

**A New Species of *Membranobalanus* (Crustacea, Cirripedia)
from the Korean Waters**

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Membranobalanus 屬의 따개비 (甲殼綱, 蔓脚亞綱) 一新種

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要 約

南海의 蓮花島와 東海의 安仁津에서 採集된 海綿, *Cliona celata* Grant에 묻혀사는 따개비 一新種을 發見하여, 이를 *Membranobalanus koreanus*로 命名, 記載한다. 이 種은 西大西洋産, *M. declivis* Darwin 및 東太平洋産, *M. orcutti* Pilsbry와 形態의으로 類似한 點이 있으나 殼板과 鬚가 特徵的이다.

Order Thoracica Darwin, 1854

Suborder Balanomorpha Pilsbry, 1916

Superfamily Balanoidea Leach, 1817

Family Archaeobalanidae Newman and Ross, 1976

Subfamily Archaeobalaninae Newman and Ross, 1976

Genus *Membranobalanus*(Hoek, 1913)

***Membranobalanus koreanus*, new species**

Pl. I, Figs. 1-9; Pl. II, Figs. 1-7

Type specimens and type localities. Holotype: NM 78071901, July 19, 1978, Yeonhwa Island, South Sea of Korea, from about 10 meters depth on rocky bottom. Paratype no. 1: NM78071902, imbedded in the same host sponge as the holotype. Paratype no. 2: NM81100503, October 5, 1981, Aninjin, East Sea (Sea of Japan) near Gangreung, from 7 meters depth on rocky bottom. Paratype no. 3: NM81100504, imbedded in the same host sponge as the paratype no. 2. Other paratypes still imbedded in the host sponge, *Cliona celata* Grant, are preserved in 70 percent alcohol. The holotype and all paratypes are deposited in the Department of Zoology, Seoul National University.

Diagnosis. Rostrum beaked, boat-shaped, twice as long as other plates, with lower half wide; carina with V-shaped deep notch at apex; radii present, somewhat clear and wide at rostrum; scutum with strongly projected articular ridge and with elongated triangular radius broadly expanded from occludent edge; tergum much wider than length, with spur two thirds as wide as basal margin; cirrus IV with anterior ramus armed with recurved teeth and erect teeth.

Description. Shell (Pl. I, Fig. 3) large, snowy white, with small, toothed orifice. Plates solid, thin, easily separable. Outer surface of parietes lined with feeble, irregular growth lines, not covered with epidermis; inner surface smooth glossy. Rostrum boat-shaped, recurved inwards, twice as long as other plates, with or without small notch at apex; lower half thin, broadly rounded; outer surface striated by rather deep, basally curved growth lines; sheath of rostrum very short, one fourth as long as the plate, with basal edge isolated and overhanging. Lateral longer than carinolateral with apex curved inwards and forwards; pariete very thickened near ala which is, hence, suddenly sunken. Carina (Pl. I, Fig. 1, 2) with deeply notched apex; depth of notch is one third of length of the plate. Sheath long, one half to two thirds as long as plates; surface covered with dirty yellow epidermis and lined by fine growth lines, with its upper part usually eroded; basal edges of sheaths, except for that of rostrum, slightly overhanging. Radii present, rather wide and clear at rostrum, but very narrow or obsolete at carinolateral; summits of radii not reach apices of plates; outer surfaces striated by faint, oblique lines; sutural edge smooth. Alae wide with summits very thin, usually eroded, and, therefore, irregularly outlined; ala of lateral wider than pariete, and that of carinolateral nearly equal.

Table 1. Dimensions of the types in millimeters

	Holotype	Paratype no. 1	Paratype no. 2	Paratype no. 3
carino-rostral diameter	16.0	—	—	—
lateral diameter	12.2	—	—	—
length of carina	8.8	8.2	7.5	5.5
depth of carinal notch	3.3	3.2	1.5	2.0
length of rostrum	19.5	16.0	14.4	10.7
basal width of rostrum	11.8	11.1	8.5	7.3
length of rostral sheath	5.7	4.3	3.6	2.8

Scutum (Pl. I, Figs. 4, 5) convex, covered with yellow epidermis; outer surface ornamented with fine, densely closed growth ridges and with more fine, thread-like radial ridges, but the former not crenulated; articular ridge strongly projected with angle of terminal less than ninety degrees; articular furrow narrow and rather shallow; articular ridge thick, prominent, less than half length of tergal margin; adductor muscle pit rather deep, well defined from adductor ridge; depressor muscle pit large, clearly outlined; radius, an elongated triangular area broadly expanded from occludent edge, is thin, weakly

striated and covered with thick, brownish epidermis exteriorly.

Tergum (Pl. I, Figs. 8, 9) convex, thin and very wide; outer surface covered with yellow epidermis with fine, densely aggregated growth ridges; apex bulged, highly raised; basal margin very wide with concave carinal side beside spur; spur short and wide, about two thirds as wide as basal margin; basiscutal angle blunt; scutal margin incurved rectangularly, hence, scutal border widened; articular furrow short and round; articular ridge very feeble; no other ridge or depression on interior.

Labrum (Pl. II, Fig. 1) with small teeth, zero to three in number, on each side of deep central notch; each crest rounded, faintly hairy,

Palps (Pl. II, Fig. 5) with concave superior margin, and with superodistal angle provided with long, crowded bristles; inferior margin slightly convex.

Mandible (Pl. II, Fig. 3) with five teeth, second tooth bifid; third and fourth teeth usually furnished with extra denticles; fifth tooth smallest, sometimes confluent with inferior angle; lower edge between fifth tooth and inferior angle with or without small denticles.

Maxilla I (Pl. II, Fig. 2) with straight anterior margin; upper pair of spines largest, without notch below it; lower pair slender than upper pair; spines between upper and lower pairs nearly equal sized, five to eight, usually six or seven in number; inferior angle rounded, with densely arranged setae.

Maxilla II (Pl. II, Fig. 7) glove-shaped with proximal lobe soft and circular; both lobes furnished with hairs along inner margin.

Cirrus I with anterior ramus reversed, about three times as long as posterior ramus. Cirrus II and cirrus III with subequal rami, anterior rami slightly longer; articles of cirrus III occasionally with clusters of minute erect denticles on anterodistal borders. Cirrus IV with posterior ramus slightly longer than anterior; anterior margins of proximal and medial articles of anterior ramus (Pl. II, Fig. 4) armed with recurved teeth which are four to seven, usually five in maximum number; medial and proximal articles furnished with series of distal erect teeth, but without recurved tooth or erect tooth on distal articles; posterior ramus with erect teeth and with one to three recurved teeth on upper medial articles, but only erect teeth on proximal and distal articles. Paratype no. 1 without recurved tooth on posterior ramus. Both articles of protopodite (Pl. II, Fig. 6) with anterodistal series of erect teeth. Cirrus V with posterior ramus slightly longer than anterior which is occasionally armed with recurved teeth at lower distal segments, but without erect tooth. Cirrus VI longest, with equal rami, and with or without small distal denticles. Both rami of cirrus V and cirrus VI with two to four, usually three pairs of anterior spines.

Penis very long, about three times as long as cirrus VI, with very small, triangular basidorsal point.

Discussion. The new species can be easily distinguished from *Membranobalanus longirostrum* (Hoek, 1913), *M. cuneiformis* (Hiro, 1936) and *M. brachialis* (Rosell, 1972) by

Table 2. The numbers of segments of the cirri

Cirri	Rami	Types Rows	Holotype		Paratype no. 1		Paratype no. 2		Paratype no. 3	
			left	right	left	right	left	right	left	right
I	anterior		30	30	25	26	25	27	26	28
	posterior		12	13	11	10	11	11	10	10
II	anterior		13	13	15	15	14	13	14	13
	posterior		11	13	12	12	12	12	12	11
III	anterior		18	18	19	20	17	17	17	17
	posterior		15	15	18	18	15	15	14	13
IV	anterior		23	21	23	23	18	21	21	20
	posterior		23	20	24	23	24	26	24	26
V	anterior		25	27	30	26	26	27	29	28
	posterior		31	24	29	—	29	27	32	28
VI	anterior		34	34	30	32	34	—	31	32
	posterior		32	—	34	34	27	32	32	33

the armature of cirrus IV and by broad lower half of the rostrum.

In external appearance, *M. koreanus* seems to be closely allied to *M. declivis* (Darwin, 1854) hitherto known from the middle West Atlantic, and also to the East Pacific species, *M. orcutti* (Pilsbry, 1907) (Cited from Pilsbry, 1916), but obviously differs from both in peculiar structures of opercular valves and shell.

Though Zullo and Beach (1973) pointed out the probability that the form of opercular valves and rostrum is variable in accordance with the animal's age and habitat, the new species possesses the constantly different structure, i.e., the scutum has a strongly projected articular ridge and a characteristically developed radius expanded from the occludent edge, moreover, the tergum is very wide.

M. koreanus has the carina deeply notched at apex as in unbroken specimens of *M. nebrius* (Zullo and Beach, 1973) but both are hardly related each other in the form of labrum and cirri, and other important characters mentioned above.

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EXPLANATION OF PLATES

Plate I (holotype; scales, 1 millimeter)

- Fig. 1. Carina, exterior
- Fig. 2. The same, interior
- Fig. 3. Shell, lateral view
- Fig. 4. Scutum, interior
- Fig. 5. The same, exterior
- Fig. 6. Carinolateral, interior
- Fig. 7. The same, exterior
- Fig. 8. Tergum, interior
- Fig. 9. The same, exterior

Plate II (holotype; scales, 0.1 millimeter)

- Fig. 1. Labrum
- Fig. 2. Maxilla I
- Fig. 3. Mandible
- Fig. 4. Fifth and sixth segments of anterior ramus of cirrus IV
- Fig. 5. Palp
- Fig. 6. Protopodite of cirrus IV
- Fig. 7. Maxilla II

PLATE I

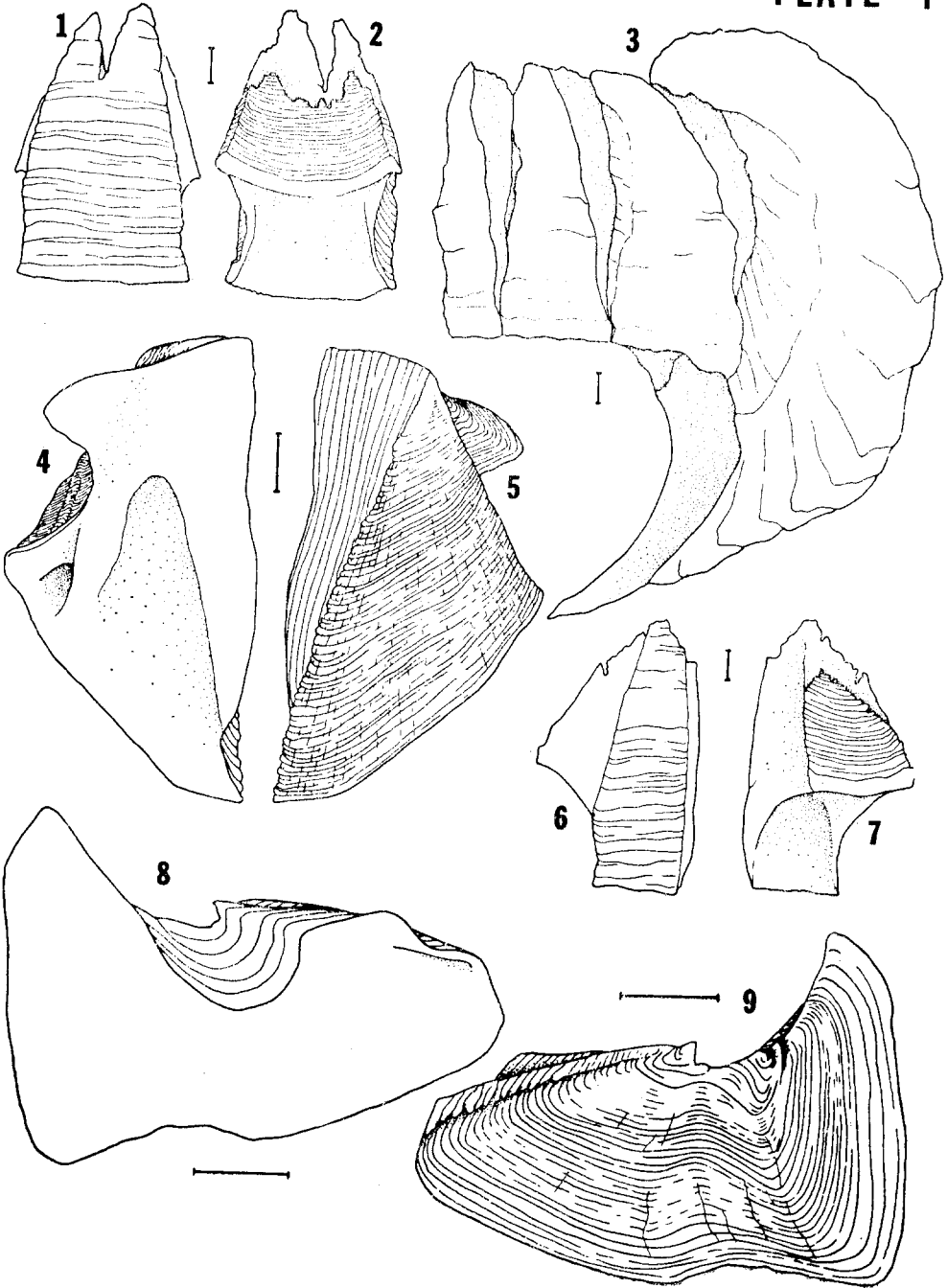


PLATE II

