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Hermit crabs of the genus *Calcinus* Dana, 1851 (Decapoda: Anomura: Diogenidae) from the Austral Islands, French Polynesia, with description of a new species

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Abstract

Knowledge of morphology, coloration, and distribution of species of *Calcinus* Dana, 1851 from French Polynesia is expanded based primarily on collections obtained during the French BENTHAUS Expedition in 2002 to the Austral Islands, the southernmost of the French Polynesian islands. Six species of *Calcinus* were obtained from inshore to depths of 280 m. Of these, one proved to be a new species, *C. albengai*, and is fully described. This new species has two colour variants, one with pale pink to cream chelipeds that lives in shallow-water from the intertidal to about 50 m, the other with bright orange chelipeds, from deeper waters from about 50 to 280 m. Morphologically this new species is distinguished by differences in the armature of the ocular acicles, aspects of the left and right palms, ventrodistal pilosity of third pereopods, and telson armature. Five species were collected by dredging, trawling, or using traps, in depths of 40 to 280 m: *C. anani* Poupin & McLaughlin, 1998, *C. gouti* Poupin, 1997, *C. haigae* Wooster, 1984, *C. spicatus* Forest, 1951, and *C.* aff. *sirius* Morgan, 1991. Of these, *C. gouti* was previously known exclusively based on the holotype from Tuamotu, and a more complete diagnosis is presented; the others are also diagnosed, including new details on coloration. Inshore and scuba collecting on Rapa Island produced four additional, but better known species: *C. elegans* (H. Milne Edwards, 1836), *C. latens* (Randall, 1840), *C. laevimanus* (Randall, 1840), and *C. vachoni* Forest, 1958. The inshore *Calcinus* fauna of Rapa is briefly compared with its counterpart on Easter Island, located at the same latitude 3500 km to the east. A total of 19 (or possibly 20, should *C. sirius* be confirmed in the future) *Calcinus* species are now known from French Polynesia. Cases of sibling species of *Calcinus*, distinguished almost exclusively by coloration, are summarized.

Key words: Crustacea, Decapoda, Diogenidae, *Calcinus*, hermit crab, coral reef, French Polynesia, Austral Islands, systematics, sibling species.

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Introduction

Species of the hermit crab genus *Calcinus* Dana, 1851 are distributed throughout the world tropics, and are typically found along the shoreline or in shallow waters. Individuals are relatively small, and their striking colour patterns are important in species recognition. Careful documentation of colour patterns during the last 20 years has led to the description of many new species in the Indo-West Pacific region, including Hawaii (Haig & McLaughlin 1984), Mariana Islands (Wooster 1984), Australia (Morgan 1991; Morgan & Forest 1991), Mauritius (Gherardi & McLaughlin 1994), French Polynesia (Poupin 1997; Poupin & McLaughlin 1998), Indonesia (Rahayu & Forest 1999) and Japan (Asakura & Tachikawa 2000).

Out of 33 known Indo-West Pacific *Calcinus* species, 18 have been recorded to date from French Polynesia (Poupin 1997; Poupin & McLaughlin 1998). The present study, based on French collections obtained during the BENTHAUS Expedition to the Austral Islands (the southernmost of these Polynesian islands), expands the knowledge of morphology, coloration, or distribution of ten *Calcinus* species. The *Calcinus* species were collected in relatively deep waters ranging from 40 to 280 m, using dredges, trawls, and traps. One new species was discovered, and a specimen of unclear identity but sharing affinities with *C. sirius* Morgan, 1991, was found. Other *Calcinus* species found in these relatively deep-water collections are: *C. anani* Poupin & McLaughlin, 1998, *C. gouti* Poupin, 1997, *C. haigae* Wooster, 1984, and *C. spicatus* Forest, 1951. One of these, *C. gouti*, was known based only on the holotype used by Poupin (1997), and the new specimens found during this study have made it possible to provide a more complete diagnosis. Four additional *Calcinus* species were also collected at Rapa Island (27°S) from the intertidal to 53 m: *C. elegans* (H. Milne Edwards, 1836), *C. latens* (Randall, 1840), *C. laevimanus* (Randall, 1840), and *C. vachoni* Forest, 1958. These better known shore species are not diagnosed or included in the systematic account, although they are used to compare the shallow-water *Calcinus* fauna of Rapa with its counterpart in Easter Island, located 3500 km eastward at the same latitude. A Total of 19 *Calcinus* species, or possibly 20 if the presence of *C. sirius* is confirmed in the future, have now been found in French Polynesia.

Materials and methods

The BENTHAUS Expedition, named using a combination of the words “BENTHos” and “AUStral”, took place from October 28 to November 28, 2002, on the Austral Islands. It was organized by the Institut de Recherche pour le Développement (IRD, formerly ORSTOM) and the Muséum national d'Histoire naturelle, Paris (MNHN). Sampling gear included a Warén dredge, beam trawl, and traps. A total of 161 stations were made at depths of 40 to 1000 m. However, *Calcinus* species were captured only at stations ranging in depth from 40 to 280 m, between latitudes 23°S and 29°S, at Macdonald Bank, Marotiri

Isles, Rapa Island, Neilson reef, Thiers Bank, Raivavae Island, Arago Bank and Tubuai Island. The complete list of stations is in Marmayou & Fontaine (2003).

Additional specimens of *Calcinus* were collected at Rapa Island from the shoreline at low tide, to a depth of 53 m. These specimens were obtained while the FRV *Alis* was docked at Rapa, and during scuba dives organized by a team of malacologists attending a workshop. A few specimens of *C. gouti* collected by Gustav Paulay in the Society and Tuamotu archipelagos, have also been examined, and remain deposited in the Florida Museum of Natural History, University of Florida, Gainesville (UF). Additional specimens of *C. haigae* and *C. spicatus* have been examined from the National Museum of Natural History, Smithsonian Institution, Washington, D.C. (USNM). All specimens from the Austral Islands are deposited in the MNHN collections.

The colour illustrations shown in Figs. 2 to 4 were prepared from drawings made using a camera lucida, which were then scanned and coloured using Corel PHOTO-PAINT ®. Based on Fig. 1 and other photographs, the "pipette" tool was used to select matching colour tones. Photographs taken under the stereo microscope were used to prepare Fig. 5.

The use of "ventrodistal pilosity" refers to setation on the ventral margin of the dactyl, and ventrodistal margin of the propodi of P2 or P3. In describing coloration, the term "band" indicates transverse, ring-like portions, whereas "stripes" indicates longitudinal portions.

The measurements in millimetres included in the material examined are of shield length (sl), measured from tip of rostrum to posterior edge of the shield. Other abbreviations used in the manuscript are: DW, Warén dredge; CAS, from the French "Casier", meaning trap; CP, from the French "Chalut à perche", meaning beam trawl; FRV, Fishing Research Vessel; juv., juvenile(s); ov., ovigerous; P2, P3, second and third pereopods respectively, or ambulatory legs; spec., specimen(s); stn, station. The Polynesian island names are used following Motteler (1986). LIFOU, refers to the French campaign to the New Caledonia island of that name; and MUSORSTOM is the name of the series of French campaigns in the Pacific sponsored by MNHN and ORSTOM (now IRD).

Taxonomy

Family Diogenidae Ortmann, 1892

Genus *Calcinus* Dana, 1851

Calcinus albengai n. sp. (Figs 1a,b, 2, 5a)

Type material. **French Polynesia, Austral Islands**, BENTHAUS Expedition. **Marotiri Isles**, *Holotype*, stn DW 1888, 27°51.38'S, 143°31.42'W, 100–120 m, 6.xi.2002: 1 ♂ 3.8 mm, (MNHN Pg 6359). **Thiers Bank**, *Paratypes*, stn DW 1927, 24°39.03'S, 146°01.58'W, 95–105 m, 13.xi.2002: 1 ♂ 4.0 mm (parasitized by bopyrid isopod *Parathelges weberi* Nierstrasz & Brender à Brandis, 1923), 1 juv. (MNHN Pg 6360); **Neilson Reef**,

stn DW 1914, 27°03.52'S, 146°04.01'W, 150 m, 11.xi.2002: 4 ♂ 2.2–5.0 mm, 1 ov. ♀ 3.0 mm, 4 juv. in shells (MNHN Pg 6361).

Other material. **French Polynesia, Austral Islands**, BENTHAUS Expedition. **Macdonald Bank:** stn DW 1877, 28°59.012'S, 140°15.102'W, 59–150 m, 4.xi.2002: 1 juv. (MNHN Pg 6362). **Marotiri Isles:** stn DW 1879, 27°54.8'S, 143°30.14'W, 52 m, 6.xi.2002: 1 ♂ 1.8 mm, 1 ♀ 1.8 mm (MNHN Pg 6379); stn DW 1880, 27°54.8'S, 143°29.45'W, 90–94 m, 6.xi.2002: 3 ♂ 2.2–2.6 mm, 15 juv. in shells (MNHN Pg 6363); stn DW 1881, 27°54.6'S, 143°28.5'W, 112–121 m, 6.xi.2002: 1 ♂ 2.6 mm (MNHN Pg 6364); stn DW 1888, 27°51.38'S, 143°31.42'W, 100–120 m, 6.xi.2002: 1 ♀ 1.9 mm, 10 juv. (MNHN Pg 6365). **Off Rapa Island, NE bank**: stn CP1906, 27°24.78'S, 144°01.75'W, 110–127 m, 9.xi.2002: 1 ov. ♀ 2.0 mm (MNHN Pg 6366). **Rapa Island**: Komire Point, malacologist team, dive 10, 16–18 m, 7.xi.2002: 1 ♂ (damaged) ~ 2.2 mm, 1 ov. ♀ 2.6 mm (MNHN Pg 6380); Komire Point, NE, malacologist team, stn 26, 27°33.0'S, 144°19.1'W, living coral, 53 m, 14.xi.2002: 1 ♂ 3.5 mm (MNHN Pg 6382); N of Anatakuri Bay, malacologist team, stn 38, 27°37.4'S, 144°18.4'W, under stone, 2 m, 22.xi.2002: 1 ♀ 1.8 mm (MNHN Pg 6383); Hiri bay, malacologist team, stn 9, 27°33.3'S, 144°22.2'W, coral, 3–24 m, 6.xi.2002: 1 ♀ 2.0 mm (MNHN Pg 6384); W of Tauna Isle, malacologist team, stn 16, 27°36.3'S, 144°18.4'W, dead coral, 5 m, 9.xi.2002: 2 ♂ 1.3–1.9 mm (MNHN Pg 6385); stn DW 1894, 27°40.13'S, 144°21.51'W, 100 m, 8.xi.2002: 1 juv. (MNHN Pg 6367). **Neilson Reef**: stn CAS 1916, 27°00.3'S, 146°03.6'W, 180 m, 11.xi.2002: 1 ov. ♀ 3.4 mm (MNHN Pg 6371); stn CP 1918, 27°03.45'S, 146°03.96'W, 130–140 m, 12.xi.2002: 6 ♂ 1.0–2.6 mm, 3 ov. ♀ 1.9–2.3 mm, 1 ♀ 1.4 mm, 1 juv. (MNHN Pg 6368); stn CP 1920, 27°03.58'S, 146°03.84'W, 120–203 m, 12.xi.2002: 2 juv. (MNHN Pg 6369); stn CP 1922, 27°03.67'S, 146°03.93'W, 150–163 m, 12.xi.2002: 1 juv. in shell (MNHN Pg 6370). **Thiers Bank**: stn DW 1926, 24°38.16'S, 146°00.82'W, 50–90 m, 13.xi.2002: 3 ♂ 1.0–2.3 mm, 5 ov. ♀ 1.5–3.0 mm, 1 ♀ 2.0 mm (MNHN Pg 6372), 1 ♂ 2.0 mm, 2 ov. ♀ 2.3–3.0 mm, 1 ♀ 1.6 mm (MNHN Pg 6381); stn DW 1936, 24°39.71'S, 145°57.09'W, 80–100 m, 14.xi.2002: 1 ov. ♀ 2.5 mm, 1 juv. (MNHN Pg 6373). **Lotus Bank, off Raevavae Island**: stn DW 1948, 23°48.7'S, 147°53.5'W, 120–280 m, 17.xi.2002: 1 ♂ 4.0 mm (MNHN Pg 6374); stn DW 1946, 23°49.24'S, 147°41.25'W, 100–200 m, 17.xi.2002: 1 ov. ♀ 1.6 mm, 1 ♀ 1.2 mm (MNHN Pg 6375). **Tubuai Island**: stn DW 1958, 23°19.64'S, 149°30.3'W, 80–150 m, 18.xi.2002: 1 ♂ 2.1 mm (MNHN Pg 6376). **Arago Bank:** stn DW 1978, 23°22.02'S, 150°43.41'W, 120–180 m, 21.xi.2002: 1 ♂ 1.8 mm (MNHN Pg 6377); stn DW 1986, 23°26.3'S, 150°44.2'W, 150 m, 21.xi.2002: 1 ♀ 4.4 mm, 1 juv. in shell (MNHN Pg 6378).

Diagnosis. Ocular acicle terminating in simple spine. Anterodorsal plate of branchiostegite with 1 or 2 spinules subproximally. Upper margin of right chela with 4 spines. Outer face of left chela regularly convex. Dactyl of P3 subequal in length to propodus or slightly shorter, with 6–8 small spines on ventral margin. Dactyls of P2 and P3 with similar setation consisting of sparse, widely-spaced tufts of setae. Propodus of P3 with dorso-

lateral margin evenly rounded. Telson with posterior lobes each with single terminal spine. Ocular peduncles bright orange with white suboblong or subcircular spots, and white distal band adjacent to corneas. Chelipeds bright orange except for white-tipped fingers, and small white suboblong or subcircular spots on outer face of dactyl and fixed finger. Ambulatory legs bright orange with white suboblong or subcircular spots.

Description. Shield about 0.9 times as long as broad. Rostrum (Fig. 2a) rounded, slightly overreaching level of broadly subtriangular lateral projections; anterior margins between rostrum and lateral projections concave. Anterodorsal plate of branchiostegite with dorsal margin nearly smooth, with few spinules on proximal half.

Ocular peduncles (Fig. 2a) 0.7–1.1 (average 0.9) times as long as shield, slightly constricted medially; peduncles each 3.5 to 6.5 times as long as diameter of cornea. Corneas weakly dilated. Ocular acicles well developed, subtriangular, terminating in simple spine. Antennular peduncles reaching to distal 0.25–0.3 of ocular peduncles. Ultimate segment 0.3–0.5 times as long as shield.

Antennal peduncles shorter than antennular peduncles, reaching between midpoint and distal 0.3 of ocular peduncles. First segment with ventrolateral angle produced, bearing 2 or 3 spines. Second segment with laterodistal angle produced, terminating in bifid spine; distomesial angle unarmed or with spine. Third segment with strong spine at ventrodistal angle. Fourth segment with dorsodistal spine. Fifth segment unarmed. Antennal acicle reaching beyond proximal margin of fifth antennal segment, terminating in strong spine; dorsolateral margin with spine distally, dorsomesial margin with row of 2–4 spines.

Left chela (Fig. 2b, g, 5a) 0.5–0.8 times as high as long. Dactyl equal or slightly longer than palm; cutting edge with 2 or 3 calcareous teeth; dorsolateral margin usually with row of granules. Fixed finger with 2 median teeth on cutting edge, and 1 or 2 smaller teeth proximally; outer and lower faces with low granules. Palm with outer face regularly convex, finely granular; lower face with some squamous tubercles; inner face smooth, with sharp ventral tubercle bearing few long setae; upper margin smooth (Fig. 2b) or with 7–11 spines (Fig. 2g). Carpus with prominent submedian tubercle on outer face; upper margin with 1 or 2 small spines or indentations, and strong spine at dorsodistal angle. Merus stout, triangular in cross-section; ventromesial margin with 2–4 spines distally; ventrolateral margin with 1 or 2 spines distally; upper margin unarmed.

Right chela (Fig. 2c) with 4 or 5 corneous spines on upper margin of palm. Dactyl about as long as palm; cutting edge with 2 triangular teeth; dorsal surface with 2 subparallel rows each of 3 or 4 spines. Fingers with some squamous tubercles basally; fixed finger with triangular tooth on cutting edge. Palm with outer face weakly convex, smooth; inner face flat, smooth. Upper margin of carpus with 2 or 3 spines increasing in size distally. Merus similar to that of left cheliped, often with spine on dorsodistal angle.

Ambulatory legs similar from left to right. P2 (Fig. 2d) exceeding left cheliped by length of dactyl when fully extended; dactyl 0.7–1.2 (average 0.9) times as long as propodus; ventral margin with widely-spaced, sparse tufts of setae and 6–8 minute spines; pro-

podus with few long setae, and minute movable spine on ventrodistal angle; carpus 0.5–0.7 times as long as propodus, with dorsodistal spine; merus about as long as propodus, with laterodistal spine. P3 (Fig. 2e) shorter than P2, overreaching tip of cheliped by distal half of dactyl when fully extended; ventrodistal pilosity similar to that of P2, not brush-like; dactyl 0.9–1.3 (average 1.0) times as long as propodus, ventral margin armed with 5–9 minute spines; propodus with minute movable spine on ventrodistal angle, dorsolateral margin regularly rounded; carpus 0.6–0.8 times as long as propodus, with dorsodistal spine; merus about as long as propodus, with laterodistal spine sometimes small or indistinct.

Fourth pereopod semichelate. Dactyl terminating in corneous claw; ventrolateral margin with row of spinules. Propodus with broad rasp consisting of several rows of corneous scales. Carpus with dorsodistal spine. Merus unarmed; ventral margin with long setae.
Fifth pereopod chelate, with rasp on propodus and dactyl. Carpus and merus unarmed, subovate in cross-section.

Abdomen with 4 unpaired biramous left pleopods in both sexes. Sixth abdominal tergite calcified, with dorsal face divided into 4 subequal areas by longitudinal and transverse furrows.

Telson (Fig. 2f) with posterior lobes asymmetrical, left more elongated than right; lobes with long setae marginally, and each with 1 posterior spine slightly curved ventrally.

Size. Male sl 1.0–5.0 mm; female sl 1.2–4.4 mm; ovigerous female sl 1.5–3.4 mm.

Live coloration. This new species has two colour variants, a deep-water variant in depths of about 50 to 280 m, and a shallow-water variant found at less than 50 m. The deep-water variant (Fig. 1a) has the following coloration. Shield bright orange to totally white. Ocular acicles, and ocular peduncles bright orange, the latter with white spots on dorsal and lateral surfaces, and white band adjacent to cornea (Fig. 2a). Antennular peduncles orange overall, with pale orange at articulation of segments; ultimate segment white on distal 0.2; flagella white to pale orange. Antennal peduncles orange overall; fifth segment with median longitudinal white stripe on dorsal surface; flagella pale orange. Antennal acicles bright orange with scattered white patches on dorsal surfaces. Chelipeds bright orange; fingers with white tips, and small subcircular to suboblong white spots on outer faces (Figs. 2b, c, g, 5a). Ambulatory legs bright orange with suboblong or sub-circular white spots on basis, coxae, meri, carpi, propodi and dactyls; terminal claws of dactyls black (Fig. 2d–e). Fifth and fourth pereopods with similar orange coloration but less bright, especially on fifth pereopod. Abdomen brown-orange; sixth abdominal tergite, uropods and telson with scattered orange patches.

The shallow-water colour variant (Fig. 1b) differs from the deep-water variant as follows. When it is not white, the shield is red-brown instead of bright orange. The ocular peduncles each have a white patch on the proximal 0.6 of the ventral surface, instead of being solid orange. The antennular peduncles are violet on distal 0.2 and flagella, instead of orange. The chelipeds are whitish-pink with some minute white orange spots at the fin-

ger tips. The ambulatory legs are red-brown with white spots larger and more elongated, arranged in straight lines (Fig. 2h).

Distribution. So far known only from the Austral Islands, French Polynesia, in the South central Pacific, between 23–29°S and 140–151°W. Depth: shore to 280 m.

Habitat. *Calcinus albengai* is the second Indo-West Pacific species of *Calcinus* with a depth range exceeding 150 m, the other being *C. anani*. This new species lives on coral substrates, and uses as housing gastropod shells of the families Bursidae (*Bursa*), Cerithiidae (*Cerithium*), Columbellidae (*Mitrella*), Mithridae (*Cancilla*), Ranellidae (*Gyrineum*), and Trochidae (*Euchelus*).

Etymology. This new species is named for Laurent Albenga, assistant curator, Muséum national d'Histoire naturelle, Paris, in recognition of his invaluable, and dedicated assistance during the BENTHAUS Expedition.

Remarks. The armature of the left cheliped varies with growth and sex. The upper margin of the left chela is almost smooth in large males (sl ≥ 3 mm), or can be armed with 7 to 11 spines in smaller males (sl < 3 mm) and all female sizes examined (Figs. 2b, g). A similar variation occurs on the outer face of the carpus where large individuals have a blunt submedian tubercle, and at most low spines on the upper margin; on the outer face of the carpus, small males and females have a strong spine with some smaller spines nearby, and 3 or 4 spines on the upper margin.

Coloration of the shield varies from fully coloured (bright orange or red-brown) to totally white. A somewhat similar observation for the shield is reported for *C. anani* by Poupin & McLaughlin (1998), and for *C. gaimardii* (H. Milne Edwards, 1848) by Asakura *et al.* (2002). Thus, it appears that shield coloration alone must be used with caution as a diagnostic character for *Calcinus* species.

Calcinus albengai is morphologically similar to *C. dapsiles* Morgan, 1991, known from Western Australia at depths ranging from the subtidal to 97 m. These two species have similar armature of the ocular acicles and telson, aspects of the chelae, and ventrodistal pilosity of P3. However, they can be easily separated on the basis of live coloration. In *C. dapsiles* the ocular peduncles are brown, with a short, cream-coloured band adjoining the cornea; the chelipeds are brown fading to cream or white on the distal half of chelae and fingers; and the ambulatory legs are a mixture of white, pink, brown, and red. The colour pattern of the ambulatory legs of *C. albengai* bears some resemblance to that of *C. anani*, but the two are easily separated by coloration of the ocular peduncles (lacking spots in *C. anani*), and ventrodistal pilosity of P3 (with brush-like setae in *C. anani*).

The two colour variants of *C. albengai* have been found to be morphologically indistinguishable. Whether these variants could actually represent sibling species can not be ruled out. However, until in-depth studies (including DNA data) of additional specimens can be made there is no other practical alternative than to consider the material to represent a single species.

Calcinus anani Poupin & McLaughlin, 1998

Calcinus anani Poupin & McLaughlin, 1998: 10, figs. 1, 2 (type locality: Tuamotu, Moruroa atoll, French Polynesia); Asakura & Tachikawa, 2000: 267 (Japan); Asakura & Nomura, 2001: 101 (Japan); Kato & Okuno, 2001: 69, unnumbered colour photograph (Japan); Asakura, 2002: 29, figs. 2, 3, 21A (Japan).

Calcinus pulcher.— Miyake & Imafuku, 1980: 5, pl. 2, fig. 3 (Japan); Miyake, 1982, 1991: 114, pl. 38, fig. 5 (Japan) [Not *C. pulcher* Forest, 1958, see "Remarks"].

Material examined. **French Polynesia, Austral Islands**, BENTHAUS Expedition**. Thiers Bank**: stn DW 1927, 24°39.03'S, 146°01.58'W, 95–105 m, 13.xi.2002: 1 ♂ 5.0 mm (MNHN Pg 6386). **Off Raevavae, Lotus Bank**: stn DW 1947, 23°48.51'S, 147°53.47'W, 120–150 m, 17.xi.2002: 1 ov. ♀ 4.4 mm (MNHN Pg 6387). **Tubuai**: stn DW 1958, 23°19.64'S, 149°30.3'W, 80–150 m, 18.xi.2002: 2 ♂ 1.9–2.0 mm, 2 ♀ 1.8–2.2 mm (MNHN Pg 6388); stn DW 1960, 23°19.77'S, 149°30.62'W, 230–262 m, 18.xi.2002: 2 ♀ 2.0–3.0 mm (MNHN Pg 6390). **Arago Bank**: stn DW 1985, 23°26.35'S, 150°44.22'W, 100–107 m, 21.xi.2002: 1 ♂ 5.0 mm, 2 ♀ 3.0–3.2 mm (MNHN Pg 6389).

Additional material. **Japan, Okinawa**, Ryukyu Islands, unknown depth and date, coll. R.F. Bolland: 1 ♂ 2.4 mm (USNM 1005010). **New Caledonia, Loyalty Islands**, LIFOU, stn 1463, Santal Bay, Gaatcha, dredge, sand and coral rubble, 20–30 m, 20°55.05'S, 167°03.35' E, 10.xi.2000: 1 spec. (MNHN). **French Polynesia, Tuamotu, Marutea South atoll**, FRV *Marara*, stn CAS 243, 21°30.8'S, 135°38.5'W, 130 m, 30.v.1990: 1 spec. (MNHN). **Marquesas Islands**, MUSORSTOM 9, 1997, Eiao Island, stn DW 1154, 07°58.50'S, 140°43.70'W, 102 m, 23.viii.1997: 1 spec. (MNHN Pg 6357). Hiva Oa Island, stn DW 1204, 09°52.60'S, 139°03.20'W, 60–62 m, 28.viii.1997: 1 spec. (MNHN Pg 6355). Nuku Hiva Island, stn DW 1170, 08°45.10'S, 140°13.10'W, 104–109 m, 25.viii.1997: 1 spec. (MNHN Pg 6356); stn DW 1171, 08°44.90'S, 140°14.90'W, 248–252 m, 25.viii.1997: 2 spec. (MNHN Pg 6358).

Diagnosis. Ocular acicles terminating in simple spine. Right chela with 4 or 5 corneous-tipped spines on upper margin. Left chela with outer face regularly convex. P3 with dactyl 0.8–1.1 as long as propodus; ventrodistal pilosity dense, brush-like. Telson with posterior lobes each with single terminal spine. Ocular peduncle uniformly white or pale orange fading distally. Antennular peduncles with proximal segments orange, distal segments white or cream. Antennal peduncles orange. Chelae bright orange or brown fading on distal half of palm and fingers. Ambulatory legs pale orange with dark orange stripes; stripes merging into intricate network of reticulations on propodi and dactyls, and in some specimens also on meri and carpi.

Distribution. Western and central Pacific: from Japan to French Polynesia. Depth: 18 to 262 m, more commonly from 100 to 250 m.

Habitat. In the Austral Islands this species was found occupying gastropod shells of the families Muricidae (*Muricopsis*), Fasciolariidae (*Fasciolaria, Latirus*), and Bursidae (*Bursa*).

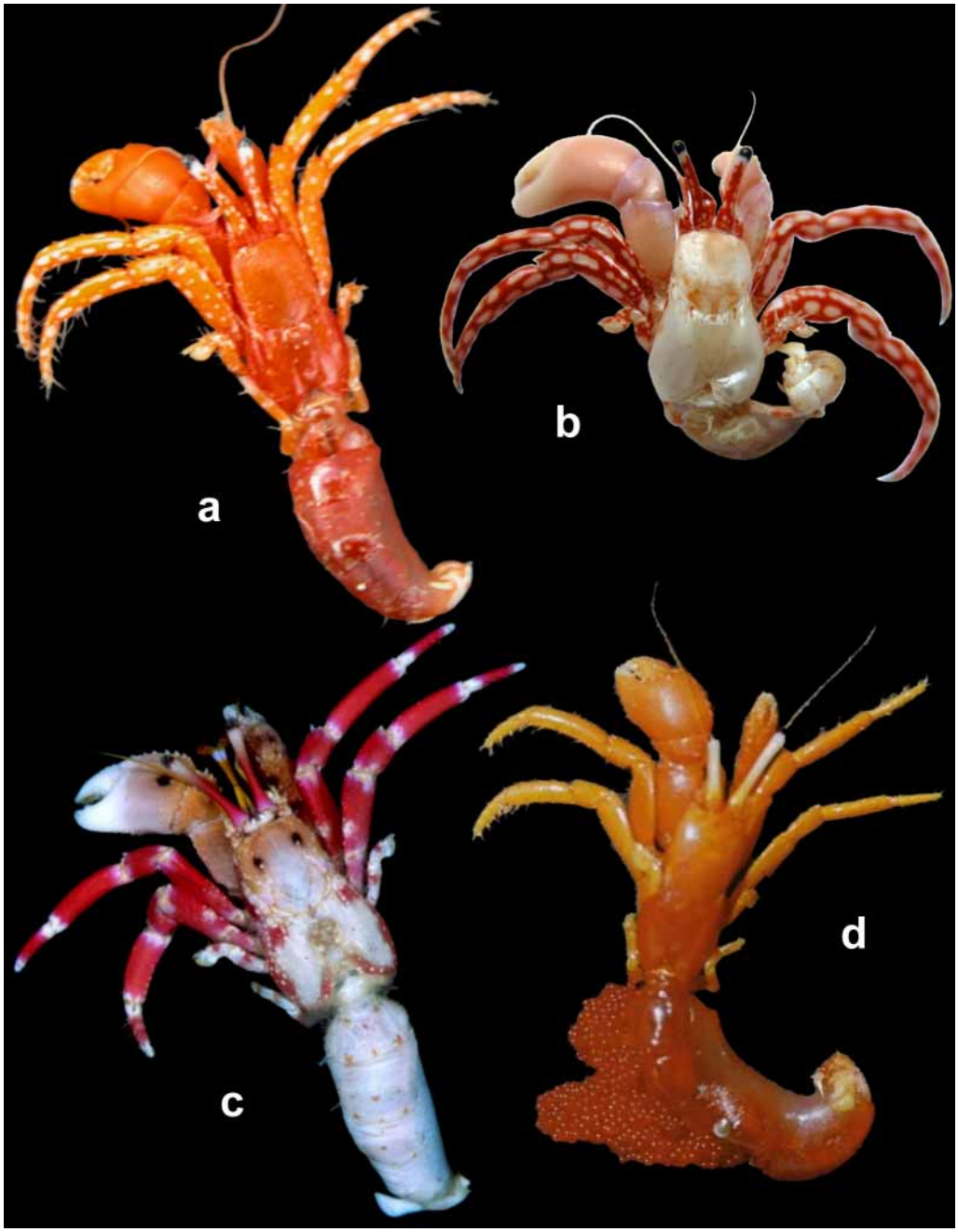

FIGURE 1. Live coloration (except b, taken several weeks after preservation): a, *Calcinus albengai* n. sp., deep-water variant, holotype ♂ 3.8 mm, Marotiri Isles, 100–120 m (MNHN Pg 6359); b, *Calcinus albengai* n. sp., shallow-water variant, ♂ 3.5 mm, Rapa Island, 53 m (MNHN Pg 6382); c, *Calcinus gouti* Poupin, 1997, ♂ 5.0 mm, Tikehau, 15 m (UF 1349); d, *Calcinus* aff. *sirius* Morgan, 1991, 1 ov. ♀ 5.5 mm, Rapa Island, 100 m (MNHN Pg 6395). Photographs by L. Albenga (a, b), G. Paulay (c), and J. Poupin (d).

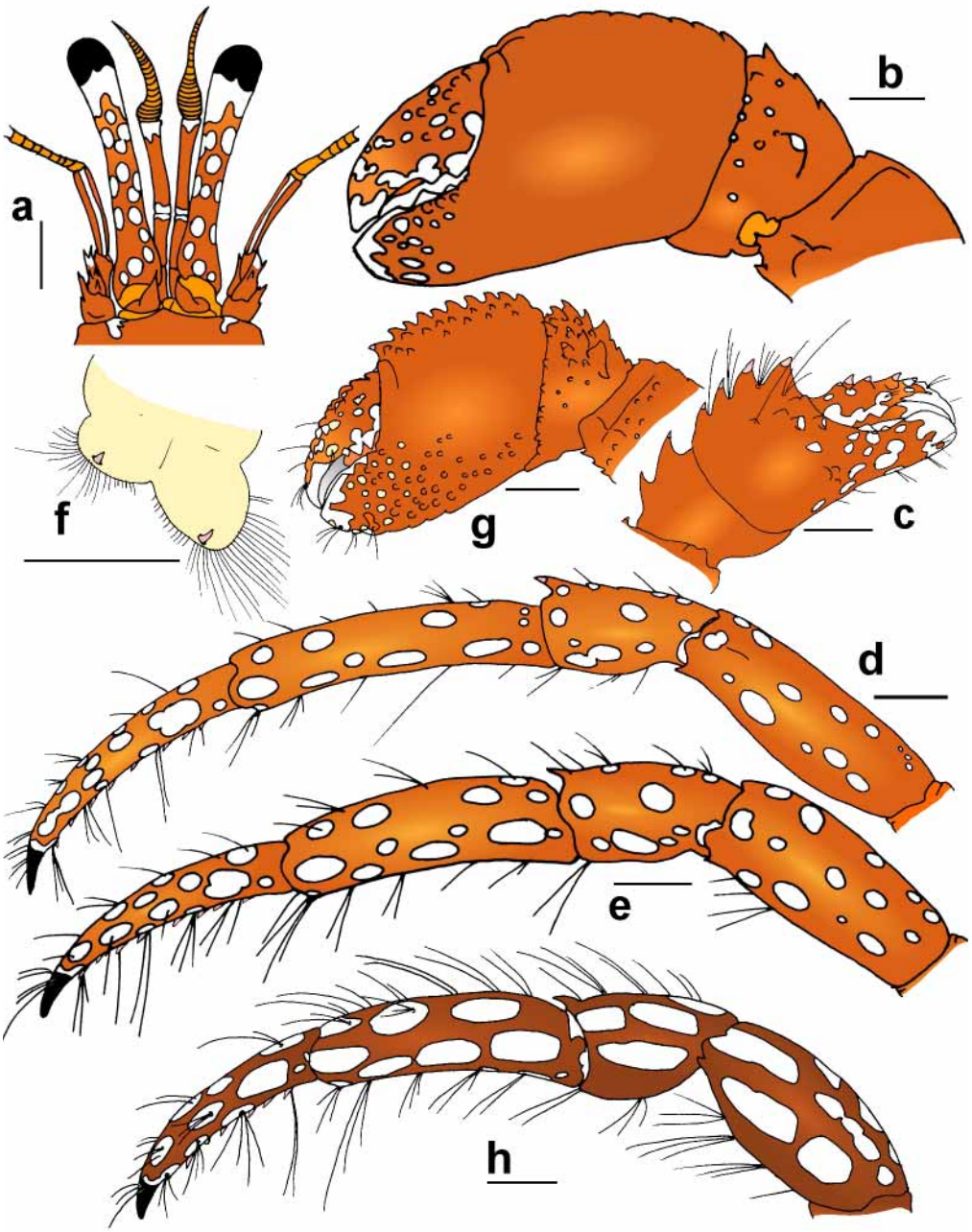

FIGURE 2. *Calcinus albengai* n. sp.: a–f, holotype ♂ 3.8 mm, Marotiri Isles (MNHN Pg 6359); g, paratype ov. ♀ 3.0 mm, Neilson Reef, 150 m (MNHN Pg 6361); h, ♂ 3.5 mm, Rapa Island, 53 m (MNHN Pg 6382). a, anterior portion of shield and cephalic appendages; b, left chela and carpus, outer face; c, right chela and carpus, outer face; d, left P2 of deep-water variant, outer face; e, left P3 of deep-water variant, outer face; f, posterior portion of telson, ventral view; g, left chela and carpus, outer face; h, left P3 of shallow-water variant, outer face. Scale bars 1 mm.

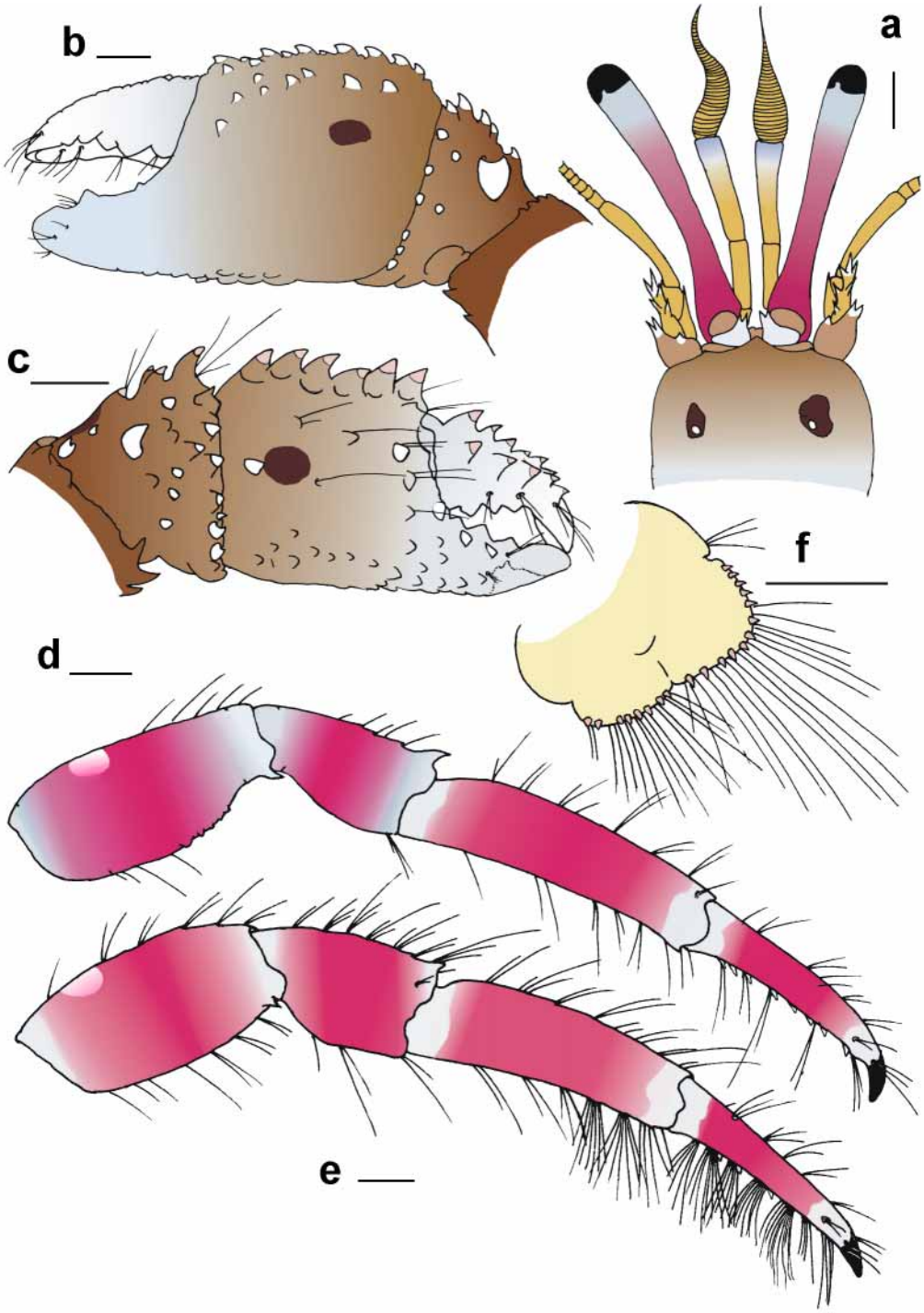

FIGURE 3. *Calcinus gouti* Poupin, 1997, ♂ 5.0 mm, Tikehau Atoll, 15 m (UF 1349): a, anterior portion of shield and cephalic appendages; b, left chela and carpus, outer face; c, right chela and carpus, outer face; d, right P2, outer face; e, right P3, outer face; f, posterior portion of telson, ventral view. Scale bars 1 mm.

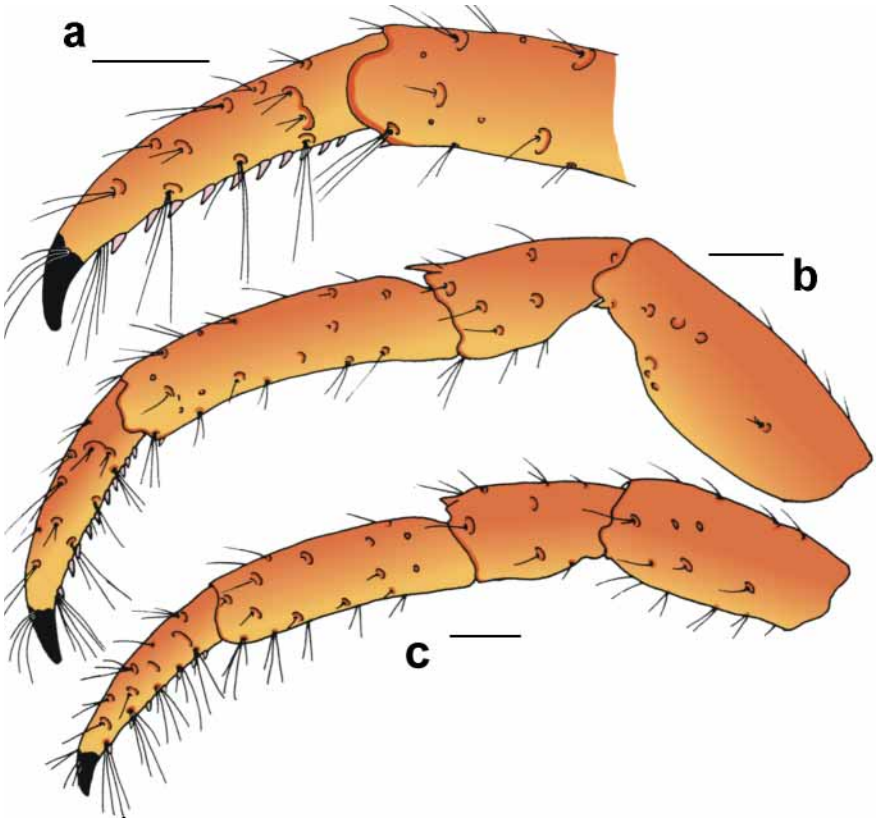

FIGURE 4. *Calcinus* aff. *sirius* Morgan, 1991, ov. ♀ 5.5 mm, Rapa Island, 100 m (MNHN Pg 6395): a, distal part of propodus, and dactyl of left P2, outer face; b, left P2, outer face; c, left P3, outer face. Scale bars 1 mm.

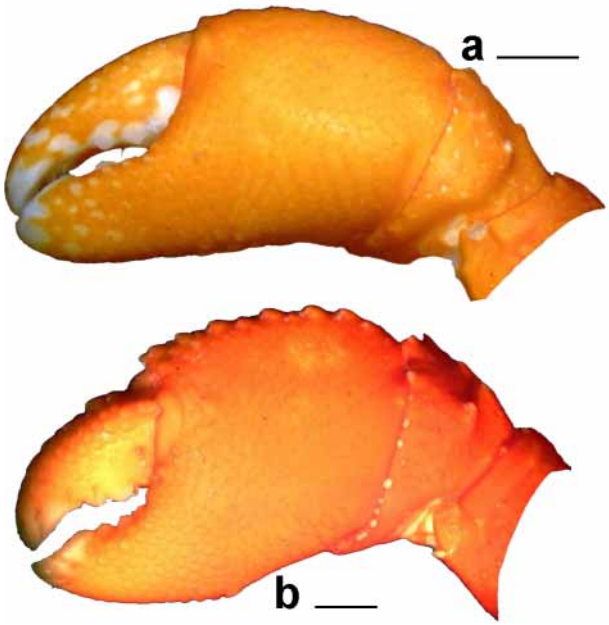

FIGURE 5. Left chela: a, *Calcinus albengai* n. sp., holotype ♂ 3.8 mm, Marotiri Isles, 100–120 m (MNHN Pg 6359); b, *Calcinus* aff. *sirius*, ov. ♀ 5.5 mm, Rapa Island, 100 m (MNHN Pg 6395). Scale bars 1 mm.

Remarks. In smaller specimens the brush-like setation on P3 is sometimes reduced, and thus this character must be used with caution as a diagnostic character. Morphologically, *Calcinus anani* resembles *C. areolatus* Rahayu & Forest, 1999, *C. argus* Wooster, 1984, *C. kurozumii* Asakura & Tachikawa, 2000, and *C. revi* Poupin & McLaughlin, 1998. However, the coloration and depth distribution of *C. anani* are different from those species.

Calcinus anani is also very similar to *C. sirius* Morgan, 1991. Separation of these two has been based on differences in density of ventrodistal pilosity of P3, and coloration (Poupin & McLaughlin 1998). However, Asakura (2002) noted that the setation on P3 varies considerably, and that colour pattern in *C. sirius* is yet unknown, raising the possibility that *C. anani* and *C. sirius* might be conspecific.

Asakura & Nomura (2001) indicated that records of *C. pulcher* Forest, 1958 by Miyake & Imafuku (1980), and Miyake (1982), most likely are referable to *C. anani*. The book by Miyake (1982) was reprinted using the same pagination and figure numbers (Miyake 1991).

Calcinus gouti Poupin, 1997 (Figs. 1c, 3)

Calcinus gouti Poupin, 1997: 690, figs. 3B, 5F, 7A (type locality: Moruroa Atoll, Tuamotu, French Polynesia); Poupin, 1998: 38; Poupin & McLaughlin, 1998: 13 (French Polynesia).

Type material. Holotype: Tuamotu, Moruroa Atoll, coll. B. Gout, 7.x.1996, ov. ♀ 2.6 mm (MNHN Pg 5412).

Material examined. **French Polynesia: Tuamotu, Rangiroa Atoll**: off Motu Maeherehonae, outer reef slope, under rocks, 6–12 m, 10.xi.2001, coll. G. Paulay: 1 ♂ 5.0 mm, 1 ov. ♀ 4.0 mm, 1 (damaged) + uncounted no. in shells (UF 1863). **Tikehau Atoll**: outer end of Passe Tuheiava, outer reef slope, under rocks, 15 m, 10.vii.2001, coll. G. Paulay: 1 ♂ 5.0 mm (UF 1349). **Society, Moorea Island**: East of Passe Taotoi, outer reef slope, under rocks, 12–25 m, 22.x.2001, coll. G. Paulay: 1 spec. in shell of *Astralium confragosa* (UF 1849). **Austral Islands**, BENTHAUS Expedition: **Thiers Bank**: stn DW 1926, 24°38.16'S, 146°00.82'W, 50–90 m, 13.xi.2002: 1 ♀ 2.9 mm (MNHN Pg 6392). **Arago Bank**: stn DW 1968, 23°22.88'S, 150°43.52'W, 100–120 m, 20.xi.2002: 1 ov. ♀ 3 mm, 1 ♀ 2 mm (MNHN Pg 6393); stn DW 1977, 23°22.32'S, 150°43.5'W, 90–95 m, 21.xi.2002: 1 ♂ 4.5mm (MNHN Pg 6391).

Diagnosis. Ocular acicles (Fig. 3a) with 2–4 terminal spines. Left chela (Fig. 3b) with 6–8 spines on upper margin; outer face of palm regularly convex. Upper margin of right chela (Fig. 3c) with 5 or 6 corneous-tipped spines. Dactyl of P3 subequal in length to propodus or slightly shorter; distal pilosity of P3 more pronounced than on P2, more dense in larger specimens (Figs. 3d–e) but not quite forming brush of setae. Posterior lobes of telson (Fig. 3f) with 5–9 spines terminally, and 4–9 spines laterally, on left lobe; and 3–7

spines terminally, and 1 or 2 spines laterally, on right lobe. Shield cream on proximal half, turning to brown on distal half; with 2 dark brown patches on anterior half. Ocular peduncles pink, grading to white or pale blue on distal 0.3. Antennular peduncles yellow with pale blue on distal 0.25 of terminal segments; flagella yellow. Antennal peduncles and antennal acicles pale brown to yellow, with white-tipped spines; flagella yellow. Chelipeds brown fading to white or pale blue on distal half of chelae and fingers; meri each with dorsodistal dark brown patch extending on lateral and mesial faces; carpi each with similar patch on dorsoproximal area; outer and inner faces of chelae (Fig. 3b, c) each with submedian dark brown spot. Ambulatory legs (Figs 3d-e) with coxae, meri and carpi almost totally pink with white or pale blue near articulations; propodi and dactyls pink with narrow white bands proximally and distally. Abdomen white to cream.

Distribution. Known only from French Polynesia. Depth: 10 to 120 m.

Habitat. Coral bottoms, sometimes associated with *Pocillopora*.

Remarks. Juveniles of *Calcinus* species often have the upper margin of the left chela armed with spines that disappear with growth in adult males. However, in large males of *C. gouti*, spines are still present on the upper margin (Fig. 3b).

The coloration of *C. gouti* was described by Poupin (1997, figs. 3B, 5F) based exclusively on the holotype, a female specimen of small size (2.6 mm, MNHN Pg 5412), and differs slightly from the specimens examined during this study. In the holotype, the shield is cream, lacking brown patches. On P2 and P3, the pink bands on carpus, propodus and dactyl are short, the pink band on the merus is restricted to the upper half of the segment; and there are weakly defined light yellow stripes on the lateral faces of merus, carpus, propodus and dactyl. However, these differences have been found to be related to growth. With increasing size, the brown patches on the shield become more clear, the pink bands on the segments of P2 and P3 become wider, and the yellow stripes disappear.

Calcinus gouti is similar to *C. pulcher* and *C. lineapropodus* Morgan & Forest, 1991. The three have similar coloration on the ocular peduncles, a submedian dark spot on the outer and inner faces of the chelae, and similarly armed ocular acicles and telson. They can be separated by the colour pattern of the ambulatory legs, which have stripes in *C. lineapropodus* (see Morgan & Forest 1991, fig. 2e), or bands and longitudinally arranged flecks in *C. pulcher* (see Poupin 1997, fig. 3B; Asakura & Nomura 2001, fig. 3A,E), instead of only bands as in *C. gouti*. They also differ in ventrodistal pilosity of P3, which is weak and similar to that of P2 in *C. pulcher* and *C. lineapropodus*, whereas in *C. gouti* pilosity is more pronounced on P3 than on P2.

Calcinus gouti is also similar to *C. hakahau* Poupin & McLaughlin, 1997, from the Marquesas Islands, in coloration of ocular peduncles and ambulatory legs, and armature of ocular acicles and telson. These two differ only by the presence in *C. gouti*, or absence in *C. hakahau*, of a submedian spot on the outer and inner faces of the chelae. Poupin & McLaughlin (1998) indicated that ventrodistal pilosity of P3 in *C. hakahau* is weak, similar to that of P2, and they used this as one of the characters to separate the two species.

However, examination of previously unreported specimens of *C. hakahau* from the Marquesas (Ua Huka, 6–15 m, MNHN Pg 6351–6353) showed that at least in larger specimens the ventrodistal pilosity of P3 is more pronounced than on P2, and is similar to that observed in *C. gouti*. Thus, it appears that currently *C. gouti* and *C. hakahau* can be reliably distinguished only using differences in coloration. The former also has a wide distribution in French Polynesia, whereas the latter is known only from the Marquesas Islands.

Calcinus haigae Wooster, 1984

Calcinus haigae Wooster, 1984: 146, fig. 5 (type locality: Guam, Marianas); Haig & McLaughlin, 1984: 110, 114 (Hawaii); Morgan, 1991: 880, figs. 17–20 (Australia, Cocos Islands); Poupin, 1997: 695, figs. 2D, 3E, 4D (French Polynesia); Poupin, 1998: 38; Hoover, 1998: 254, unnumbered colour photograph (Hawaii).

? *Calcinus haigae*.— Gherardi & McLaughlin, 1994: 619 (Mauritius, see "Remarks").

Material examined. **French Polynesia, Austral Islands,** BENTHAUS Expedition. **Arago Bank**: stn DW 1984, 23°26.37'S, 150°43.91'W, 40 m, 21.xi2002: 1 ♂ 6.0 mm, 1 ov. ♀ 3.7 mm (MNHN Pg 6394).

Additional material. **Caroline Islands, Ponape**: Ant Atoll, off Imwinyap Island reef front, stn PNP 14, 6–7.5 m, on *Pocillopora*, coll. R.K. Kropp & C. Birkeland, 17.xi.1984: 1 ♂ 2.6 mm (USNM 255916); Pakin Atoll, 1.5 miles W of Mant Island, reef front, stn PNP 18, 6–7.5 m, coll. R.K. Kropp & C. Birkeland, 19.xi.1984: 1 ♂ 1.6 mm, 1 ♀ 2.3 mm (USNM 255914); Ant Atoll, 100 m N of Patya Island reef front, stn PNP 22, 4.6–6 m, on *Pocillopora*, coll. R.K. Kropp & C. Birkeland, 23.xi.1984: 1 ♀ 3.7 mm (USNM 255915). **American Samoa**: Tuituila Island, 1 spec., coll. G. Paulay (UF 3225). **French Polynesia, Tuamotu, Rangiroa atoll**: off Motu Maeherehonae, outer reef slope under rock, 6–12 m, coll. G. Paulay, 10.xi.2001: 1 spec. (UF 1332), 1 spec. (UF 1744); Avatoru Motu, coll. G. Paulay, 10.x.2001: 8 spec. (UF 1333).

Diagnosis. Ocular acicles each with 2–5 (usually 3) terminal spines. Left chela with outer face regularly convex. Upper margin of right chela with 4 or 5 corneous-tipped spines. Ventrodistal pilosity of P3 weak, similar to that of P2. Telson with posterior lobes armed with 5–9 spines (left lobe) or 3–6 spines (right lobe) on terminal margins. Shield purple-brown. Ocular peduncles purple with narrow white band adjacent to cornea. Antennular peduncles black with dark blue on distal fourth of terminal segment. Antennal peduncles and antennal acicles dark brown, with tips of spines white. Chelipeds dark brown, with purple on distal half of chelae; fingers with white tips. Ambulatory legs purple, with darker purple spots on propodi and dactyls.

Distribution. Indo-Pacific: questionably from Mauritius, western Indian Ocean (see "Remarks"), and Cocos Islands (Australia) to French Polynesia. Depth: intertidal to 40 m.

Habitat. On rocky shores along the intertidal; in coral rubble or in *Pocillopora* corals in the subtidal.

Remarks. According to Poupin (1997: 696) the specimens of *C. haigae* recorded from Mauritius by Gherardi & McLaughlin (1994) probably represent *C. rosaceus* Heller, 1861, from eastern Africa and the Red Sea. However, until at least live coloration of *C. rosaceus* is properly documented, Poupin's hypothesis cannot be confirmed.

Calcinus spicatus Forest, 1951

Calcinus spicatus Forest, 1951: 90, figs. 10–13 (type locality: Gambier Islands, French Polynesia); Haig & McLaughlin, 1984: 119 (Australia, Vanuatu); Morgan, 1991: 903, figs. 56–59 (Australia); Tudge, 1995: 14, pl. 2D (Australia); Poupin, 1996: 4, 15; Poupin, 1997: 711, figs. 2I, 3J, 6D.

Calcinus cf. *spicatus*.— McLaughlin & Dworschak, 2001: 155 (Tahiti).

Calcinus latens.— Heller, 1865: 88 (in part, Tahiti) [Not *C. latens* (Randall, 1840) = *Calcinus* cf. *spicatus*, see "Remarks"].

Material examined. **French Polynesia, Austral Islands**, BENTHAUS Expedition. **Rapa Island**: Haurei Bay, seashore at low tide, coll. A. Warén, 8.xi.2002: 1 ♂ 4.2 mm, 1 ov. ♀ 2.4 mm (MNHN Pg 6396); Rapa Iti islet, malacologist team, stn 82, 27°37.3'S, 144°18.1'W, low tide, 12,13.xi.2002: 2 spec. in shells (MNHN Pg 6399). **Thiers Bank**: stn DW 1926, 24°38.16'S, 146°00.82'W, 50–90 m, 13.xi.2002: 1 ov. ♀ 2.6 mm, 1 ♀ 2.3 mm (MNHN Pg 6397). **Arago Bank**: stn DW 1984, 23°26.37'S, 150°43.91'W, 40 m, 21.xi.2002: 1 ♂ 2.0 mm (MNHN Pg 6398).

Additional material. **New Caledonia**, Ouano reef, intertidal, coll. B. Richer de Forges, 24.iv.1998: 1 ♂ (MNHN). **Loyalty Islands**, LIFOU, stn 1422, Santal Bay, Easo, 4 m, 20°47.1'S, 167°07.4' E, 25.xi.2000: 1 ♂ (MNHN). **Cook Islands, Mangaia**, Oneroa village, stn 175, 21°54.30'S, 157°58'W, 0–1.5 m, coll. C.A. Child, 3.viii.1978: 1 ♂ 3.3 mm (USNM 222313).

Diagnosis. Ocular acicles with single terminal spine. Outer face of left chela regularly convex. Upper margin of right chela with 4 or 5 corneous-tipped spines. Dactyl of P3 subequal in length to propodus; ventrodistal pilosity of P3 more pronounced than on P2, but not forming dense brush of setae. Telson with posterior lobes armed with 11–13 (left) or 5–8 (right) on terminal and lateral margins. Shield burgundy. Ocular peduncles burgundy with narrow white band adjacent to cornea. Antennular peduncles orange, with distal half of ultimate segment blue; flagella orange. Basal segments of antennal peduncles burgundy, distal segments and flagella orange. Meri and carpi of chelipeds black, with burgundy on anterior margins. Chelae black on proximal half; distal half of palm and fingers burgundy, fading to white at finger tips. Ambulatory legs banded in orange and burgundy; meri and carpi burgundy, with orange hue proximally; propodi yellow on proximal 0.6, burgundy distally; dactyls burgundy.

Distribution. Pacific Ocean: from eastern Australia to French Polynesia. Depth: intertidal to 40 m.

Habitat. On rocky shores in the intertidal, and subtidal coral bottoms.

Remarks. In the smallest specimens examined of *C. spicatus*, the number of spines on the terminal margins of the telson is fewer than in larger specimens. In small specimens the number of spines ranges from 5–8 (left lobe) or 0–2 (right lobe), whereas in large specimens the number ranges from 11–13 (left lobe) or 5–8 (right lobe). *Calcinus spicatus* is similar to *C. pascuensis* Haig, 1974 from Easter Island, in armature of ocular acicles and telson, and aspect of both chelae. They differ in ventrodistal pilosity of P3, which is weak and similar to that of P2 in *C. pascuensis*, whereas it is slightly more pronounced on P3 than on P2 in *C. spicatus*. They also differ in coloration, *C. pascuensis* lacking burgundy hues, and the ambulatory legs have a distinct striped pattern.

Heller's (1865) specimens of *C. latens* (Randall) from Tahiti were assigned by McLaughlin & Dworschak (2001) to *C.* cf. *spicatus*.

Calcinus aff. *sirius* Morgan, 1991 (Figs. 1d, 4, 5b)

Material examined. **French Polynesia, Austral Islands**, BENTHAUS Expedition. **Rapa**, stn DW 1894, 27°40.13'S, 144°21.51'W, 100 m, 8.xi.2002: 1 ov. ♀ 5.5 mm (MNHN Pg 6395).

Diagnosis. Ocular acicles terminating in simple spine. Left chela (Fig. 5b) with outer face regularly convex; upper margin of palm with 7 blunt spines; lower margin with few tubercles on distal half. Upper margin of right chela with 6 corneous-tipped spines. Dactyl of P2 (Fig. 4a, b) with 10 movable spines on ventral margin. Dactyl of P3 (Fig. 4c) slightly shorter than propodus, with 7 mobile spines on ventral margin. Ventrodistal pilosity of P3 weak, not much different from that of P2 (Fig. 4b, c). Telson with posterior lobes each armed with single terminal spine. Shield and posterior carapace orange (Fig. 1d). Ocular peduncles pale orange on proximal third, fading gradually to white on distal two-thirds. Antennular peduncles orange, becoming pale on distal fourth of terminal segment. Antennal peduncles orange, with white-tipped spines. Chelipeds bright orange. Ambulatory legs orange, with minute dark orange spots on setal pores. Abdomen red-brown; eggs red.

Habitat. The single specimen was found on coral bottom, at 100 m.

Remarks. Morgan's (1991) *Calcinus sirius* is known from eastern Australia (Norfolk and Lord Howe Islands, Middleton and Elizabeth reefs, at 2–22 m), at a latitude similar to that of Rapa where the specimen of *C.* aff. *sirius* was collected. Should the specimen reported here be confirmed in the future to be *C. sirius*, it would represent a considerable range extension for this species.

In the specimen of *C.* aff. *sirius* from Rapa, the ocular acicles, telson, left and right chelae, and ventral armature of the dactyl of P2, are similar to those of *C. sirius*. However, the ventrodistal pilosity of P3 is similar to that of P2 in the Rapa specimen, whereas pilosity is slightly more pronounced on P3 than on P2 in *C. sirius*. Based on a single specimen it is not possible to determine the extent of variation that might exist in the ventrodistal pilosity of P3 and P2, a character known to vary intraspecifically in at least some *Calcinus*

species (see Poupin & McLaughlin 1998: 22). The bright orange coloration of the specimen of *C.* aff. *sirius* also seems to differ from that of *C. sirius*, which at least in preserved specimens has been described as brown or dark brown, with cream on fingers and palm of chelae (Morgan 1991). Until ventrodistal pilosity of P2 and P3, and coloration can be fully evaluated in additional specimens from French Polynesia, and coloration of live *C. sirius* is documented, it is best to refer our specimen to *C.* aff. *sirius*.

Morphologically, the specimen of *Calcinus* aff. *sirius* bears some superficial resemblance to *C. albengai*, collected at the same station. However, it clearly differs from *C. albengai* in coloration (Fig. 1a, d), shape of left chela (Fig. 5a, b), and number of spines on the ventral margin of the dactyl of P2 (10 in *C.* aff. *sirius*, 6–8 in *C. albengai*).

Discussion

As previously mentioned, *Calcinus* species are primarily found in intertidal and shallow subtidal habitats, although two species, *C. anani* and *C. albengai*, occur at depths exceeding 150 m (more commonly between 100 and 200 m). Among the other species of the genus found in French Polynesia, *C. gouti*, *C. haigae*, and *C. spicatus*, were previously considered to occur exclusively in littoral waters not exceeding 30 m; however, all three have been found as deep as 50 m. Thus, it appears that some *Calcinus* species can have broader vertical distributions than previously believed, and are not necessarily confined to inshore, shallow waters.

Four *Calcinus* species were collected inshore at Rapa Island: *C. elegans*, *C. latens*, *C. laevimanus*, and *C. vachoni*. A more intense collecting effort is needed at Rapa to obtain a better inventory of *Calcinus* species; however, the species collected do provide enough information to compare the *Calcinus* fauna of Rapa with that of Easter Island, 3500 km to the East. Only three *Calcinus* species have been recorded from Easter Island: *C. imperialis* Whitelegge, 1901, *C. pascuensis*, and *C. vachoni* (see Poupin *et al*. 2003). Of these, *C. vachoni* is widely distributed in the Indo-West Pacific, and therefore its presence both at Rapa and Easter Islands is not surprising. *Calcinus imperialis* also has a wide distribution, ranging from eastern Australia to Easter Island, between latitudes 14°S and 34°S, and future sampling may prove that it is present at Rapa. Although *C. pascuensis* is considered endemic to Easter Island (Poupin *et al.* 2003), the possibility exists that it may have a broader distribution including Rapa. At least two other decapods previously thought to be Easter Island endemics have been found at Rapa, the lobster *Panulirus pascuensis* Reed, 1954 (see Laboute & Richer de Forge 1986), and the slipper lobster *Parribacus perlatus* Holthuis, 1967 (J. Poupin, pers. obs. based on specimens in MNHN). Three of the inshore species found at Rapa, *C. elegans*, *C. latens*, and *C. laevimanus*, have not been found at Easter Island. These are abundant and easily collected species that would have been already found at Easter Island if they were present there. The absence of these three at Easter Island more likely reflects the decrease in species diversity that is observed in many crustaceans from West to East across the Pacific (Abele 1982).

In *Calcinus*, there are at least four pairs of species where each pair can be considered as sibling species. Morphologically, the species in each pair are nearly identical, and can be distinguished almost exclusively by coloration. These pairs are: *C. gouti* Poupin, 1997 and *C. hakahau* Poupin & McLaughlin, 1998; *C. gaimardii* (H. Milne Edwards, 1848) and *C. morgani* Rahayu & Forest, 1999; *C. nitidus* Heller, 1865 and *C. minutus* Buitendijk, 1937; and *C. elegans* (H. Milne Edwards, 1836) and *C. orchidae* Poupin, 1997. Of these, *C. elegans* has a second colour variant in Hawaii (see Hoover 1998). As reported herein, in the Austral Islands *C. albengai* has two colour variants, one in shallow-water, and another in deep-water. Whether the colour variants of *C. albengai*, and *C. elegans* actually represent distinct species remains to be studied. As has been shown by Macpherson & Machordom (2001) with species of the galatheid genus *Raymunida* Macpherson & Machordom, 2000, the combined use of morphological characters and DNA data, might prove useful in such studies.

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