

# The hermit crabs *Paguristes* Dana, 1851 s.l. (Crustacea, Decapoda, Anomura, Diogenidae) from the western Indian Ocean

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## ABSTRACT

A small collection of *Paguristes* Dana, 1851 s.l. from the western Indian Ocean in the Muséum national d'Histoire naturelle, Paris, contains five species of *Paguristes* s.s., two of *Stratiotes* Thomson, 1899, and two of *Pseudopaguristes* McLaughlin, 2002. Except for *Paguristes lauriei* McLaughlin & Hogarth, 1998, and *Stratiotes abbreviatus* (Dechancé, 1963) n. comb., five other species, i.e. *P. palythophilus* Ortmann, 1892, *P. puniceus* Henderson, 1896, *P. antennarius* Rahayu, 2006, *S. micheleae* Rahayu, 2005 and *Pseudopaguristes laurentae* (Morgan & Forest, 1991) are new for the area, and two, *Paguristes petalodactylus* n. sp. and *Pseudopaguristes araeos* n. sp., are new to science. *Paguristes petalodactylus* n. sp. is characterized by the broad and flattened dactyls of the second and third pereopods and the form of the dactyls of the chelipeds, which are subrectangular and covered with small corneous-tipped spines on each mesial face. *Pseudopaguristes araeos* n. sp. is characterized by the presence of three irregular rows of spines on the mesial face of each dactyl of the chelipeds and the distal tapering of ocular peduncles.

## RÉSUMÉ

*Les bernards-l'hermite du genre Paguristes Dana, 1851 s.l. (Crustacea, Decapoda, Anomura, Diogenidae) de l'ouest de l'océan Indien.*

Une petite collection de *Paguristes* Dana, 1851 s.l. de l'ouest de l'océan Indien déposée au Muséum national d'Histoire naturelle de Paris contient cinq espèces de *Paguristes* s.s., deux de *Stratiotes* Thomson, 1899 et deux de *Pseudopaguristes* McLaughlin, 2002. À l'exception de *Paguristes lauriei* McLaughlin & Hogarth,

**KEY WORDS**  
Crustacea,  
Paguroidea,  
Diogenidae,  
hermit crabs,  
*Paguristes*,  
*Stratiotes*,  
*Pseudopaguristes*,  
western Indian Ocean,  
new species.

1998 et *Stratiotes abbreviatus* (Dechancé, 1963) n. comb., les cinq autres espèces, i.e. *P. palythophilus* Ortmann, 1892, *P. puniceus* Henderson, 1896, *P. antennarius* Rahayu, 2006, *S. micheleae* Rahayu, 2005 et *Pseudopaguristes laurentae* (Morgan & Forest, 1991) sont nouvelles pour la région, et deux, *Paguristes petalodactylus* n. sp. et *Pseudopaguristes araeos* n. sp., sont nouvelles pour la science. *Paguristes petalodactylus* n. sp. est caractérisée par les dactyles larges et aplatis des deuxièmes et troisièmes péréiopodes et la forme des dactyles des chélipèdes qui sont subrectangulaires et couverts de petites épines à extrémité cornée sur chaque face mésiale. *Pseudopaguristes araeos* n. sp. est caractérisée par la présence de trois rangées irrégulières d'épines sur la face mésiale de chaque dactyle des chélipèdes et par la pointe distale des pédoncules oculaires.

#### MOTS CLÉS

Crustacea,  
Paguroidea,  
Diogenidae,  
bernards-l'hermite,  
*Paguristes*,  
*Stratiotes*,  
*Pseudopaguristes*,  
ouest de l'Océan Indien,  
espèces nouvelles.

## INTRODUCTION

The genus *Paguristes* Dana, 1851 was revised and restricted by Rahayu (2005), with some species assigned to *Stratiotes* Thomson, 1899, and others to *Pseudopaguristes* McLaughlin, 2002. Subsequently, a small collection of *Paguristes* s.l. from Madagascar, Seychelles, Mozambique and la Réunion was studied during a visit to Muséum national d'Histoire naturelle, Paris. Although the hermit crabs of the western Indian Ocean have been studied previously (Miers 1879; Richters 1880; Lenz & Richters 1881; Ortmann 1892; Henderson 1896; Alcock 1905; Lenz 1910; Bouvier 1915; Laurie 1926; Ward 1942; Dechancé 1963, 1964; Lewinsohn 1982; Reay & Haig 1990; Gherardi & McLaughlin 1994; McLaughlin 1998; McLaughlin & Hogarth 1998; Rahayu & McLaughlin 2006), only five species of *Paguristes* s.l. have been reported from this region. These are: *Stratiotes abbreviatus* (Dechancé, 1963) n. comb. as *Paguristes abbreviatus*, from Madagascar (Dechancé 1963), *P. pusillus* Henderson, 1896 from Sri Lanka (Henderson 1896), *P. jousseaumei* Bouvier, 1892 reported by Lewinsohn (1982) from Somalia, *P. lauriei* McLaughlin & Hogarth, 1998 from the Seychelles (McLaughlin & Hogarth 1998), and *P. simplex* Rahayu & McLaughlin, 2006 from Madagascar (Rahayu & McLaughlin 2006). The collection studied herein contains nine species, of which five belong to *Paguristes* s.s., two to *Stratiotes*, and two to *Pseudopaguristes*. The five species of *Paguristes* s.s. are: *P. palythophilus*

Ortmann, 1892, *P. puniceus* Henderson, 1896, *P. lauriei* McLaughlin & Hogarth, 1998, *P. antennarius* Rahayu, 2006, and a new species, *P. petalodactylus* n. sp. Except for *P. lauriei* and the new species, the three others are new records for the region.

*Paguristes lauriei* was described from a single female specimen with a broken abdomen (McLaughlin & Hogarth 1998); therefore, the presence of several specimens in the collection provides the opportunity to complete the description of both sexes of this species.

The new species, *P. petalodactylus* n. sp., differs from other species of the genus with unequal chelipeds and unarmed telson, in having broad and flattened dactyls on the second and third pereopods, subrectangular dactyls of the chelipeds that are covered by small corneous-tipped spines on the mesial faces, and symmetrical lobes of the telson.

*Stratiotes* is represented in the collection by *S. abbreviatus* n. comb., a species formerly in *Paguristes* s.l. and now transferred to *Stratiotes*, and by *S. micheleae* Rahayu, 2005. *Pseudopaguristes* is represented by *P. laurentae* (Morgan & Forest, 1991), and a new species, *P. araeos* n. sp. This new species differs from *P. laurentae* by the presence of three irregular rows of spines on the mesial face of each dactyl of the chelipeds.

## MATERIAL AND METHODS

The specimens used in this study were collected from Madagascar in 1971 and 1972, la Réunion in

1982, the Mozambique Channel in 1977, and the Seychelles in 1980. Animal size is indicated by the shield length, measured from the tip of the rostrum or midpoint of the rostral lobe to the midpoint of the posterior margin of the shield, and rounded to the nearest single decimal. The length of the ocular peduncles has been determined by measuring the left ultimate peduncular segment, including the cornea, along its lateral surface; corneal diameter represents the maximum width of the cornea measured on the dorsal surface. Terminology used in the descriptions generally follows that of Forest & McLaughlin (2000). The abbreviations stn, and ovig. refer to station, and ovigerous, respectively. Genera and species are arranged in alphabetical order. Those arrangements are not meant to suggest phylogenetic relationship. Except when otherwise noted, the materials were collected by A. Crosnier. All materials examined are deposited in the Muséum national d'Histoire naturelle, Paris (MNHN).

## SYSTEMATICS

Family DIOGENIDAE Ortmann, 1892  
Genus *Paguristes* Dana, 1851

*Paguristes antennarius* Rahayu, 2006

*Paguristes antennarius* Rahayu, 2006: 369, figs 13-15.

MATERIAL EXAMINED. — Madagascar. 15°18.3'S, 46°10.3'E, 500-550 m, 8.XI.1972, 1 ♂ (2.8 mm); 1 ♀ (4.6 mm). — 21°24.5'S, 43°13.5'E, 640-720 m, 26.XI.1973, 1 ♂ (6.8 mm). — 21°25.5'S, 43°14.5'E, 425-550 m, 26.XI.1973, 2 ♂♂ (6 and 6.8 mm); 1 ♀ (5.6 mm). — 15°18'S, 43°02.2'E, 640-660 m, 1.XII.1973, 2 ♀♀ (4.3 and 6.8 mm).

DISTRIBUTION. — Indonesia and Madagascar, from 425 to 720 m.

## REMARKS

Rahayu's (2006) description of *P. antennarius* did not include a comparison with *P. miyakei* Forest & McLaughlin, 1998, despite these two species having several characters in common, such as the long and dense setation on the antennal flagella, the short ocular peduncles, which are only half the length of the shield

or a little longer, and the covering of small spinulose tubercles on mesial faces of dactyls of chelipeds. The comparison with specimens of *P. miyakei* deposited in MNHN showed certain differences. The two species differ in the armament of the second and third pereopods and the mesial faces of the dactyls of the chelipeds. The ventral margins of dactyls of the second and third pereopods of *P. miyakei* each have a row of 20-28 small corneous spines and the mesial face is unarmed; *P. antennarius* has 19 or less (16-19 in the specimens examined) corneous spines on the ventral margins of the dactyls of the second and third pereopods, and the mesial faces of these dactyls have a row of small corneous spines on each second pereopod and a shorter row of small spines proximally on each third pereopod. Moreover, in addition to rows of setae near each dorsal and ventral margin of the mesial and lateral faces of propodi of the second and third pereopods, a row of long and dense setae is present medially in *P. antennarius*, while in *P. miyakei* this median row of setae is absent. The tubercles on the mesial faces of the dactyls of the chelipeds of *P. antennarius* are more or less arranged longitudinally in three rows: the first row is situated near the dorsal margin with each tubercle accompanied by tuft of setae, the second and third rows are irregular or scattered with one or two short setae; in *P. miyakei* the tubercles are arranged in oblique rows. Additionally, the telson in *P. antennarius* is remarkably asymmetrical, while in *P. miyakei* it is only slightly asymmetrical. The chelipeds and pereopods of *P. antennarius* also are covered with longer and denser setae than in *P. miyakei*. Although these two latter characters are variable, they are constant over the size range and sex of the specimens studied.

*Paguristes lauriei* McLaughlin & Hogarth, 1998  
(Fig. 1)

*Paguristes mundus* — Laurie 1926: 154. *Non* Alcock, 1905.

*Paguristes lauriei* McLaughlin & Hogarth, 1998: 16, figs 6-10.

MATERIAL EXAMINED. — Seychelles Island. *Reves II* Expedition, stn 1, 5°24.8'S, 57°03.5'E, 55 m, sand, 2.IX.1980, 1 ♀ (3.3 mm); 1 ovig. ♀ (4.9 mm). — Stn 5, 5°04.48'S,

56°23.8'E, 33 m, fine sand and shells, 4.IX.1980, 3 ♂♂ (2.4-6.4 mm); 8 ♀♀ (2.6-3.4 mm); 9 ovig. ♀♀ (3.9-4.3 mm). — Stn 6, 4°57.8'S, 56°12.0'E, 40-45 m, sand with shells, 4.IX.1980, 2 ♀♀ (3.0 mm); 1 ovig. ♀ (3.6 mm). — Stn 11, 5°05.4'S, 55°54.4'E, 58 m, sand, 7.IX.1980, 1 ♂ (1.9 mm); 1 ♀ (3.4 mm). — Stn 15, 5°32.4'S, 56°43.9'E, 40-45 m, sand, 4.IX.1980, 1 ovig. ♀ (4.2 mm). — Stn 22, 5°16.3'S, 55°58.2'E, 60 m, sand and shells debris, 6.IX.1980, 1 ♂ (3.3 mm); 1 ovig. ♀ (4.3 mm). — Stn 23, 5°15.0'S, 55°42.2'E, 45-50 m, sand and shells debris, 7.IX.1980, 1 ♂ (3.4 mm). — Stn 31, 4°37.4'S, 54°20.7'E, 50 m, shells debris, 9.IX.1980, 1 ♂ (3.0 mm). — Stn 33, 5°25.9'S, 54°39.0'E, 45-60 m, sand and mud, 10.IX.1980, 1 ♂ (4.2 mm). — Stn 37, 4°35.8'S, 55°12.7'E, 65 m, sand and shell debris, 10.IX.1980, 3 ♂♂ (2.9-3.0 mm); 2 ovig. ♀♀ (3.2, 4.0 mm). — Stn 38, 5°03.5'S, 56°50.5'E, 44 m, mud and dead coral, 13.IX.1980, 1 ♂ (2.0 mm); 1 ♀ (4.4 mm); 2 ovig. ♀♀ (3.6 and 4.0 mm). — Stn 42, 4°31.6'S, 56°09.7'E, 55-60 m, shells debris, 13.IX.1980, 1 ♂ (4.4 mm); 1 ovig. ♀ (4.8 mm). — Stn 46, 4°06.7'S, 56°10.6'E, 60 m, sandy mud, 14.IX.1980, 1 ♂ (4.2 mm). — Stn 47, 4°03.8'S, 55°59.5'E, 45-55 m, shells debris, 14.IX.1980, 1 ♀ (4.6 mm). — Stn 49, 3°54.7'S, 55°50.6'E, 57 m, sand and shells debris, 15.IX.1980, 1 ♂ (4.0 mm). — Stn 55, 3°48.0'S, 55°06.2'E, 50-55 m, shells debris, 17.IX.1980, 1 ♂ (3.6 mm). — Stn 61, 4°22.3'S, 55°22.0'E, 65 m, shells debris, 19.IX.1980, 1 ♂ (4.4 mm).

**La Réunion.** Marion Dufresne, MD 32, stn FA 40, 21°21'S, 55°27'E, 150 m, 18.VIII.1982, 1 ovig. ♀ (6.2 mm). — Stn DC 56, 21°05'S, 55°12'E, 170-225 m, 22.VIII.1982, 1 ♀ (3.4 mm).

**DISTRIBUTION.** — Seychelles and la Réunion in the western Indian Ocean, at depths from 40 to 225 m.

#### DESCRIPTION

Thirteen pairs of quadrilateral gills. Shield almost 1.2 longer than broad, rostrum slender, acutely triangular, reaching proximal third of ocular acicles. Lateral projections shorter than rostrum. Ocular peduncles unequal, left slightly longer than right, longer than antennal and antenniferous peduncles. Ocular acicles subtriangular, terminating acutely. Antennal acicle reaching to distal fifth of fifth peduncular segment, terminating in prominent bifid spine; two spines on lateral margin, three or four spines on mesial margin and few setae. Antennal flagellum about 1.5 length of shield; articles each with one to two short setae.

Chelipeds subequal, left larger than right, armament similar. Left cheliped with dactyl 1.5 length of palm; dorsal surface of dactyl with two irregular rows

of tuberculate spines and sparse short setae; mesial face (Fig. 1A) with irregular rows of tuberculate spines dorsally, each accompanied by one or two short setae, few tufts of setae near ventral margin. Palm with row of five prominent spines on dorsomesial margin, convex dorsal surface with rows of small to large tuberculate spines, rounded dorsolateral margin with row of tuberculate spines continued onto fixed finger, some spines accompanied by one or two setae. Carpus with row of five prominent spines on dorsomesial margin, each accompanied by sparse setae; dorsal surface with irregular rows of tuberculate spines, each also accompanied by one or two setae. Merus with row of prominent spines on distal margin extending onto lateral margin, dorsal surface with subdistal short, transverse row of spines also extending to lateral face, remainder of dorsal surface with row of corneous-tipped spines, becoming smaller proximally; ventromesial margin with row of prominent spines and sparse setae; ventrolateral margin with row of corneous-tipped spines and sparse setae. Ischium with several small spines on ventromesial margin.

Second and third pereopods (Fig. 1B-E) similar from left to right. Dactyls 1.5-1.6 length of propodi, dorsal margins of dactyls each with row of corneous-tipped spines, becoming smaller distally, accompanied by long stiff setae (second), with row of small corneous spines also accompanied by long, stiff setae (third); lateral faces each with rows of tuft of short, sparse setae, shallow longitudinal sulcus dorsoproximally; mesial faces each with longitudinal ridge, lower on second, accompanied by row of corneous spines, flanked by short proximal sulcus dorsally and long shallow sulcus ventrally, row of spinules on proximal half of ventral sulcus; ventral margins each with row of 16-19 corneous spines. Dorsal margins of propodi each with row of prominent corneous-tipped spines (second) or corneous-tipped protuberances (third), each accompanied by tufts of short setae, lateral surfaces each with shallow longitudinal sulcus medially, deeper median sulcus on third, and row of short, sparse setae; mesial faces of second each with scattered tubercles, denser proximally, two to four corneous spines ventrodistally; third smooth, one or two corneous spines ventrodistally, few tufts of sparse

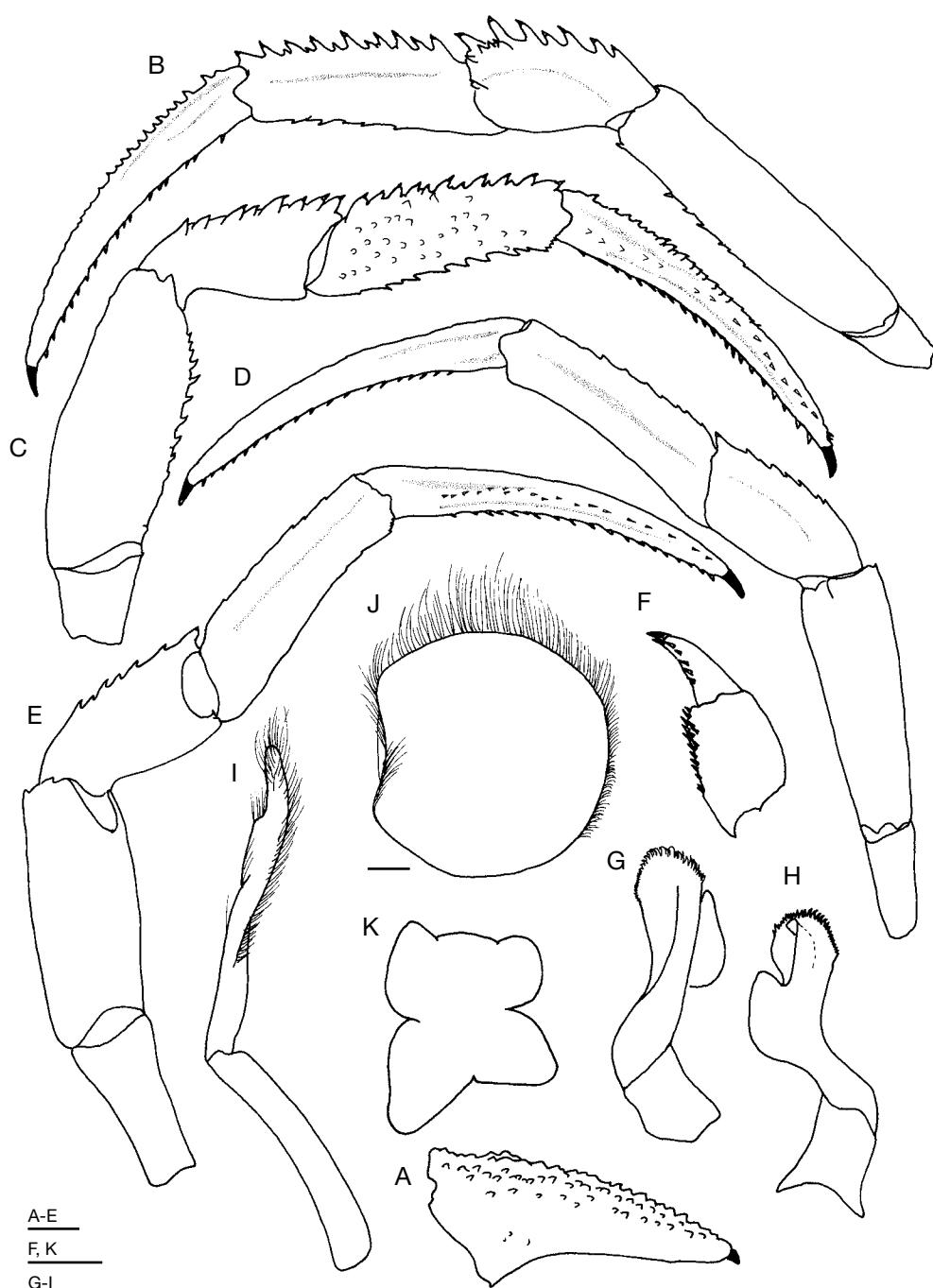


FIG. 1. — *Paguristes lauriei* McLaughlin & Hogarth, 1998: A-I, K, ♂, 6.9 mm; J, ♀, 4 mm; A, dactyl of left cheliped, mesial face; B, left second pereopod, lateral view; C, same, mesial view; D, left third pereopod, lateral view; E, same, mesial view; F, left fourth pereopod, lateral view; G, male first pleopod, external view; H, same, internal view; I, male second pleopod, internal view; J, female brood pouch, external view; K, telson, dorsal view. Setae partially omitted. Scale bars: 1 mm.

setae; ventral margins each with row of spinules and setae (second) or with sparse setae (third). Dorsal margins of carpi each with row of prominent spines (second) or spinules (third) and sparse tufts of long setae; lateral faces each with longitudinal sulcus and sparse setae. Meri with ventromesial and ventrolateral margins of second each with row of small spines and long setae; third unarmed. Fourth pereopod (Fig. 1F) with preungual process at base of dactylar claw, no spine on distal margin of carpus.

Male first pleopods (Fig. 1G, H) each with single row of small hook-like corneous spines on distal margin of inferior lamella; external lobe slightly shorter than inferior lamella, internal lobe short, with marginal setae. Basal segments of second pleopods (Fig. 1I) glabrous, endopods slightly twisted, long setae on distal margins. Female gonopores paired; brood pouch (Fig. 1J) large, rounded, distal margin fringed with long setae. Pleon with longitudinal tergal thickenings covered by long plumose setae above acetabula of second and third pleopods. Eggs numerous, diameter about 0.7 mm.

Telson (Fig. 1K) with moderately deep lateral incisions; shallow and narrow median cleft; posterior lobes asymmetrical, terminal and lateral margins unarmed, each with row of long setae.

#### *Colour in preservative (after McLaughlin & Hogarth 1998)*

Shield white with mottling of orange. Ocular peduncles solidly orange; ocular acicle mottled orange and white spines with reddish tips. Antennular peduncles with faint orange tint. Antennal peduncles with faintly tinted fifth, fourth and third segments; first and second segment and acicles mottled orange and white. Meri of chelipeds with faint orange tint, mesial and lateral faces each with circular patch of dark orange in distal third; carpi also with faint orange tint, some spines with slightly darker tint; chelae generally white with few spines orange-tinted, dactyls each with submedian orange band. Ambulatory legs with scattered splotches of orange on white background colour; mottled orange bands as follows: one submedian band on merus and propodus, two, one subproximal and one subdistal, on dactyl.

In the material studied, most of the coloration is still visible especially the dark orange circular

patch on distal third of each mesial and lateral face of merus.

#### VARIATION

Variation appears to be size related. McLaughlin (in press) noted that the holotype of *P. lauriei* had unarmed mesial face dactyls of the chelipeds. In the small specimens examined in this study (shield length 1.9–4.0 mm) these surfaces are either unarmed or armed with a longitudinal row of low protuberance or tuberculate spines. In large specimens (>4.5 mm) they have one or two irregular rows of tuberculate spines dorsally.

Most of the large specimens have unequal chelipeds, the right much smaller than left, but the armament is the same. In the largest specimen (SL 6.9 mm) the tuberculate spines on the dorsal surface of palm and fixed finger and the spines on the dorsomesial margin of palm are smaller and widely-spaced.

The mesial faces of the second and third pereopods of small specimens are slightly convex; each with only a proximal, shallow longitudinal sulcus dorsally rather than a ridge flanked by sulci dorsally and ventrally in large specimens. Additionally, the row of corneous spines on the mesial face of the dactyl in small specimens is on the proximal half of each second pereopod only, while in large specimens it is on the entire length of dactyl of each second and third pereopods.

#### REMARKS

The morphological characters and colour of the specimens examined during this study agree well with McLaughlin & Hogarth's (1998) description of *P. lauriei*. McLaughlin & Hogarth described this species from a single female specimen lacking half of the pleon. They assumed that the brood pouch was missing as the eggs were shielded by a uniform row of long, dense, plumose setae arising dorsally from a thickened longitudinal tergal ridge that extended from anterior of the acetabulum of the second pleopod to just posterior of the third (McLaughlin & Hogarth 1998: 20). The presence of female and male specimens in this study provides the opportunity to complete the description of this species. As mentioned by McLaughlin & Hogarth

(1998) the thickened pleonal tergal ridges each are interrupted by a short membranous space between the acetabula of the second and the third pleopods. In the females of this study, above the acetabulum of the fourth pleopod, the tergal ridge is also thickened, short, and separated from the third ridge by a moderately wide space and a large, rounded brood pouch situated adjacent to the fourth pleopod. The eggs are attached to the second, third and fourth pleopods, and only those on the fourth pleopod are protected by the brood pouch, whereas the eggs on the second and third pleopods are shielded by the long, dense, plumose setae.

#### *Paguristes palythophilus* Ortmann, 1892

*Paguristes palythophilus* Ortmann, 1892: 277, pl. 12, fig. 5, 5p, q. — Komai 2001: 359, figs 3-6 (full synonymy).

MATERIAL EXAMINED. — **Madagascar.**  $15^{\circ}24.5' S$ ,  $46^{\circ}02.0' E$ , 250-265 m, 7.XI.1972, 2 ♀♀ (4.4-4.8 mm). —  $15^{\circ}18.0' S$ ,  $16^{\circ}12.1' E$ , 480-510 m, 8.XI.1972, 27 ♂♂ (3.6-7.0 mm); 21 ♀♀ (3.4-6 mm); 6 ovig. ♀♀ (6.0-7.0 mm). —  $12^{\circ}52.0' S$ ,  $48^{\circ}10.3' E$ , 420-428 m, 4.III.1971, 4 ♂♂ (4.2-5.4 mm).

**Northeast of Mozambique Channel.** *Bentheddi* Expedition, stn DR 38,  $12^{\circ}54.8' S$ ,  $45^{\circ}15.6' E$ , 200-500 m, 26.III.1977, 1 ♀ (3.0 mm).

DISTRIBUTION. — Japan, Taiwan, Indonesia from 80 to 233 m, and now recorded from Madagascar and Mozambique Channel in deeper water, from 200 to 510 m.

#### REMARKS

The morphological characters of most of the specimens in this study agree well with Komai's (2001) redescription of *P. palythophilus*. However, the specimens studied have stouter ocular peduncles, which are only about half length of the shield; the diameters of the corneas are 0.3-0.4 the lengths of ocular peduncles. Komai's observation of the holotype and others materials from Japan indicated slender ocular peduncles (0.7-0.8 length of shield), with corneal diameters ranging from 0.1 to 0.2 of peduncular length. Some specimens from Madagascar had bifid ocular acicles, possibly as result of a broken tip that regenerated a bifid tip with the molt. The setation is less dense, especially in female

specimens. As mentioned earlier, *Paguristes* species show a high degree of intraspecific morphological variability as demonstrated by McLaughlin (2004) for *P. puniceus* Henderson, 1896. The differences observed in Madagascar specimens seem to be growth related as they are smaller than those studied by Komai (2001).

#### *Paguristes petalodactylus* n. sp.

(Figs 2; 3)

TYPE MATERIAL. — **Madagascar.** Tuléar, coll. Thomassin, holotype, ♂ (5.7 mm) (MNHN-Pg 7741).

ETYMOLOGY. — From the Greek *petalo*s, broad, and *dactylos*, alluding to the broad dactyls of the second and third pereopods.

TYPE LOCALITY. — Tuléar, Madagascar.

DISTRIBUTION. — Known only from Tuléar, Madagascar, depth unknown.

#### DESCRIPTION

Thirteen pairs of quadriserial gills; branchiostegites each with one spine on distal margin and few spinules on dorsal margin accompanied by few setae. Shield (Fig. 2A) 1.4 longer than broad, dorsal surface with few spinules laterally and sparse short setae. Rostrum acutely triangular, reaching half length of ocular acicles, terminating in small spinule. Lateral projections shorter than rostrum, triangular, each terminating in small spinule.

Ocular peduncles long, 0.8 shield length, moderately slender, dorsal surfaces each with row of sparse tufts of setae; corneal diameter 0.2 of peduncular length. Ocular acicles triangular, each terminating in acute spine, and with sparse setae on distal margin; separated by about basal width of one acicle.

Antennular peduncles when fully extended reaching middle of corneas; ultimate and penultimate segments unarmed, basal segment with small spinule on lateral face of statocyst lobe.

Antennal peduncles reaching 0.6 of ocular peduncles. Fifth segment with few scattered setae; fourth segment with small dorsodistal spine; third segment prominently produced ventrally, terminating in acute spine accompanied by moderately long,

sparse setae; second segment with dorsolateral distal angle produced, terminating in bifid spine and with sparse setae, mesial margin with one spine; first segment unarmed. Antennal acicle overreaching distal margin of fifth peduncular segment, terminating in prominent bifid spine; three spines on dorsal surface mesially, two spines on lateral margin, sparse setae on dorsal and lateral faces not concealing armature. Antennal flagellum about same length as shield, article each with one or two short setae.

Chelipeds unequal and dissimilar, left (Fig. 2B) larger than right (Fig. 2D). Dactyl of left cheliped 1.5 longer than palm, somewhat subrectangular in shape (in dorsal view); dorsal surface with closely-spaced tuberculate spines, some corneous-tipped; dorsomesial margin delimited only proximally by row of corneous-tipped spines; mesial face (Fig. 2C) with irregular rows of tuberculate spines, some corneous-tipped, larger spines near dorsal margin, some spines accompanied by one or two short setae; ventral surface with few tufts of setae; cutting edge with moderately small calcareous teeth on proximal 0.7, corneous teeth distally, terminating in small corneous claw, no hiatus between dactyl and fixed finger. Palm approximately 0.6 length of carpus; dorsal surface with irregular rows of moderately small tuberculate spines, sometimes corneous-tipped, or accompanied by one or two short setae, becoming blunt and less dense proximally, but closely-spaced and densest on fixed finger; dorsomesial margin weakly delimited by row of slightly larger corneous-tipped spines; mesial face with irregular rows of tuberculate, corneous-tipped spines, some accompanied by one or two short setae; dorsolateral margin slightly delimited only distally by rows of moderately small corneous-tipped spines continuing onto lateral surface; ventral surface with rows of corneous-tipped spines and tuft of sparse short setae; cutting edge of fixed finger with row of moderately small calcareous teeth, terminating in small corneous claw. Carpus approximately half length of merus, row of moderately large, corneous-tipped spines on dorsomesial margin; dorsal surface with irregular rows of tuberculate spines, larger spines near dorsomesial margin, distal margin with row of small spines laterally; dorsolateral margin not delimited; mesial face with scattered tuberculate

spines and sparse setae. Merus with large spine at dorsodistal margin and several smaller spines laterally; dorsal margin with subdistal transverse row of large spines continuing onto lateral face, remainder of dorsal margin with low protuberances; lateral face with few tubercles near ventral margin; ventrolateral and ventromesial margins each with row of spines; ventral surface with scattered tubercles and few tufts of setae.

Right cheliped (Fig. 2D) with dactyl 1.6 longer than palm, subrectangular in shape (in dorsal view); dorsomesial margin delimited by moderately large, corneous-tipped spines; dorsal surface with closely-spaced tuberculate, and sometimes corneous-tipped, spines; mesial face (Fig. 2E) with irregular rows of moderately large, corneous-tipped spines, each spine accompanied by one or two short setae. Palm approximately 0.6 length of carpus; dorsomesial margin with row of five prominent, corneous-tipped spines, each accompanied by one or two short setae, dorsal surface with irregular rows of moderately small tuberculate, sometimes corneous-tipped spines, becoming closely-spaced on moderately flattened dorsal surface of fixed finger. Carpus with 10 moderately large corneous-tipped spines on dorsomesial margin, sometimes accompanied by one or two short setae, dorsal surface with irregular row of small tuberculate spines, becoming less dense and obtuse tubercles near dorsolateral, distal margin with numerous small spines laterally. Merus with large spine at dorsodistal margin and several smaller spines laterally; dorsal margin with subdistal transverse row of large spines continuing to lateral face, remainder of dorsal margin with small spines; lateral face with few tubercles near ventral margin; ventrolateral and ventromesial margins each with row of spines.

Second and third pereopods (Fig. 3A-D) with broad dactyls, second broader than third. Dactyls approximately twice length of propodi; dorsal margins each with row of corneous-tipped spines (second) or row of protuberances (third), all with long setae, not concealing armature; ventral margins each with row of 24 or 25 (second) or 20-25 (third) corneous spines and moderately long setae; mesial faces of second flattened, only slightly on third, each with three or four irregular rows of tiny corneous spines,

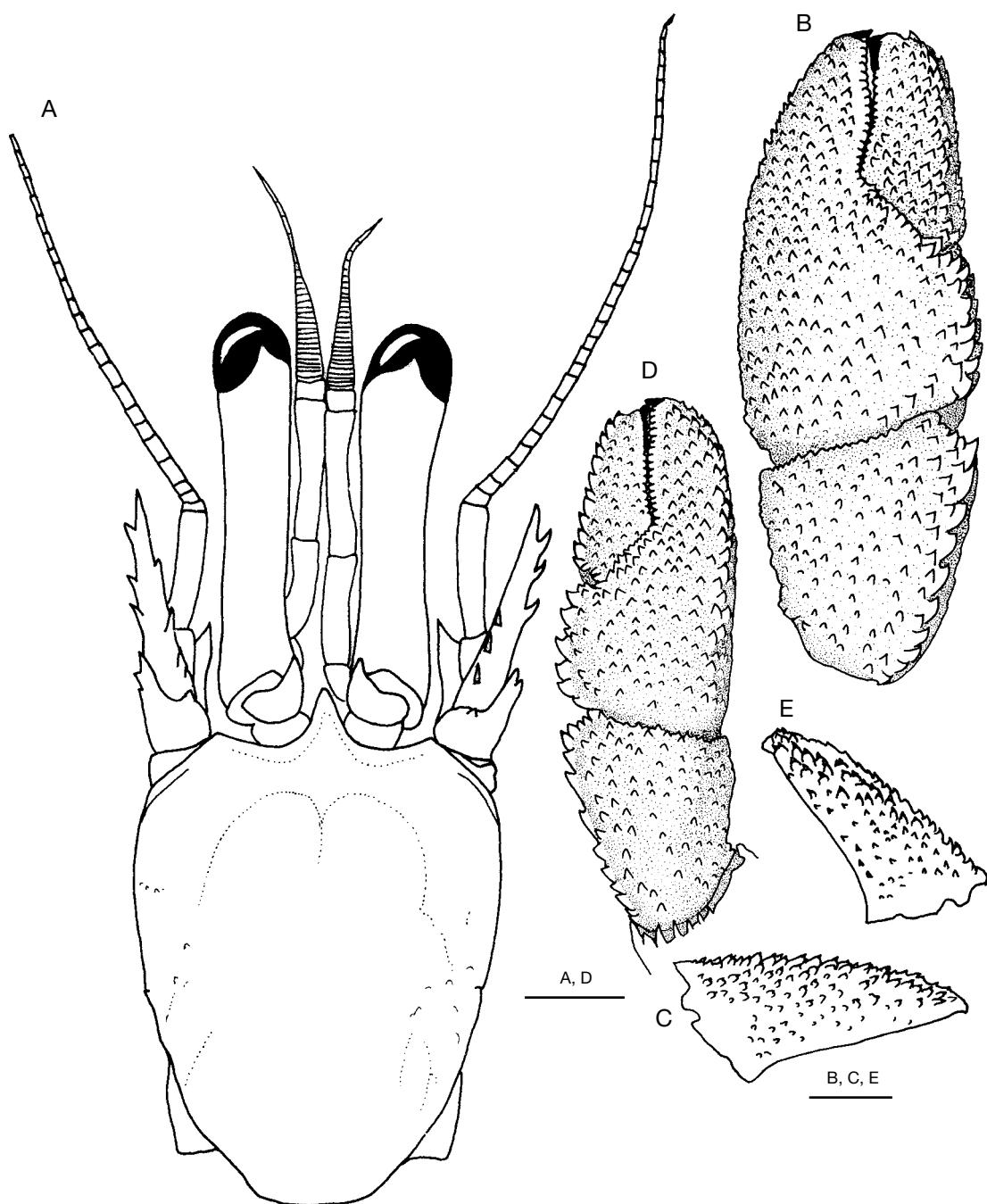


FIG. 2. — *Paguristes petalodactylus* n. sp., holotype, ♂, 5.7 mm: A, shield and cephalic appendages; B, left cheliped, dorsal view; C, dactyl of left cheliped, mesial face; D, right cheliped, dorsal view; E, dactyl of right cheliped, mesial face. Setae omitted. Scale bars: 1 mm.

larger corneous spines on third, and short, shallow longitudinal sulcus proximally; lateral faces each with rows of tufts of sparse, short setae and shallow, short longitudinal sulcus proximally. Propodi each with row of prominent corneous-tipped spines (second) and smaller spines (third) on dorsal margin, accompanied by tufts of setae; mesial faces of second slightly flattened, each with irregular rows of spinules, accompanied by two or three short setae, mesial face of third weakly convex with few tuft of short setae; lateral surfaces each with three rows of tuft of sparse, short setae; ventral margins each row of spinules and setae, barely visible on lateral face. Carpi each with row of prominent spines on dorsal margin, second row of smaller spines near dorsal margin on second pereopod, each accompanied by short setae; lateral faces each with longitudinal sulcus. Meri each with row of protuberances and short setae on dorsal margin, longer and denser setae on ventral margin, ventromesial margins each with row of small spines; ventrolateral margin with row of small spine (second), or unarmed (third). Fourth pereopods (Fig. 3E) each with preungual process at base of dactylar claw, no spines on distal margins of carpi.

Male first pleopods (Fig. 3F, G) each with single row of small hook-like corneous spines on distal margin of inferior lamella; external lobe as long as inferior lamella, internal lobe short, with marginal setae. Second pleopods (Fig. 3H) with basal segment and endopod glabrous, appendix masculina with moderately long setae. Female unknown.

Telson (Fig. 3I) with moderately deep lateral incisions; median cleft small, shallow; posterior lobes almost symmetrical, terminal and lateral margins unarmed, each with row of long setae.

#### REMARKS

The species of *Paguristes* s.l. are known to have considerable intraspecific variability in morphological characters, therefore a suite of characters is needed to differentiate closely related species (McLaughlin 2004). Although only one specimen of *P. petalodactylus* n. sp. is available in this study, a combination of characters distinguish this new species from other species of the genus that have unequal chelipeds and unarmed telson, such as *P. alcocki* McLaughlin & Rahayu, 2005, *P. arostratus* Rahayu,

2005, *P. balanophilus* Alcock, 1905, *P. brachyrostris* Rahayu, 2006, *P. calvus* Alcock, 1905, *Paguristes* sp. (new species to be described by McLaughlin in press), *P. frontalis* H. Milne Edwards, 1936, *P. kimberleyensis* Morgan & Forest, 1991, *P. lewinsohni* McLaughlin & Rahayu, 2005, *P. purpureantennatus* Morgan, 1987, and *P. seminudus* Stimpson, 1858. This combination of characters includes broad and flattened dactyls on the second and third pereopods, subrectangular dactyls of the chelipeds, which are covered by small corneous-tipped spines on the mesial faces, and symmetrical lobes of the telson.

The apparently most closely related species is *P. lewinsohni*. These two species are quite similar in general appearance of the shield and cephalic appendages. The differences are in the shape of the dactyls of the chelipeds, which are subtriangular, and the small spines on the mesial faces that are arranged in two irregular rows partially concealed by tufts of moderately short setae with one or two low protuberances ventrally in *P. lewinsohni*. Furthermore, the ventral margins of the dactyls of the second and third pereopods of *P. petalodactylus* n. sp. have 20-25 corneous spines, while in *P. lewinsohni* only 14-20 corneous spines are present. The armature of mesial faces of propodi of the second and third pereopods is also different. In *P. lewinsohni* a scute-like ridge is developed ventrally, whereas in *P. petalodactylus* n. sp. there are only simple spinules or protuberances. There is a difference also in the shape of the telson, which is appreciably asymmetrical in *P. lewinsohni*. Additionally, *P. petalodactylus* n. sp. has simple ocular acicles, whereas in *P. lewinsohni* the ocular acicles have two or three spines on distal margin.

This new species also is superficially similar to *Paguristes* sp. (new species to be described by McLaughlin in press) in having a subrectangular right cheliped. However, both chelipeds of *P. petalodactylus* n. sp. are subrectangular while in *Paguristes* sp. only the right cheliped is rectangular, furthermore the mesial face of dactyl of the cheliped is covered with small tubercles in the new species, while in *Paguristes* sp. it is armed with one row of spines. The setation is denser in *Paguristes* sp. obscuring some armament of the cheliped and pereopods while in the new species the setation is sparse.

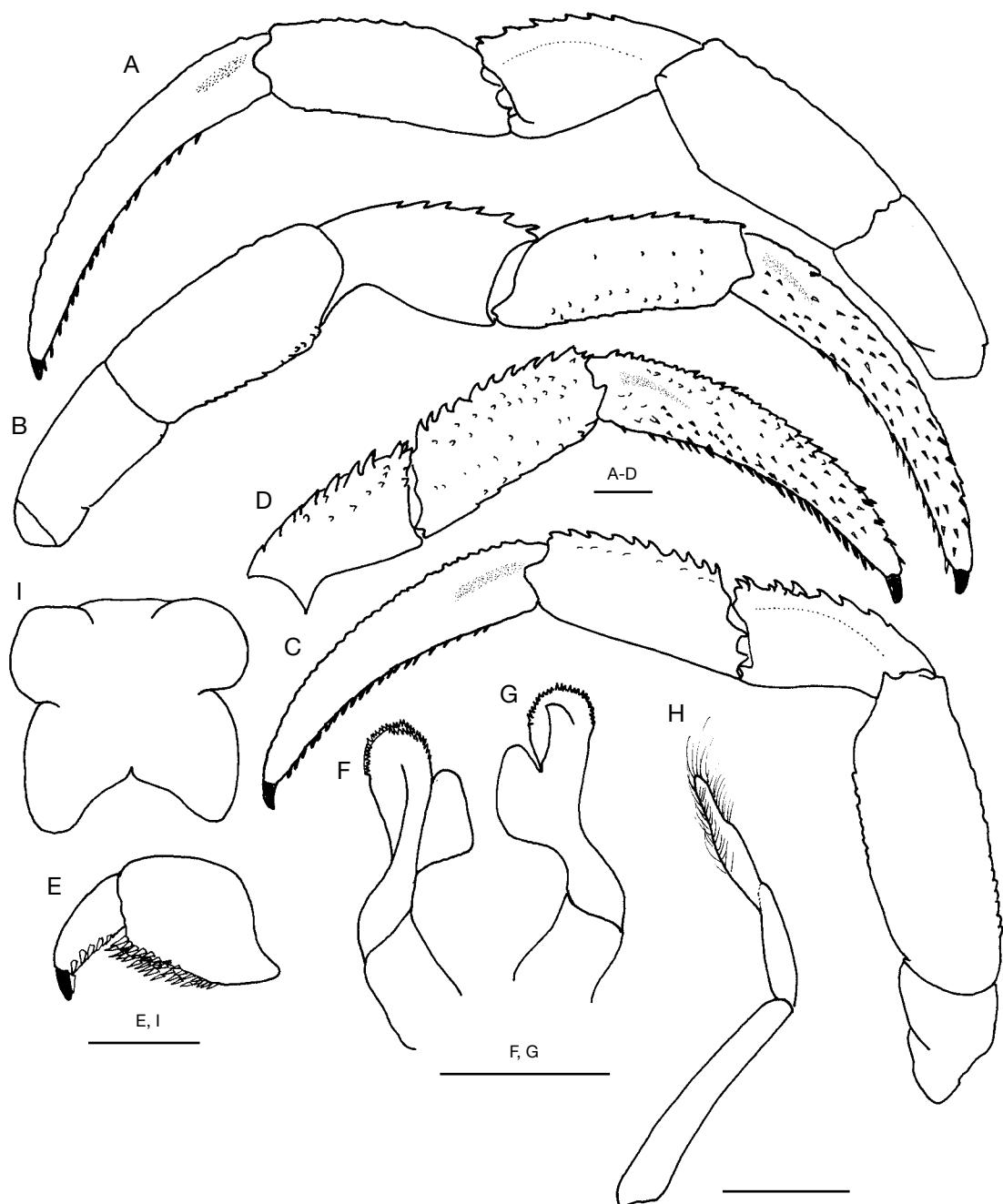


FIG. 3. — *Paguristes petalodactylus* n. sp., holotype, ♂, 5.7 mm: A, left third pereopod, lateral view; B, same, mesial view; C, left second pereopod, lateral view; D, same, mesial view; E, left fourth pereopod, lateral view; F, male first pleopod, external view; G, same, internal view; H, male second pleopod, external view; I, telson, dorsal view. Setae omitted. Scale bars: 1 mm.

### *Paguristes puniceus* Henderson, 1896

*Paguristes puniceus* Henderson, 1896: 527. — McLaughlin 2004: 15, figs 1, 2 (full synonymy).

MATERIAL EXAMINED. — **Madagascar.** 12°53.3'S, 48°09.4'E, 480-520 m, 4.III.1971, 1 ♂ (6.7 mm). — 12°52.3'S, 48°10.4'E, 415-403 m, 4.III.1971, 1 ♂ (3.6 mm); 1 ♀ (3.2 mm). — 15°20.0'S, 46°11.8'E, 245-250 m, 7.XI.1972, 1 ♂ (2.2 mm).

**La Réunion.** *Marion Dufresne*, MD32, stn DC 56, 21°05'S, 55°12'E, 170-225 m, 22.VIII.1982, 1 ♂ (3.9 mm).

DISTRIBUTION. — Bay of Bengal and Travancore coast, India; Andaman Sea; Indonesia, northern Australia from 150 to 766 m. This is the first record from western Indian Ocean.

#### REMARKS

The specimens examined agree with the redescription of this species by McLaughlin (2004). Some variation in the morphological characters not mentioned by McLaughlin (2004) were observed. The dorsolateral surfaces of the shields of the specimens from Madagascar have prominent spines. The antennal peduncles have more spines: the second segments of the antennal peduncles each have the dorsodistal angle produced, terminating into two large spines followed by three or four spines on the lateral margin, the dorsomesial distal angle has two prominent spines; the antennal acicles have six or seven spines on the mesial margin, and two to four spines on lateral margin. The chelipeds and the second and third pereopods are more setose.

### Genus *Pseudopaguristes* McLaughlin, 2002

#### *Pseudopaguristes laurentae* (Morgan & Forest, 1991)

*Paguristes laurentae* Morgan & Forest, 1991: 678, figs 12, 13.

*Paguristes brachytes* Komai, 1999: 3, figs 1-4.

*Pseudopaguristes gracilis* Rahayu, 2005: 28, figs 10, 11.

*Pseudopaguristes laurentae* — Rahayu 2005: 25. — McLaughlin in press.

MATERIAL EXAMINED. — **Madagascar.** 15°19.1'S, 46°11.8'E, 400 m, 7.XI.1972, 1 ♀ (2.9 mm). — 15°18.3'S, 46°10.3'E,

500-550 m, 8.XI.1972, 1 ♂ (2.8 mm). — 15°19.0'S, 46°11.8'E, 405 m, 8.XI.1972, 2 ♂♂ (2.8 and 3.0 mm); 1 ♀ (2.2 mm). — 12°40.0'S, 48°18.0'E, 205-185 m, 1.VIII.1973, 3 ♂♂ (1.8-2.4 mm); 2 ♀♀ (2.2 and 2.4 mm). — 12°38.5'S, 48°16.0'E, 240 m, 11.X.1974, 2 ♀♀ (both 1.4 mm); 1 ♀ ovig. (2.2 mm). — 12°19.0'S, 48°27'E, 250 m, coll. G. Cotellato, 1 ♂ (1.2 mm).

**Mozambique Channel.** West of Glorieuses Islands, *Bentheddi* Expedition, stn DR 8, 11°29.2'S, 47°18.2'E, 250 m, 19.III.1977, 1 ♀ (1.5 mm); 2 ♂♂ (1.8 and 2.0 mm). — North east of Mozambique Channel, West of Glorieuses Islands, *Bentheddi* Expedition, stn DR 8, 12°29.2'S, 47°18.2'E, 250 m, 19.III.1977, 1 ♂ (1.8 mm); 1 ♀ (2.2 mm); 1 ovig. ♀ (2.0 mm). — North east of Mozambique Channel, West of Grandes Glorieuses, stn F 98, 11°35.5'S, 47°16.5'E, 280-460 m, 7.IV.1977, 1 ♂ (3.0 mm).

**La Réunion.** *Marion Dufresne*, MD32, stn DS 142, 20°50'S, 55°38'E, 480-675 m, 3.IX.1982, 1 ♂ (1.2 mm).

DISTRIBUTION. — Sagami-nada, Torishima, Kii peninsula, Japan; South Sulawesi, Madura Bay and Kai Islands in Indonesia; eastern Australia to Southwest Australia, from Rottnest Island, north to the vicinity of Point Cloates, Western Australia, and herein recorded from Madagascar; 121-675 m.

#### REMARKS

Most of the specimens used in this study are smaller than the holotype of *P. laurentae*. Variations were observed in the number and size of spines on the antennal peduncles and chelipeds. The antennal peduncles of the present specimens have more spines on the fifth segment (two or three spines mesially), and the ventrodistal angle of the third segment sometimes terminates in an acute bifid spine, whereas in the type there is one spine on the fifth segment, and the ventrodistal angle of the third segment terminates in a acute spine. The mesial faces of the dactyls of the chelipeds each has a row of tuberculate spines along the midline or near the dorsal margin, whereas the type has a row of low protuberances.

#### *Pseudopaguristes araeos* n. sp. (Fig. 4)

TYPE MATERIAL. — **Madagascar.** 15°20.0'S, 46°11.8'E, 245-250 m, 7.XI.1972, holotype, ♂ (3.4 mm) (left 2nd pereopod missing) (MNHN-Pg 7742). — 15°21.0'S, 46°12.5'E, 150 m, 8.XI.1972, paratype, ♂ (4.7 mm) (MNHN-Pg 7743).

ETYMOLOGY. — From the Greek *araios*, meaning thin or narrow, in reference to the ocular peduncles, which are narrowed distally.

TYPE LOCALITY. — Madagascar.

DISTRIBUTION. — Madagascar; 150 to 250 m.

#### DESCRIPTION

Eight pairs of biserial gills; branchiostegites each with one or two spinules distally on distal and dorsal margins, concealed by moderately dense setae. Shield (Fig. 4A) slightly longer than broad; dorsal surface with few tubercles or subacute spines and several tufts of setae laterally, few scattered tufts dorsolaterally. Rostrum low and broad, not reaching bases of ocular acicles and considerably shorter than lateral projections. Lateral projections obtusely triangular, without terminal spine.

Ocular peduncles subequal, left slightly longer than right, 0.8 of shield length, slender, swollen basally, tapering distally; dorsomesial faces of peduncles each with row of moderately dense and long setae; corneal diameter 0.1 peduncular length. Ocular acicles subtriangular, terminating subacutely or in simple terminal spine; separated by less than basal width of one acicle. Interocular lobe subquadrate, with several spinules distally.

Antennular peduncles, when fully extended, exceeding left cornea by 0.75 length of ultimate segment; basal segment with small distal spine on lateral face of statocyst lobe.

Antennal peduncles reaching 0.8 of left ocular peduncle; fifth segment with few scattered setae; fourth and third segments each with ventrodistal margin drawn out into acute spine; second segment with dorsolateral distal angle produced, terminating in simple or bifid spine, lateral and ventral surfaces with sparse long setae, dorsomesial distal angle with small spine, mesial margin with dense setae; first segment unarmed. Antennal acicle reaching to proximal 0.3 of fifth peduncular segment, terminating in prominent bifid spine; one spine on lateral margin and moderately dense and long setae concealing armature. Antennal flagellum slightly longer than shield; articles each with two to four moderately long setae proximally, slightly more numerous and longer setae distally.

Chelipeds subequal, armature similar; left slightly larger. Left cheliped (Fig. 4B) with dactyl almost twice length of palm; dorsomesial margin delimited by row of large tubercles, larger spines proximally becoming smaller distally, dorsal surface with irregular rows of tubercles, accompanied by long sparse setae; mesial face (Fig. 4C) with two irregular rows of tubercles: one in midline and one near dorsal margin, several tubercles and protuberances near ventral margin, obscured by covering of moderately long, dense setae; cutting edge with row of large calcareous teeth, one larger tooth medially, terminating in small corneous claw; moderately wide hiatus between dactyl and fixed finger. Palm with row of moderately large spines on dorsomesial margin, convex dorsal surface with rows of tuberculate spines, each accompanied by long sparse setae, dorsolateral margin with row of tuberculate spines, becoming more prominent distally on fixed finger and concealed by moderately dense long setae; mesial face with scattered spinulose tubercles; ventral margin with prominent tuberculate spines; lateral face of palm and fixed finger with irregular rows of spinulose tubercles, ventral surface with irregular rows of spinulose tubercles, increasing in size on fixed finger and accompanied by tufts of setae; cutting edge of fixed finger with row large calcareous teeth, one larger tooth medially, terminating in small corneous claw. Carpus with row of moderately prominent spines on dorsomesial margin; dorsolateral margin not delimited, dorsal and lateral surfaces with numerous, small tuberculate spines, each accompanied by long setae; mesial face with row of small spinulose tubercles on distal margin, partially obscured by tufts of long setae, remainder of surface with low, spinulose tubercles, accompanied by tufts of setae. Merus with row of spines on distal margin extending onto lateral and mesial faces, dorsal surface with subdistal short, transverse row of spines also extending onto lateral and mesial faces, remainder of dorsal margin with row of spinules; mesial face smooth, ventromesial margin with double row of small, spinulose tubercles or tuberculate spines and tufts of dense setae; lateral face spinulose, at least ventrally, ventrolateral margin with row of small, tuberculate spines and long setae; ventral surface with covering of short, dense setae.

Ischium with row of small tubercles on ventromesial margin concealed by long dense setae.

Right cheliped with same armature as left but with more prominent spines and tubercles.

Second and third pereopods (Fig. 4D, E) differ somewhat in armature; right pereopods slightly longer than left. Dactyls 1.6 longer than propodi; dorsal margins each with moderately stiff, long setae; ventral margins each with one or two tiny spines and long setae; lateral faces each with row of sparse tufts of short setae medially; mesial face of right second with three rows of tufts of long setae, medial row with longer setae, mesial faces of third each with three irregular rows of sparse tufts of moderately long setae. Propodus of right second pereopod with row of prominent spines on dorsal surface accompanied by tufts of long setae; propodi of third pereopods unarmed, dorsal surfaces each with sparse tufts of setae; ventral margins of second and third pereopods each with sparse tufts of setae; mesial faces each with three rows of sparse tufts of long setae; lateral faces each with two rows of sparse tufts of setae. Carpi each with shallow longitudinal sulcus on lateral face accompanied by scattered long and moderately dense setae; carpus of right second pereopod with dorsal row of prominent spines and few small spines and tuft of moderately long setae; carpi of third pereopods each with prominent dorsodistal spine and tufts of setae. Merus of right second pereopod with few spinules on ventral margin and dorsal margin with rows of long setae, third unarmed, but with long setae. Ischia unarmed but with dense ventral setae. Fourth pereopods (Fig. 4F) each with small preungual at base of claw; no dorsodistal spine on carpus.

Male first pleopods (Fig. 4G, H) each with tuft of setae on superior mesial angle of basal lobe; single row of small hook-like corneous spines on distal margin of inferior lamella; external lobe over-reaching inferior lamella, internal lobe broad, with marginal setae and moderately dense setae covering inner surface. Second pleopods (Fig. 4I, J) each with basal segment and endopod glabrous; appendix masculina broad, fan-shaped, with long setae on distal margin and inferior surface. Left pleopods 3-5 with well developed exopods; endopods very rudimentary. Female unknown.

Telson (Fig. 4K) with deep lateral incisions; median cleft small, shallow; posterior lobes markedly asymmetrical, terminal margins armed with four spines on each lobe.

#### VARIATION

The chelipeds of the paratype, which are larger than those of the holotype, have larger and denser tubercles and tuberculate spines on the dorsal surfaces of the dactyls and fixed fingers. The dactyls of the second and third pereopods are slightly curved, and 1.5 the length of the propodi. The second left pereopod have the same armament as the right. The telson has five and three spines on the left and right lobes, respectively.

#### REMARKS

*Pseudopaguristes araeos* n. sp. is similar to *P. laurentae* in the shape of the antennal acicles which are triangular, and the ocular peduncles swollen basally. However, in the new species the ocular peduncles are much slenderer with small, elongate corneas compared to the stout ocular peduncles and small rounded corneas in *P. laurentae*. The appendix masculina of the second male pleopods of *P. laurentae* is not as broad as in *P. araeos* n. sp. Other characters that distinguish this new species from *P. laurentae* are the presence of three irregular rows of tuberculate spines on the mesial face of the dactyl of the cheliped (*P. laurentae* has only one row of spines on the mesial face of this appendage), the presence of only one or two tiny corneous spines on ventral margin of each dactyl of the second and third pereopods (*P. laurentae* has a row of few spines distally), and the presence of a preungual process on the base of dactylar claw of the fourth pereopod (in *P. laurentae* the preungual process is absent).

#### Genus *Stratiotes* Thomson, 1899

##### *Stratiotes micheleae* Rahayu, 2005

*Stratiotes micheleae* Rahayu, 2005: 16, figs 6, 7.

MATERIAL EXAMINED. — Madagascar. 12°40'S, 48°09.5'E, 595-605 m, 13.IX.1972, 1 ♀ (5.0 mm). — 12°50.0'S, 48°01.2'E, 580-585 m, 14.IX.1972, 1 ♀ (4.8 mm). —

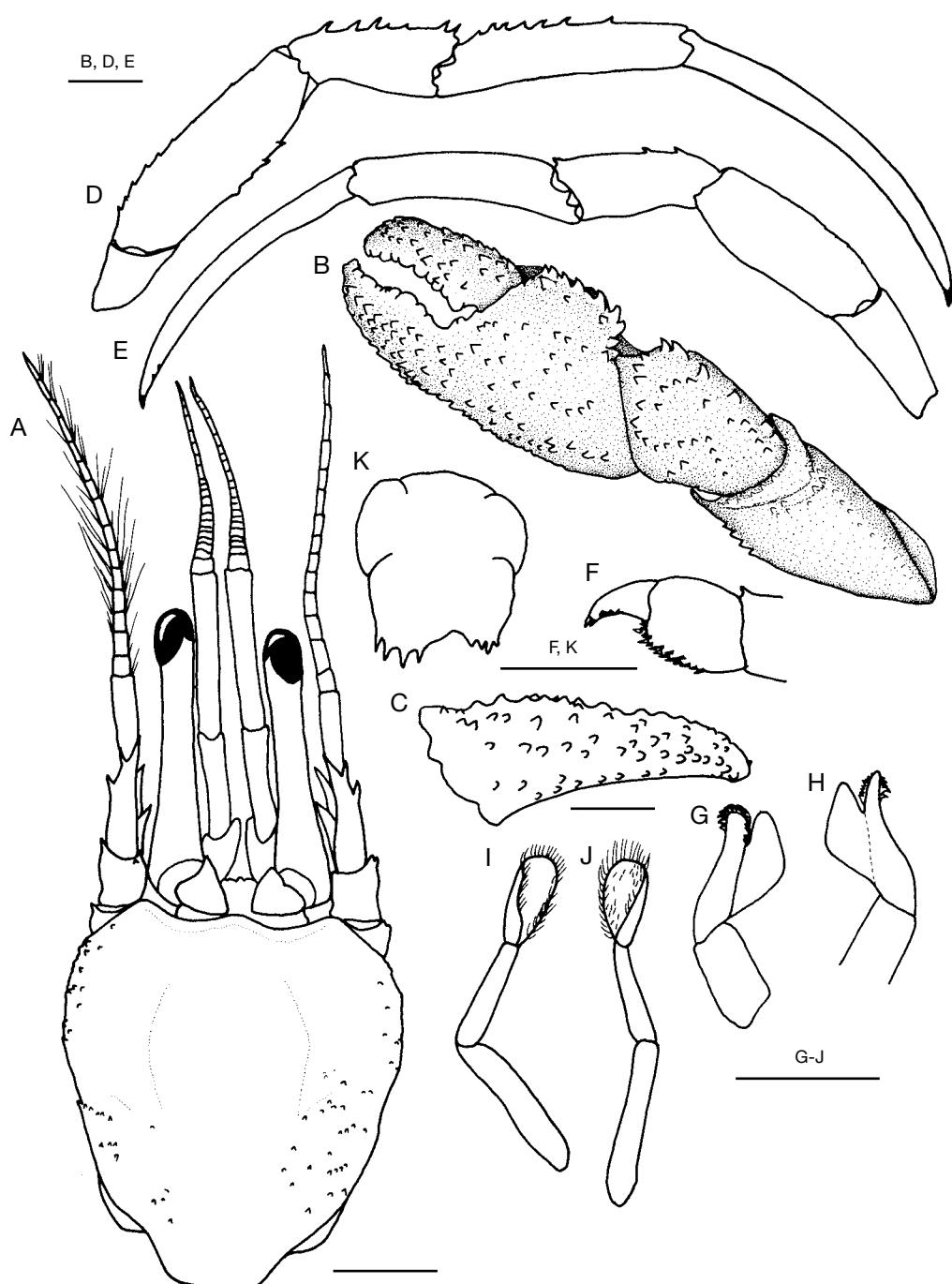


FIG. 4. — *Paguristes araeos* n. sp., holotype, ♂, 3.4 mm: A, shield and cephalic appendages; B, left cheliped, dorsal view; C, dactyl of left cheliped, mesial face; D, left second pereopod, lateral view; E, right third pereopod, lateral view; F, left fourth pereopod, lateral view; G, male first pleopod, external view; H, same, internal view; I, male second pleopod, internal view; J, same, external view; K, telson, dorsal view. Setae partially omitted. Scale bars: 1 mm.

15°18'S, 46°12.1'E, 480-510 m, 8.XI.1972, 2 ♀♀ (3.4-3.8 mm).

**Mozambique Channel.** *Bentheddi* Expedition, stn DR 38, Mayotte, East of Bandelé Reef, 12°54.8'S, 45°15.6'E, 200-500 m, 26.III.1977, 1 ♀ (2.4 mm).

DISTRIBUTION. — Indonesia, Madagascar; 200 to 605 m.

#### REMARKS

The specimens in the collection studied agree well with the description of this species by Rahayu (2005). The spines on the terminal margin of the lobes of the telson varied from small, almost obsolete, to large.

#### *Stratiotes abbreviatus*

(Dechancé, 1963) n. comb.  
(Fig. 5)

*Paguristes jousseaumei* var. *perspicax* — Nobili 1906: 87  
(*pro parte*).

?*Paguristes pusillus* var. — Nobili 1906: 88.

*Paguristes abbreviatus* Dechancé, 1963: 297, figs 3, 6, 9.

MATERIAL EXAMINED. — **Bahrein coast.** Expedition J. Bonnier and Ch. Pérez on Arabian coasts, stn LVI, holotype, ♀ ovig. (3.8 mm) (MNHN-Pg 1525). — Same locality as holotype, 2 ♀♀ ovig. (2.6-3.4 mm) (MNHN-Pg 1524).

**Madagascar.** Nosy Bé, 1 ♀ (2 mm) (MNHN-Pg 1526). — Nosy Bé, 15-22 m, 15.I.1971, coll. P. Laboute, 1 ♀ (1.9 mm). — Tuléar, Grand récif, stn 97, 1.XII.1965, coll. Thomassin, 1 ♀ ovig. (3.2 mm). — Tuléar, stn 369, coll. Thomassin, 1 ♂ (1.8 mm). — Tuléar, stn 435, coll. Thomassin, 1 ♀ ovig. (3.8 mm).

DISTRIBUTION. — Bahrein coast, Nosy Bé and Tuléar, Madagascar.

#### REDESCRIPTION

Twelve pairs of biserial gills; branchiostegites each with two or three spinules on distal margin concealed by dense setae. Shield longer than broad, dorsal surface with several tubercles or subacute spine and several tuft of setae. Rostrum broadly triangular, slightly overreaching bases of ocular acicles, terminating acutely. Lateral projections as long as rostrum, acutely triangular, each with terminal spine.

Left ocular peduncle slightly longer than right, 0.6 of shield length, slender, swollen basally, narrowing distally to small, rounded cornea; dorsomesial and dorsolateral surfaces of peduncles each with row of dense setae on half proximally; corneal diameter 0.1 of peduncular length. Ocular acicles subquadrate, approximate, terminal margin with five or six spines, decreasing in size laterally.

Antennular peduncles, when fully extended, exceeding corneas by 0.2 of length of ultimate segments; basal segment with small median spine on lateral margin.

Antennal peduncles reaching 0.6 of ocular peduncles; fifth and fourth segments unarmed, with few scattered setae; third segment with ventrodistal margin rounded, three to six spinules on terminal margin and few scattered setae; second segment with dorsolateral distal angle produced, terminating in bifid spine, lateral margin with two spines, lateral and ventral surfaces with sparse setae, dorsomesial distal angle with two small spines, mesial margin with few setae; first segment with one distal spine dorsolaterally and few long setae. Antennal acicle reaching half length of fifth peduncular segment, terminating in prominent bifid spine; three spines on lateral margin, three or four spines on mesial margin and dense and long plumose setae concealing armature. Antennal flagellum shorter than shield; articles each with two to four moderately long setae, slightly more numerous setae distally.

Chelipeds subequal, left slightly larger than right, armament similar. Left cheliped (Fig. 5A, B) with dactyl almost twice length of palm; dorsomesial margin delimited by row of large corneous-tipped spines, with row of short, stiff setae circumscribing each spine, larger spines proximally, becoming smaller distally; dorsal surface with row of small, corneous-tipped spines, each circumscribed by row of short stiff setae; mesial face (Fig. 5C) with irregular rows of low protuberances, each circumscribed by row of short, stiff setae; cutting edge with row of moderately small calcareous teeth on proximal half, distal half with small corneous teeth, terminating in corneous claw; narrow hiatus proximally between dactyl and fixed finger. Palm with row of four large corneous-tipped spines on dorsomesial margin, row of short stiff setae circumscribing each

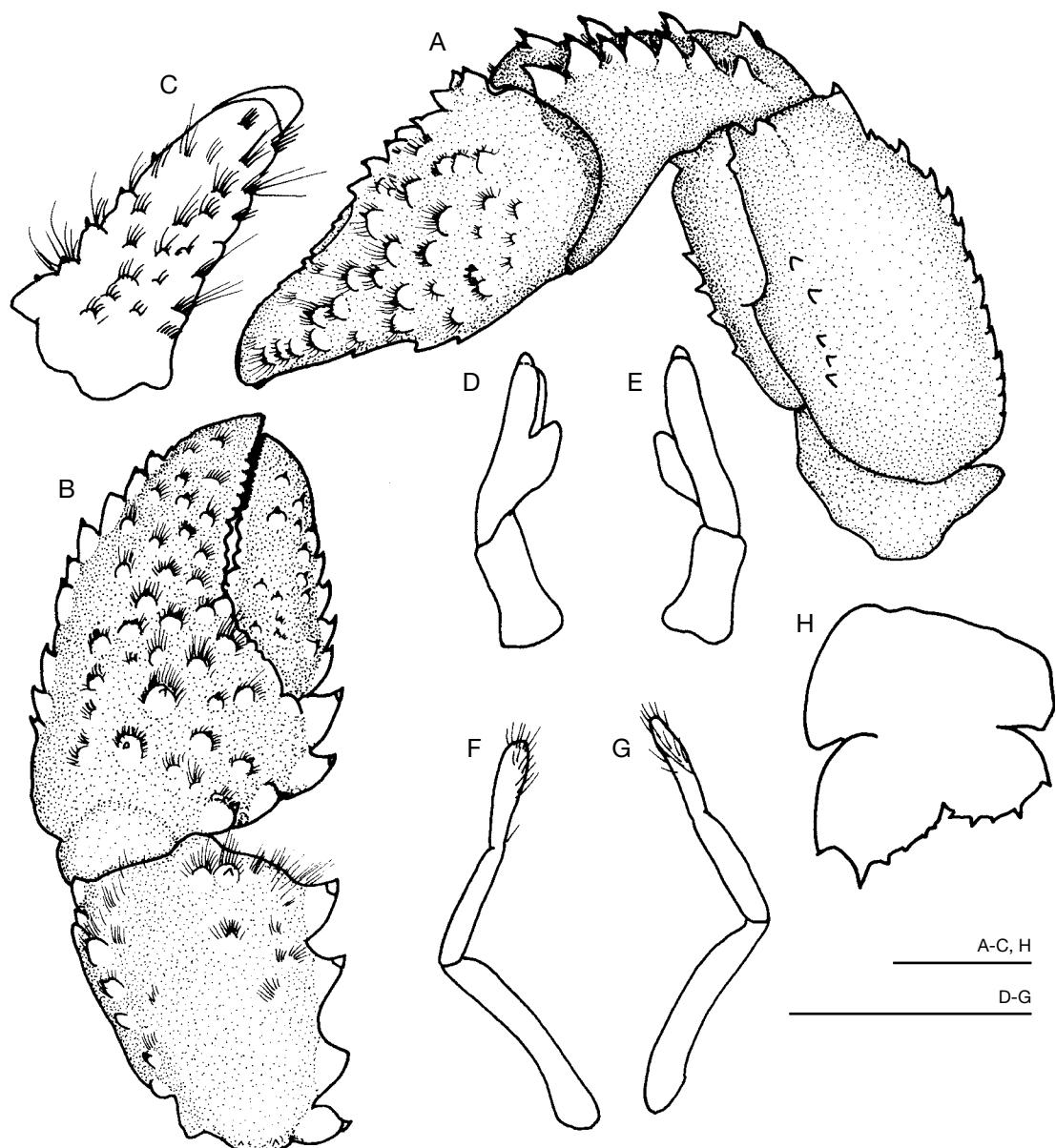


FIG. 5. — *Stratiotes abbreviatus* (Dechancé, 1963) n. comb., ♀, 3.8 mm: A, left cheliped, mesial view; B, left cheliped, dorsal view; C, dactyl of left cheliped, mesial face; D, male first pleopod, external view; E, same, internal view; F, second male pleopod, internal view; G, same, external view; H, telson, dorsal view. Setae partially omitted. Scale bars: 1 mm.

spine, convex dorsal surface with irregular rows of large corneous-tipped spines, each circumscribed by row of short stiff setae, rounded dorsolateral margin with row of large corneous-tipped spines,

becoming less prominent distally on fixed finger, each spine also circumscribed by row of short stiff setae; lateral face of palm and fixed finger with irregular row of spinulose tubercles, each circumscribed

by row of short stiff setae, ventral surface with row of spinulose tubercles, decreasing in size on fixed finger and accompanied by tufts of setae; mesial face with few protuberances and tufts of short stiff setae; cutting edge of fixed finger with row of moderately large calcareous teeth, terminating in small corneous claw. Carpus with row of four prominent, corneous-tipped spines on dorsomesial margin, each accompanied by row of short, stiff setae; dorsolateral margin delimited by row of six prominent corneous-tipped spines accompanied by row of stiff setae, dorsal surface with row of tuberculate spines near dorsomesial margin, each also circumscribed by row of short and stiff setae; dorsodistal margin with row of corneous-tipped spinules; mesial face with longitudinal row of tufts of short stiff setae. Merus with one prominent spine and row of long stiff setae on distal margin extending onto lateral and mesial faces, dorsal surface with subdistal short, transverse row of spinules extending onto lateral and mesial faces, remainder of dorsal margin with row of prominent spines becoming smaller proximally, each spine accompanied by tuft of short, stiff setae; mesial face smooth, ventromesial margin with row of small, spinulose tubercles and sparse tufts of setae; lateral face spinulose, at least dorsally, ventrolateral margin with row of tuberculate spines and long plumose setae. Ischium with row of small tubercles on ventromesial margin and sparse long setae. Right cheliped slightly smaller than left, armature similar but with less prominent spines.

Left second and third pereopods slightly longer than right. Dactyls slightly longer than propodi, dorsal margins each with row of dense setae, ventral margins each with five to seven corneous spines (second) or five to 10 corneous spines (third) concealed by dense plumose setae. Propodi of second pereopods each with row of prominent, corneous-tipped spines concealed by stiff, sometimes plumose, setae on dorsal margin; dorsal surface of third unarmed but with dense, sometimes plumose, setae; mesial faces each with row of tufts of short setae medially and transverse rows of tufts of short setae (second), or long plumose setae (third) on mesioventral and ventral surfaces, and row of tufts of short setae near dorsal margin; lateral faces of second each with row of tufts of short, stiff setae medially; lateral faces

of third each with row of spinules near ventral margin, accompanied by tufts of setae. Carpi of second pereopods each with irregular row of seven or eight prominent, corneous-tipped spines on dorsal margin, concealed by dense plumose setae. Third pereopods each with prominent distal spine and also dense plumose setae on dorsal margin; mesial faces each with row of tuft of plumose setae; lateral face each with longitudinal sulcus accompanied by row of tufts of dense plumose setae and with two or three distal spines, few tufts of setae laterad of sulcus; ventral surface with dense long plumose setae distally. Meri each with dorsal row of low protuberance, few spines and long, dense plumose setae proximally; ventral margins each with row of dense long plumose setae, mesioventral margin with several small corneous-tipped spines (second) or unarmed (third). Ischia each with one or two spinules on ventromesial margin distally and dense plumose setae. Fourth pereopods each with preungual process at base of claw, no distal spine on dorsal margin of carpus.

Male with paired first and second pleopods. Male first pleopods (Fig. 5D, E) each with tuft of setae on superior mesial angle of basal lobe; distal margin of inferior lamella unarmed; external lobe overreaching inferior lamella, internal lobe short, with marginal setae. Second pleopods (Fig. 5F, G) each with basal segment glabrous; endopod with row of moderately long setae on mesial margin, distal angle with tuft of stiff setae; appendix masculina with long setae on distal margin and inferior surface. Female with single gonopore on coxa of third left pereopod, first pleopod 2-segmented. Brood pouch small, obtusely triangular with marginal long plumose setae. Eggs small, attached to second and third pleopods.

Telson (Fig. 5H) with moderately deep lateral incisions separating anterior and posterior portions; posterior lobes asymmetrical, separated by small, V-shaped median cleft, terminal margins each armed with three to six spines.

#### VARIATION

In small female specimens ( $SL \leq 2.6$  mm) the setae on chelipeds and pereopods are less dense; and the ventral margins of the dactyls of the second and third pereopods each have four to 10 corneous spines. In

male specimens the terminal margins of posterior lobes of telson have five or six spines.

#### REMARKS

*Stratiotes abbreviatus* was described by Dechancé (1963) as *Paguristes abbreviatus*. Rahayu (2005) revised *Paguristes* s.l. and transferred to *Stratiotes* those species with 12 pairs of gills. Examination of Dechancé's taxon has shown that it has 12 pairs of biserial gills; therefore it is also transferred to *Stratiotes*. The redescription herein included is based on the holotype, paratypes and the specimens collected by Thomassin in Tuléar, Madagascar.

Differences were observed in setation between the types and the specimens reported herein. In the holotype and paratypes, the setation of the chelipeds and pereopods is much reduced; the specimens are almost glabrous. It is probable that the setae were removed during a previous study in order to see the armament clearly. On the specimens from Tuléar the setae were dense and matted by mud. When the mud was removed, the plumose setae and row of stiff setae circumscribing each spine were revealed. The shape of shield and cephalic appendages and the armament of the chelipeds and pereopods showed that they all belong to the same species.

The female brood pouch, although small, is present in the females examined, while Dechancé (1963: 298) mentioned that types were "sans repli membraneux sur l'abdomen". The holotype and paratypes have broken or damaged pleons, and it is probable that the brood pouches are missing.

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