

New records and a new species in the genus *Turleania* McLaughlin, 1997 (Crustacea, Decapoda, Anomura, Paguridae) from MUSORSTOM cruises, with a key to species

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McLaughlin P. A. 2007. — New records and a new species in the genus *Turleania* McLaughlin, 1997 (Crustacea, Decapoda, Anomura, Paguridae) from MUSORSTOM cruises, with a key to species. *Zoosystema* 29 (3): 583-593.

KEY WORDS

Crustacea,
Anomura,
Paguridae,
Turleania,
new records,
new species.

ABSTRACT

The ranges of two species of the hermit crab genus *Turleania* McLaughlin, 1997, *T. multispina* McLaughlin, 1997 and *T. senticosa* (McLaughlin & Haig, 1996), heretofore known from the Philippine Islands and Indonesia, are extended to include the New Caledonia economic zone. Because the latter species has proved to be the senior subjective synonym of *T. similis* Komai, 1999, the range of *T. senticosa* also now includes the Ogasawara Islands of Japan. A new species, *Turleania boucheti* n. sp., is described and illustrated from materials collected in the New Caledonia and Wallis and Futuna economic zones.

RÉSUMÉ

Nouvelles occurrences et une nouvelle espèce dans le genre Turleania McLaughlin, 1997 (Crustacea, Decapoda, Anomura, Paguridae) provenant des campagnes MUSORSTOM, avec une clé des espèces.

Les répartitions de deux espèces du genre de bernard-l'hermite *Turleania* McLaughlin, 1997, *T. multispina* McLaughlin, 1997 et *T. senticosa* (McLaughlin & Haig, 1996), jusqu'ici connues des Philippines et d'Indonésie sont étendues pour inclure la zone économique de Nouvelle-Calédonie. Cette dernière espèce ayant été reconnue comme synonyme subjectif plus ancien de *T. similis* Komai, 1999, la répartition de *T. senticosa* inclut aussi dorénavant les îles Ogasawara au Japon. Une nouvelle espèce, *Turleania boucheti* n. sp., est décrite et illustrée sur la base de matériel récolté dans les zones économiques de Nouvelle-Calédonie et de Wallis et Futuna.

MOTS CLÉS

Crustacea,
Anomura,
Paguridae,
Turleania,
nouvelles occurrences,
espèce nouvelle.

INTRODUCTION

The name *Turleania* was proposed by McLaughlin (1997) as a replacement for *Laurentia* McLaughlin & Haig, 1996, when it was discovered that the latter name was a junior homonym of the lepidopteran insect genus *Laurentia* Ragonot, 1888. All four of the originally included species, *T. albatrossae* (McLaughlin & Haig, 1996), *T. balli* (McLaughlin & Haig, 1996), *T. sibogae* (McLaughlin & Haig, 1996), and *T. senticosae* (McLaughlin & Haig, 1996), were described from Indonesian waters, as was a fifth species, *T. multispina* McLaughlin, 1997. Komai (1999) extended the ranges of all five taxa to include the Philippine Islands and described two new species from the Japanese Oceanic Islands.

During ongoing studies of the hermit crabs collected during the MUSORSTOM and associated expeditions in the western Pacific, one new species of this genus has been recognized and the distributions of *T. multispina* and *T. senticosae* have been expanded to include the New Caledonia Exclusive Economic Zone. In addition to emending the generic diagnosis to incorporate current terminology and recent observations, *Turleania similis* Komai, 1999 is placed in synonymy with *T. senticosae*. A key to the currently recognized species is presented.

MATERIALS AND METHODS

Materials for the present study have come from samples collected during the cruises BIOCAL and MUSORSTOM 4 to 7. General information about these cruises, maps showing the specific areas of coverage, and station data are given by Richer de Forges (1990) for BIOCAL and MUSORSTOM 4-6 and by Richer de Forges & Menou (1993) for MUSORSTOM 7. The holotype and paratypes of the new species and the supplemental materials of the three taxa reported herein are deposited in the collection of the Muséum national d'Histoire naturelle, Paris (MNHN) with the catalog code Pg. The abbreviations CP, DW, stn, and ovig. refer to Charcot dredge, Warén dredge, station, and ovigerous, respectively. MUSORSTOM is the acronym for the joint expeditions of the MNHN and the Office de

la Recherche scientifique et technique d'Outre-Mer (ORSTOM), now Institut de Recherche pour le Développement (IRD). The abbreviation ZMA is used for the Zoölogical Museum, University of Amsterdam; POLIPI is used for Puslitbang Oseanologi – Indonesian Institute of Sciences, Jakarta; and USNM is used for the National Museum of Natural History, Smithsonian Institution, Washington, DC. One measurement, shield length, measured from the tip of the rostrum to the midpoint of the posterior margin of the shield, and given in parentheses following specimen sex, provides an indication of animal size. Ocular peduncle length was measured along the lateral surface of the left ultimate peduncular segment, including the cornea. Corneal diameter represents the maximum width of the cornea when viewed dorsally. Terminology for the description and emended diagnosis follows that of McLaughlin (2003), except for the substitution of pleon for abdomen as recommended by Schram & Koenemann (2004).

SYSTEMATICS

Superfamily PAGUROIDEA Latreille, 1802
Family PAGURIDAE Latreille, 1802

Genus *Turleania* McLaughlin, 1997

Anapagrides de Saint Laurent-Dechancé, 1966: 262 (in part). — Miyake 1978: 142 (in part).

Anapagrides – de Saint Laurent 1968: 1115. — Haig & Ball 1988: 177. Not *Anapagrides* de Saint Laurent-Dechancé, 1966.

Laurentia McLaughlin & Haig, 1996: 76. Not *Laurentia* Ragonot, 1888.

Turleania McLaughlin, 1997: 476. — Komai 1999: 49. Gender feminine.

TYPE SPECIES. — *Laurentia albatrossae* McLaughlin & Haig, 1996, by original designation.

EMENDED DIAGNOSIS. — Eleven pairs of deeply quadrilateral gills. Rostrum well developed, triangular; terminally acute or blunt. Ocular peduncles with corneas slightly to prominently dilated; ocular acicles simple or multifid. Antennal peduncle with supernumerary segmentation. Maxillule with external lobe of endopod somewhat produced, not recurved; with or without terminal seta. Third maxilliped with crista dentata well developed, without accessory tooth. Chelipeds

unequal or subequal, with right appreciably stouter, but not necessarily longer. Second and third pereopods with or without corneous spines on ventral margins of dactyls; carpi each with small dorsodistal spine. Sternite of third pereopods (sixth thoracic sternite) with subquadrate or weakly subrectangular anterior lobe, unarmed or with one to few marginal spines or tubercles. Fourth pereopod subchelate or weakly semichelate; propodal rasp consisting of single row of corneous scales. Sternite of fifth pereopods (eighth thoracic sternite) as single subquadrate, circular or ovate lobe. Males with moderately long to long sexual tube developed from coxa of left fifth pereopod, frequently folded or coiled, terminating in tuft of setae, right fifth coxa with gonopore and sometimes papilla or very short sexual tube; pleon with unequally biramous left pleopods 3-5. Females with paired gonopores, no paired and modified first pleopods; pleon with well developed, unpaired, biramous left pleopods 2-4, pleopod 5 as in males. Uropods markedly asymmetrical. Telson without or with very weak lateral indentations indicating anterior and posterior portions; posterior lobes symmetrical or asymmetrical, separated by distinct median cleft; terminal margins usually oblique, unarmed or with few small spines.

REMARKS

As pointed out by McLaughlin & Haig (1996), de Saint Laurent-Dechancé (1966) established the genus *Anapagrides* for three undescribed species and based her generic diagnosis on characters those taxa had in common. But she designated *Eupagurus* (*Spiropagurus*) *facetus* Melin, 1939 as the type species, incorrectly believing that it shared the same characters. Haig & Ball (1988) added a fourth species to the genus, but only as *Anapagrides* sp. After McLaughlin & Sandberg (1995) redescribed Melin's (1939) taxon, it became clear that *Anapagrides facetus* could not be considered congeneric with the undescribed taxa and the latter were made available to McLaughlin & Haig. The four taxa were represented by just one, one, two, and three specimens, respectively, most quite small. McLaughlin (1997) increased the known number of specimens of *T. senticosa* from three to 10, and described the fifth species, *T. multispina*,

on five specimens. The additional 14 specimens of *T. senticosa* and six of *T. multispina* now available has made it more feasible to assess morphological variability within the genus.

With the discovery of *Turleania boucheti* n. sp., McLaughlin's (2003) key to the genera of the Paguridae will no longer accurately lead the user to *Turleania*. In the new species described herein, although the right cheliped is appreciably stouter than the left, it is not necessarily longer, as is also the case for species of *Iridopagurus* de Saint Laurent-Dechancé, 1966. Carcinologists familiar with both genera would have no difficulty in distinguishing between them, but as both share the majority of characters used in McLaughlin's (2003) key, attention is called to a significant character not previously emphasized. Species of *Turleania* are distinct in the development of the sternite of the fifth pereopods (eighth thoracic sternite) as a single small, ovate, subquadrate or circular lobe. This same sternite in species of *Iridopagurus* is subrectangular and has a generally bilobed appearance (see García-Gómez 1983). Similarly, the anterior lobe sternite of the third pereopods (sixth thoracic sternite) is most often subquadrate or subovate in *Turleania*, but broadly and irregularly rectangular in *Iridopagurus*; however, variability in both genera makes this character less reliable. For example, in *T. spinimanus* Komai, 1999 this lobe is described as "hammer-shaped" and in *Iridopagurus margaritensis* García-Gómez, 1983, it is described as irregularly semisubcircular.

McLaughlin (1997) noted in her diagnosis of *Turleania* that the protrusion of the vas deferens from the right male gonopore occasionally produced a slight papilla, but that no sexual tube was developed. However, in males of *T. senticosa* from New Caledonia and males of *T. boucheti* n. sp. from the Wallis and Futuna economic zone, a short, but definitive sexual tube, as defined by Tudge & Lemaitre (2004), is sometimes present.

KEY TO THE SPECIES OF *TURLEANIA* McLAUGHLIN, 1997

1. Ocular acicles simple 2
- Ocular acicles multifid *T. multispina*
2. Right chela with dorsal surface unarmed or with very few scattered spinules 3
- Right chela with dorsal surface armed with numerous spines or spinules 5

3. Dactyl of right cheliped with row of spines on dorsomesial margin *T. balli*
 — Dactyl of right cheliped unarmed or with only few low protuberances on dorsomesial margin 4
4. Corneas only very slightly dilated; dorsomesial margin of right chela with few widely-spaced spines; dactyls of ambulatory legs each with 6-8 corneous spines on ventral margin *T. sibogae*
 — Corneas prominently dilated; dorsomesial margin of right chela unarmed; dactyls of ambulatory legs without corneous spines on ventral margins *T. boucheti* n. sp.
5. Dorsomesial margin of palm of right chela with row of prominent spines *T. albatrossae*
 — Dorsomesial margin of palm of right chela with spinules or irregular rows of small spines 6
6. Anterior lobe of sternite of third pereopods subovate to subquadrate, with 0-5 small marginal spines *T. senticosa*
 — Anterior lobe of sternite of third pereopods "hammer-shaped", unarmed *T. spinimanus*

Turleania multispina McLaughlin, 1997
 (Fig. 1A)

Turleania multispina McLaughlin, 1997: 497, fig. 12. — Komai 1999: 50.

HOLOTYPE. — **Indonesia**. Kai Islands, KARUBAR, stn CP 35, 06°08'S, 132°45'E, 390-508 m, 27.X.1991, ovig. ♀ (2.3 mm) (MNHN-Pg 5273).

PARATYPES. — KARUBAR, stn DW 02, 05°47'S, 132°13'E, 209-230 m, 22.X.1991, 1 ovig. ♀ (2.1 mm) (USNM 276003). — Stn DW 03, 05°48'S, 132°13'E, 278-301 m, 22.X.1991, 1 ♂ (1.8 mm) (MNHN-Pg 5271); 1 ♀ (1.9 mm) (POLIPI). — Stn DW 31, 05°40'S, 132°51'E, 288-289 m, 26.X.1991, 1 ♀ (2.1 mm) (MNHN-Pg 5272).

NEW MATERIAL EXAMINED. — **New Caledonia**. MUSORSTOM 4, stn CP 158, 18°49.30'S, 163°15.00'E, 620 m, 15.IX.1985, 1 ♀ (2.2 mm) (MNHN-Pg 7716). — Stn CP 169, 18°54.03'S, 163°11.20'E, 600 m, 17.IX.1985, 1 ♂ (1.8 mm), 1 ♀ (1.5 mm), 1 ovig. ♀ (2.9 mm) (MNHN-Pg 7717). — Stn CC 177, 18°54.60'S, 163°10.00'E, 540-600 m, 18.IX.1985, 1 ♂ (2.4 mm) (MNHN-Pg 7740). — Stn CP 199, 18°50.00'S, 163°14.50'E, 600 m, 20.IX.1985, 1 ovig. ♀ (2.4 mm) (MNHN-Pg 7718).

DISTRIBUTION. — Kai Islands, Indonesia, Philippine Islands, and now New Caledonia; 309-620 m.

REMARKS

As previously indicated, Komai (1999) commented that all five species of *Turleania* known at that time

from Indonesia also were found in the Philippine Islands; however, he gave no specific information for any of them. The presence of *T. multispina* in New Caledonian waters represents significant geographic and bathymetric range extensions. Although these specimens agree well with McLaughlin's (1997) original description, some variations have been observed. Most obvious are the oblique terminal margins of the ocular acicles (Fig. 1A), each provided with five or six long and moderately slender spines. The spines on both chelae appear slightly larger and more numerous than in McLaughlin's (1997: fig. 12b, c) illustrated holotype, and the spines on the dorsomesial margins of the right carpi form more definitive rows. The dorsomesial margin of the carpus of the left cheliped may be unarmed, as in the Indonesian specimens, or may have minute spinules in the larger specimens.

Turleania boucheti n. sp.
 (Figs 1B-H; 2A, B)

HOLOTYPE. — **Wallis and Futuna economic zone**. MUSORSTOM 7, stn DW 541, 12°26.7'S, 177°28.0'W, 608-600 m, 19.V.1992, ♀ (3.3 mm) (MNHN-Pg 7727).

PARATYPES. — **New Caledonia**. MUSORSTOM 5, stn DW 272, 24°40.91'S, 159°43.00'E, 500-540 m, 9.X.1986, 1 ♀ (1.5 mm) (MNHN-Pg 7728). BIOCAL, stn DW 33, 23°09.71'S, 167°10.27'E, 675 m, 29.VIII.1985, 2 ♂♂ (2.4, 2.6 mm), 1 ovig. ♀ (2.6 mm) (MNHN-Pg 7729).

Wallis and Futuna economic zone. MUSORSTOM 7, stn DW 530, 12°32.7'S, 176°39.3'W, 580-600 m, 16.V.1992, 1 ♂ (2.8 mm), 1 ♀ (3.2 mm) (MNHN-Pg 7730). — Stn DW 557, 11°41.1'S, 178°18.2'W, 608-600 m, 19.V.1992, 1 ♂ (2.3 mm, pleon missing), 1 ♀ (3.0 mm) (MNHN-Pg 7731).

OTHER MATERIAL EXAMINED. — **New Caledonia.** BIO-CAL, stn DW 33, 23°09.71'S, 167°10.27'E, 675 m, 29.VIII.1985, 2 ♂♂ (2.1, 2.1 mm), 1 ♀ (1.7 mm), 1 ovig. ♀ (2.3 mm), 1 specimen not removed from shell (MNHN-Pg 7732).

Wallis and Futuna economic zone. MUSORSTOM 7, stn DW 529, 12°31.4'S, 176°39.6'W, 500 m, 16.V.1992, 1 ovig. ♀ (3.6 mm, badly damaged) (MNHN-Pg 7733). — Stn DW 535, 12°29.6'S, 176°41.3'E, 470-340 m, 16.V.1992, 1 ♂ (2.7 mm, no chelipeds) (MNHN-Pg 7734).

ETYMOLOGY. — This species is named for Prof. Philippe Bouchet in recognition of his considerable and continuing contributions to the success of the MUSORSTOM exploratory program.

DISTRIBUTION. — Presently known only from New Caledonia and the Wallis, Alofi and Futuna Islands areas; 340-675 m.

DESCRIPTION

Shield (Fig. 1B) approximately as long as broad to distinctly longer than broad; anterior margin between rostrum and lateral projections concave; anterolateral margins terraced or sloping; posterior margin roundly truncate; dorsal surface often with anterior gastric region circumscribed by sparse tufts of setae. Rostrum triangular, reaching slightly to well beyond level of lateral projections, terminating acutely or subacutely. Lateral projections well developed, obtusely triangular, each with prominent marginal spine.

Ocular peduncles (including corneas) 0.3-0.6 length of shield, moderately stout; corneas prominently dilated, corneal diameter 0.5-0.7 of peduncular length. Ocular acicles acutely triangular, terminally subacute, each with prominent submarginal spine; mesial margins each with row of fine setae.

Antennular peduncles elongate, overreaching distal margins of corneas by slightly less to slightly more than entire lengths of ultimate peduncular segments; ultimate segments each with transverse row of long setae at distal margin and 1 or 2 lon-

gitudinal rows of shorter setae on dorsal surface, at least in distal half. Penultimate segments with few scattered setae. Basal segments each with small acute spine on lateral face of statocyst lobe.

Antennal peduncles overreaching distal corneal margins by approximately 0.5 lengths of ultimate segments. Fifth and fourth segments with scattered moderate to long setae. Third segment unarmed or with very small spinule on ventrodiscal margin. Second segment with dorsolateral distal angle produced, terminating in simple spine, occasionally supplemental tiny spinule on lateral or mesial margin; dorsomesial distal angle with spine. First segment with or without subacute spine on ventrolateral distal angle. Antennal acicle moderately long, reaching to or beyond proximal 0.2 of ultimate peduncular segment, unarmed but with few setae terminally and on mesial surface. Antennal flagellum with 1 or 2 moderately long and 1-4 shorter setae every 1 or 2 articles, at least in proximal half.

Third maxilliped with crista dentata comprised of 10-12 small teeth, most proximal 2 or 3 largest.

Chelipeds with right appreciably stouter than left, but not necessarily longer. Dactyl of right chela (Fig. 2A) usually approximately equal to slightly longer than palm and slightly shorter than fixed finger, occasionally distinctly shorter; dorsomesial margin not delimited; surfaces unarmed but all with covering of low, short slightly elevated ridges provided with moderately dense long setae not concealing integument, or simply with scattered moderate to long setae. Palm 0.7-0.8 length of carpus, dorsal and ventral surfaces convex, unarmed but each with covering of similar short, low, transverse ridges and moderate to long setae, densest dorsally, or simply scattered moderate to long setae; rounded mesial and lateral faces each also with rows of very low, short, transverse ridges and moderate to long setae; cutting edge of fixed finger with 2 moderately large calcareous teeth proximally, simple calcareous ridge distally, terminating in small calcareous claw. Carpus varying from equal to nearly twice length of merus; dorsomesial margin with 1 distal or subdistal spine and 2 or 3 short, transverse, often spinose ridges more proximally, dorsodistal margin unarmed or rarely with small spine, dorsal surface with numerous short, transverse lines or low ridges with moderate

to long setae; mesial, lateral and ventral surfaces all with long setae, scattered or forming moderately dense covering but not concealing integument. Merus with transverse rows of fine setae on dorsal surface; mesial, lateral and ventral surfaces with scattered setae; ventrolateral distal angle often with small spine or spinule. Ischium unarmed but with ventral setae.

Left cheliped (Fig. 2B) with dactyl very slightly overlapped by fixed finger; 1.1-1.3 length of palm; surfaces all unarmed but setation varying from low ridges with moderate to long setae forming covering but not concealing integument to simply scattered setae; cutting edges of dactyl and fixed finger each with row of tiny calcareous teeth, terminating in small calcareous claw. Chela unarmed, setation on convex dorsal and ventral surfaces both varying from low ridges with moderate to long setae to simply scattered setae; rounded lateral and mesial faces also with numerous long setae. Carpus usually slightly longer than both chela and merus; surfaces unarmed but with scattered or covering of moderate to long setae, 1 spinule or small spine at or just posterior to poorly delineated dorsomesial distal angle. Merus with short, transverse rows of setae on dorsal surface; lateral, mesial and ventral surfaces with scattered moderate to long setae; ventromesial and ventrolateral distal margins each usually with spine or spinule, smallest mesially. Ischium unarmed, but with ventral setae.

Ambulatory legs (Fig. 1C, D) similar; dactyls 1.1-1.3 length of propodi; dorsal surfaces each with row of moderately long, stiff setae; ventral margins lacking corneous spines, but each with numerous long setae; lateral faces each with few scattered long setae; mesial faces each with few setae distally. Propodi with scattered setae dorsally and ventrally. Carpi each with small dorsodistal spine; dorsal and ventral surfaces with scattered setae. Meri and ischia each with scattered setae dorsally and ventrally. Fourth pereopods (Fig. 1F) subchelate or very weakly semichelate; propodal rasp consisting of single row of sharp corneous scales. Sternite of third pereopods with roundly subquadrate anterior lobe (Fig. 1E), unarmed or with 1 or 2 small spines or tubercles at outer anterior angles. Sternite of fifth

pereopods (Fig. 1G) roundly subquadrate, surface with numerous long setae.

Males with long sexual tube developed from coxa of left fifth pereopod (Fig. 1G), with terminal tuft of moderate to long setae; right coxa often with very short sexual tube produced and partially concealed by long setae. Male and female pleopods typical for genus. Telson (Fig. 1H) with slight transverse indentations indicating very unequal anterior and posterior portions, latter largest; posterior lobes triangular, symmetrical or nearly so, separated by narrow, deep, V-shaped median cleft, oblique inner margins each with 2-4 small to moderately prominent spines, terminating in prominent simple or bifid spine.

Colour in preservative

Ground colour white. Carpi of chelipeds each with patch of orange on dorsomesial surface distally and dorsolateral surface proximally; meri each with patch of orange dorsally on mesial and lateral face in distal half. Second and third pereopods each with incomplete band of orange on propodus distally, on carpus medianly, and on merus proximally.

REMARKS

Initially, it appeared that *Turleania boucheti* n. sp. was represented by two distinct populations, one located in the Wallis and Futuna economic zone and the second found south of the Isle of Pines in the New Caledonia economic zone. Specimens from the Wallis and Futuna area were consistently larger in overall body size and exhibited a moderately dense covering of long setae on the chelae. In contrast, the specimens from south of the Isle of Pines were smaller, yet mature, but had only sparse and scattered setae on the chelae. However, one female specimen collected in the Chesterfield Plateau region of the New Caledonia economic zone, although similar to the Isle of Pines specimens in body size, had the same moderately dense covering of long setae seen in the specimens from the Pacific Plate region considerably further north and east. It can only be concluded that body size may be geographically influenced while setation in this species is variable.

Turleania boucheti n. sp. is similar to *T. sibogae* in having the dorsal surfaces of the chelae unarmed;

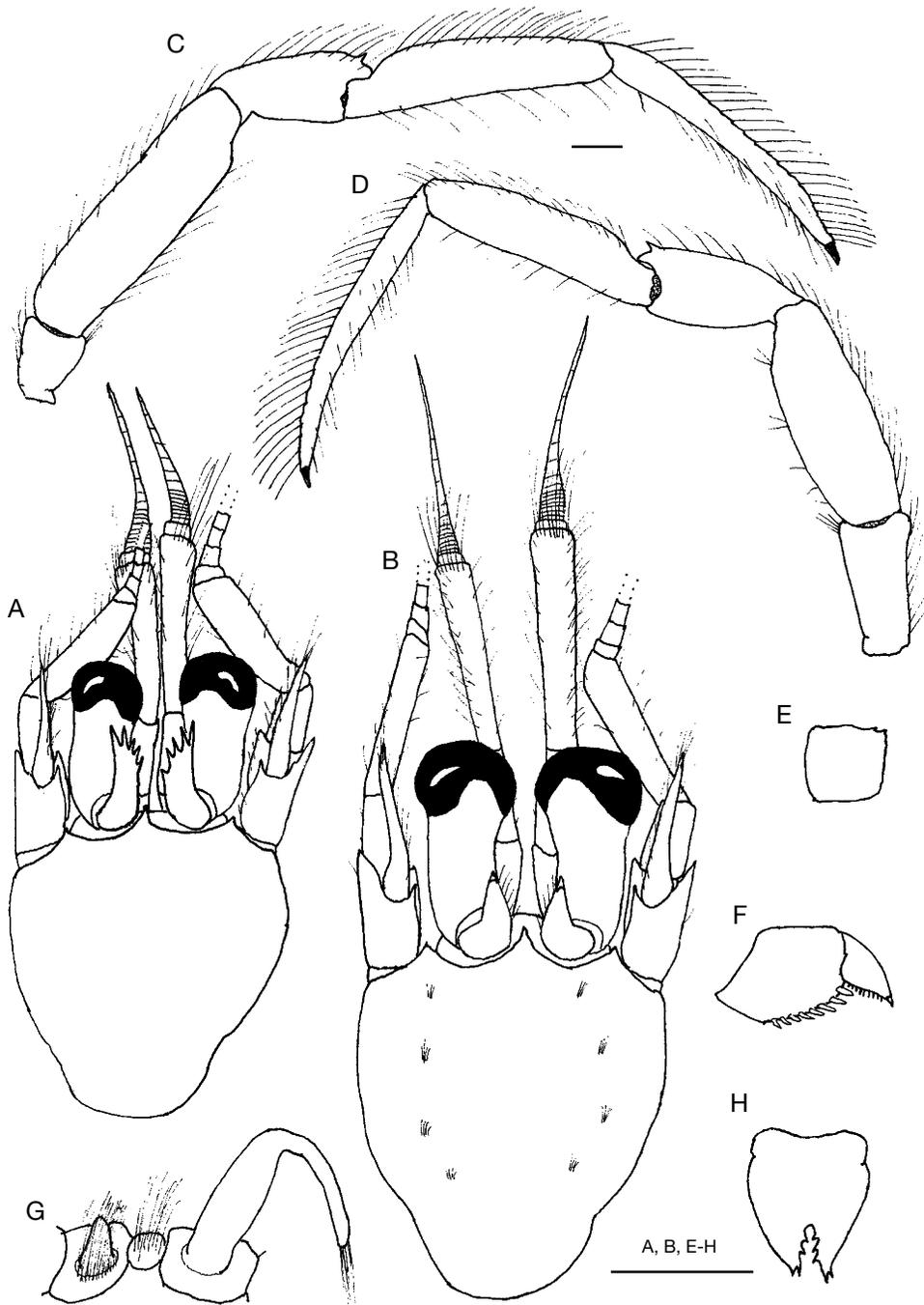


FIG. 1. — **A**, *Turleania multispina* McLaughlin, 1997, ovig. ♀ 2.9 mm, MUSORSTOM 4, stn CP 169 (MNHN-Pg 7717); **B-H**, *Turleania bouchetti* n. sp., MUSORSTOM 7, stn DW 530 (MNHN-Pg 7730); **B-F, H**, paratype ♀ 3.2 mm; **G**, paratype ♂ 2.8 mm; **A, B**, shield and cephalic appendages (aesthetascs omitted); **C**, right second pereopod (lateral view); **D**, left third pereopod (lateral view); **E**, anterior lobe of sternite of third pereopods; **F**, propodus and dactyl of right fourth pereopod (lateral view, setae omitted); **G**, coxae and sternite of fifth pereopods; **H**, telson. Scale bars: 1 mm.

however, the chelae of the new species are entirely devoid of spines, whereas a row of widely-spaced spines is present on the dorsomesial margin of the right chela of *T. sibogae*. A more significant difference is found on the ventral margins of the dactyls of the second and third pereopods. These margins are provided only with long setae in *T. boucheti* n. sp., but in all other species of the genus, these margins each have a row of corneous spines.

Turleania senticosa (McLaughlin & Haig, 1996)
(Fig. 2C, D)

Laurentia senticosa McLaughlin & Haig, 1996: 87, figs 3E, 6.

Turleania senticosa – McLaughlin 1997: 447, fig. 11h-k. — Komai 1999: 50. — Asakura 2006: 136, figs 2C-E, 3.

Turleania similis Komai, 1999: 50, figs 27-30. — Komai *et al.* 2002: 56. — Asakura 2006: 52.

?*Turleania similis* – Asakura 2006: 136.

?*Turleania spinimanus* – Asakura 2006: 136, not *Turleania spinimanus* Komai, 1999.

HOLOTYPE. — **Seram Ceram, Indonesia.** *Siboga* stn 166, 02°28.5'S, 131°03.3'E, 118 m 22.VIII.1899, ♂ (1.8 mm) (ZMA Crust. DE.20176a).

PARATYPES. — Same data as holotype, 1 ♂ (1.3 mm), 1 ♀ (1.4 mm) (ZMA Crust. DE.20176b).

NEW MATERIAL EXAMINED. — **New Caledonia.** MUSORSTOM 4, stn DW 204, 22°37.00'S, 167°05.70'E, 120 m, 27.IX.1985, 1 ♂ (1.7 mm, no appendages), 1 ♀ (2.3 mm) (MNHN-Pg 7719). — Stn DW 225, 22°52.50'S, 167°23.50'E, 590-600 m, 30.IX.1985, 1 ♀ (1.8 mm) (MNHN-Pg 7720).

MUSORSTOM 5, stn DW 263, 25°21.30'S, 159°46.44'E, 225-150 m, 8.X.1986, 1 ♂ (1.3 mm, poor condition), 1 ovig. ♀ (1.3 mm) (MNHN-Pg 7721). — Stn DW 346, 19°30.77'S, 158°27.07'E, 345-252 m, 17.X.1986, 2 ♂♂ (1.4, 1.8 mm), 1 ovig. ♀ (1.5 mm) (MNHN-Pg 7722). — Stn DW 349, 19°34.45'S, 158°34.48'E, 275 m, 17.X.1986, 1 ♂ (2.0 mm) (MNHN-Pg 7723). — Stn DW 350, 19°34.00'S, 158°35.30'E, 180 m, 17.X.1986, 2 ♂♂ (1.7, 2.3 mm) (MNHN-Pg 7724). — Stn DW 353, 19°26.50'S, 158°40.40'E, 290 m, 18.X.1986, 1 ♂ (0.9 mm), 1 ♀ (2.3 mm) (MNHN-Pg 7725). — MUSORSTOM 6, stn DW 462, 21°05.10'S, 167°26.85'E, 200 m, 21.II.1989, 1 ♂ (1.5 mm) (MNHN-Pg 7726).

DISTRIBUTION. — Southern Sea of Japan, Japanese Ogasawara Islands, Philippine Islands, Indonesia, and now New Caledonia and the Loyalty Islands; 85-590 m, possibly to 600 m.

COLORATION (in formalin)

Shield mottled yellow-orange and white, with few small darker orange areas; ocular peduncles whitish in distal 0.4-0.5 and orange in proximal 0.2-0.3; ocular acicles whitish, with tips orange. Antennular peduncles generally whitish, each with distal, medial, and proximal narrow orange bands on ultimate segment; penultimate segment with subdistal narrow orange band. Antennal peduncles whitish, with fourth and second segments each orange distally and first segment pale orange; acicles with proximal 0.3-0.5 orange, remainder whitish. Right cheliped with both fingers generally white, each with subdistal narrow transverse orange band and proximal dark brown band. Palm generally faint orange, with seven longitudinal orange stripes and irregular distal orange area on dorsal surface and dark brown patch at mesial angle; very narrow dark brown areas on distal margins of dorsal and mesial faces. Carpus generally faint orange; dorsal surface with faint orange transverse band medially, spines on dorsomesial margin dark brown; mesial and lateral faces with few irregular faint orange areas. Merus generally faint orange or whitish, with few irregular faint orange patches on lateral, dorsal and mesial faces. Left cheliped with both fingers generally white, each with distal narrow transverse brown band and proximal narrow dark brown band. Palm generally faint orange, with six longitudinal orange stripes, and irregular distal orange area on dorsal face, small dark brown patch present at proximal angle mesially; narrow dark brown areas on distal margins of dorsal and mesial faces. Carpus generally faint orange; dorsal face with faint orange transverse band medially, spines on dorsomesial margin dark brown; mesial and lateral faces with few faint orange patches. Merus with some irregularly-shaped faint orange areas. Second and third pereopods generally similar, each segment with transverse faint orange bands on semitransparent white background: dactyls each with subdistal, medial, and proximal bands; propodi

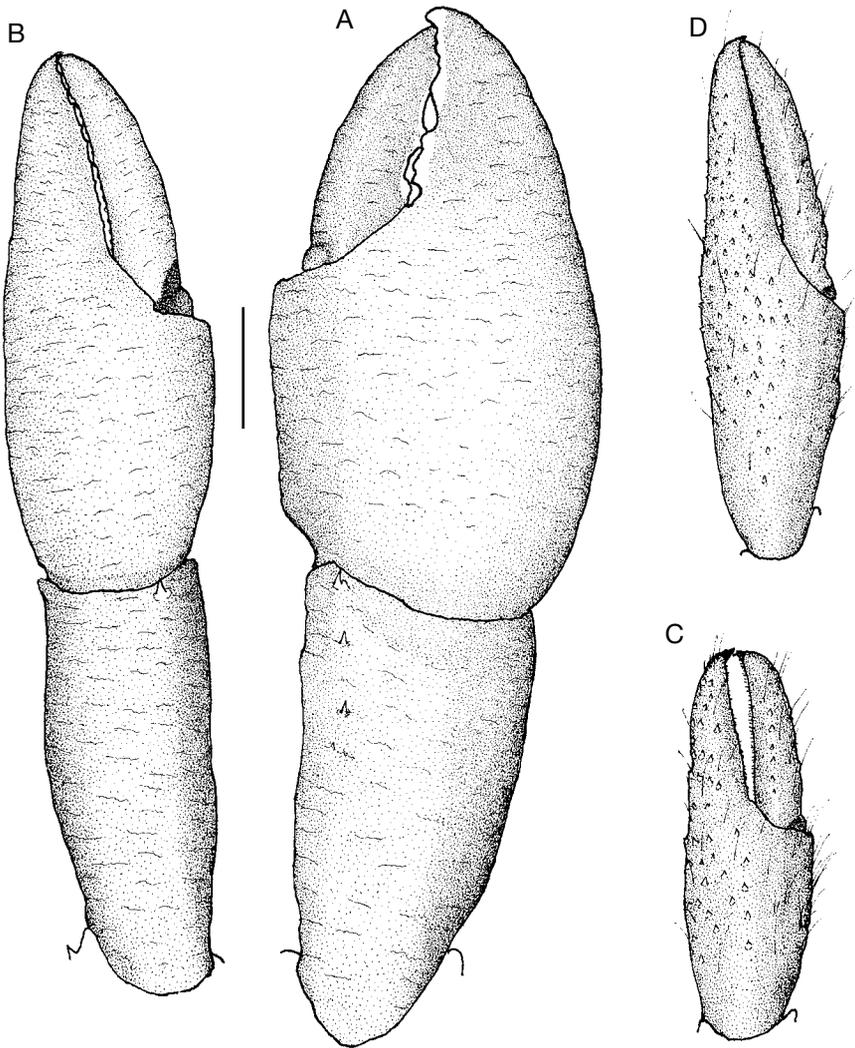


FIG. 2. — **A, B**, *Turleania boucheti* n. sp., paratype ♀ 3.2 mm, MUSORSTOM 7, stn DW 530 (MNHN-Pg 7730); **A**, chela and carpus of right cheliped (setae omitted); **B**, chela and carpus of left cheliped (setae omitted); **C, D**, *Turleania senticosa* (McLaughlin & Haig, 1996), left chela; **C**, ♂ 2.3 mm, MUSORSTOM 5, stn DW 350 (MNHN-Pg 7724); **D**, ♀ 2.3 mm, MUSORSTOM 5, stn DW 353 (MNHN-Pg 7725). Scale bars: 1 mm.

each with band in distal half and sometimes with irregular patch on proximal half of lateral face; carpi of second each with medial and proximal bands, third each with distal, medial and proximal bands; meri of second each with one proximal and two subdistal bands, third each with band in distal half and adjacent to proximal margin (after Asakura 2006).

REMARKS

Turleania senticosa was originally described on the basis of three quite small individuals, the male holotype being the largest with a shield length of 1.8 mm. The seven additional specimens, three males and four females, reported by McLaughlin (1997) from the Kai and Tanimbar Islands ranged in shield length from 1.5 to 2.3 mm. Shield lengths

of the 14 specimens reported herein from New Caledonia varied from 0.9 to 2.3 mm, including two ovigerous females with shield lengths of 1.3 and 1.5 mm, respectively. Clearly, this species matures at a very small size. Even the smallest male (0.9 mm) had a moderately well developed left sexual tube. As indicated previously, the larger males exhibited development of a very short, but definitive right sexual tube as well.

Turleania similis was described on two specimens, a male holotype of 1.8 mm and a female paratype of 1.9 mm, and *T. spinimanus* on just the ovigerous female holotype (2.7 mm). Although Komai (1999) indicated an awareness of McLaughlin's (1997) report of *T. senticosa* from the Indonesian KARUBAR expedition, he differentiated both of his taxa from the former species on the basis of McLaughlin & Haig's (1996) original description of their species. McLaughlin (1997) noted that the dactyls of the left chelipeds in the Kai Islands specimens of *T. senticosa*, unlike those of the type series, were unarmed or had only a few spinules, and while the palms were described as armed with tiny spines; no mention was made of defining rows of spines on the dorsolateral margins. It was those two characters in the original description that led Komai (1999) to conclude that his *T. similis* from the Ogasawara Islands was distinct. In addition to the armature of the left chela, Komai (1999) differentiated his *T. spinimanus* from *T. senticosa* by the shape of the anterior lobe of the sternite of the third pereopods. Komai *et al.* (2002) remarked that the specimen, a male with shield length of 1.5 mm, collected subsequently from the southern Sea of Japan, agreed with the type material of *T. similis* with minor exceptions. These were more numerous spinules on the palm of the right cheliped and the coloration of the dactyls of the ambulatory legs. The latter difference Komai *et al.* (2002) attributed possibly to differences in preservation.

Asakura (2006) compared McLaughlin's (1997) specimens of *T. senticosa* from the KARUBAR expedition with his material from the Ryukyu Islands to verify his identification of the species. Then noting the similarities in coloration between his material, preserved in formalin for two days, and Komai's descriptions of coloration in formalin preserved

specimens of *T. similis* and *T. spinimanus*, Asakura questionably placed both taxa in synonymy with *T. senticosa*.

The specimens of *T. senticosa* from New Caledonia exhibited variability in chela spination. In the case of the left chela (Fig. 2C, D) variation was such that some specimens could be considered *T. senticosa* while others agreed with *T. similis*. Variations in the development of a hiatus between the dactyl and fixed finger of the right chela, and in the armament and symmetry of the telson, as noted by McLaughlin (1997), were also seen in the New Caledonia specimens. However, the "hammer-shaped" anterior lobe of the sternite of the third pereopods described for *T. spinimanus* was not observed in any of the recently examined material. Therefore, while it must be concluded that *T. senticosa* and *T. similis* are conspecific, *T. spinicarpus* is considered a valid taxon until such time as additional specimens exhibit variation in that anterior sternal lobe. The fact that all the New Caledonia specimens exhibited the prominent spines on the ventrodorsal angles of the coxae of the chelipeds described by Komai (1999) for *T. similis*, but not mentioned either by McLaughlin & Haig (1996) or McLaughlin (1997) for *T. senticosa* is viewed simply as an oversight by the latter authors.

Acknowledgements

The author is indebted to Dr Alain Crosnier, USM Taxonomie-Collections, Département Systématique et Évolution, MNHN, for making the material available for study. This is a scientific contribution from the Shannon Point Marine Center, Western Washington University.

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Submitted on 16 October 2006;
accepted on 19 March 2007.

