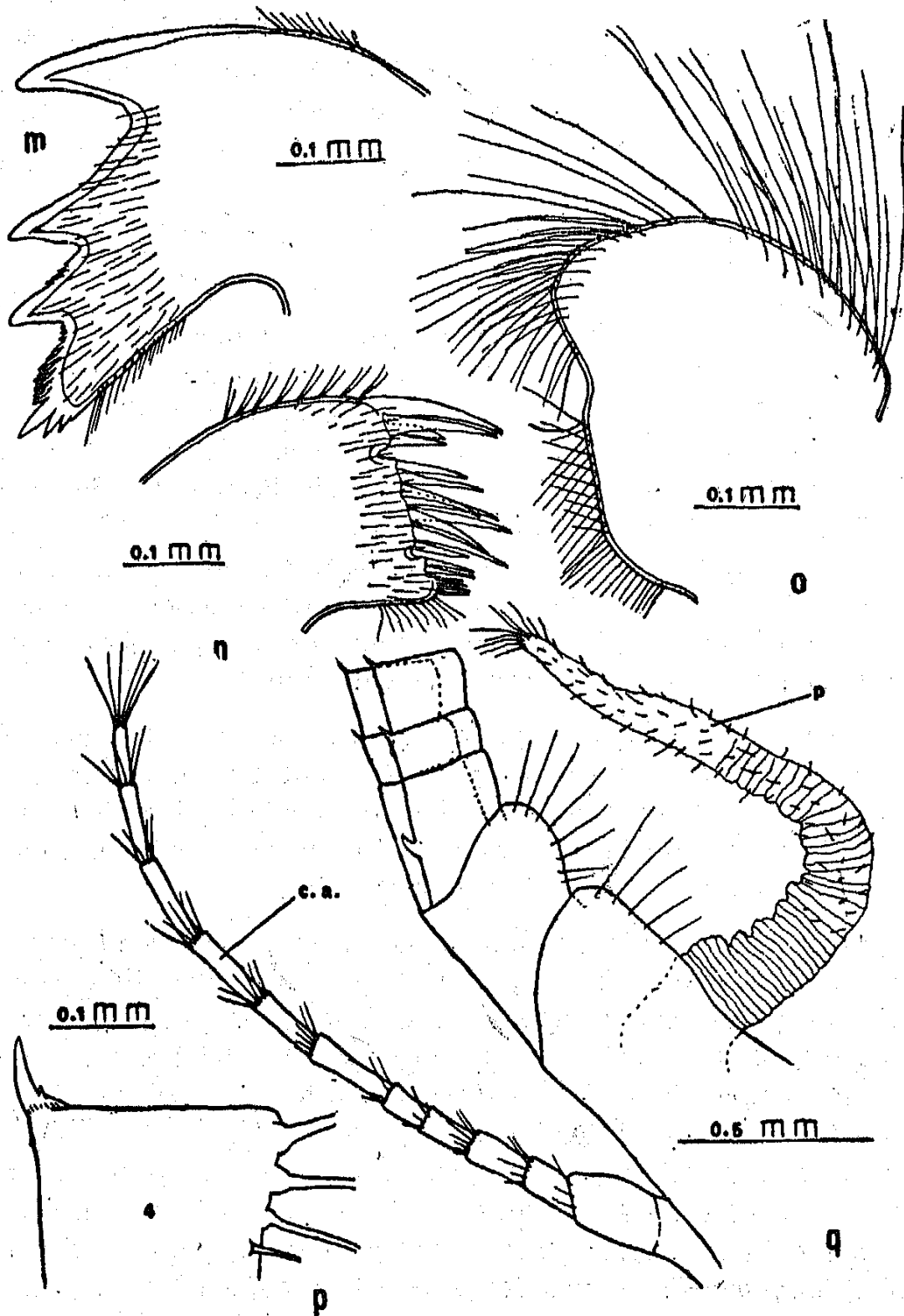


Fig. 3. *Octomeris sulcata*. m, mandible; n, maxilla I; o, Maxilla II; p, 4th segment, anterior ramus of cirrus IV; q, cirrus VI (part only) together with caudal appendage (c.a.) and penis (p).

mily *Chthamalidae*, must be viewed on its phylogenetic significance rather than its systematic value. In this context, it will apparently unite or relate all three subfamilies, as proposed by Utinomi (15), *Catophragminae*, *Chthamalinae*, and *Pachylasminae*, to one another under family *Chthamalidae*.

Distribution: Kobe, Japan; Takao, Formosa; and Corregidor, Philippines.

Crust. Coll. No. 159 (Rosell, 11-24-68).

Family Balanidae Leach, 1817

Subfamily Balaninae Leach, 1817

Genus *Balanus* Da Costa, 1778

Subgenus *Balanus* Da Costa, 1778

8. *Balanus amphitrite amphitrite* Darwin, 1854

Fig. 4, a-g.

Balanus amphitrite var. *communis* Darwin, 1854, (16) p. 240.

Balanus amphitrite communis Utinomi, 1960, (17) p. 43, text-figs. 1, d and 2, c & d.

Occurrence: Together with *B. a. hawaiiensis* were found attached to sedimentary rocks forming a breakwater. Some were collected attached to a plastic slipper, on a bamboo, and to a driftwood stranded on same breakwater boulders.

Locality: Manila South Harbor. Approximately 120° 57' 30" E. long., 14° 34' 15" N. lat.

Darwin (16) described this subspecies as nearly white, with pale or dark violet-colored longitudinal stripes; epidermis rarely persistent; shell either thin or thick; radii white or freckled with reddish mahogany colour, with their summits either oblique, sometimes in a high degree or nearly parallel to the basis; basal point of spur of the tergum either square or bluntly pointed.

Shell of present material with pale violet longitudinal stripes crossed by indistinct same colored stripes imparting enlarged colored areas at their intersections. Inner paries below sheath with 2 kinds of longitudinal ribs, larger ones coinciding with primary septa, while 2 or 3 narrower ribs lie between 2 adjoining main rib whose basal ends exceeds basal margin

of inner lamina imparting a serrate appearance. Septae on inner surface of outer lamina are of 2 kinds, few larger ones almost reaching sheath level and several minute short ones traces of it are absent on upper part. Sutural edges denticulate and septate downward. Radii narrow with oblique summits, internally freckled with reddish mahogany color. Alae with oblique summits and on its inner lamina with longitudinal band of pale violet color (usually on laterals).

Scutum with a broad median pale violet longitudinal band, faintly striated, tergal margin white. Internally (Fig. 4, d) adductor ridge prominent with a canal on its side facing basitergal angle. Tergum externally pale violet with a narrow white longitudinal stripes; spur fasciole white colored; crests for depressor muscles slightly projecting beyond basal margin. Internally (Fig. 4, e) articular ridge on upper part pronounced; scutal margin inflected; crests for depressor muscles prominent.

The numbers of segments of the cirri:

	I		II		III		IV		V		VI	
	a	p	a	p	a	p	a	p	a	p	a	p
Right row	16	11	12	11	12	12	20	22	24	23	25	26
Left row	14	11	13	12	12	9	21	22	23	23	25	24

The 3 anterior cirri shorter than posterior ones. Anterior ramus of cirrus I longer than posterior ramus, frontal margin of upper segments highly protuberant bearing dense pinnate setae. Intermediate segments of rami of cirrus III (Fig. 4, b) with downward curving teeth on its frontal margin which are prominent on its anterior ramus. In both rami there are additional minute denticles alongside its frontal surface. Intermediate segments of posterior cirri with 4 pairs of subequal setae and some minute denticles on its frontal surface (Fig. 4, c). Penis very long, gradually tapering, distinctly annulated with few scattered short hairs. Basi-dorsal point in a form of conical elevation.

Mouth parts: Labrum (Fig. 4, f) with a deep median notch, labral crests supports 3 prominent teeth and a minute one medially. Palpus truncated, inner margin highly setose. Mandible (Fig. 4, a) with 5 teeth, first to the third well developed, second tooth bifid, upper margin of third tooth with denti-

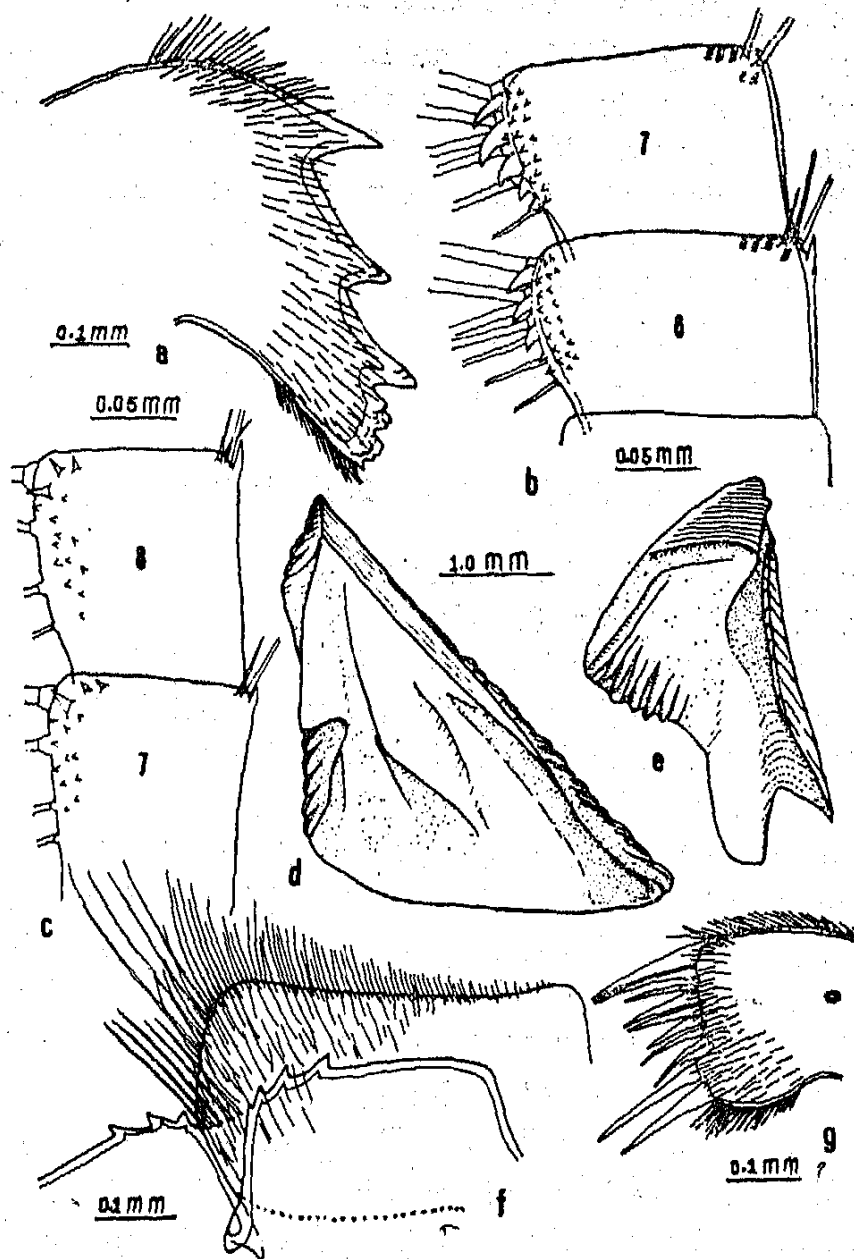


Fig. 4. *Balanus amphitrite amphitrite* Darwin, 1854 (= *B. a. communis* Darwin, 1854). a, mandible; b, 6th and 7th segments, anterior ramus of cirrus III; c, 7th and 8th segments, anterior ramus of cirrus IV; d, scutum, inner side view; e, tergum, inner side view; f, labrum and palpus; g, maxilla I.

cles, fourth and fifth teeth placed closed to inferior angle. Maxilla I (Fig. 4, g) lower part of cutting edge distinctly protuberant supporting 2 large spines, upper 2 spines are likewise large, intermediate ones smaller.

Remarks: Utinomi (18) raised *Balanus amphitrite communis* Darwin, *partim.* to a specific rank designated as *Balanus reticulatus* nom. nov. This according to him was based on Harding's revision of *Balanus amphitrite*-complex after re-examining the original specimens of Darwin. However, morphologically I still believed that this form should be retained within the *amphitrite*-series.

Distribution: Cosmopolitan, in warmer temperate and tropical seas.

Crust. Coll. No. 231-4; 231b-1; 231b-4; 231c (Rosell, 1970).

9. *Balanus amphitrite hawaiiensis* Broch, 1922

Fig. 5, a-f and Fig. 6, g-k.

Balanus a. hawaiiensis Broch, 1922, (1) p. 314-317, textfigs. 56 and 57, a-e; Hiro, 1937, (7) p. 432-435, textfigs. 20, A-C and 21, A-E; Utinomi, 1960, (17) p. 43-50, textfigs. 1, a, b, e, and 2, a & b.

Occurrence: Like *B. a. amphitrite* this species is very common usually attached to coastal rocks, driftwood, plastic slipper, nipa palm *Nipa fruticans* (Wrumb) (9) and to *Ostreae* sp.

Localities: Manila South Harbor, approximately 120° 57' 30" E. long., 14° 31' 15" N. lat.; Puting Bato, Limay, Bataan, approximately 120° 30' 2" E. long., 14° 40' 4" N. lat.; Cavite City, approximately 120° 52' 35" E. long., 14° 27' 36" N. lat.

Shell with longitudinal purple colored stripes (Fig. 5, a). In some, stripes faintly indicated and it may sometimes appear all white. Like Broch's (1) observations, usually a broad white zone runs along median line of compartments and sometime also along the side. Sheath slightly free, below this part quite smooth, unlike *B. a. amphitrite*, ribs are prominent only near basal margin and without minute riblets between. Septae on inner surface of outer lamina generally very short, upper part of walls smooth. Individuals dissected with the following sizes; orifice, carino-rostral diameter, 3 to 7 mm; carino-rostral basal diameter, 8 to 17 mm; height, 3 to 7 mm.

Opercular valves (Fig. 5, e & f) very similar to Broch's (1) description and illustrations, textfig. 56.

The numbers of segments of the cirri:

	I		II		III		IV		V		VI	
	a	p	a	p	a	p	a	p	a	p	a	p
Right row	21	13	14	12	14	12	27	27	27	27	29	29
Left row	22	14	14	12	13	13	24	26	27	27	28	28

Rami of 3 anterior cirri short, except anterior ramus of cirrus I, containing only about half the number of segments than rami of cirri IV to VI. Frontal margin of posterior ramus of cirrus I highly protuberant, supporting finely pinnate subequal setae. Posterior margin of basal segments of cirrus III (Fig. 6, k) bears several prominent spines which are more numerous on anterior ramus. Intermediate segments bears several small spines (Fig. 5, b) on its frontal margin, and several minute spinulets alongside in addition to numerous subequal setae which tends to be arranged in pairs. However, segments of rami from cirri IV to VI bears a single upward curving spine (Figs. 5, d and 6, j) proximal to its posterior distal angle and several minute spines alongside its frontal margin. Intermediate segments bears 5 pairs of subequal setae on its frontal margin, proximal pair minute.

Penis very long, annulated with few sensory hairs. Basidorsal point well developed, sharply pointed and dagger-shaped with minute spinulets on its surface.

Mouth parts: Labrum (Fig. 6, i) with a median notch, labral crests multidenticulate, those alongside the notch minute and on this area there are minute hairs. Palpus club-shaped, supporting numerous subequal setae along its outer and apical margins. Mandible (Fig. 6, h) with 5 teeth, fourth and fifth teeth poorly developed placed very closed to inferior angle. Maxilla I (Fig. 6, g) inferior margin of cutting edge protuberant supporting 2 prominent spines. Maxilla II (Fig. 5, c) bilobed, upper lobe large and fan-shaped, highly setose; lower lobe small with few short setae on its frontal margin.

Remarks: Utinomi (19) placed this species as *B. a. amphitrite* Darwin *sensu* Harding.

Distribution: Japan; Manila Bay, Jolo, Philippines; Gulf of Siam; Persian Gulf.

Crust. Coll. No. 232-2; 234-1; 228b; 238a (Rosell, 18-15-70).

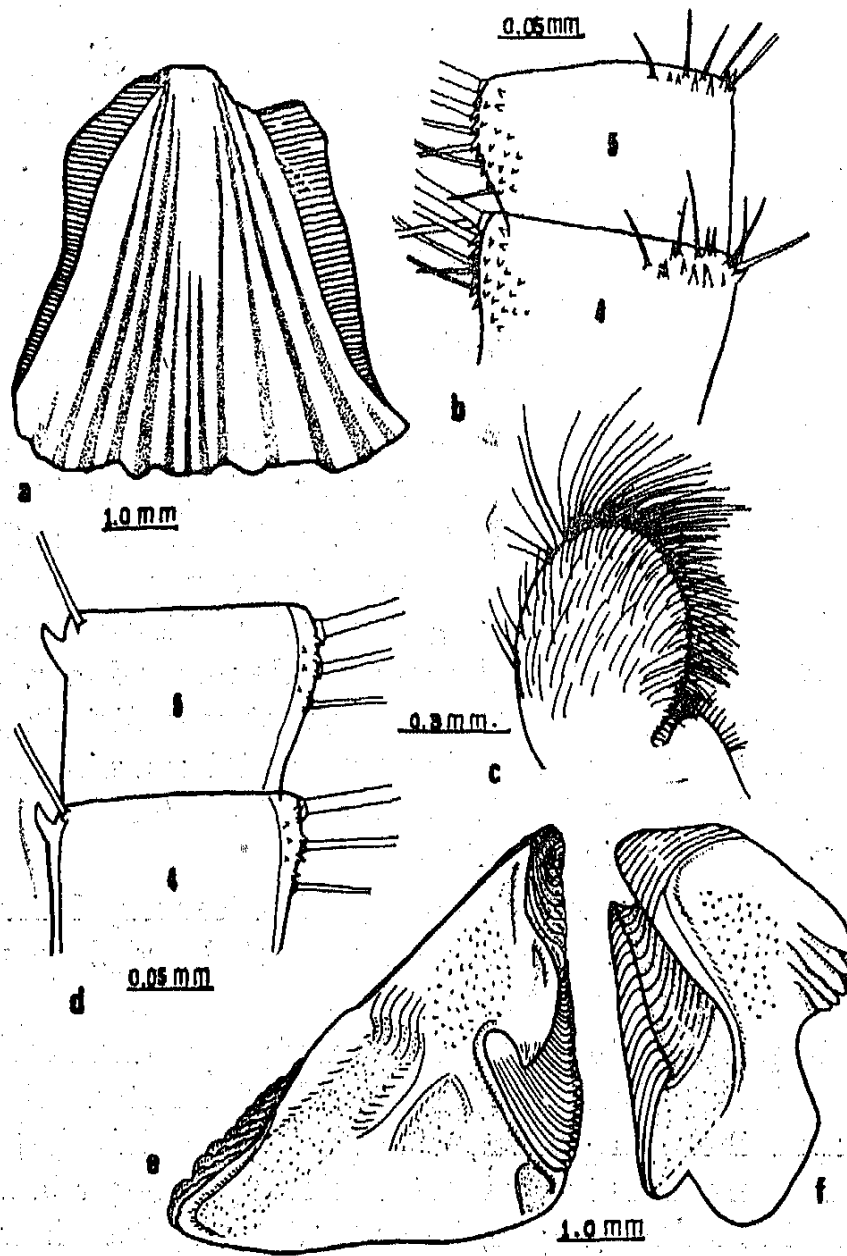


Fig. 5. *B. a. hawaiiensis* Broch, 1922. a, rostral valve, outer side view; b, 4th and 5th segments, anterior ramus of cirrus III; c, maxilla II; d, 4th and 5th segments, anterior ramus of cirrus IV; e, scutum, inner side view; f, tergum, inner side view.

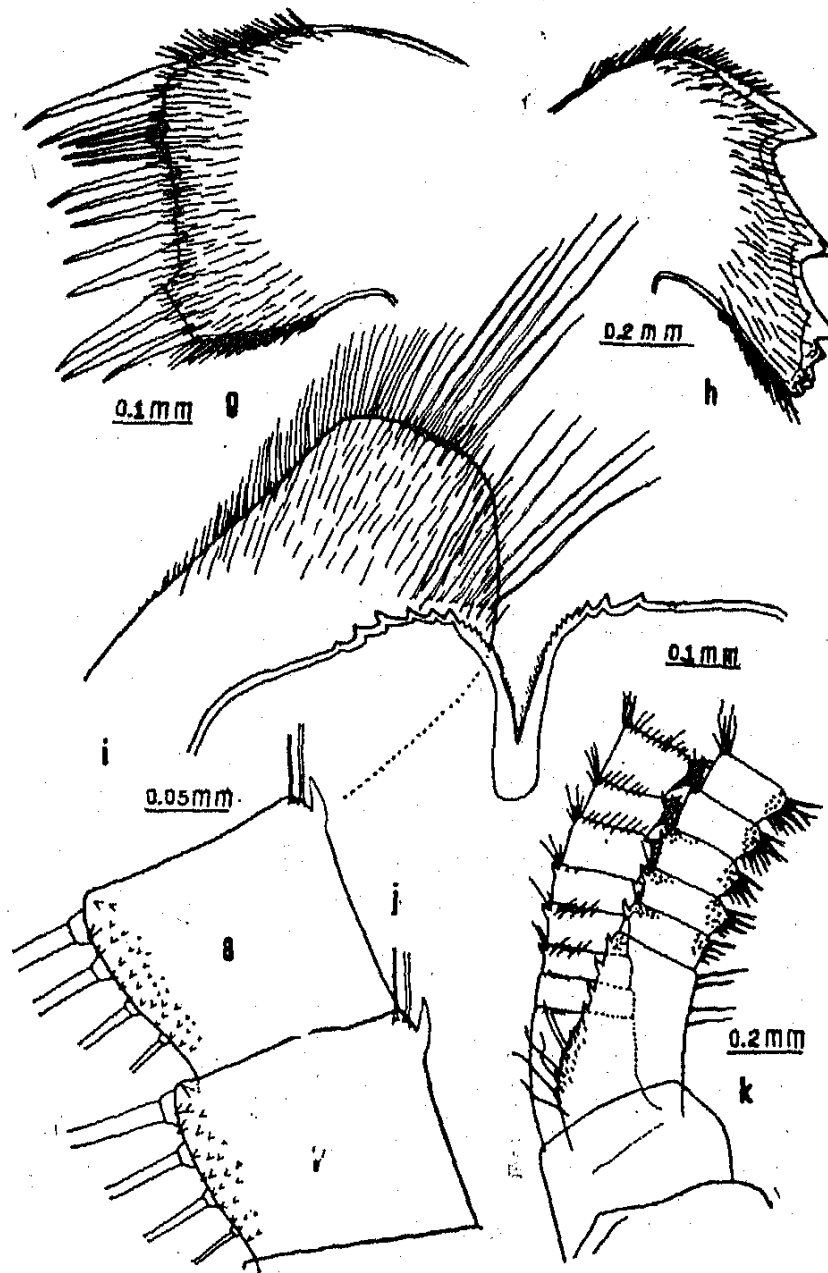


Fig. 6. *B. a. hawaiiensis*. g, maxilla I; h, mandible; i, labrum and palpus; j, 7th and 8th segments, anterior ramus of cirrus IV; k, cirrus III, basal segments partly including protopodite.

10. *Balanus amphitrite krugeri* Nilsson-Cantell, 1932

Fig. 7, a-g.

Balanus amphitrite krugeri Nilsson-Cantell, 1932, (10) p. 24-27, textfig. 10, a-g; Hiro, 1939, (11) p. 263.

Occurrence: Three specimens were found attached to a piece of bamboo stranded on breakwater boulders.

Locality: Cavite City, approximately 120° 52' 35" E. long., 14° 27' 36" N. lat.

Shell white with light brownish longitudinal stripes traversed by horizontal lines of similar taint. Sutural edges of plates denticulate. Sheath free or projecting, walls below prominently longitudinally ribbed; inner surface of outer lamina with minute short septae between primary septa. Basis moderately thick and porous. Dimensions of dissected animal: orifice, carino-rostral diameter, 10 mm; carino-rostral basal diameter, 18 mm; height, 7 mm.

Opercular valves very similar to Nilsson-Cantell's (10) illustrations, textfig. 10, f & g. Tergum (Fig. 7, c) with a long narrow spur distinctly separated from basi-scutal angle; basal margin posterior to spur distinctly notch; scutal margin strongly inflected; articular furrow deep; articular ridge prominent; crests for depressor muscles pronounced. Externally with rose-purple hue toward its apico-scutal border, carinal border white; spur fasciole narrow and shallow. Scutum (Fig. 7, b) externally white with a lighter rose-purple hue toward its apical angle, tergal border white. Internally white, upper area finely tuberculate; articular ridge prominent; articular furrow shallow; adductor ridge short but pronounced almost reaching articular ridge; pits for adductor and depressor muscles distinct; crests for depressor muscles obsolete.

The numbers of segments of the cirri:

	I		II		III		IV		V		VI	
	a	p	a	p	a	p	a	p	a	p	a	p
Right row	18	11	12	11	15	12	26	26	33	34	34	34
Left row	18	12	13	13	17	13	26	28	—	34	33	33

Rami of cirri I to III shorter than rami of cirri IV to VI. Rami of cirrus I like other members of the *amphitrite*-complex typical, supporting numerous finely pinnate setae. Intermediate segments of cirrus II with protuberant frontal margin bear-

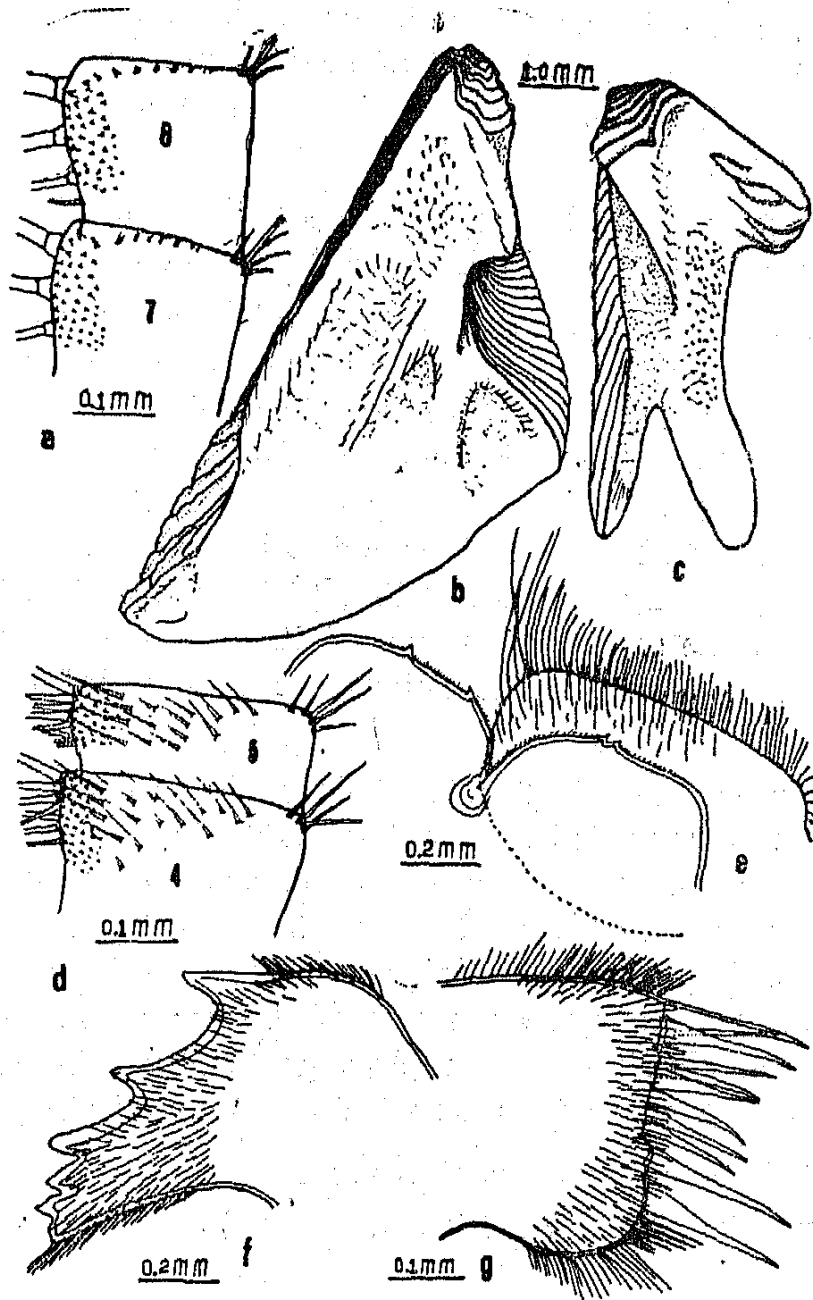


Fig. 7. *B. a. krugeri* Nilsson-Cantell, 1932. a, 7th and 8th segments, anterior ramus of cirrus IV; b, scutum, inner side view; c, tergum, inner side view; d, 4th and 5th segments, anterior ramus of cirrus III; e, labrum and palpus; f, mandible; g, maxilla I.

ing dense finely pinnate setae. Alongside frontal and distal margins of intermediate segments of rami III to VI with minute triangular spines, more numerous on cirrus III (Fig. 7, d) and IV (Fig. 7, a) particularly on anterior rami, becoming fewer on intermediate segments of rami of cirri V and VI. Segments of posterior cirri bears 3 or 4 pairs of subequal setae on its frontal margin.

Penis long, gradually tapering, distinctly annulated covered with few fine hairs. Basi-dorsal point prominent.

Mouth parts: Labrum (Fig. 7, e) notch, labral crests with minute hairs, unlike those of Nilsson-Cantell's specimen, instead of having 4 denticles there are only 2 minute ones. Mandible (Fig. 7, f) with 5 teeth, second and third teeth bifid and/or with minute denticles on its upper margin, fourth and fifth teeth placed closed to each other and to inferior angle. Maxilla I (Fig. 7, g) cutting edge supporting 10 to 14 spines, like other members of the series, lower part of its frontal margin protuberant where 1 or 2 large spines are seated, inferior angle rounded.

Remarks: Utinomi (18) raised this species, *Balanus (Balanus) amphitrite krugeri* Nilsson-Cantell, 1932 to a specific rank and proposed a new name *Balanus uliginosus* nom. nov. According to him this is in accordance with the International Code since *krugeri* is preoccupied by *Balanus (Chirona) krugeri* Pilsbry 1916 (19). Morphological features of the animal is very similar to the *amphitrite*-complex, phylogenetically it is still better to maintain its present status within the *amphitrite*-series.

Distribution: Japan and Formosa.

Crust. Coll. No. 237-2 (Rosell, 8-19-70).

11. *Balanus amphitrite kondakovi* Tarasov and Zevina, 1957
Fig. 8, c-j.

Balanus amphitrite kondakovi Tarasov and Zevina, 1957,
(20) p. 191-193, textfig. 76, a-e.

Occurrence: Two large specimens were found attached to a floating grass belonging to the corn group stranded on boulders of a breakwater.

Locality: Manila South Harbor. Approximately 126° 57' 30" E. long., 14° 34' 15" N. lat.

Shell white, sometimes a faint light purple longitudinal stripes are present, when complete, interrupted by white areas usually near its basal part; poorly calcified, easily crumbles into powdery particles when touch by a dissecting needle; epidermis persistent covering entire shell. Orifice toothed (Fig. 8, j), radii and alae with oblique summits. Radii sometimes with light purple blotch on inner surface. Sutural edges prominently dentate and septate. Sheath white and slightly free or projecting. Inner lamina below sheath longitudinally ribbed, near its basal margin prominently raised becoming lower and finally blending with inner lamina as it approaches sheath, these ribs projects beyond basal margin of inner lamina. Parietal tubes large and on inner surface of outer lamina there are smaller short secondary septae. Basis calcareous with radiating pores, centrally very thin, substratum where animal is attached visible. Size of those dissected are; orifice, carino-rostral diameter, 4 to 5 mm; carino-rostral basal diameter, 9 to 9.2 mm height, 3 to 4.7 mm.

Opercular valves very similar to the illustrations of Tarasov and Zevina (20) textfig. 76, a & b. Like shell plates, poorly calcified. Scutum (Fig. 8, f) transversely elongated, occludent margin longer than tergal margin. Externally horizontal growth ridges pronounced, persistent epidermis hirsute. Internally smooth, adductor ridge short but pronounced with a shallow canal on side facing basi-tergal angle. Articular ridge well developed; articular furrow narrow and shallow; pits for adductor and depressor muscles distinct; crests for lateral depressor muscles obsolete. Tergum (Fig. 8, i) triangular, scutal margin straight and inflected, basi-scutal angle pointed; carinal margin convex and upraised; spur long, narrow and pointed, distinctly separated from basi-scutal angle by a wide space, spur fasciole distinct. Basal margin longer than carinal margin with a slight depression posterior to spur. Internally smooth, articular ridge pronounced; articular furrow deep; crests for depressor muscles well developed.

The numbers of segments of the cirri:

	I		II		III		IV		V		VI	
	a	p	a	p	a	p	a	p	a	p	a	p
Right row	16	12	12	11	13	13	16	17	22	23	24	23
Left row	14	11	13	10	13	12	17	17	21	19	17	19

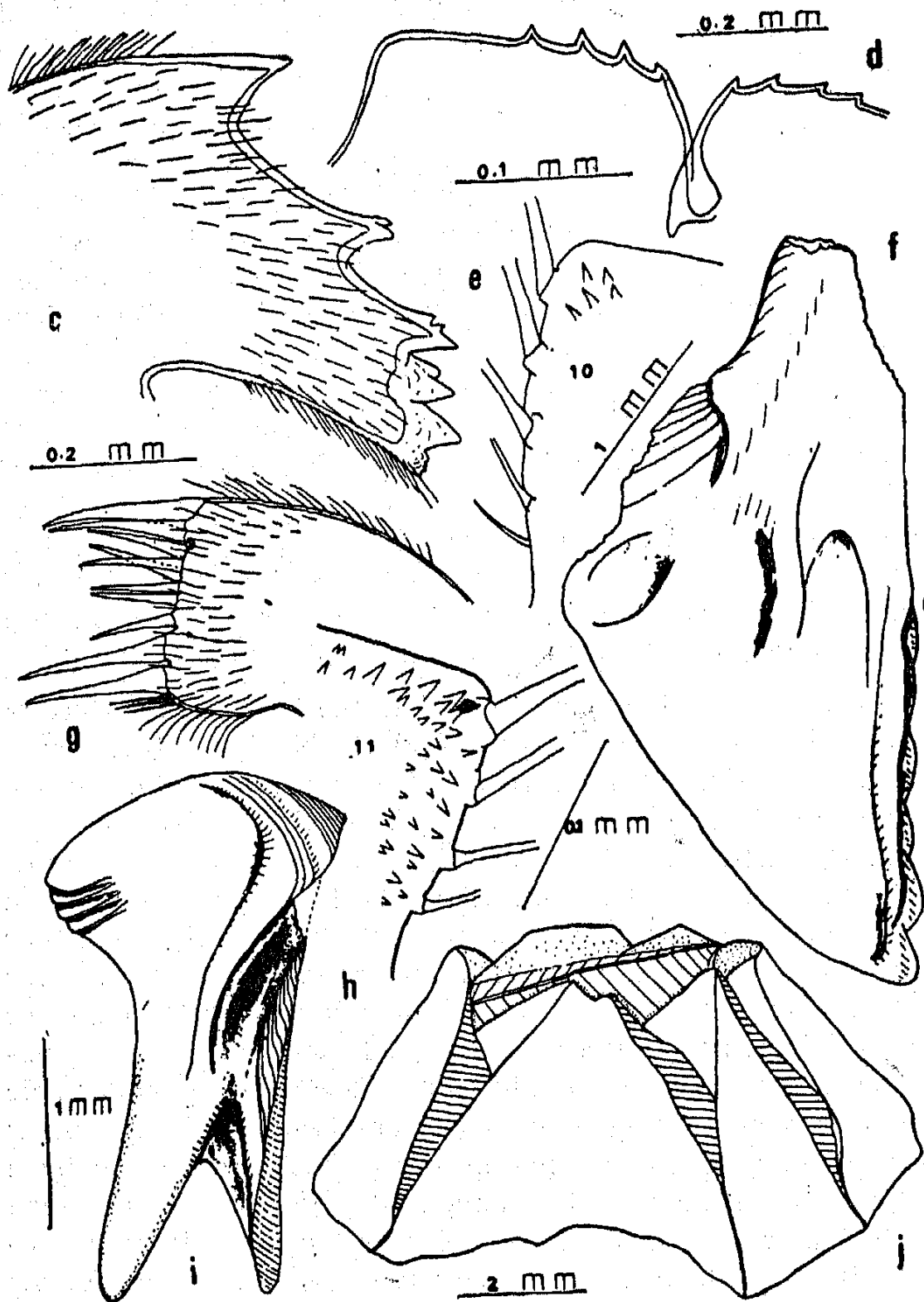


Fig. 8. *B. a. kondakovi* Tarasov and Zevina, 1957. c, mandible; d, labrum; e, 10th segment, anterior ramus of cirrus VI; f, scutum (partly broken), inner side view; g, maxilla I; h, 11th segment, anterior ramus of cirrus IV; i, tergum, inner side view; j, animal, undissected.

The 3 anterior cirri shorter than posterior ones. Frontal margin of intermediate segments of rami of cirri I and II protuberant, highly setose, setae finely pinnate. Toward frontal margin of intermediate segments of rami from cirri III to VI with minute denticles, more numerous on cirrus IV (Fig. 8, h) fewer among the rests (Fig. 8, e), these in addition to 4 or 5 pairs of subequal setae. Penis long, distinctly annulated, gradually tapering with few short hairs. Basi-dorsal point not distinct.

Mouth parts: Labrum (Fig. 8, d) with a deep central notch, labral crests supporting 4 teeth-like denticles. Palpus and Maxilla II as in other members of *amphitrite*-series. Mandible (Fig. 8, c) with 5 teeth, second tooth bifid, third tooth with minute denticles on its upper margin, fourth and fifth teeth sharply pointed, the former with a denticle on its superior margin, both are placed closed to each other and inferior angle. Maxilla I (Fig. 8, g) with a very shallow notch along its cutting edge below 2 upper large spines, lower margin slightly protuberant supporting 2 large spines. Its entire cutting edge supporting 10 subequal spines, intermediate ones smaller than 2 uppermost and 2 lowermost spines; inferior angle rounded.

Crust Coll. No. 233 (Rosell, 8-15-70).

12. *Balanus variegatus cirratus* Darwin, 1854.

Fig. 9, a-g.

Balanus amphitrite var. *cirratus* Darwin, 1854, (16) p.

241, pl. V, fig. 2, b.

Balanus amphitrite cirratus Nilsson-Cantell, 1921, (21) p. 316, texfig. 65.

Balanus variegatus cirratus Utinomi, 1967, (19) p. 214, textfig. 8.

Occurrence: Numerous specimens were collected attached to driftwood, bamboo and plastic slipper stranded on boulders of breakwater. They were found together with *Balanus a. amphitrite* (= *B. a. communis*) and *B. a. hawaiiensis*.

Locality: Manila South Harbor. Approximately 126° 57' 30" E. long., 14° 34' 15" N. lat.

Shell tubulo-conical when in crowded condition. Compartments with purple-pinkish longitudinal stripes crossed by

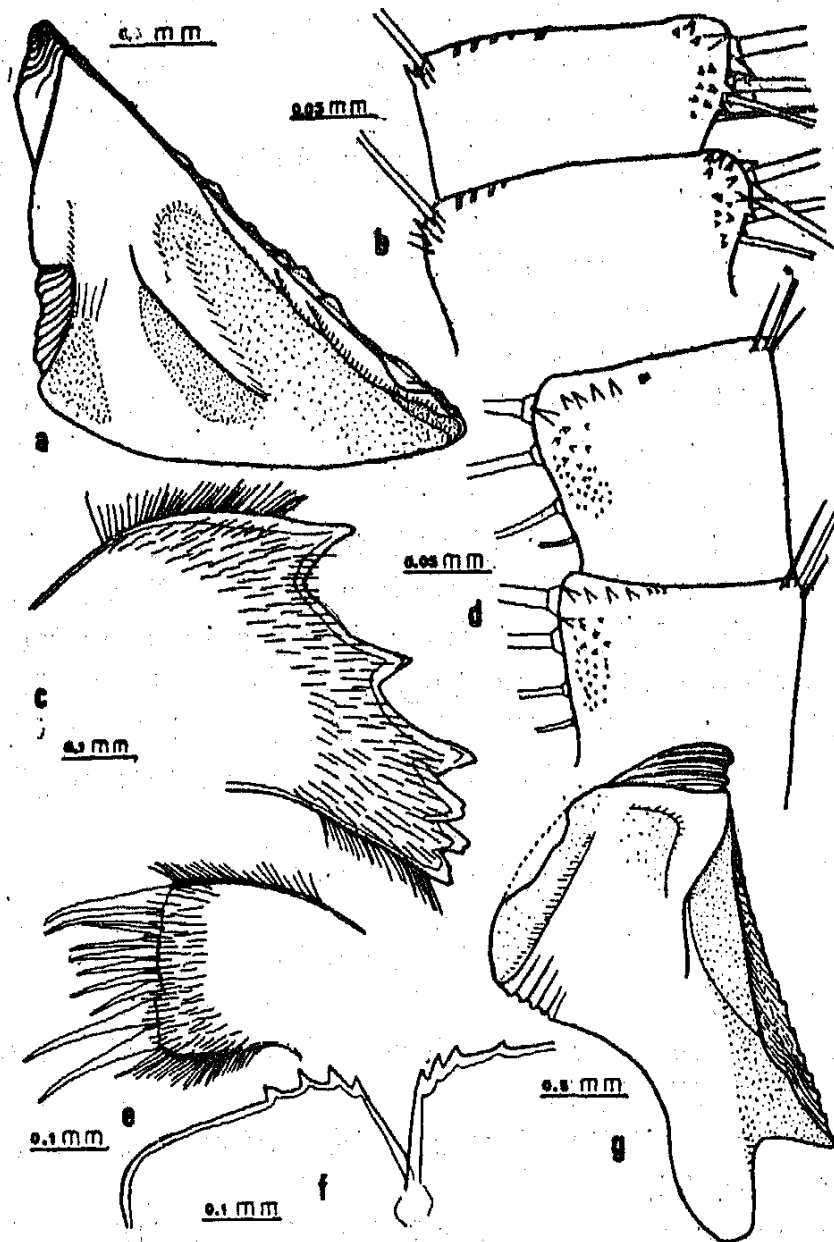


Fig. 9. *B. variegatus cirratus* Darwin, 1854. a, scutum, inner side view; b, 4th and 5th segments, anterior ramus of cirrus III; c, mandible; d, 7th and 8th segments, anterior ramus of cirrus IV; e, maxilla I; f, labrum; g, tergum, inner side view.

horizontal white lines. Scutum (Fig. 9, a) slightly transversely elongated toward basi-occludent angle. Externally, horizontal growth lines beaded; medially is broad purple-violet colored band; tergal margin white, apico-occludent side of valve reflexed. Internally adductor ridge short and prominent; articular ridge pronounced; articular furrow narrow and shallow; adductor pit distinct; crests for depressor muscles obsolete. Tergum (Fig. 9, g) with a well developed spur, fasciole shallow, grayish-purple posteriorly up to carinal border, white toward scutal margin. Internally purple-red behind spur, white along scutal border; articular ridge strong; articular furrow deep; crests for depressor muscles distinct.

The numbers of segments of the cirri:

	I		II		III		IV		V		VI	
	a	p	a	p	a	p	a	p	a	p	a	p
Right row	18	13	14	11	13	11	—	—	17	—	19	19
Left row	17	12	13	12	12	11	—	17	—	17	18	14

Intermediate segments of rami of cirrus III (Fig. 9, b) with downward curving teeth on its frontal margin and some minute denticles on its lateral surface confined to its protuberant part. On cirrus IV (Fig. 9, d) triangular spines present near antero-distal angle and minute denticles inferior to it. Segments of posterior cirri bears 4 or 5 pairs of subequal setae with spinules between bases. Penis long, gradually tapering, annulated with few short hairs. Basi-dorsal point short and pointed.

Mouth parts: Labrum (Fig. 9, f) with a central deep notch, labral crests supporting 4 teeth-like denticles. Mandible (Fig. 9, c) with 5 teeth, second and third teeth bifid, fourth and fifth teeth small placed closed to each other and inferior angle. Maxilla I (Fig. 9, e) cutting edge supporting 10 subequal spines, intermediate ones smaller and shorter than 2 uppermost and 2 lowermost spines, the latter seated on slightly protuberant margin.

Distribution: North Korea; Kyusyu, Japan; Taiwan; China; Hongkong; Philippines; Sunda Islands; Australia, and India.

Crust. Coll. No. 230-1; 230b-2; 231b-2; 232-1, 2 & 4; 234-3 (Rosell, 8-15-70).

Family Tetracitidae (Nilsson-Cantell) Ross, 1968

Genus *Tetracita* Schumacher, 1817

Subgenus *Tetracita* Schumacher, 1817

13. *Tetracita squamosa squamosa* Darwin, 1854

Occurrence: Several specimens were found attached to coastal rocks together with *P. mitella* and *Ibla cumingi*.

Locality: Corregidor Island. Approximatley 120° 30' 6" E. long., 14° 20' 5" N. lat.

Remarks: This species had been described with figures in Rosell's "Some barnacles (Cirripedia Thoracica) of Puerto Galera found in the vicinity of the U.P. Marine Biological Station."

Distribution: Japan, Caroline Islands, Palao Islands, Philippines, South China, Malay Archipelago, Indonesia, Australia, Great Nicobar island, and West Africa.

Crust. Coll. No. 179 (Rosell, 11-24-68).

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