Crustaceana 39 (3) 1980, E. J. Brill, Leiden

TWO NEW SPECIES AND ONE NEW RECORD OF *PHYLLADIORHYNCHUS* BABA FROM THE INDIAN OCEAN (DECAPODA, GALATHEIDAE)

BY

NASIMA M. TIRMIZI

and

WAQUAR JAVED

Invertebrate Reference Museum, University of Karachi, Karachi-32, Pakistan

The genus *Phylladiorhynchus* was established by Baba (1969) for three species previously included in the genus *Galathea*: *G. pusilla* Henderson (type-species), *G. serrirostris* Melin and *G. ikedai* Miyake, all from Indo-Pacific waters. Mayo (1972) described a new species *P. caribensis*, from the Atlantic. The genus was separated from *Galathea* on the shape of the rostrum and the antennules, presence or absence of the outer orbital angle. A complete diagnosis of the genus is given by Baba (1969: 3). Mayo (1972: 526) suggested slight modification such as "... the lack of spination on the ambulatory legs and three rather than four or five terminal spines on the basal antennular segment".

During the International Indian Ocean Expedition (I.I.O.E.) 1963-64 three species of *Phylladiorhynchus* were obtained. An examination of the material indicated that two of the three species were undescribed and another had not been recorded from the Indian Ocean. The present paper includes the description of the two new species: *P. antonbruuni* and *P. bengalensis*, a note on *P. serrirostris*, hitherto known from Japan and the eastern part of the East Indian Archipelago; and a key to the Indo-Pacific species of the genus.

Carapace length including rostral length (c.l. + r.) is measured on the mid-line from the tip of the rostrum to the posterior margin of the carapace; rostral length (r.l.) is measured from the tip of the rostrum to the base of the same; carapace breadth (c.b.) is determined by measuring the widest part.

The material will be deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C.

Key to Indo-Pacific species of *Phylladiorhynchus* Baba

1. Lateral margin of carapace diverging posteriorly; gastric region with six spines; postcervical spine present; outer orbital angle unarmed; disto-lateral angle of third segment of antennal peduncle produced . . . . . *P. antonbruuni* sp. nov.
— Lateral margin of carapace convex; gastric region with less than six spines; postcervical spine absent; outer orbital angle produced; disto-lateral angle of third segment of antennal peduncle unarmed 2

2. Rostrum with indistinct spines distally; gastric region with five spines; merus of third maxilliped elongated, inner margin armed with two spines 3
— Rostrum with minute spines distally; gastric region with less than five spines; merus of third maxilliped sub-triangular, inner margin armed with a strong spine 4
3. Anterior second of lateral spines of carapace distinctly dorsal in position; disto-lateral margin of basal antennular segment armed with four spines; anterior margin of third thoracic sternite with median and lateral projections . . . . . *P. bengalensis* sp. nov.
— Anterior second of lateral spines of carapace placed at same level as remaining ones; disto-lateral margin of basal antennular segment armed with three spines; anterior margin of third thoracic sternite with feeble median notch . . . . . *P. ikedai* Miyake
4. Gastric region with two spines; anterior margin of third thoracic sternite convex anteriorly without median projection . . . . . *P. serrirostris* (Melin)
— Gastric region with four spines; anterior margin of third thoracic sternite nearly transverse with median projection . . . . . *P. pusilla* (Henderson)

Phylladiorhynchus antonbruuni sp. nov. (fig. 1A-H)

Material. — Sta. 401C, Cruise 8, 19°51'S 36°21'E, depth 62 m, 4 October 1964; 1 ♀ (holotype).

Diagnosis. — Rostrum flat and long, with disto-lateral notch and supra-ocular spine on each side; outer orbital angle unarmed; well developed antero-lateral spine and six following lateral spines; gastric region armed with six spines; postcervical spine present; transverse striae of carapace weak and interrupted; anterior margin of third thoracic sternite medially crenulated and notched; disto-lateral margin of basal antennular segment armed with four spines, disto-median angle produced into large spine; basal spine of antennal peduncle small, disto-lateral angle of third segment armed with a small spine; merus of third maxilliped elongated, with two spines on inner margin, outer margin serrated and distally produced into spine; epipods absent from all pereopods.

Description of holotype. — The rostrum is rather broad and long, with distinct supra-ocular spine and an indistinct tooth forming a notch near the apex of each side. The outer orbital angle is unarmed. The antero-lateral spine is fairly well developed, followed by six spines. The gastric region is armed with three pairs of small spines anteriorly, the postcervical spine is present on each side. The striation of the carapace is weak, broken and with only a few setae (fig. 1 A). The carapace broadens posteriorly. The abdomen is unarmed.

The pterygostomian flap is as illustrated (fig. 1 B).

The third thoracic sternite is laterally expanded, posteriorly narrowing, somewhat boat-shaped, its anterior margin crenulated, and notched medially (fig. 1 C).

The ocular peduncles are stout, the cornea is strip-like and with a few 'lashes'.

The antennule is armed with a short, sharp, disto-median and four disto-lateral spines; the proximal of the latter being exceedingly small (fig. 1 D). The basal spine of the antennal peduncle is short but sharply pointed, the disto-lateral and the disto-median angles of the second segment are produced, each into a strong spine directed forward; the third segment has the outer distal angle minutely produced (fig. 1 E).

The ischium of the third maxilliped is armed with spines on both distal angles,

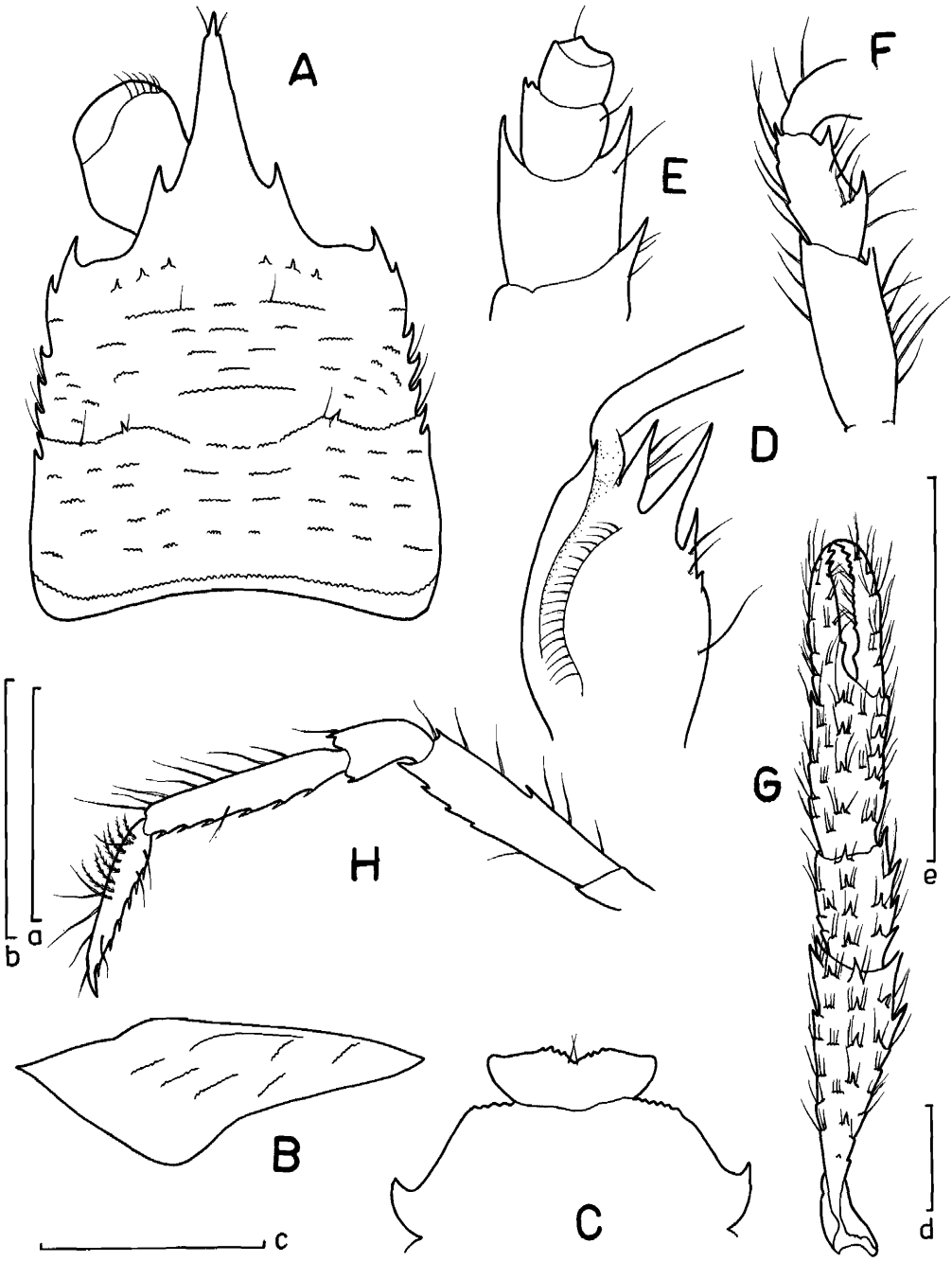

Fig. 1. *Phylladiorhynchus antonbruuni* sp. nov., holotype ♀. A, carapace and left eye, in dorsal view; B, left pterygostomian flap; C, anterior part of sternal segments; D, basal segment of right antennule; E, right antennal peduncle; F, ischium and merus of right third maxilliped; G, left cheliped; H, detached left pereopod. Fig. A at scale a = 1 mm; B at scale b = 1 mm; C, E, F at scale c = 0.5 mm; D at scale e = 0.5 mm; G, H, at scale d = 1 mm.

the merus is armed with two spines on the inner margin; the outer margin is serrated, distally produced into a small spine (fig. 1 F).

The chelipeds (fig. 1 G) are more than three times the length of the carapace, including the rostrum, they are spinose and setose, the chela is nearly half as long as the entire cheliped, the palm and the fingers are of equal length. The walking legs are detached, one of them is illustrated in fig. 1 H; the posterior margins of the dactylus and the propodus are armed with movable spinelets, the carpus is armed with disto-lateral and disto-median spines, both margins of the merus are spinose as illustrated.

Epipods are absent from all the pereopods.

Measurements of holotype (in mm). — Length of carapace including rostrum, 2.0; breadth of carapace, 1.5; length of rostrum, 0.7; length of cheliped, 7.0; length of palm, 1.5; length of movable finger, 1.5.

Remarks. — *P. antonbruuni* differs from the known species of the genus in having the outer orbital angle unarmed, more gastric spines (six in number) and a postcervical spine on each side. Furthermore, the basal spine of the antennal peduncle is much smaller.

Etymology. — The species is named for the vessel 'Anton Bruun'.

Phylladiorhynchus bengalensis sp. nov. (fig. 2 A-G)

Material. — Sta. 18A, Cruise 1, 07°34'N 98°00'E, depth 77 m, 21 March 1963; 1 ♂ (holotype).

Diagnosis. — Rostrum triangular, with indistinct distal notches and well developed basal spines; outer orbital angle produced, lateral margin of carapace with seven spines, anterior second slightly dorsal in position; gastric region armed with five spines; no postcervical spine; striae on carapace uninterrupted; third thoracic sternite with median and lateral projections on anterior margin; basal antennular segment more or less elongated, disto-lateral margin armed with four spines, disto-median angle armed with a minute spine; basal spine of antennal peduncle very long; merus of third maxilliped elongated with two large spines on inner margin; outer margin distally produced into well developed spine; epipods absent from all pereopods.

Description of holotype. — The rostrum is triangular, with hardly perceptible distal spines; the basal spines are, however, acute and well developed. The outer orbital angle is a small tooth-like projection, the antero-lateral spine of the carapace is long, sharply pointed and followed by five spines, excluding a spine slightly dorsal to the marginal level, in front of the end of the cervical groove. The gastric region is armed with five spines arranged in an arc, most of the striae on the carapace are continuous and furnished with fairly long setae (fig. 2 A). The abdomen is unarmed.

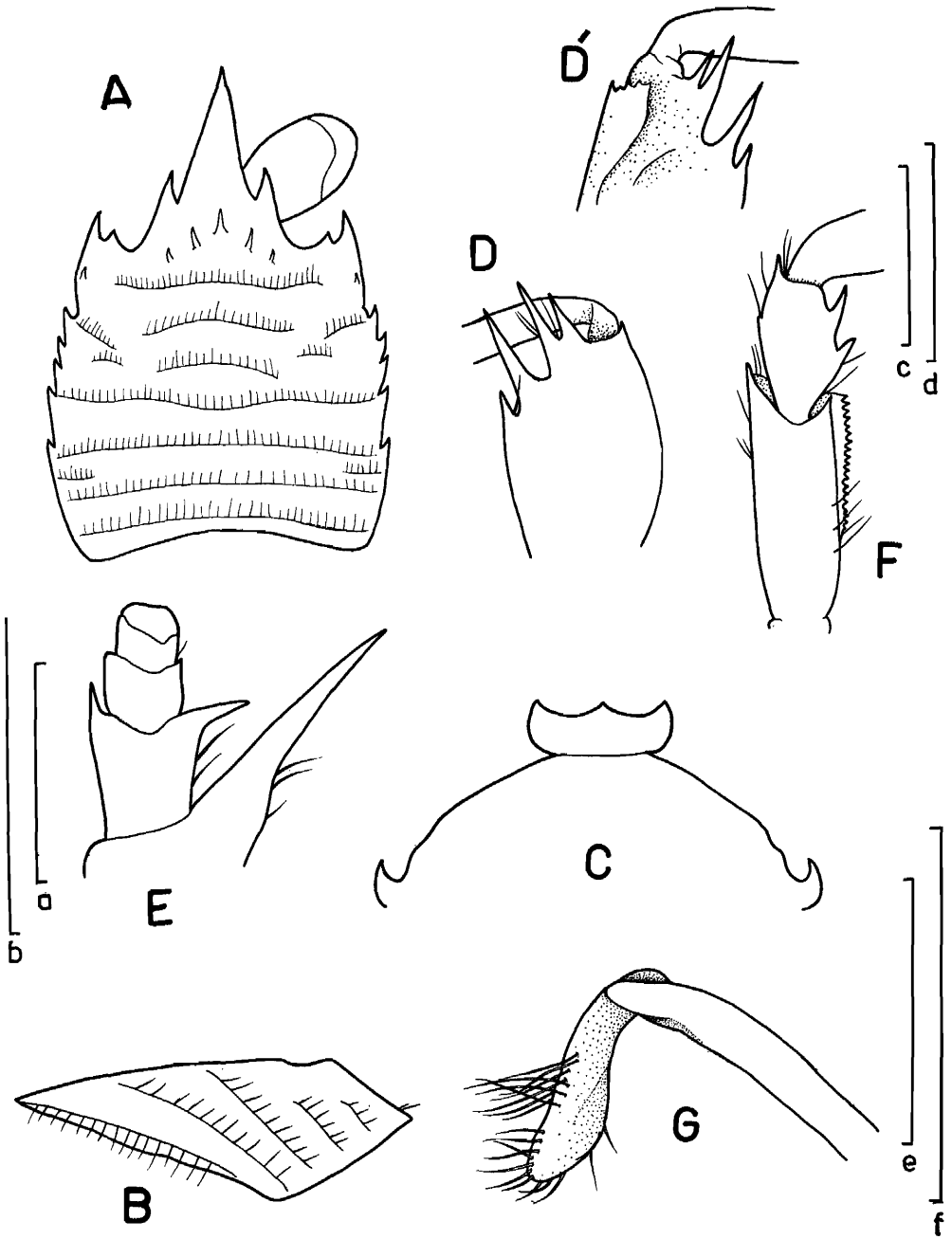

Fig. 2. *Phylladiorhynchus bengalensis* sp. nov., holotype ♂. A, carapace and right eye in dorsal view; B, right pterygostomian flap; C, anterior part of sternal segments; D, basal segment of right antennule; D′, distal part of same; E, right antennal peduncle; F, ischium and merus of right third maxilliped; G, right second pleopod. Fig. A at scale c = 1 mm; B at scale d = 1 mm; C at scale e = 0.5 mm; D, D′, F at scale a = 0.5 mm; E at scale b = 0.5 mm; G at scale f = 0.5 mm.

The pterygostomian flap is rather broad, with distinct, uninterrupted striae (fig. 2 B).

The third thoracic sternite is relatively wider, the anterior margin is smooth and produced medially and laterally (fig. 2 C).

The ocular peduncles are globular, the cornea is narrow and without 'lashes'.

The basal segment of the antennule is armed with five distal spines (fig. 2 D, D'). The basal antennal spine attains a considerable size, distinctly exceeding the end of the peduncle; the second segment is armed with both inner and outer terminal spines; the third segment is unarmed.

The armature of the third maxilliped is very similar to that of *P. ikedai*, except that the lateral margin of the merus is weakly serrated, with the disto-lateral angle produced into a much stronger spine (fig. 2 F).

Both chelipeds and all walking legs are wanting.

Epipods are absent from all pereopods.

The first pleopod is absent, the second bears a setose blade-like distal segment (fig. 2 G).

Measurements of holotype (in mm). — Length of carapace including rostrum, 3.0; breadth of carapace, 2.0; length of rostrum, 1.0.

Remarks. — *P. bengalensis* is closely related to the Japanese species *P. ikedai* from which it may be distinguished by the spination of the antennule, antenna and the very different shape of the third thoracic sternite.

Etymology. — The name is derived from the geographical name Bengal.

Phylladiorhynchus serrirostris (Melin, 1939) (fig. 3 A-G)

Galathea serrirostris Melin, 1939: 72, figs. 43-47; Miyake & Baba, 1965: 590, figs. 5, 6; Miyake & Baba, 1966: 67, fig. 8.

Phylladiorhynchus serrirostris: Baba, 1969: 4; Baba, 1977: 251.

Material and measurements. — Sta. 400C, Cruise 8, 20°30'S 35°43'E, depth 62 m, 3 October 1964; 18 ♂♂ (c.l. + r. = 1.2-3.5 mm), 5 ovigerous ♀♀ (c.l. + r. = 1.2-2.5 mm), 22 mutilated specimens. Sta. 381B, Cruise 7, 33°13'S 43°51'E, depth 38 m, 30 August 1964; 2 ♂♂ (c.l. + r. = 2-2.5 mm, c.b. = 1.5 mm, r.l. = 0.5 mm), 4 ♀♀ (c.l. + r. = 2 mm, c.b. = 1.5 mm, r.l. = 0.5 mm). Sta. 445, Cruise 9, 09°41'N 051°03'E, 16 December 1964; 1 ♂ (c.l. + r. = 3 mm). Sta. 390S, Cruise 7, 29°35'S 31°42'E, depth 138 m, 9 September 1964; 1 ♀. Sta. 447, Cruise 9, 10°00'N 51°15'E, benthic trawl, 16 December 1964; 10 ♂♂ (c.l. + r. = 2-3.5 mm, c.b. = 1.5-2.5 mm; r.l. = 0.5 mm), 12 ♀♀ (7 ovigerous) (c.l. + r. = 2.3-3.5 mm). Sta. 381C, Cruise 7, 33°13'S 43°53'E, depth 40 m, 30 August 1964; 1 ♀ (c.l. + r. = 2 mm; c.b. = 1.5 mm; r.l. = 0.5 mm). Sta. 29, Cruise 1, 11°23'N 93°31'E, depth 40-55 m; 28 March 1963; 1 ♂ (c.l. + r. = 2.5 mm; c.b. = 2 mm; r.l. = 0.5 mm), 5 ♀♀ (2 ovigerous) (c.l. + r. = 1-2.5 mm).

Descriptive remarks. — The specimens listed above agree rather well with the previous descriptions and illustrations of the species. A male, from Sta. 381B measuring 2.5 mm in carapace length, including rostrum, is illustrated in fig. 3 A. As pointed out by Miyake & Baba (1966: 68), the rostrum is not serrated at the base of the lateral margin. The spines on the lateral margin of the carapace are subject to slight variation, in most specimens they are four in number on the branchial region, but in some they are reduced to three, as mentioned earlier for

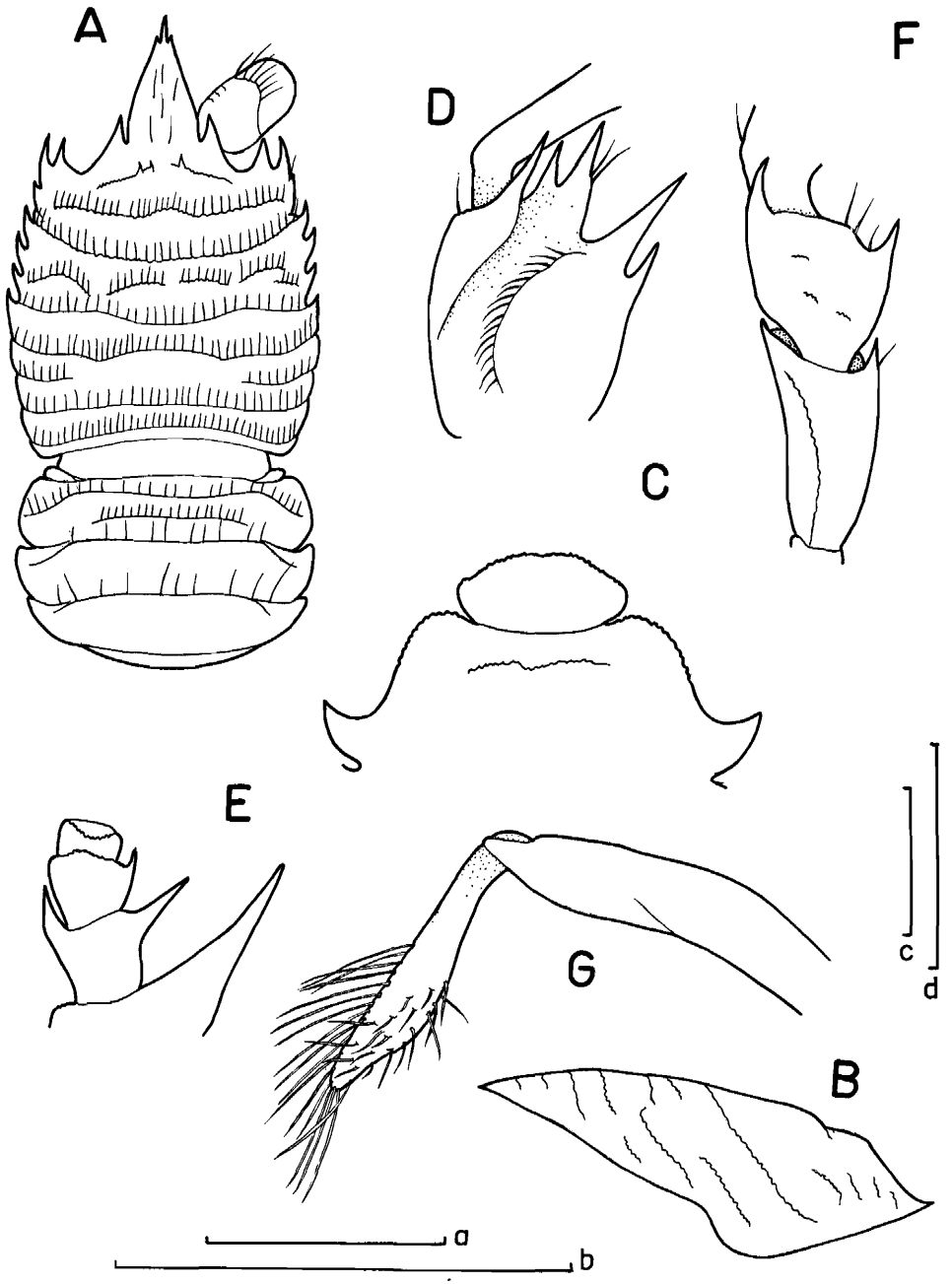

Fig. 3. *Phylladiorhynchus serrirostris* (Melin), ♂. A, animal, in dorsal view; B, right pterygostomian flap; C, anterior part of sternal segments; D, basal segment of right antennule; E, right antennal peduncle; F, ischium and merus of right third maxilliped; G, right second pleopod. Fig. A at scale c = 1 mm; B at scale a = 1 mm; C, D, E, F at scale d = 0.5 mm; G at scale b = 0.5 mm.

material from the Ryukyu Islands (Miyake & Baba, 1966: 67). The gastric area bears a pair of small spines; in the male of Sta. 381B however, an additional spine is present inside the left of the pair (fig. 3 A).

The pterygostomian flap is illustrated in fig. 3 B.

The third thoracic sternite, has the same characteristic shape as illustrated by Melin (1939) for the Bonin Islands specimens, but the anterior margin of the following sternite in our specimen is only slightly concave (fig. 3 C).

The spination of the antennule, antenna and the third maxilliped (fig. 3 D-F) are as illustrated for the Bonin Islands material (Miyake & Baba, 1965, fig. 6 A-C).

Epipods are absent from all the pereopods.

The second pleopod is elongated and slender, its tip is narrow and slightly produced (fig. 3 G).

Distribution. — This species was hitherto known only from Japan, the Bonin Islands, Amamioshima Island (one of the Ryukyus) and Ternate (Indonesia). This is the first record from the Indian Ocean.

ACKNOWLEDGMENTS

We take great pleasure in thanking Dr. Keiji Baba of Kumamoto University, Kumamoto, Japan, for reading the manuscript and valuable help throughout the work. We are indebted to Dr. R. B. Manning, for making this collection available for study.

SUMMARY

The present paper is based on the study of three species of *Phylladiorhynchus* Baba. Two species: *P. antonbruuni* and *P. bengalensis* are new and *P. serrirostris* is now recorded for the first time from the Indian Ocean.

LITERATURE CITED

BABA, K., 1969. Four new genera with their representatives and six new species of the Galatheidae in the collection of the Zoological Laboratory, Kyushu University, with redefinition of the genus Galathea. Ohmu, **2**: 1-32, figs. 1-9.

——, 1977. Biological results of the Snellius Expedition XXVIII. The galatheid Crustacea of the Snellius Expedition. Zool. Meded. Leiden, **50** (15): 243-259, figs. 1, 2.

MELIN, G., 1939. Paguriden und Galatheiden von Prof. Dr. Sixten Bocks Expedition nach den Bonin-Inseln 1914. K. Svenska Vetensk-Akad. Handl., **18** (2): 1-119, figs. 1-71.

MIYAKE, S. & K. BABA, 1965. Some galatheids obtained from the Bonin Islands. Journ. Fac. Agr. Kyushu Univ., **13** (3): 585-593, figs. 1-6.

——, 1966. Descriptions of galatheids collected from coral reefs of the Ryukyu Islands. Journ. Fac. Agr. Kyushu Univ., **14** (1): 57-79, figs. 1-14.

MAYO, B. S., 1972. Three new species of the family Galatheidae (Crustacea, Anomura) from the western Atlantic. Bull. Mar. Sci., **22** (2): 522-535, figs. 1-4.

Received for publication 31 January 1980.