

The genus *Wolffogebia* Sakai, 1982 (Crustacea, Decapoda, Thalassinidea, Upogebiidae) with a new species from Vietnam

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ABSTRACT

The genus *Wolffogebia* was established in 1982 by Sakai, and species that have been included in it are discussed. A revised diagnosis is presented. Abundant material from Vietnam belonging to a new species of *Wolffogebia* is described. *Wolffogebia nhatrangensis* n. sp. is compared to its congeners. It differs in having small teeth on the lateral rostral borders, an unarmed distal rostral border and a spinule on the antero-lateral border of the carapace. Also, adult males bear eight to 12 oblique crests on the mesial surface of the pereopod 1 propodus.

KEY WORDS

Crustacea,
Decapoda,
Thalassinidea,
Upogebiidae,
Wolffogebia,
Indo-Pacific,
Vietnam,
new species.

RÉSUMÉ

Le genre Wolffogebia Sakai, 1982 (Crustacea, Decapoda, Thalassinidea, Upogebiidae) avec une espèce nouvelle du Vietnam.

Le genre *Wolffogebia* a été établi par Sakai en 1982 et les espèces qui y ont été incluses sont discutées. Une diagnose révisée est présentée. Un abondant matériel récolté au Vietnam et appartenant à une nouvelle espèce de *Wolffogebia* est décrit. *Wolffogebia nhatrangensis* n. sp. est comparé aux autres espèces du genre. Il diffère par la présence de petites dents aux bords latéraux du rostre alors que le bord distal est inerme, et par la présence d'une spinule au bord antérolatéral de la carapace. D'autre part, les mâles adultes présentent une série de huit à 12 crêtes obliques à la face mésiale du propode des chélipèdes.

MOTS CLÉS

Crustacea,
Decapoda,
Thalassinidea,
Upogebiidae,
Wolffogebia,
Indo-Pacifique,
Vietnam,
espèce nouvelle.

INTRODUCTION

The genus *Wolffogebia* was established by Sakai (1982: 75) to include four species: *Wolffogebia phuketensis* Sakai, 1982, *W. inermis* Sakai, 1982, *W. obtifrons* Sakai, 1982 and *Gebicula exigua* Alcock, 1901. In the same work (Sakai 1982: 105, addendum), *W. obtifrons* was considered as identical to *Upogebia giralia* Poore & Griffin, 1979 and the latter was assigned to *Wolffogebia*. Another species, *Upogebia kyusyuensis* Yokoya, 1933, was later added (Sakai 1987: 305, 306). The genus was redefined by its author (1993: 109) with three species included: *Wolffogebia phuketensis* Sakai, 1982, *W. inermis* Sakai, 1982, *W. obtifrons* Sakai, 1982.

Ngoc-Ho (1994a: 72, 1994b: 210) discussed the inclusion of *Upogebia giralia* Poore & Griffin and *Gebicula exigua* Alcock in *Wolffogebia*.

In this contribution, the holotype of *Wolffogebia obtifrons* is re-examined and its synonymy with *Upogebia giralia* is confirmed. Species that have to date been included in *Wolffogebia* are reviewed. A revised diagnosis of the genus based upon examination of new material is presented, and species assigned to the genus are restricted.

Many specimens of upogebiids have recently been collected in Nhatrang, Vietnam, and appear to belong to a new species of *Wolffogebia*. Description of this species and notes on its ecology are presented.

The new taxon is compared to the two species of *Wolffogebia* currently placed into this genus, both from the Indo-Pacific.

The measurements given (in mm) in the description are: the carapace length (cl) measured from the tip of the rostrum to the posterior border of the carapace, and the total length (tl) measured from the tip of the rostrum to the posterior border of the telson.

Specimens and appendages figured were stained with a light solution of chlorazol black, sometimes with a drop of lactic acid added.

ABBREVIATIONS

MNHN Muséum national d'Histoire naturelle, Paris;
NHML Natural History Museum, London;
NMV Museum of Victoria, Melbourne;

NHMW Natural History Museum, Wien;
RMNH Rijksmuseum of Natural History, Leiden;
SMF Senckenberg Museum, Frankfurt;
ZMH Zoologisches Museum, Hamburg.

SYSTEMATICS

Genus *Wolffogebia* Sakai, 1982

Wolffogebia Sakai, 1982: 75; 1993: 109. — Ngoc-Ho 1994b: 210.

TYPE SPECIES. — *Wolffogebia phuketensis* Sakai, 1982, by designation.

DIAGNOSIS (adapted from Sakai 1993 and Ngoc-Ho 1994b). — Rostrum rounded or convex distally, ventral border unarmed. Anterior region of carapace with dense setae and a slight, non-setose median carina; no longitudinal median groove on rostrum. Anterolateral border of carapace unarmed or with minute spine. Antennular and antennal peduncles unarmed. Mandible with no anteromesial tooth. Maxilliped 1 with large epipod, maxilliped 3 without epipod, maxillipeds 2 and 3 with exopods lacking articulated flagellum. Arthrobranchs with single row of large lamellae on each side of rachis. Pereiopod 1 subcheliform. Telson slightly broader than long, posterior border nearly straight or slightly concave medially.

SPECIES INCLUDED. — *Wolffogebia phuketensis* Sakai, 1982; *W. inermis* Sakai, 1982; *W. nhatrangensis* n. sp.

REMARKS

The holotype of *Wolffogebia obtifrons* (ZMH K-30878), an ovigerous female from Port Hedland Australia, was compared to specimens of *Upogebia giralia* from Queensland, Australia (MNHN Th 1249). As Sakai (1982: 105) previously stated, both lots belong to the same species and share the unusual feature of a pleurobranch on the thoracic segment of pereiopod 5. A minor difference occurs in the shape of the rostrum (see Sakai 1982: fig. 17b; Ngoc-Ho 1994a: fig. 10a) which is more rounded distally in the Queensland material.

Similarities and differences between *Upogebia giralia* and *Wolffogebia* species have been discussed in detail (Ngoc-Ho 1994a: 73). *Upogebia giralia* is similar to *Wolffogebia* species and especially to the type species, *W. phuketensis*, in certain aspects, i.e. the absence of a median rostral

groove and possession of the unusual combination of characters: unarmed antero-lateral border of carapace with subcheliform pereopod 1. Nevertheless, it differs in several important features, especially by having maxillipeds 2 and 3 exopods of usual morphology (terminating in an articulated flagellum) and an extra pleurobranch on pereopod 5. The latter is at present reported in only six upogebioid species and considered of great evolutionary importance.

In this work, *Wolffoebia obtifrons* Sakai is regarded as a junior synonym of *Upogebia giralia* Poore & Griffin and set aside from the genus *Wolffoebia*. It has also been questioned whether *Gebicula exigua* Alcock, 1901, a deep-sea species, could be placed within *Wolffoebia* (Ngoc-Ho 1994b: 210). The holotype, a female captured at 485 m depth, is deposited in the Indian Museum and unavailable for examination at present. Nevertheless, the original figure (Alcock 1901: fig. 4), in lateral view, shows the anterolateral border of the carapace bearing at least two spines and depicts several spines on the lower border of the antenna as well as on pereopods 1, 2 and 3, which is in contradiction to all other *Wolffoebia* species. It seems unlikely that *Gebicula exigua* belongs to *Wolffoebia*, but this cannot be known for certain until its holotype is examined.

Most specimens of *Upogebia kyusyuensis* Yokoya, 1933 are missing and the rest difficult to access (Sakai pers. comm.). Still, considering the original description and figures, Sakai (1993) was probably right to exclude it from *Wolffoebia*. It differs especially by having a median longitudinal groove on the anterior half of the carapace and the rostrum and by the telson having a deeply concave posterior border.

Specimens of *W. phuketensis* from Singapore (MNHN Th 1293) and numerous specimens of *W. inermis* collected from Vietnam in late 1993 and in 1995 were examined. As reported by Ngoc-Ho (1994b), specimens of *W. inermis* agree well with the description and figures of the holotype (Sakai 1982: 81) and also with the Australian female examined by Sakai (1993: 109), except for the morphology of maxillipeds (Sakai 1993: fig. 13A-C). Stained appendages confirm

the presence of a large epipod on maxilliped 1 and no articulated flagellum on the exopod of maxillipeds 2 and 3. The small median spine on the posterior border of the telson (see Sakai 1993: fig. 12C) is present in only a few specimens examined.

The new taxon, *Wolffoebia nhatrangensis* n. sp. can be distinguished from known species of *Wolffoebia* by having a minute spine on the antero-lateral border of the carapace, which is present in all specimens examined. The diagnosis of the genus is amended to accommodate this feature.

Wolffoebia nhatrangensis n. sp.

TYPE MATERIAL. — Holotype, Vietnam, Binh An, Nhatrang, about 20-30 cm in mud, near a shrimp pond, Tran-Phi-Hung & Duong-Ngoc-Dung coll., 24.XI.1999, 1 ♂ cl 10 mm, tl 27.5 mm (MNHN Th 1385). Paratypes, 1 ♂ cl 9.5 mm, tl 26.5 mm (MNHN Th 1386); 2 ♂ ♂, 1 ovigerous ♀ cl 7-10 mm, tl 21.5-29 mm (MNHN Th 1387); 17 ♂ ♂ cl 7-9 mm, tl 20-25 mm; 15 ♀ ♀ (1 ovig.) cl 6.5-7.5 mm, tl 20-23.5 mm (MNHN Th 1388); 2 ♂ ♂, 2 ♀ ♀ (NHML 2000.1656-1659); 2 ♂ ♂, 2 ♀ ♀ (NHMW 19457); 2 ♂ ♂, 2 ♀ ♀ (NMV J 4714); 2 ♂ ♂, 2 ♀ ♀ (RMNH D 48593); 2 ♂ ♂, 2 ♀ ♀ (SMF 25785).

TYPE LOCALITY. — Nhatrang, Vietnam.

ETYMOLOGY. — The species is named after its type locality.

OTHER MATERIAL EXAMINED. — **Binh An.** Nhatrang, Vietnam, about 20-30 cm in mud, near a shrimp pond, Tran-Phi-Hung & Duong-Ngoc-Dung coll., 24.XI.1999, 23 ♂ ♂ cl 5-8.5 mm (MNHN Th 1389); 18 ♂ ♂ cl 6-9 mm; 14 ♀ ♀ cl 6.5-7 mm (MNHN Th 1390); 6.II.2000, 5 ♂ ♂, 1 ovigerous ♀ cl 7.5-9 mm, 91 juveniles cl 4-6 mm (MNHN Th 1394).

Mouth of Lô River. Nhatrang, Pham thi Du coll., 7.X.1998, 2 ♂ ♂ cl 6.5 and 7 mm (MNHN Th 1391).

DIAGNOSIS. — Rostrum semicircular distally, with three to four small round tubercles on each lateral border, distal border unarmed; eight to nine very small tubercles on lateral ridges of gastric region. Slight median carina on anterior region of carapace extending distally to almost entire rostrum; anterolateral border of carapace with minute spine. Telson slightly broader than long, posterior border straight. Pereopod 1 subcheliform: merus with upper subdistal spine; carpus with upper mesial subdistal and lower distal spine; propodus, with upper proximal spine and eight to twelve fine oblique crests on lower anterior half of mesial surface, crests distinct in large males, faint or absent in younger males, absent in females; fixed finger

with small proximal round tooth on cutting edge. Dactylus with two to three small round teeth over mesial proximal half in large males. Pereiopods 2 and 3 with lower proximal spine on merus. Exopod of uropods about as long as telson.

DESCRIPTION

Rostrum (Fig. 1A) semicircular distally, about 1.5 time as long as broad at base, with three to four small rounded tubercles on each lateral border, distal border unarmed; lateral ridges of gastric region with eight to nine very small tubercles, the two or three proximal of which hardly visible. Anterior region of carapace with slight broad non-setose median carina extending to nearly tip of rostrum; anterolateral border of carapace (Fig. 1B) with minute spine. Tergites of abdominal segments 3 and 4 (Fig. 2A) bearing dense setae on lateral distal border. Telson (Fig. 1C) approximately 1.2 time as broad as long, lateral borders slightly convex, distal border straight, a faint longitudinal groove medially.

Antennular and antennal peduncles (Fig. 2B, C) unarmed. Maxillipeds 1-3 (Fig. 2D-F) as figured. Arthrobranchs with single row of large lamellae on each side of rachis.

Pereiopod 1 in large males (cl > 7-7.5 mm) (Fig. 1D, E), stouter than in younger males and females. Ischium with spinule on proximal lower border. Merus with upper subdistal spine and sometimes lower proximal spinule. Carpus with large upper mesial subdistal spine and slightly smaller lower distal spine. Propodus about twice as long as broad, with upper proximal spine, and mesially a series of 10 to 12 fine oblique crests on lower anterior half, the longest near fixed finger, decreasing in size both distally and proximally; fixed finger subdistal, about half as long as dactylus, a proximal round tooth on cutting edge. Dactylus with corneous tip and two small triangular teeth near proximal and distal third of cutting edge; mesial surface with two or three round teeth over proximal half.

Pereiopod 1 in younger males (Fig. 3C) with propodus about three times as long as broad. Among the males examined, 14 specimens (cl 5-7.5 mm) bear no crest on mesial surface of propodus; in nine others (cl 6.5-8.5 mm), crests

are shorter, fewer (6-8) than in large males and sometimes hardly visible. No round teeth on proximal mesial surface of dactylus.

Pereiopod 1 in females (Fig. 3A, B) slender, propodus about four times as long as broad, narrowing distally, fixed finger small, dactylus approximately five times as long, both unarmed. Pereiopod 2 (Fig. 3D) with lower proximal spine on merus and sometimes upper distal spinule on carpus.

Pereiopod 3 (Fig. 3E) with lower proximal spinule on merus.

Pereiopod 4 unarmed. Pereiopod 5 subcheliform. Two ovigerous females bearing large eggs of 1-1.4 mm in diameter.

Uropod (Fig. 1C) basipod unarmed; exopod triangular, about as long as telson, endopod approximately trapezoidal, both unarmed, posterior border slightly convex.

ECOLOGY

The material examined in this work was obtained on an intertidal sandy mudflat, near a shrimp pond. The first sample, collected by digging randomly on November 24, 1999, included 112 specimens, 72 males, 40 females (2 ovigerous), with a sex-ratio of approximately two males, one female. Most specimens were adults with a carapace length exceeding 6.5 mm.

Another sample was collected on February 6, 2000 at the same mudflat, also by digging from a surface area of 1/16 m², to a depth of 30 cm. Specimens were taken at three levels: near the surface, at 20 cm and at 30 cm depth. In all, 122 individuals were captured, most of which were juveniles, of cl 4-6 mm. Only three males, of cl 7.5-8.5 mm, were obtained near the surface; two males, of cl 8 and 9 mm, and 1 ovigerous female, of cl 9 mm, were found at 30 cm depth. Specimens were most abundant at the intermediate level (20 cm depth), with 61 juveniles but no adults. Water salinity was 18‰ at high tide on the day of sampling.

Specimens of this species can also be collected in smaller number in surrounding areas with a sandy muddy substrate. They are used as fishing bait.

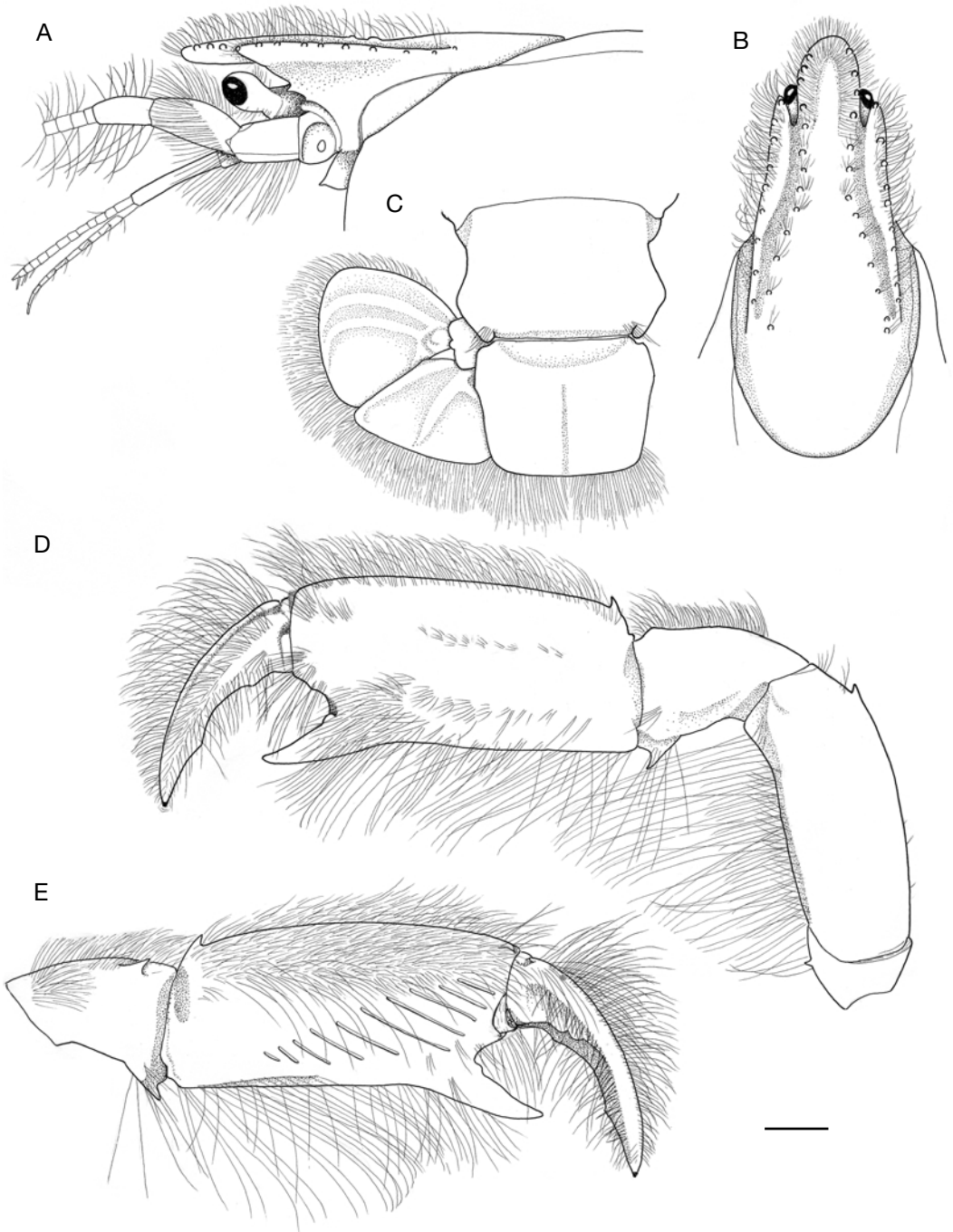


FIG. 1. — *Wolffoergia nhatrangensis* n. sp.: **A, B-E**, holotype, ♂ tl 27.5 mm (MNHN Th 1385); **A, B**, anterior part of carapace in lateral and dorsal view respectively; **C**, paratype, ♂ tl 29 mm (MNHN Th 1387) telson and uropods; **D**, pereopod 1 in lateral view; **E**, distal part of pereopod 1 in mesial view. Scale bar: 1 mm.

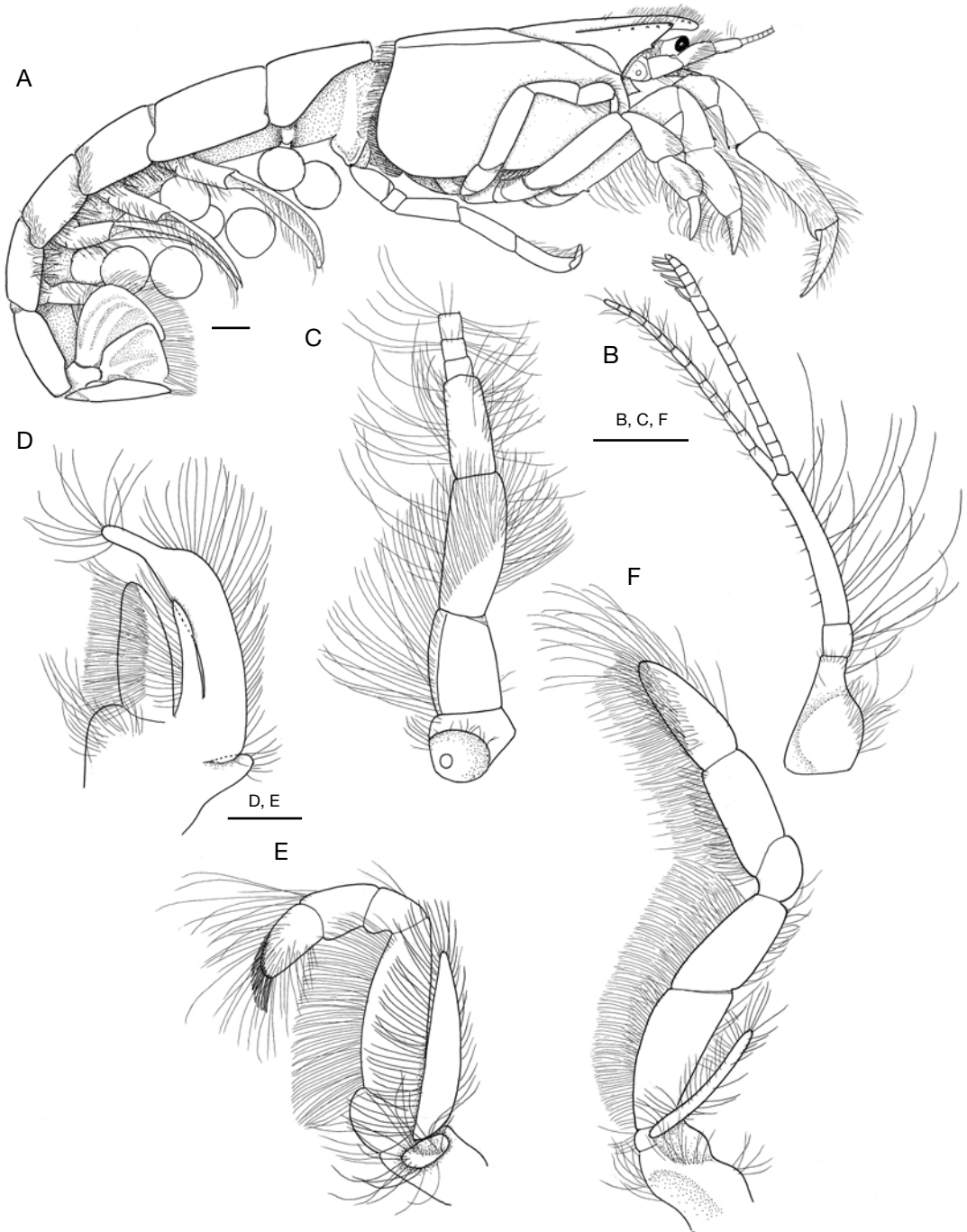


FIG. 2. — *Wolffogebia nhatrangensis* n. sp.; **A**, paratype, ovig. ♀ tl 24 mm (MNHN Th 1387), lateral view; **B-F**, paratype, ♂ tl 26.5 mm (MNHN Th 1386); **B, C**, antennule and antenna; **D, E, F**, maxillipeds 1, 2 and 3 respectively. Scale bars: A-C, F, 1 mm; D, E, 0.5 mm.

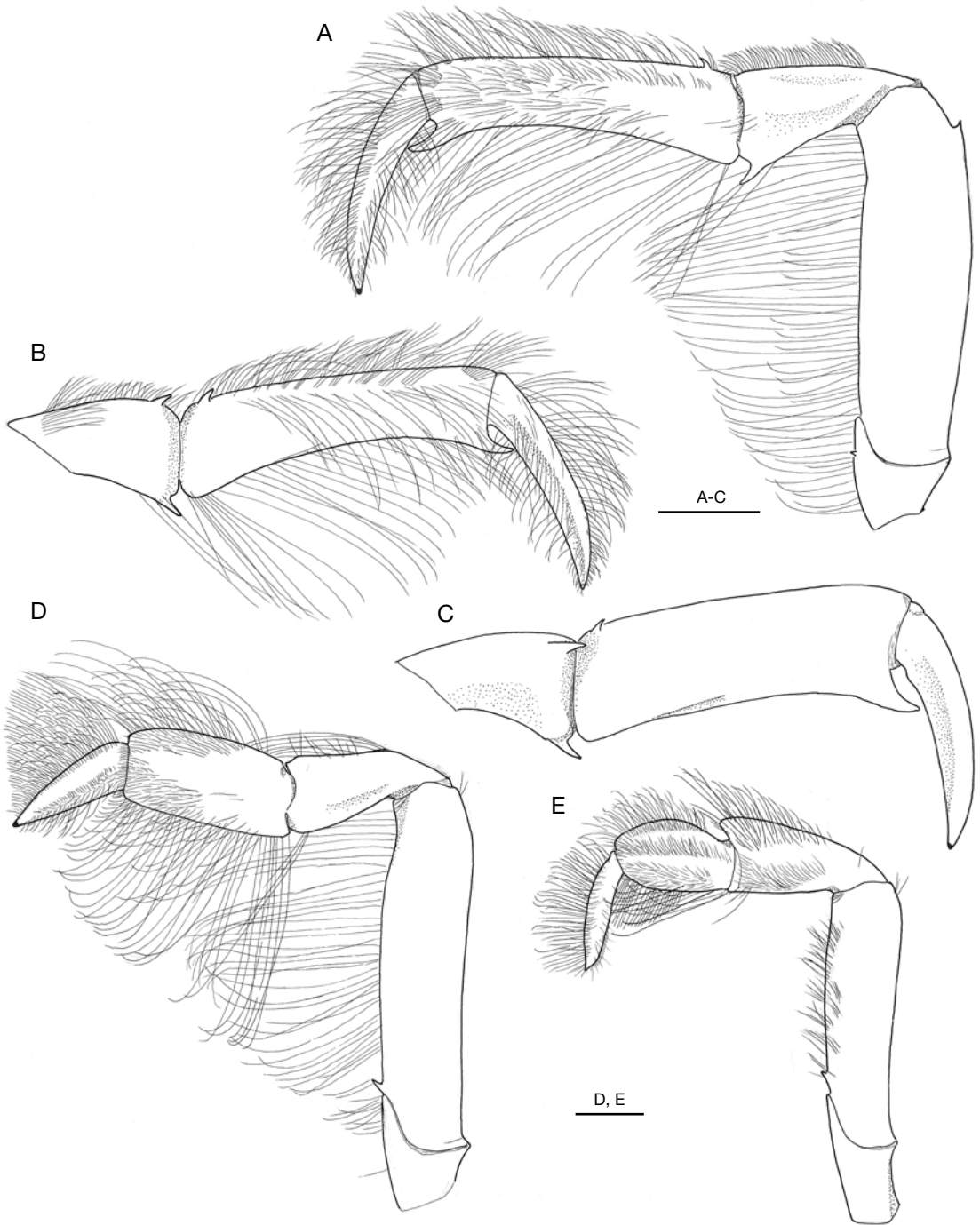


FIG. 3. — *Wolffoebia nhatrangensis* n. sp.; **A**, paratype, ovig. ♀ tl 24 mm, pereiopod 1 in lateral view; **B**, paratype, ovig. ♀ tl 24 mm, distal part of pereiopod 1 in mesial view; **C**, paratype, ♂ tl 21.5 mm, distal part of pereiopod 1 in mesial view; **D**, **E**, paratype, ♂ tl 29 mm (MNHN Th 1387) pereiopod 2 and 3 respectively. Scale bars: 1 mm.

TABLE I. — Distinguishing characters between *Wolffoebia phuketensis* Sakai, *W. inermis* Sakai and *W. nhatrangensis* n. sp.

Characters	<i>W. phuketensis</i>	<i>W. inermis</i>	<i>W. nhatrangensis</i>
Rostrum	about as long as eyes	overreaching eyes	overreaching eyes
lateral border	with round teeth	unarmed	with small teeth
distal border	with round teeth	unarmed	unarmed
Lateral ridges of gastric region	with round teeth	unarmed	with small teeth or denticles
Antero-lat. border of carapace	unarmed	unarmed	with spinule
Pereopod 1			
meral lower spine	absent	1, proximal	absent
carpal mesial distal spines	2	2	1
propodus upper border	unarmed	1 subdistal spine	1 proximal spine
propodus mesial surface	unarmed	unarmed	oblique crests in males
Pereiopod 2			
meral upper subdist. spine	small	large	absent
carpal upper subdist. spine	absent	large	absent
Exopod of uropod	as long as telson	longer than telson	as long as telson

DISCUSSION

The three known species of *Wolffoebia* are of small to medium size (average tl 25-35 mm). They all live in mangrove or nearby areas and in mud. Among them, *W. phuketensis* is particular in that it burrows frequently into the sides of the mud mound excavated by the mud lobster *Thalassinia anomala* (Ng & Kang 1988).

Besides characteristics listed in the diagnosis, the three *Wolffoebia* species share setae on the lateral distal border of abdominal segments 3 and 4 tergites (Fig. 2A). This is unusual among the Upogebiidae; these setae are denser in the new taxon than in other species. Otherwise, the three exhibit distinct specific features, and the examination of the rostrum alone, for instance, would be sufficient to separate them. Their main distinguishing characters are listed in Table I.

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