



Four new species of coral crabs belonging to the genus *Tetralia* Dana, 1851 (Crustacea, Decapoda, Brachyura, Tetraliidae)

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Abstract

Four new species of *Tetralia* Dana, 1851, are described from the west Pacific. Like the six previously described sister species, the new species (*Tetralia aurantistellata*, *T. brengelae*, *T. brunalineata*, and *T. ocucaerulea*) are obligate symbionts of scleractinian corals belonging to the genus *Acropora*. The new species are described herein, placing particular emphasis on live color patterns.

Key words: Crustacea, Brachyura, Trapeziidae, Tetraliidae, *Tetralia*, new species, coral symbionts

Introduction

The genus *Tetralia* Dana, 1851, currently consists of six species of small, brightly colored xanthoid crabs that are obligate symbionts of *Acropora* corals (*Tetralia cavimana* Heller, 1861, *T. cinctipes* Paul'son, 1875, *T. glaberrima* (Herbst, 1790) (= *T. fulva* Serène, 1984), *T. muta* (Linnaeus, 1758) (= *Tetralia vanninii* Galil & Clark, 1988), *T. nigrolineata* Serène & Dat, 1957, and *T. rubridactyla* Garth, 1971). Due to their close morphological similarities, some previous authors have mistakenly labeled separate *Tetralia* species as one species, *Tetralia glaberrima* Herbst, 1790 and used “forma” (Patton 1966) or subspecies (Serène 1984) to note morphological differences. In addition to the six species of *Tetralia*, two closely related species belonging to *Tetraloides* Galil, 1986 (*Tetraloides heterodactyla* (Heller, 1861), *T. nigrifrons* (Dana, 1852)) are also obligate symbionts of scleractinian corals, and together with *Tetralia* compose the family Tetraliidae Castro, Ng and Ahyong, 2004. Until recently, crabs of the genera *Tetralia* and *Tetraloides* were included in the family Trapeziidae Miers, 1886. Castro *et al.* (2004) removed *Tetralia* and *Tetraloides* and placed them in the new family Tetraliidae. A complete list of these previously described species with synonyms can be found in Castro *et al.* (2004). Members of the family Tetraliidae are found throughout the Indo-West Pacific region from the Red Sea and the east coast of Africa to French Polynesia. Tetraliids are absent from the Eastern Pacific region.

Material and methods

Crabs were collected by snorkeling or scuba diving (surface to approximately 15 m) in Sept. 2002 in shallow water in Guam and Fiji. Whole colonies of *Acropora* corals approximately 5–50 cm wide were extracted using hammer and chisel. Colonies were placed in plastic bags underwater in order to prevent crabs from being dislocated during transport. Coral colonies were temporarily removed from the water and placed in a shallow tray. A thin, malleable stainless steel wire was used to separate the crabs from their host corals. Samples of coral branches approximately 1–2 cm in length were collected for potential species identification of *Acropora*

hosts. Coral colonies were returned to their approximate location at the collection site. Crabs and coral samples were placed in Whirl-Pak® sample bags with a small amount of seawater and then frozen in order to immobilize crabs and preserve color. Whole fresh crabs were photographed in the field and specific characters were later photographed at the Natural History Museum of Los Angeles County, California (LACM) using a Wild M5 (M5APO) dissecting microscope. Digital photographs were taken with a Nikon D1. All specimens were fixed in 70% isopropyl alcohol (or 150 proof rum) and preserved in 95% ethanol. Specimens were deposited at LACM. Other museum specimens were examined as listed below. Holotypes were prepared for scanning electron microscopy by using the gold-plated “sputtering” method. A Cambridge 360 scanning electron microscope (SEM) from the University of Southern California, Los Angeles, and a Hitachi (model N3000) SEM from LACM were used for SEM images.

Key morphological characters traditionally used to delineate tetraliid species (see Galil 1988, Castro 2003) have been used herein: (1) carapace shape, (2) carapace frontal margin dentition, (3) anterior margin shape and dentition of cheliped meri, and (4) male first pleopod morphology. Morphology of the first maxilliped endopod and antennular fossa are sometimes difficult to discern and were not used in this examination. More conspicuous morphological characters such as live color pattern, shape of major cheliped dactylus, and details regarding the fifth pereopods were also used. Since morphological differences between species are subtle, these characters were used in order to broaden the repertoire of characters available to delineate tetraliid species.

Color patterns have been used in previous studies (see Castro 1997a, b, 1999a, Castro *et al.* 2004), but color photographs of living specimens are limited in the scientific literature (e.g., Castro 1997a, b). Color patterns have also been described from museum specimens (e.g., Serène 1984) but are questionable due to the damaging effects of preservation. A comprehensive record of color photographs of freshly collected specimens are therefore provided for the new species.

Characters such as the merus crest (or foliaceous expansion) and propodal knob of the chelipeds, and the notch on the frontal margin of the carapace are used throughout the descriptions. A crest (cr) is a flaring of the lateral anterior margin of the cheliped merus originating near the median portion (where dentition changes to smooth, medial to lateral) and terminating at the merus-carpus articulation (Plate 1D). A propodal knob (pk) is a bump or swelling found on the proximal, dorsal surface of the propodus of both chelipeds (Plate 1D). A notch (n) is the conspicuous indentation between two teeth on the frontal margin of the carapace on each lateral border that may also form a slight obtuse angle in the margin (Plate 1B). Carapace width (cw) was measured as the distance between the two widest points of the carapace (Plate 1A); carapace length (cl) as the distance between the midpoint of the frontal margin and the midpoint of the posterior margin (Plate 1A); major cheliped dactyl length (dl) from the tip to the base of the dactylus (Plate 1C); major cheliped propodus length (pl) from the tip of the immovable finger to the merus-carpus articulation along the ventral (lower) margin (Plate 1C). Characters associated with juveniles may be lost or changed as the specimen matures. The shape of the extraorbital tooth, for instance, is often sharply pointed in juveniles, but may become rounded in adults. Therefore, all morphological characters, including color patterns, were described from adult specimens unless otherwise noted. The following abbreviations are used for material deposited in museums: BM (British Museum, London), BPBM (Bishop Museum, Honolulu, Hawaii), LACM (Natural History Museum of Los Angeles County, Los Angeles, California), MF (Museo di Zoologia “La Specola,” Università di Firenze, Florence, Italy), MNHN (Muséum national d’Histoire naturelle, Paris), SMF (Forschungs-Institut Senckenberg, Frankfurt-am-Main, Germany), UF (Florida Museum of Natural History, University of Florida, Tallahassee), ZRC (Zoological Reference Collection, Raffles Museum, National University of Singapore).

Taxonomy

Subphylum Crustacea Brünnich, 1772

Order Decapoda Latreille, 1802

Infraorder Brachyura Latreille, 1802

Superfamily Xanthoidea MacLeay, 1838

Family Tetraliidae Castro, Ng and Ahyong, 2004

Genus *Tetralia* Dana, 1851

Tetralia aurantistellata, new species

(Pl. 2, Figs. A-F; Pl. 6, Fig. A; Pl. 7, Fig. A; Pl. 8, Fig. A)

Type material: Holotype, LACM CR 2002-043.1 (1 male) Fiji, Viti Levu island (17°27'S, 177°23'E), collected by scuba diving on patch reef from *Acropora* sp., depth 5 m, Sept. 26, 2002, S. Trautwein coll. Allotype, LACM CR 2002-043.2 (1 ovigerous female), same collection data.

Other material examined (total of 40 specimens): **Fiji.** Viti Levu island (17°27'S, 177°23'E), LACM CR 2002-044.1 (1 male, 1 ovig. female, 1 juvenile, depth 1 m, Sept. 24, 2002, S. Trautwein coll.), LACM CR 2002-044.2 (1 male, depth 1 m, Sept. 24, 2002, S. Trautwein coll.).

New Caledonia. Loyalty Is., MNHN B29229 (1 male, 2 ovig. female), MNHN B29228 (1 male, 1 ovig. female), MNHN B29227 (1 ovig. female), MNHN B29232 (4 male, 5 ovig. female), MNHN B29230 (1 male, 1 ovig. female), MNHN B29231 (7 males, 12 females).

Philippine Is. Bohol, Panglao Is., ZRC R47 (1 male, 1 ovig. female, June 16, 2004), ZRC B16 (1 male, 1 ovig. female, June 17, 2004).

Description. Carapace: Carapace quadrilateral, lenticular in both sexes (Plate 2A); carapace width exceeding length (Table 1); anterolateral margins parallel in males, slightly convex to parallel in females; exterior orbital angle sharply pointed in both sexes (Plate 2B); frontal margin finely denticulate, nearly smooth with 3–5 most lateral teeth very widely spaced (dentate), notch may be present or absent (Plate 6A), few long setae scattered between teeth.

Chelipeds: Chelipeds markedly unequal, especially in males (major cheliped propodus much wider, longer than minor) (Plate 2A). Tomentose pit of major cheliped measures approximately 1/4–1/3 propodus length in females (Plate 2E), greatly reduced in males, barely extending beyond proximal margin of propodus; several long setae distributed throughout tomentose pit in females, absent in males; thickness of propodus uniform along entire length, creating a very square ventral “elbow” and concave inner pocket whose dorsal boundary is defined by a ridge (Plate 2F). Finger inner margins smooth (except for small granules present on lateral finger surfaces, especially near tips), gaping in males (Plate 2F), serrate, non-gaping (touching) in females; dactylus length approximately 1/2 propodus length (Table 1). Propodus granular; proximal, dorsal surface with prominent brown propodal knob. Carpus anterior margin serrate with medial serrations becoming more developed as spines, or spines may be reduced to granulations (Plate 2D). Merus anterior margin dentate to serrate without crest, but smooth on lateral region (Plate 2D); dorsal surface granular.

Fifth pereopod (P5): Few setae present on ventral surface of P5 propodus, dactylus. P5 dactylus dorsal surface with 3 large, strongly curved spines near tip followed proximally by a row of approximately 5 shorter spines (Plate 7A); ventral surface with 5–6 discontinuous transverse rows of flattened chitinous spinules followed distally by 3–4 additional flattened chitinous spinules at ventral base of horny tip (Plate 8A). Propodus distal, ventral margin lined with several long chitinous spinules.

Male pleopods: Male first pleopods straight, distal 1/3–1/2 covered with setae.

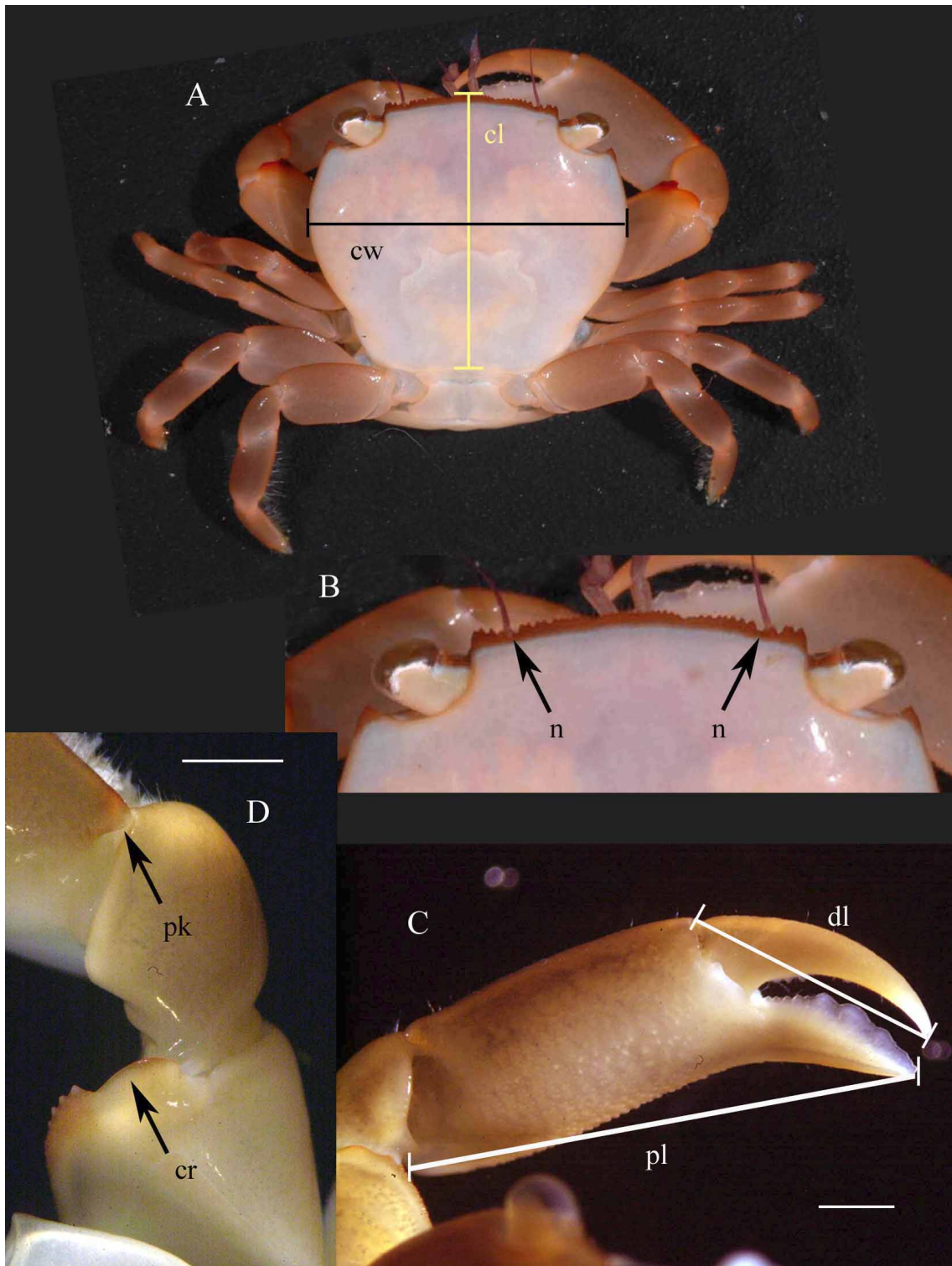


PLATE 1. *Tetralia* metrics and some characters used in descriptions. A. carapace width (cw) and carapace length (cl) (freshly-collected female, *Tetralia ocucaerulea*, UF 9235, scale unavailable, photographed by G. Pauley); B. frontal margin (same specimen as in A.), arrows delineate notches (n); C. major left cheliped, median view, propodus length (pl) and dactylus length (dl) (preserved female, *Tetralia brunalineata*, LACM CR 2002-040.4); D. major right cheliped propodus (partial), carpus, and merus, dorsal view, arrows delineate propodal knob (pk) and crest (cr) (preserved male, *Tetralia ocucaerulea*, LACM CR 2002-040.13). All scale bars 1 mm.

TABLE 1. Morphometric data for the four new species of *Tetralia*.

Species	Dactylus length (mm)	Propodus length (mm)	Ratio of dactylus length to propodus length	Carapace width (mm)	Carapace length (mm)	Ratio of carapace width to length
<i>T. aurantistellata</i>						
ZRC R47 (female)	1.94	4.23	0.46	4.98	4.26	1.17
ZRC R47 (male)	2.98	5.35	0.56	5.08	4.34	1.17
LACM CR 2002-043.1 (male, holotype)	3.40	6.85	0.50	5.95	5.31	1.12
MNHN B29232 (female)	2.33	4.54	0.51	5.46	4.65	1.17
MNHN B29232 (female)	2.24	4.28	0.52	4.90	4.15	1.18
<i>T. brengelae</i>						
LACM CR 2002-040.23 (male, holotype)	2.87	6.50	0.44	6.21	5.63	1.10
LACM CR 2002-040.23 (female, allotype)	2.38	5.23	0.46	7.00	5.83	1.20
LACM CR 2002-039.11 (female, paratype)	2.02	4.97	0.41	5.50	4.76	1.16
MNHN B25333-25335 (25717 smallest male in lot)	no data	no data	no data	3.90	3.30	1.18
MNHN B25333-25335 (25717 small male)	2.00	4.40	0.45	4.20	4.00	1.05
<i>T. brunalineata</i>						
MNHN B25333-25335 (25717 male)	4.01	7.98	0.50	7.02	5.80	1.21
MNHN B25333-25335 (25717 female)	3.01	6.03	0.50	8.01	6.80	1.18
MNHN B25335 (male)	2.00	4.10	0.49	3.80	3.10	1.23
LACM CR 2002-039.1 (male)	4.22	8.18	0.52	6.22	5.61	1.11
LACM CR 2002-039.6 (male)	2.69	5.81	0.46	no data	no data	no data
LACM CR 2002-039.1 (female)	3.01	6.20	0.49	7.12	5.67	1.26
<i>T. ocucaerulea</i>						
LACM CR 2002-041.8 (male)	3.30	5.98	0.55	no data	no data	no data
LACM CR 2002-040.14 (male)	4.23	8.17	0.52	6.98	6.81	1.02
LACM CR 2002-040.14 (female)	2.95	6.31	0.47	carapace damaged	carapace damaged	N/A
LACM CR 2002-041.7 (male)	3.55	7.24	0.49	6.39	5.95	1.07
LACM CR 2002-041.7 (female)	2.69	5.80	0.46	7.16	6.33	1.13
LACM CR 2002-040.15 (female)	2.29	4.60	0.50	4.74	4.31	1.10
LACM CR 2002-040.15 (male)	2.66	5.59	0.48	5.22	4.80	1.09

Live coloration: Anterior dorsal half of carapace brown or pale orange (including anterior portion of eye-stalks), posterior half white (Plate 2A); frontal margin orange-brown (may be faint), orbital, anterolateral margins dark brown. Ventral anterior region brown; dark line extending across posterior epistome margin; dark spots may cover entire ventral surface.

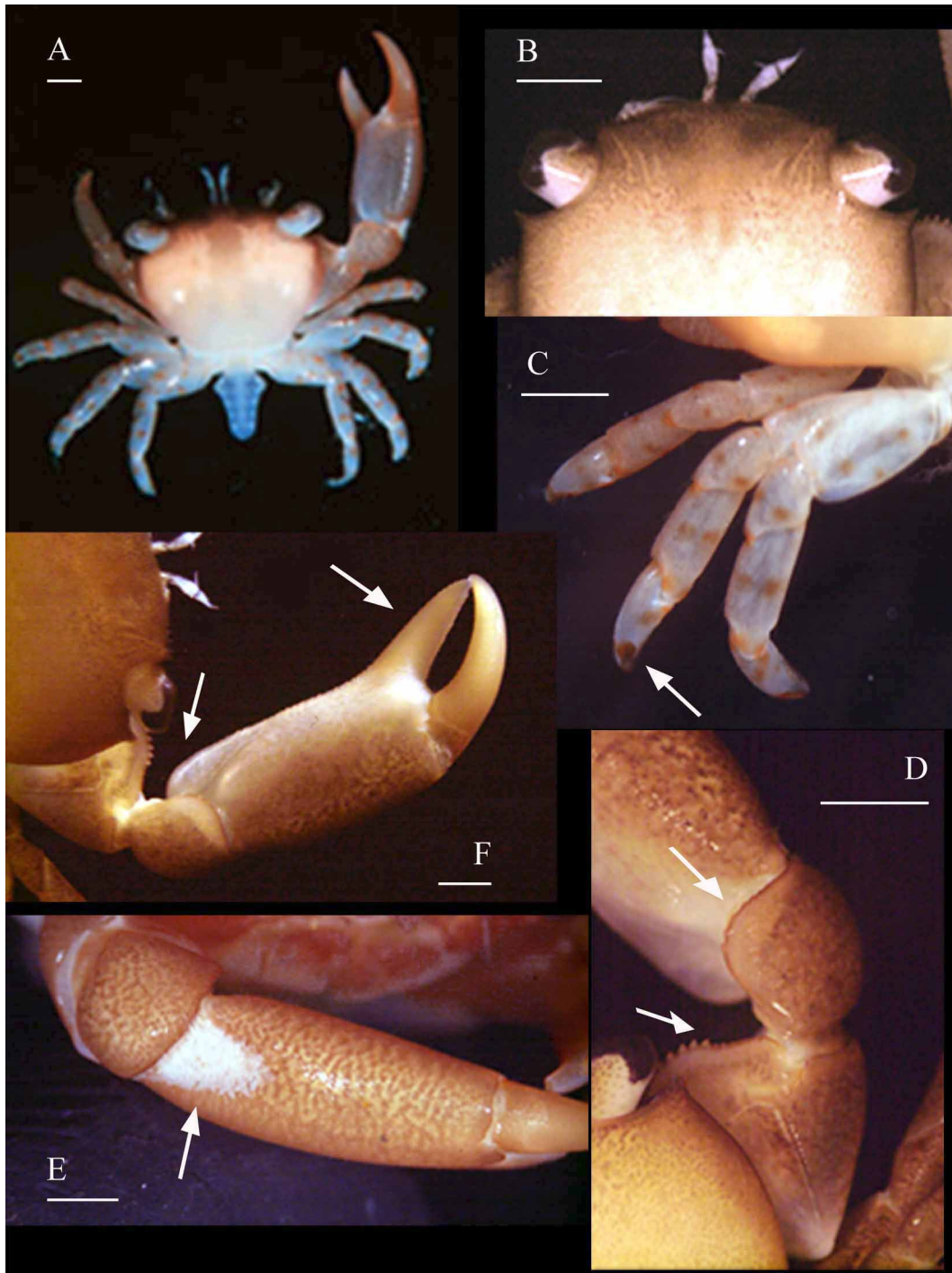


PLATE 2. *Tetralia aurantistellata*, new species (LACM CR 2002-044.2 freshly-collected male for image A; LACM CR 2002-043.1, holotype, preserved male for images B, D, F; MNHN B29229 preserved female for images C, E). A. whole body, dorsal view; B. frontal margin, dorsal view; C. left 3rd, 4th, and 5th pereopods, dorsal view, arrow indicates red spot on dactylus; D. major right cheliped carpus and merus, dorsal view, arrows indicate anterior margins; E. female tomentose pit (arrow) of major right cheliped; F. major right cheliped, dorsal/median view, left arrow indicates “elbow” and right arrow indicates gaping fingers. All scale bars 1mm.

Cheliped fingers orange with brown patch on proximal dorsal surface of dactylus in both sexes (Plate 2F); propodus, merus, carpus dorsal surfaces darker brown than ventral (Plate 2F); anterior margins of propodus, merus, carpus brown, orange or red, merus teeth white (Plate 2D); anterior margins of basi-ischium, coxa brown. Propodal knob dark brown.

Pereopods brown or tan, darker on dorsal surface than ventral surface; covered with uniform pattern of orange spots over all podomere surfaces and abdomen (Plate 2C); darker orange spots on dorsal surfaces of podomere articulations, red spot at dorsal base of dactylus horny tip (Plate 2C); dactylus tips white; large black spot absent at dorsal propodal-dactylar articulation on all pereopods.

Remarks. *T. aurantistellata* differs from the other described species of *Tetralia* in its overall color pattern, primarily by the presence of orange spots scattered over all pereopods and abdomen (Plate 2C). In addition to the unique color pattern, *T. aurantistellata* can be distinguished from other species of *Tetralia* by the following combination of morphological characters: (1) chelipeds markedly dissimilar in size (similar to that of *Tetraloides* species) (Plate 2A), (2) major cheliped fingers gaping in males (Plate 2F; see also *T. brunalin-eata*), (3) cheliped merus crest absent (Plate 2D), (4) tomentose pit greatly reduced in males, and (5) medial frontal margin very finely denticulate, almost smooth, lateral frontal margins dentate (Plate 6A). *T. aurantistellata* may be mistaken for *T. glaberrima* (= *T. fulva*), a known species that also features orange-red spots on the legs. However, the spots on *T. glaberrima* (= *T. fulva*) are limited to the carpus, propodus and dactylus of the pereopods, the spots in *T. aurantistellata* cover all pereopod podomeres. In addition, spots are present on the abdomen of *T. aurantistellata* and absent on the abdomen of *T. glaberrima* (= *T. fulva*).

Distribution. *Tetralia aurantistellata* has so far been identified from Philippine Is., Loyalty Islands and Fiji.

Etymology. From “aurantium” (Latin) for orange, “stella” (Latin) meaning star in reference to the presence of large star-like orange spots on the pereopods and abdomen.

***Tetralia brengelae*, new species**

(Pl. 3, Figs. A-G; Pl. 6, Fig. B; Pl. 7, Fig. B; Pl. 8, Fig. B)

Tetralia vanninii – Castro, 2003:442 (part).

Type material: Holotype, LACM CR 2002-040.23 (1 male) Mariana Is., Guam, Pago Bay (13°28'N, 144°46'E), collected by snorkeling on reef crest from *Acropora* sp., depth 2 m, Sept. 18, 2002, S. Trautwein coll. Paratypes (total of 2 specimens), Guam, Pago Bay: LACM CR 2002-040.23 (allotype, 1 ovigerous female, depth 2 m, Sept. 18, 2002, S. Trautwein coll.), LACM CR 2002-039.11 (1 ovig. female, depth 2 m, Sept. 17, 2002, S. Trautwein coll.).

Other material examined (total of 10 specimens): **Guam.** Pago Bay: LACM CR 2002-039.11 (1 male, depth 2 m, Sept. 17, 2002, S. Trautwein coll.), LACM CR 2002-039.12 (1 ovig. female, depth 2 m, Sept. 17, 2002, S. Trautwein coll.), LACM CR 2002-040.23 (1 juvenile, depth 2 m, Sept. 18, 2002 S. Trautwein coll.), SMF 26929 (2 ovig. female, 1 female all labeled as *Tetralia vanninii*, depth 2–4 m, Sept. 10, 1997); Ipan Beach Park (13°27'N, 144°46'E): LACM CR 2002-040.24 (1 male, 1 ovig. female, depth 2 m, Sept. 18, 2002 S. Trautwein coll.); Haputo (13°57'N, 144°82'E): UF 911 (1 male and 1 ovig. female labeled as *Tetralia vanninii*, depth 2.8 m, August 7, 2001, G. Pauley coll.).

Description. Carapace: Carapace quadrilateral, flattened in males and oval, flattened in females (Plates 3A, 3B); carapace width exceeds length (Table 1); anterolateral margins parallel in males, slightly convex to convex in females; exterior orbital angle pointed in males, blunt in females; frontal margin finely denticulate with teeth more pronounced, more widely spaced laterally, granulations on inner orbital margins, notch absent (Plate 6B), setae few to absent between teeth.

Chelipeds: Cheliped size unequal in both sexes (Plate 3A). Tomentose pit approximately 1/3–1/2 propodus length in females (Plate 3E), 1/4 propodus length in males; several long setae throughout tomentose pit in females, absent in males. Finger inner margins dentate, non-gaping (touching) in both sexes (Plate 3F); dactylus length less than 1/2 propodus length, causing fingers to appear short (Plate 3G, Table 1). Propodus strongly

granular; proximal, dorsal surface with prominent brown propodal knob with white tip (Plate 3D). Carpus anterior margin slightly serrated bearing a series of small teeth with medial teeth more prominent than lateral teeth, margin may appear smooth with only one or more granules (Plate 3D). Merus anterior margin dentate without crest (Plate 3D); dorsal surface granular.

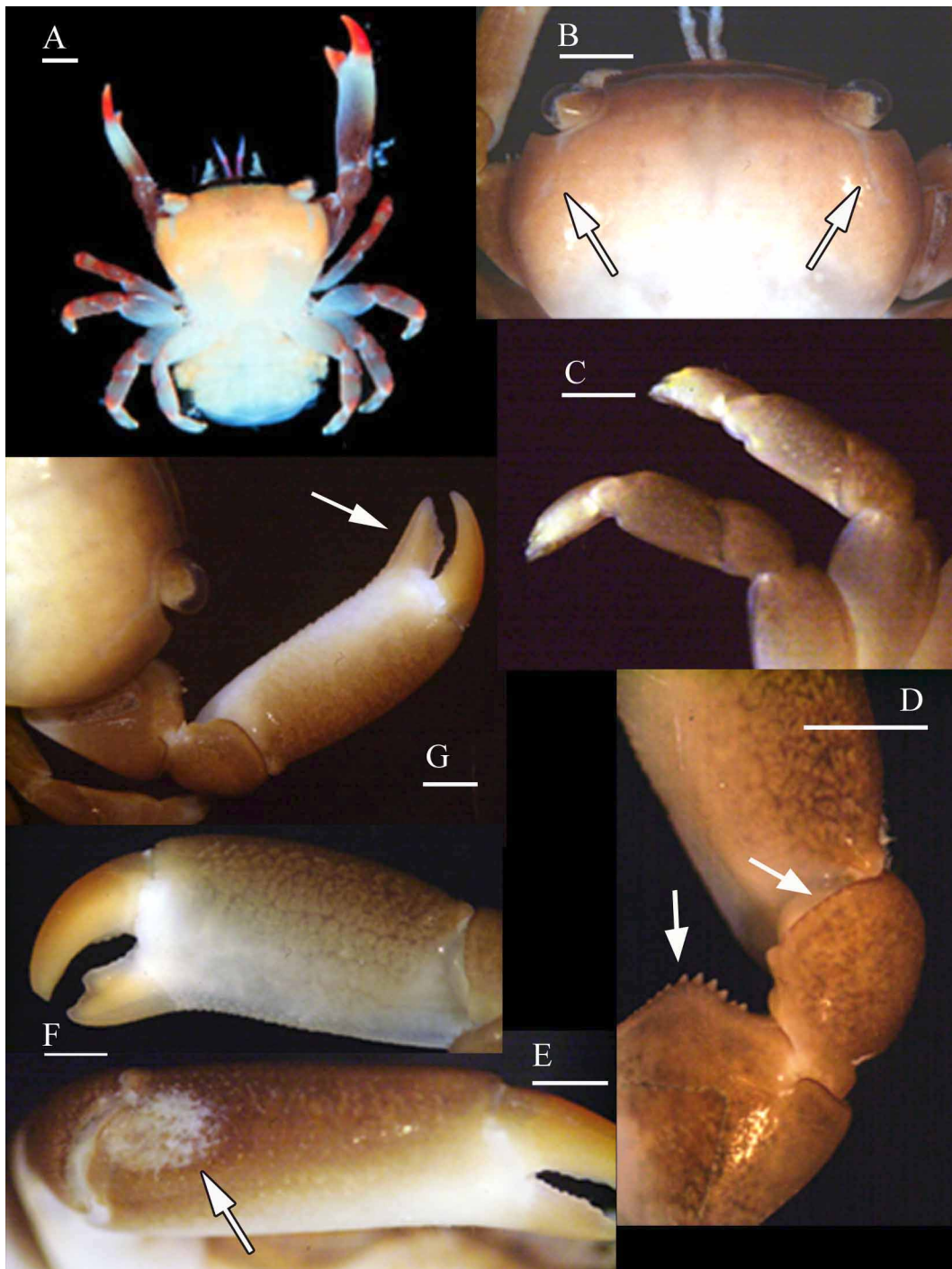


PLATE 3. *Tetralia brengelae*, new species (LACM CR 2002-039.11 freshly-collected female for image A; LACM CR 2002-040.23 allotype, preserved female for images B, E, G; LACM CR 2002-040.23 holotype, preserved male for images C, D, F). A. whole body, dorsal view; B. frontal margin and anterior carapace region, dorsal view, arrows indicate blue lines; C. left 2nd and 3rd pereopods, dorsal/posterior view; D. major right cheliped, dorsal view, arrows indicate carpus and merus anterior margins; E. female tomentose pit (arrow) of major right cheliped; F. major right cheliped propodus and dactylus, median view; G. major right cheliped propodus and dactylus, dorsal/median view, arrow indicates short fingers. All scale bars 1mm.

Fifth pereopod (P5): Few setae on ventral surfaces of P5 propodus, dactylus. P5 dactylus dorsal surface with 5 large, strongly curved spines near tip (Plate 7B); ventral surface with 4 discontinuous transverse rows of flattened chitinous spinules ending in 2–3 chitinous spinules at ventral base of horny tip (Plate 8B). Propodus distal, ventral margin lined with several long chitinous spinules.

Male pleopods: Male first pleopods straight, distal 1/3–1/2 covered with setae.

Live coloration: Anterior dorsal half of carapace yellow or brown (including anterior portion of eyestalks), posterior half white (Plates 3A, 3B); frontal region composed of three successive lines extending laterally to anterior portion of eyestalks and exterior orbital angle: most anterior margin brown followed by black line composed of dense spots (dark brown in preserved specimens) followed by thin light blue line, light blue line may or may not extend from the center of each orbit margin and run parallel to anterolateral margin for approximately 1/4–1/3 length of carapace (Plate 3B). Anterolateral margins dark brown (or matches color of anterior region of carapace). Ventral anterior region brown; buccal region white; dark line extending across posterior epistome margin.

Cheliped fingers red to orange in both sexes (Plates 3A, 3F, 3G); distal half of dorsal surface of propodus may be lighter than proximal half (Plate 3A) or uniformly brown (Plate 3G); dorsal surfaces of proximal propodus region, carpus, merus dark brown (Plate 3D) becoming white ventrally; anterior margins of merus, carpus dark brown, teeth white (Plate 3D); anterior margins of basi-ischium, coxa light brown. Propodal knob dark brown, usually with white tip (Plate 3D).

All podomeres of pereopods bear alternating bands of dark brown and red with red bands located at dorsal surface of podomere articulations (Plate 3A), white on ventral surfaces; large black spot absent at dorsal propodal-dactylar articulation on all pereopods.

Remarks. *T. brengelae* differs from the other described species of *Tetralia* in its color pattern, most especially by the presence of a thin, light blue line that originates from the center of each orbital margin and runs posteriorly and partially along the carapace (Plates 3A, 3B), although this character may be absent in some specimens. Some museum specimens (SMF 26929) identified by Castro (2003) as *T. vanninii* belong to the new species *T. brengelae*. Castro (2003: 442) described the same color pattern as “elongate blue spots extended from the edge of the orbits into the yellow band.” Other unique color features include alternating red and brown bands on the pereopods (with red articulations), and cheliped fingers that are bright red (Plate 3A). In addition to the unique color pattern, *T. brengelae* can be distinguished from the other described species of *Tetralia* by combination of the presence of uniform teeth along the frontal margin (Plate 6B) and by the length of dactylus of the major cheliped being less than 1/2 propodus length (Plate 3G, Table 1) making the fingers appear short. *T. brengelae* shares bright red, “short” major cheliped fingers and presence of a blue pattern near the anterolateral carapace border with *T. cinctipes* and may be mistaken as such. However, the blue color forms a thin line parallel to the anterolateral margins in *T. brengelae*, whereas the blue color is a broad band that extends to the anterolateral margins in *T. cinctipes*.

Distribution. *Tetralia brengelae* is so far known only from Guam.

Etymology. The species name is in honor of Ms. Lynn Brengel in recognition of her scientific contributions to the Natural History Museum of Los Angeles County.

***Tetralia brunalineata*, new species**

(Pl. 1, Fig. C; Pl. 4, Figs. A–G; Pl. 6, Fig. C; Pl. 7, Fig. C; Pl. 8, Fig. C)

Tetralia vanninii – Castro, 2003: 442 (part).

Type material: Holotype, LACM CR 2002-040.3 (1 male) Mariana Is., Guam, Ipan Beach Park (13°27'N, 144°46'E), collected by snorkeling on reef crest (located approximately 30 m from shore) from *Acropora* sp., depth 2 m, Sept. 18, 2002, S. Trautwein coll. Paratypes (total of 10 specimens), Guam, Ipan Beach Park:

LACM CR 2002-040.4 (allotype, 1 ovigerous female, depth 2 m, Sept. 18, 2002, S. Trautwein coll.), LACM CR 2002-040.1 (1 male, 1 ovig. female, depth 2 m, Sept. 18, 2002, S. Trautwein coll.), LACM CR 2002-040.2 (1 male, 1 ovig. female, depth 2 m, Sept. 18, 2002, S. Trautwein coll.); Guam, Pago Bay (13°28'N, 144°46'E): LACM CR 2002-039.1 (1 male, 1 ovig. female, depth 2 m, Sept. 17, 2002, S. Trautwein coll.), LACM CR 2002-039.2 (1 ovig. female, depth 2 m, Sept. 17, 2002, S. Trautwein coll.), LACM CR 2002-039.3 (1 male, 1 ovig. female, depth 2 m, Sept. 17, 2002, S. Trautwein coll.).

Other material examined (total of 52 specimens): **Guam.** Hagatna (=Agana) Bay (13°29'N, 144°45'E): LACM CR 2002-041.1 (1 male, depth 2 m, Sept. 16, 2002, S. Trautwein coll.), LACM CR 2002-041.2 (1 ovig. female, depth 2 m, Sept. 16, 2002, S. Trautwein coll.), LACM CR 2002-041.3 (1 male, 1 ovig. female, depth 2 m, Sept. 16, 2002, S. Trautwein coll.), LACM CR 2002-041.4 (1 male, 1 ovig. female, depth 2 m, Sept. 16, 2002, S. Trautwein coll.), LACM CR 2002-041.5 (1 male, 1 ovig. female, depth 2 m, Sept. 16, 2002, S. Trautwein coll.), LACM CR 2002-041.6 (2 females, depth 2 m, Sept. 16, 2002, S. Trautwein coll.); Pago Bay: LACM CR 2002-039.4 (1 male, damaged, depth 2 m, Sept. 17, 2002, S. Trautwein coll.), LACM CR 2002-039.5 (1 male, 1 ovig. female, depth 2 m, Sept. 17, 2002, S. Trautwein coll.), LACM CR 2002-039.6 (1 male, depth 2 m, Sept. 17, 2002, S. Trautwein coll.), LACM CR 2002-039.7 (1 male, 1 ovig. female, 2 juveniles, all damaged, depth 2 m, Sept. 17, 2002, S. Trautwein coll.), LACM CR 2002-039.8 (1 ovig. female, depth 2 m, Sept. 17, 2002, S. Trautwein coll.), LACM CR 2002-039.9 (1 male, 1 ovig. female, depth 2 m, Sept. 17, 2002, S. Trautwein coll.), LACM CR 2002-039.10 (1 male, 1 ovig. female, depth 2 m, Sept. 17, 2002, S. Trautwein coll.), LACM CR 2002-040.5 (1 male, 1 ovig. female, depth 2 m, Sept. 18, 2002, S. Trautwein coll.), LACM CR 2002-040.6 (1 male, 1 ovig. female, depth 2 m, Sept. 18, 2002, S. Trautwein coll.), LACM CR 2002-040.7 (1 male, 1 ovig. female, depth 2 m, Sept. 18, 2002, S. Trautwein coll.), SMF 26930 (1 male, 1 ovig. female, 1 female all labeled as *Tetralia vanninii*, depth 2 m, Sept. 15, 1997, P. Castro & E. Santiago coll.), SMF 26928 (1 male labeled as *Tetralia vanninii*, depth unknown, July 1997, P. Castro coll.); Ipan Beach Park: LACM CR 2002-040.8 (1 male, 1 ovig. female, depth 2 m, Sept. 18, 2002, S. Trautwein coll.), LACM CR 2002-040.9 (1 male, 1 ovig. female, depth 2 m, Sept. 18, 2002, S. Trautwein coll.), LACM CR 2002-040.10 (1 male, 1 ovig. female, depth 2 m, Sept. 18, 2002, S. Trautwein coll.), LACM CR 2002-040.11 (1 male, 1 ovig. female, depth 2 m, Sept. 18, 2002, S. Trautwein coll.), LACM CR 2002-040.12 (1 male, 1 ovig. female, depth 2 m, Sept. 18, 2002, S. Trautwein coll.).

Japan. Okinawa (26°16'N, 127°43'E): LACM CR 2004-018.1 (1 male, 1 ovig. female, depth 2 m, June 29, 2004, S. Trautwein coll.).

French Polynesia. Society Is., Moorea (17°32'S, 149°47'W): LACM CR 2001-052.1 (1 ovig. female, depth 3 m, July 24, 2001, S. Trautwein coll.), LACM CR 2006-003.1 (1 male, 1 ovig. female, depth 1 m, April 28, 2006, S. Trautwein coll.), LACM CR 2006-003.2 (1 ovig. female, depth 1 m, April 28, 2006, S. Trautwein coll.), LACM CR 2006-003.3 (1 male, 1 ovig. female, depth 1 m, April 28, 2006, S. Trautwein coll.).

Description. Carapace: Carapace quadrilateral to oval (Plate 4A), flattened in both sexes; carapace width exceeds length (Table 1); anterolateral margins convex, particularly in females; exterior orbital angle blunt in adults (may be pointed in juveniles); frontal margin very finely denticulate with teeth more pronounced (dentate), more widely spaced laterally, notch absent (Plate 6C), setae few or absent between teeth.

Chelipeds: Chelipeds slightly unequal in females (major cheliped propodus only slightly higher than minor); cheliped size markedly dissimilar in males (major cheliped propodus being much higher than minor) (Plate 4A). Tomentose pit of major cheliped approximately 1/3–1/2 length of propodus in females (Plate 4E), greatly reduced in males, barely extending beyond proximal margin of propodus; several long setae distributed throughout tomentose pit in females, absent in males. Finger inner margins smooth, gaping in males (Plate 4F), dentate, non-gaping (touching) in females; dactylus length approximately 1/2 propodus length (Table 1). Propodus granular; proximal dorsal surface with prominent red propodal knob (Plate 4G). Carpus anterior margin smooth, possibly bearing 1–2 teeth in both sexes (Plate 4D). Merus anterior margin denticulate to dentate without crest, but smooth laterally (Plate 4D); dorsal surface granular.

Fifth pereopod (P5): Few setae present on ventral surfaces of P5 propodus, dactylus. P5 dactylus dorsal surface with 3–4 large, strongly curved spines near tip (Plate 7C); ventral surface with 4–6 discontinuous transverse rows of flattened chitinous spinules with 3–4 spinules at ventral base of horny tip (Plate 8C). Distal, ventral margin of P5 propodus lined with several long chitinous spinules.

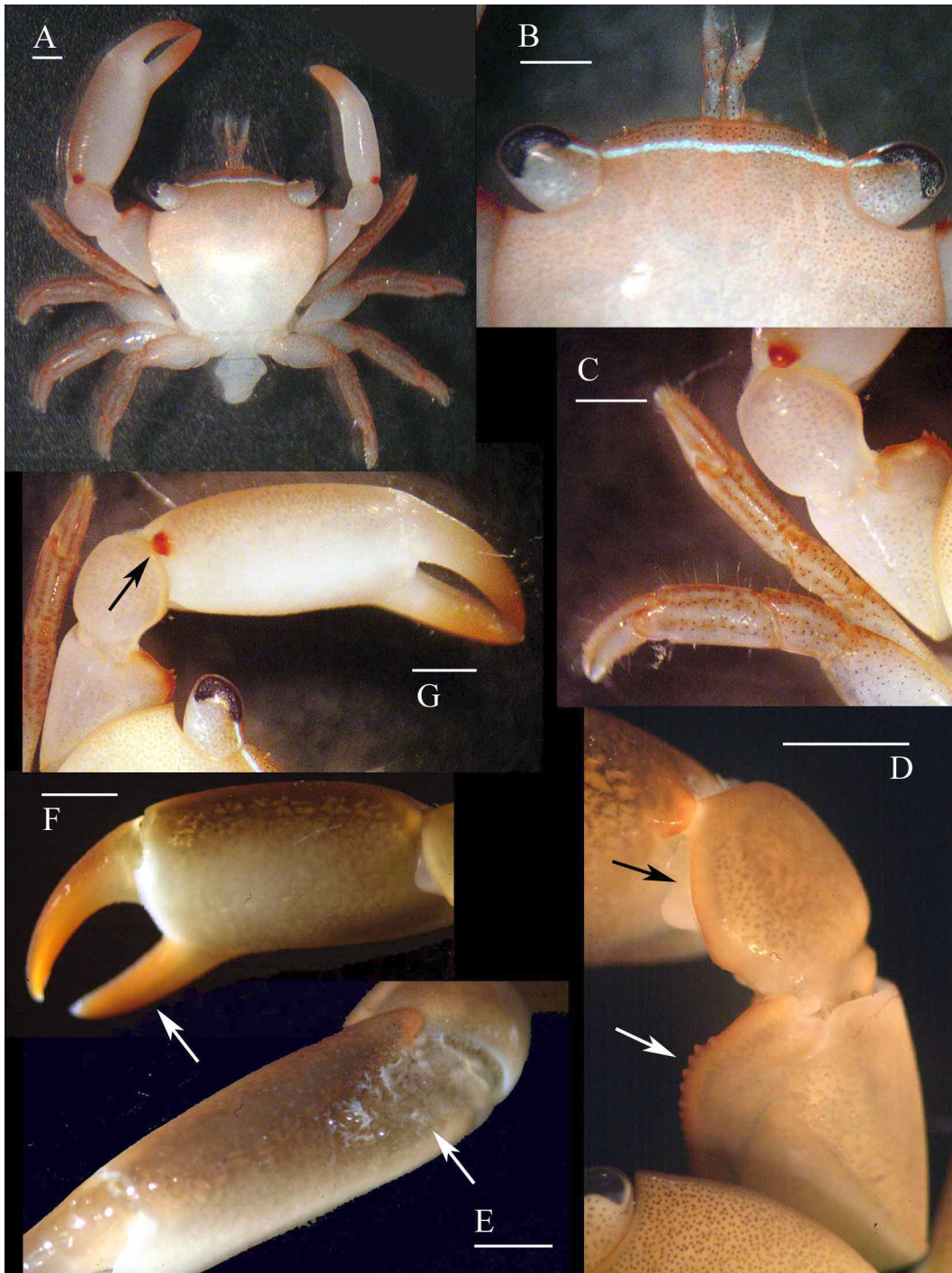


PLATE 4. *Tetralia brunalineata*, new species (LACM CR 2006-003.1 freshly-collected male for images A, B, C, G; LACM CR 2002-040.3, holotype, preserved male for images D, F; LACM CR 2002-040.4, allotype, preserved female for image E). A. whole body, dorsal view; B. frontal margin, dorsal view; C. first and second left pereopods, note brown and white stripes; D. carpus of major right cheliped, arrows indicate carpus and merus anterior margin detail; E. female tomentose pit (arrow) of major left cheliped; F. median view of major right cheliped propodus and dactylus, arrow indicates gaping fingers; G. major left cheliped, dorsal/median view, arrow indicates bright red knob. All scale bars 1mm.

Male pleopods: Male first pleopods curved, distal 1/4 covered with sparse setae.

Live coloration: Anterior dorsal half of carapace and anterior portion of eyestalks dark brown, posterior half white (Plate 4A); frontal, orbital, anterolateral margins orange-brown; thin light blue line posterior to frontal margin extends across eyestalks (Plate 4B), appearing dark blue in preserved specimens. Ventral anterior region darker than posterior; buccal region's color matches surrounding area; light blue line present on posterior epistome margin extending across eyestalks.

Cheliped fingers orange-red, may be white proximally (Plates 4F, 4G); dorsal surfaces of propodus, carpus dark brown becoming white ventrally (Plates 4E, 4F, 4G); anterior margins of propodus, carpus, merus, basi-ischium orange-red with merus anterior margin darker red than other margins (Plates 4C, 4D); anterior coxal margin color matches surrounding area. Propodal knobs dark red (Plate 4G).

Pereopods with alternating lines of dark brown and white extending along length of each podomere, most notably on dorsal and lateral surfaces of carpus, propodus, dactylus (Plate 4C); distal margins of merus, carpus, propodus orange-red (Plate 4C); large black spot absent at dorsal propodal-dactylar articulation on all pereopods.

Remarks. *T. brunalineata* differs from the other described species of *Tetralia* in its overall color pattern, primarily by the presence of brown stripes on the pereopods (Plate 4C) and bright red propodal knobs on the chelipeds (Plate 4G). In addition to the unique color pattern, *T. brunalineata* can be distinguished from other species of *Tetralia* by the following combination of morphological characters: (1) carapace width much greater than length, especially in females (Table 1), (2) major cheliped fingers gaping in males (Plate 4F; see also *T. aurantistellata*), (3) crest of cheliped merus absent (Plate 4D), and (4) tomentose pit of major cheliped greatly reduced in males. Males consistently show gaping fingers and the fingers' inner margins never touch as in most tetraliid species. Gaping cheliped fingers, however, have been noted in males of other tetraliid species. Some museum specimens (SMF 26930) collected and color patterns described (and photographed) by Castro (2003) as *T. vanninii* are the new species *T. brunalineata*. This new species may be mistaken for *T. nigrolineata* due to the presence of a thin light blue line just posterior to a dark band on the carapace frontal margin of both species. However, the frontal margin of *T. brunalineata* is orange-brown, not black (or dark brown) as in *T. nigrolineata*. In addition, this frontal margin coloration is present on the anterolateral margins in *T. nigrolineata*, but absent on the anterolateral margins in *T. brunalineata*.

Distribution. *Tetralia brunalineata* has so far been identified from Okinawa, Guam, and Moorea, French Polynesia.

Etymology. From "brunneus" (Medieval Latin) for brown, "linea" (Latin) for line in reference to the brown lines on the pereopods.

***Tetralia ocucaerulea*, new species**

(Pl. 1, Figs. A-B, D; Pl. 5, Figs. A-H; Pl. 6, Fig. D; Pl. 7, Fig. D; Pl. 8, Fig. D)

Tetralia vanninii – Castro, 2003: 442 (part).

Tetralia muta – Castro & Godwin, 2006: 54.

Type material: Holotype, LACM CR 2002-041.7 (1 male) Mariana Is., Guam, Hagatna (=Agana) Bay (13°29'N, 144°45'E), collected by snorkeling on reef crest from *Acropora* sp., depth 3 m, Sept. 16, 2002, S. Trautwein coll. Paratypes (total of 7 specimens), Guam, Hagatna (=Agana) Bay: LACM CR 2002-041.7 (allotype, 1 ovigerous female, depth 3 m, Sept. 16, 2002, S. Trautwein coll.), LACM CR 2002-040.15 (1 male, 1 ovig. female, depth 3 m, Sept. 18, 2002, S. Trautwein coll.); Guam, Shark's Hole (13°31'N, 144°46'E): LACM CR 2002-040.13 (1 male, 1 ovig. female, 1 subadult male, depth 5 m, Sept. 18, 2002, S. Trautwein coll.), LACM CR 2002-040.14 (1 male, depth 5 m, Sept. 18, 2002, S. Trautwein coll.).

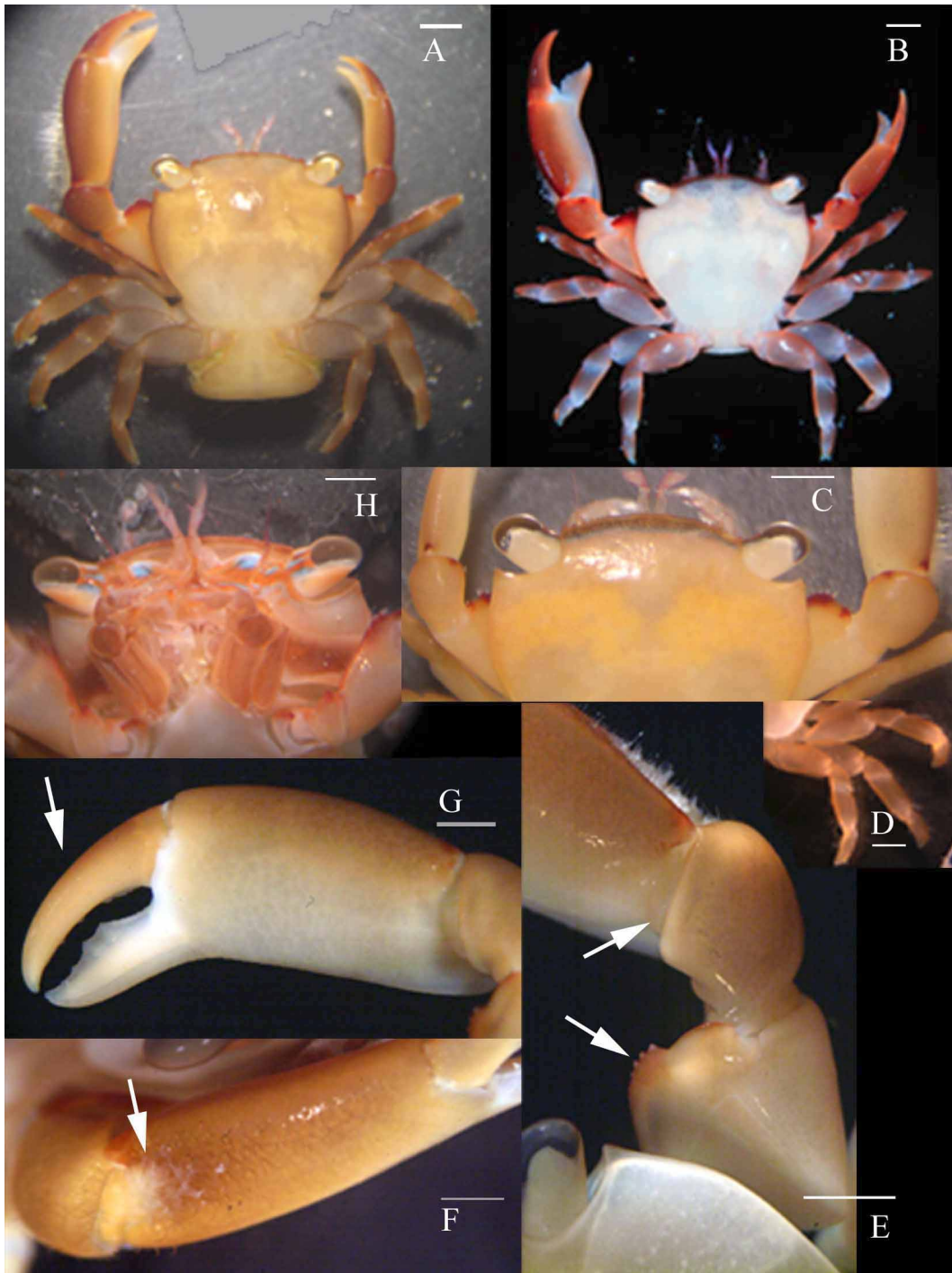


PLATE 5. *Tetralia ocucaerulea*, new species (LACM CR 2006-008.4 freshly-collected female for image A; LACM CR 2002-041.7, holotype, freshly-collected male for image B; LACM CR 2006-008.3 freshly-collected male for image C; LACM CR 2006-003.4 freshly-collected male for image D; LACM CR 2002-040.14 preserved male for images E, G; LACM CR 2002-040.13 preserved female for image F; LACM CR 2006-008.5 freshly-collected female for image H). A. whole body, dorsal view, brown morph; B. whole body, dorsal view, white morph; C. frontal margin, dorsal view; D. right pereopods, dorsal/posterior view; E. major right cheliped propodus (partial), carpus, and merus, dorsal view, arrows indicate carpus and merus anterior margins; F. female tomentose pit (arrow) of major right cheliped; G. median view of major right cheliped propodus and dactylus, arrow indicates fingers; H. "face" color pattern. All scale bars 1mm.

Other material examined (total of 55 specimens): **Guam.** Hagatna (=Agana) Bay: LACM CR 2002-041.8 (1 male, depth 2 m, Sept. 16, 2002, S. Trautwein coll.), LACM CR 2002-041.9 (1 male, 1 ovig. female, depth 2 m, Sept. 16, 2002, S. Trautwein coll.), LACM CR 2002-041.10 (1 female, depth 2 m, Sept. 16, 2002,

S. Trautwein coll.); Shark's Hole: LACM CR 2002-040.13 (3 juveniles, depth 5 m, Sept. 18, 2002, S. Trautwein coll.), LACM CR 2002-040.16 (1 male, 1 female, depth 5 m, Sept. 18, 2002, S. Trautwein coll.), LACM CR 2002-040.14 (1 ovig. female, depth 5 m, Sept. 18, 2002, S. Trautwein coll.), LACM CR 2002-040.17 (1 male, 1 ovig. female, depth 5 m, Sept. 18, 2002, S. Trautwein coll.), LACM CR 2002-040.18 (1 ovig. female, depth 5 m, Sept. 18, 2002, S. Trautwein coll.), LACM CR 2002-040.19 (1 male, 1 ovig. female, depth 5 m, Sept. 18, 2002, S. Trautwein coll.), LACM CR 2002-040.20 (1 male, 1 ovig. female, depth 5 m, Sept. 18, 2002, S. Trautwein coll.), LACM CR 2002-040.21 (1 male, 1 ovig. female, depth 5 m, Sept. 18, 2002, S. Trautwein coll.), LACM CR 2002-040.22 (1 male, 1 ovig. female, depth 5 m, Sept. 18, 2002, S. Trautwein coll.); Ipan Beach Park (13°27'N, 144°46'E): LACM CR 2002-042.1 (1 juvenile, depth 2 m, Sept. 19, 2002, S. Trautwein coll.); Pago Bay (13°28'N, 144°46'E): SMF 26928 (1 male, 1 ovig. female, 1 juvenile labeled as *Tetralia vanninii*).

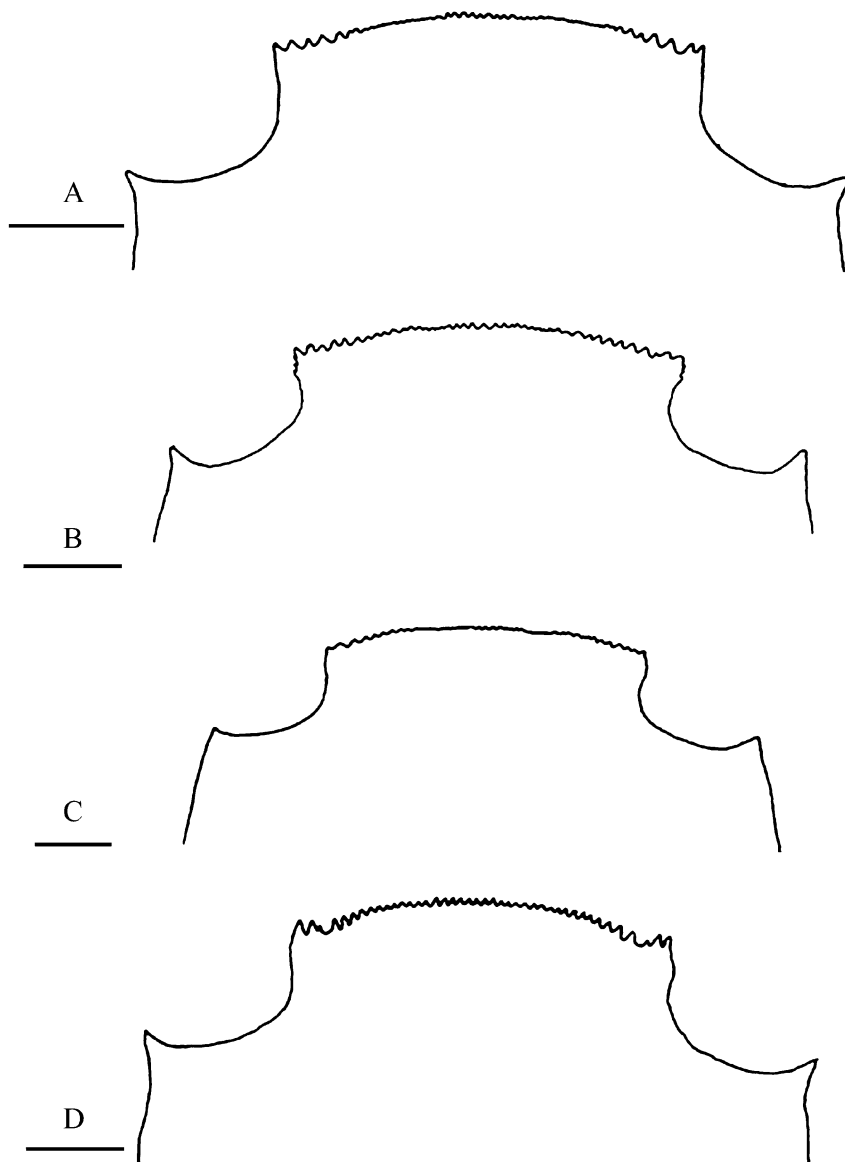


PLATE 6. Frontal margin illustrations for new species described herein. A. *Tetralia aurantistellata*, new species (LACM CR 2002-043.1, holotype, male); B. *T. brengelae*, new species (LACM CR 2002-040.23, holotype, male); C. *T. brunalin-eata*, new species (LACM CR 2002-040.3, holotype, male); D. *T. ocucaerulea*, new species (LACM CR 2002-041.7, holotype, male). All scale bars 1mm.

French Polynesia. Society Is., Moorea (17°32'S, 149°47'W): LACM CR 2001-053.1 (1 male, 1 ovig. female, 1 juvenile, depth 2 m, July 25, 2001, S. Trautwein coll.), LACM CR 2001-054.1 (1 male, 1 ovig. female, depth 2 m, July 22, 2001, S. Trautwein coll.), LACM CR 2006-004.1 (1 male, 1 ovig. female, depth 1 m, April 22, 2006, S. Trautwein coll.), LACM CR 2006-005.1 (1 male, 1 ovig. female, 1 juvenile, depth 1 m, April 26, 2006, S. Trautwein coll.), LACM CR 2006-005.2 (1 ovig. female, depth 1 m, April 26, 2006, S. Trautwein coll.), LACM CR 2006-006.1 (1 female, depth 1 m, April 27, 2006, S. Trautwein coll.), LACM CR 2006-006.2 (1 male, 1 ovig. female, depth 1 m, April 27, 2006, S. Trautwein coll.), LACM CR 2006-006.3 (2 juveniles, depth 1 m, April 27, 2006, S. Trautwein coll.), LACM CR 2006-003.4 (1 juvenile, depth 1 m, April 28, 2006, S. Trautwein coll.), LACM CR 2006-003.5 (1 male, 1 ovig. female, depth 1 m, April 28, 2006, S. Trautwein coll.), LACM CR 2006-007.1 (1 juvenile, depth 0.5 m, April 29, 2006, S. Trautwein coll.), LACM CR 2006-007.2 (1 juvenile, depth 0.5 m, April 29, 2006, S. Trautwein coll.), LACM CR 2006-008.1 (1 male, 1 ovig. female, depth 0.5 m, May 2, 2006, S. Trautwein coll.), LACM CR 2006-008.2 (1 male, 1 ovig. female, depth 0.5 m, May 2, 2006, S. Trautwein coll.), LACM CR 2006-008.3 (1 male, 1 ovig. female, depth 0.5 m, May 2, 2006, S. Trautwein coll.).

Northwestern Hawaiian Islands. French Frigate Shoals, Maro Reef (25.4614° N, 170.6830° W): BPBM S12812 (1 male, 2 ovig. female, S. Godwin coll.).

Description. Carapace: Carapace quadrilateral (Plates 5A, 5B), flattened in both sexes; carapace width exceeds length (Table 1); anterolateral margins parallel to slightly convex in both sexes; exterior orbital angle pointed in both sexes; frontal margin denticulate to dentate with teeth pronounced, more widely spaced laterally (serrate), discernible notch present (Plates 1B, 6D), several long setae scattered between teeth.

Chelipeds: Chelipeds unequal in both sexes (Plates 5A, 5B). Tomentose pit of major cheliped measures approximately 1/4–1/3 length of propodus in both sexes (Plate 5F) and several long setae distributed throughout pit in both sexes. Finger inner margins dentate, non-gaping (touching) in both sexes (Plate 5G); dactylus length approximately 1/2 propodus length (Table 1). Propodus very finely granular; proximal dorsal surface with prominent red propodal knob with white tip. Carpus anterior margin may bear one tooth that may be followed by one or more minute serrations laterally, or margin may appear smooth (Plate 5E). Merus anterior margin serrate with crest (Plate 5E); dorsal surface granular.

Fifth pereopod (P5): Numerous, long setae present on ventral surfaces of P5 propodus, dactylus. P5 dactylus dorsal surface with 7–8 large, strongly curved spines near tip (Plate 7D), followed by 3–4 smaller spines towards the proximal end (not shown in Plate 7D); ventral surface with 4–5 discontinuous transverse rows of flattened chitinous spinules ending in 3–4 chitinous spinules at ventral base of horny tip (Plate 8D). Distal, ventral margin of P5 propodus lined with several long chitinous spinules.

Male pleopods: Male first pleopod straight, distal 1/3 covered with dense setae.

Live coloration: Anterior dorsal region of carapace white or brown (Plates 5A, 5B), may be darker than posterior region (as in Plate 5A) or carapace color may be uniform in color (as in Plate 5B); frontal margin color pattern composed of three successive lines extending laterally to anterior portion of eyestalks and exterior orbital angle. The most anterior frontal margin line is orange-brown (appearing orange-red in preserved specimens) and is followed by a black line composed of numerous black spots (leaving the most anterior margin without spots) and a thin light blue line (Plate 5C). Anterolateral margins match surrounding carapace color (when carapace is uniformly colored) or orange-brown (when anterior half is darker than posterior). Frontal margin color pattern is repeated on ventral anterior surface of carapace with light blue line appearing across the posterior margin of the epistome; three light blue lines present on anterior portion of eyestalks (Plate 5H); blue patches also appear on outermost edges of ridge between antennular socket and base of antenna (Plate 5H). Buccal region brown (Plate 5H).

Movable finger of chelipeds orange or brown, fixed finger light brown to white (Plate 5G); dorsal surfaces of propodus, carpus dark brown to orange, becoming white towards ventral surface (Plate 5G); anterior margins of carpus, merus, basi-ischium, coxa dark red, with merus teeth tipped in white (Plates 5C, 5E). Propodal knob dark red, usually with white tip (Plates 5C, 5E).

All podomeres of pereopods have alternating bands of brown and white with white bands located at podomere articulations (Plates 5B, 5D); dorsal surface of dactylus orange, especially towards tip; large black spot absent at dorsal propodal-dactylar articulation on all pereopods.

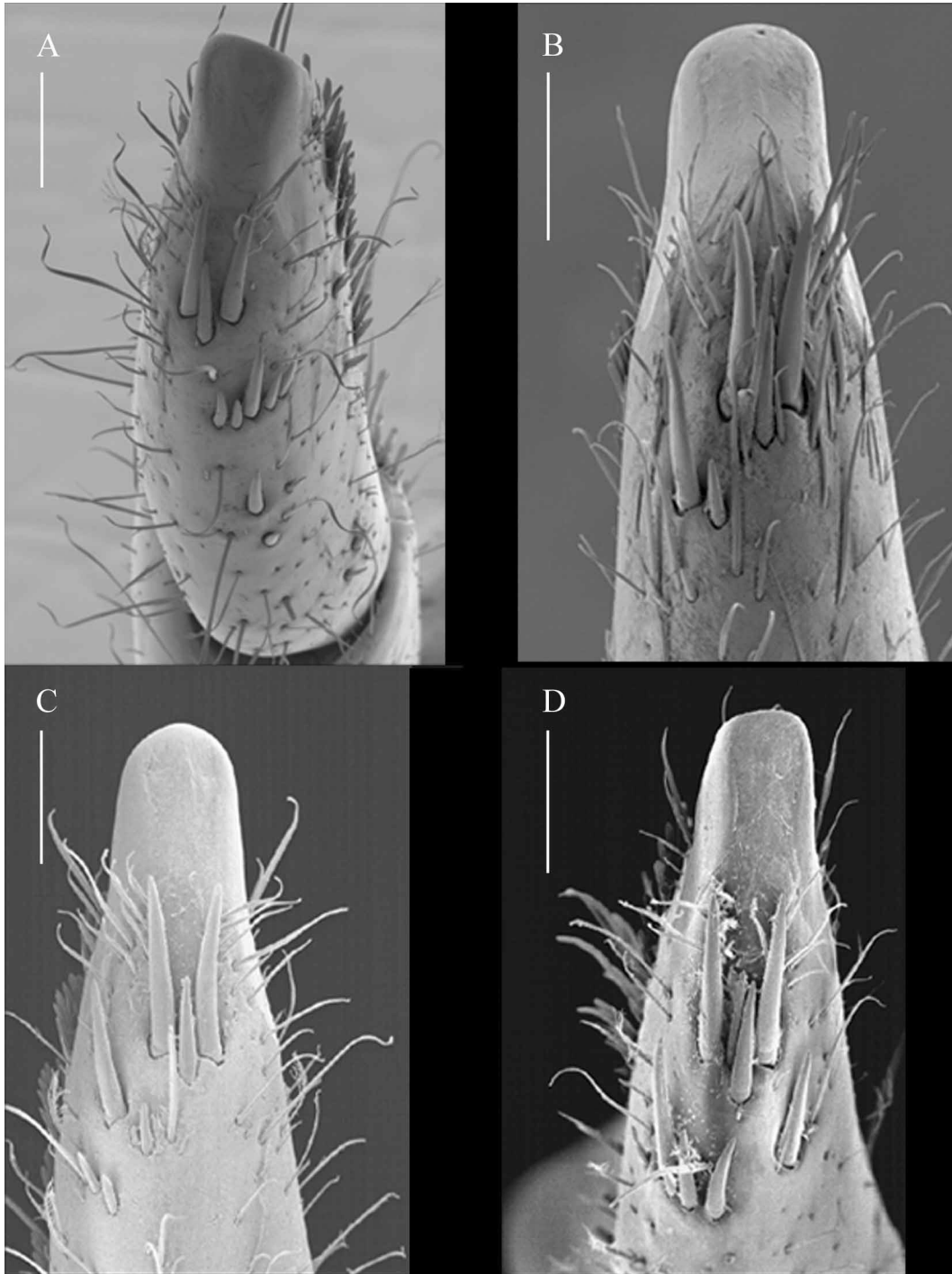


PLATE 7. Dorsal view of fifth pereopod dactylus tip for new species described herein. A. *Tetralia aurantistellata*, new species (LACM CR 2002-043.1, holotype, male, right fifth pereopod, magnification x120); B. *T. brengelae*, new species (LACM CR 2002-040.23, holotype, male, left fifth pereopod, magnification x150); C. *T. brunalineata*, new species (LACM CR 2002-040.3, holotype, male, left fifth pereopod, magnification x141); D. *T. ocucaerulea*, new species (LACM CR 2002-041.7, holotype, male, left fifth pereopod, magnification x148). All scale bars 200 μ m.

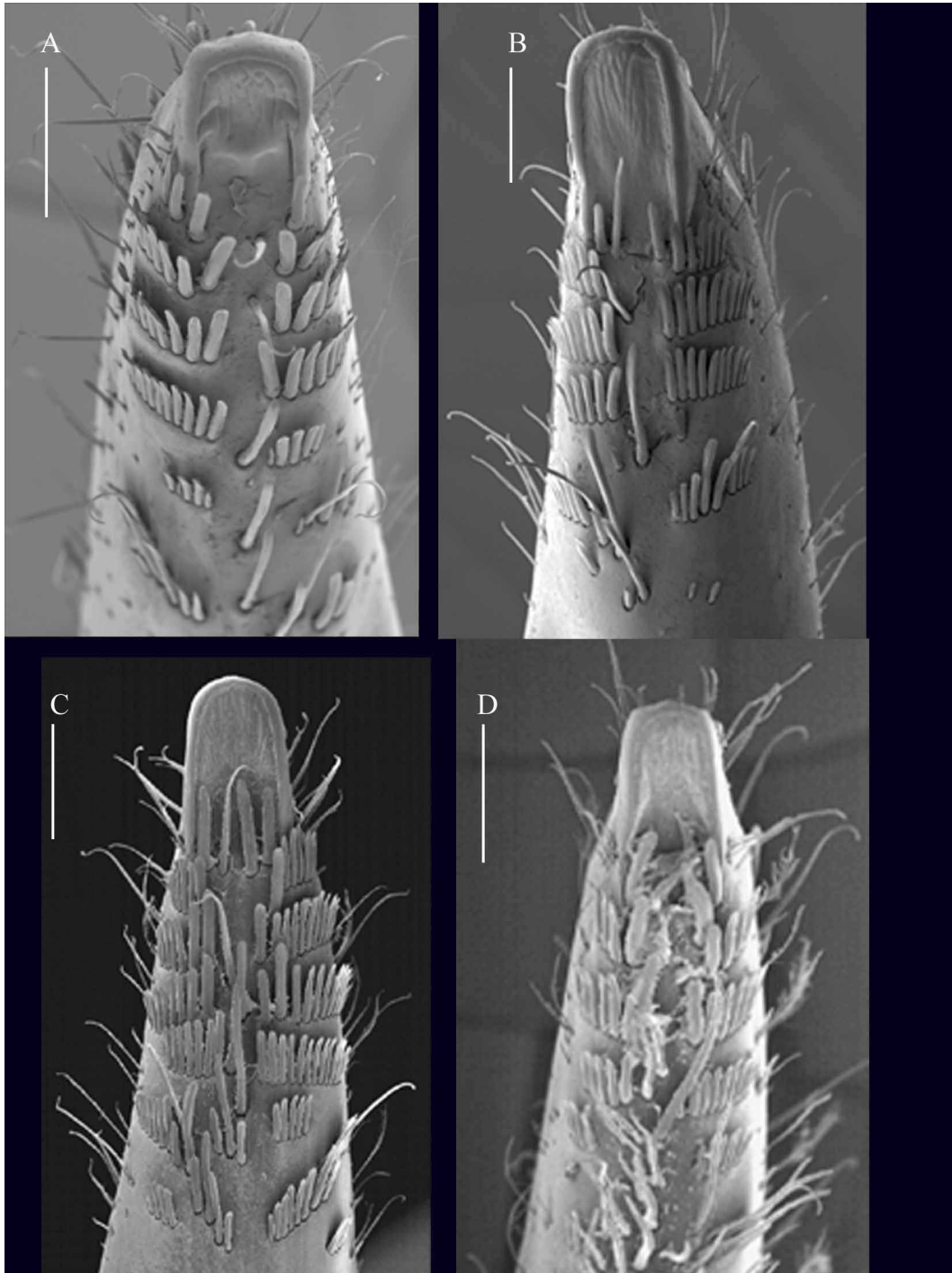


PLATE 8. Ventral view of fifth pereopod dactylus tip for new species described herein. A. *Tetralia aurantistellata*, new species (LACM CR 2002-043.1, holotype, male, right fifth pereopod, magnification x150); B. *T. brengelae*, new species (LACM CR 2002-040.23, holotype, male, left fifth pereopod, magnification x120); C. *T. brunalineata*, new species (LACM CR 2002-040.3, holotype, male, left fifth pereopod, magnification x108); D. *T. ocucaerulea*, new species (LACM CR 2002-041.7, holotype, male, left fifth pereopod, magnification x109). All scale bars 200µm.

Remarks. *T. ocucaerulea* differs from the other described species of *Tetralia* in its color pattern, most especially by the presence of three blue lines across the anterior eyestalks (Plate 5H), small blue patches on the buccal region (Plate 5H), and alternating brown and white bands on the pereopods (Plate 5D). In addition to its unique color pattern, *T. ocucaerulea* can be distinguished from other species of *Tetralia* by the following combination of morphological characters: (1) presence of numerous long setae on propodus and dactylus of

P5, (2) discernible notch present on the frontal margin (Plate 1B), (3) tomentose pit is approximately 1/4–1/3 propodus length, and (4) presence of cheliped merus crest. Castro (2003: 442) described color pattern as *T. vanninii*.

Distribution. *Tetralia ocucaerulea* is so far known from Guam, Moorea (French Polynesia), and the Northwestern Hawaiian Islands.

Etymology. From “oculus” (Latin) for eye, “caeruleus” (Latin) for sky blue in reference to three thin light blue lines extending across the anterior portion of the eyestalks.

Discussion

Several of the museum specimens examined were originally identified as *T. vanninii* Galil and Clark, 1988 (= *T. muta* (Linnaeus, 1758)). The identity of this species has been problematic due to the ambiguity of its description and problems with the type material. The holotype (MF 1263, Gesira, Somalia, X-1981) has been lost and the paratypes (MF 75/1, TAU 23104 and BM 1986: 1037) actually include two separate species. Additional museum specimens labeled *T. vanninii* (= *T. muta*) include different species. For example, specimens SMF 26928, SMF 26929, and SMF 26930 were originally identified as *T. vanninii* (= *T. muta*) (Castro 2003), but three of the SMF 26928 specimens are actually *T. ocucaerulea* and one specimen is *T. brunalineata*, SMF 26929 specimens are *T. brengelae*, and SMF 26930 specimens are *T. brunalineata*. Castro (2003) questioned the validity of *T. vanninii* (= *T. muta*) and stated that “the variation of the color pattern and the fact that the color of specimens in the type locality is unknown does not assure us that all of these specimens belong to only one species” (see also Castro 1999b). Although Galil & Clark (1988) include a detailed account of defining characters, at least half of the characters listed are also diagnostic for the genus *Tetralia* (see Galil 1988). For these reasons, *Tetralia vanninii* (= *T. muta*) remains an enigma and its validity is questionable.

Color pattern appears to be an important component of species recognition among coral crabs belonging to the families Tetraliidae and Trapeziidae. Species of *Tetralia* and *Tetraloides* inhabit *Acropora* colonies as mated pairs and may defend their territories from conspecifics as in the case of *Trapezia* on *Pocillopora* corals (Garth 1964, Knudsen 1967). Tetraliid crabs are dorsoventrally flattened and move sideways among the coral branches. Interactions with other tetraliids would most likely involve the anterior and/or lateral regions of their bodies. Therefore, color patterns on the carapace frontal margin, “face,” (the anterior region between the eyes including the frontal margin and the mouthparts) and/or pereopods may be among the most important characters in advertising species identity and are therefore important in taxonomy due to their biological significance. For example, *Tetralia aurantistellata*, *T. glaberrima* (= *T. fulva*) and both species of *Tetraloides* have large spots on their pereopods. In addition, *T. brunalineata* has brown and white stripes on the pereopods and other *Tetralia* species (e.g., *T. cinctipes*, *T. ocucaerulea*) have dark and light colored bands on the pereopods.

The use of color as a taxonomic character, however, has a short duration due to the detrimental effects of preservation. It is critical that taxonomists take color photographs and/or make detailed color notes immediately after crabs are collected in order to record living color patterns. Color is a powerful tool in delineating species of *Tetralia*, provided clear and accurate documentation.

The four new species described add 50% more species to the known species of tetraliids. There is reason to believe that *Tetralia*, and indeed other coral-associated xanthoids, may be more diverse than previously appreciated. For example, there are photographs of what are almost certainly new species of *Tetralia* from Okinawa (Takeda 2001). The color patterns of several of the species depicted do not match any known species of the genus, nor do any of those photographs resemble the new species of *Tetralia* described here. None of the species illustrated in Takeda (2001) were found among 100 tetraliid specimens collected in Okinawa. It is important to note however, that Okinawa and the surrounding region suffered a coral bleaching event in 2001

(Strong *et al.* 2002) three years prior to my collections. In 2004 acroporid colonies on average were generally small, measuring approximately 5–10 cm. A reduction in the abundance and diversity of *Acropora* species may have subsequently affected that of tetraliid crabs. Future collections may yield more diverse coral crab samples as acroporid coral diversity and colony size increases in the region.

The identification of tetraliids based strictly on morphological characters has been a challenge for carcinologists (see Castro *et al.* 2004). Life among coral branches of sympatric species probably contributed to the evolution of similar physical adaptations (e.g., flattened carapace) among species. The result of this constrained bauplan may have led to a decrease in the number of key diagnostic morphological characters used to define species. This has forced us to examine the subtle details of current characters, especially live color pattern, which appears to be used in interspecific and conspecific recognition in these sympatric species. As detailed examinations continue, future collections of coral-associated crustaceans will most likely result in the discovery of additional species. Current research in the molecular systematics of tetraliids by the author will also aid in the delineation of new species.

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