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THE CHITON FAUNA OF THE GULF OF CALIFORNIA RHODOLITH BEDS (WITH THE DESCRIPTIONS OF FOUR NEW SPECIES)

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ABSTRACT. The shallow water rhodolith beds of the Gulf of California have a rich and diverse fauna. However, there are no published studies the chiton fauna of this unique habitat. The present paper reports on eight species of chitons (four new to science) found living on the rhodoliths: *Stenoplax mariposa* (Bartsch MS, Dall, 1919), *Callistochiton* sp., cf. *C. elenensis* (Sowerby, 1832), *Lepidochitona beanii* Carpenter, 1857, *Acanthochitona avicula* (Carpenter, 1864), *Lepidochitona corteziana* new species, *Ischnochiton rhodolithaphilus* new species, *Ischnochiton tomhalei* new species, and *Acanthochitona burghardtae* new species.

Key words: Chiton, Gulf of California, rhodoliths.

INTRODUCTION

Rhodoliths are free-living, often branched, nongenticulate coralline red algae found in dense concentrations (or beds) worldwide, from the low intertidal zone to over 100 m depth (Bosence, 1983). Extensive shallow water (2-12 m) rhodolith beds of the southwestern Gulf of California were discussed by Bosence (1983) and their ecological parameters defined. Steller & Foster (1995) and Foster *et al.* (1997) further documented the rich biodiversity associated with these specialized habitats.

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In April of 1995, Mr. Barry F. Putman of Cuesta College in San Luis Obispo, California sent me his rough manuscript, which described an apparently new species of chiton from rhodolith beds at Isla El Requeson, Bahia Conception, Baja California Sur. Mr. Putman requested that I re-write the manuscript, and submit it for publication. He also put me in contact with Dr. Michael S. Foster of Moss Landing Marine Laboratories (California). Dr. Foster provided 30+ additional chiton specimens collected at various localities between Punta Bajo and La Paz, from November 1994 to April 1995 by Mr. Marco Medina-Lopez, a student at Universidad Autonoma de Baja California Sur (La Paz). All specimens were among the often closely spaced branches of individual rhodoliths as part of their diverse cryptofauna. This paper reports the study of these specimens, as well as three additional specimens collected at Punta Chivato in March of 1998, and received subsequently from Dr. Foster. The map in figure 26 shows the collection sites.

MATERIALS AND METHODS

Numerous very small chitons (2-10 mm) were collected from rhodoliths taken with SCUBA at depths of 4-12 m at several locations along the SE shore of Baja California Sur, and preserved in 70% ethanol. The specimens were studied using a light and a scanning electron microscope (SEM), and their characters compared with species known to occur in the region (Skoglund, 1997; Kaas and Van Belle, 1985, 1990, 1994).

Specimens were prepared for SEM examination by boiling whole in 10% KOH and separating out the radula, valves, and epidermal layers of the girdle. The valves were air dried, and the radula and girdle fragments were dehydrated in an acetone series, rinsed, dried and mounted on SEM viewing stubs. The specimens were then sputter coated for 2 minutes with gold-palladium and examined with at 10-15 kv with a Hitachi 2100 S SEM at the Department of Biology at Southern Oregon University, Ashland, Oregon.

Whole animals were photographed using a Nikon SLR camera with macro lens and bellows attachment.

Abbreviations used in the text are LACM, Los Angeles County Museum of Natural History; CAS, California Academy of Sciences; SBMNH, Santa Barbara Museum of Natural History; RNC, Private collection of the author.

RESULTS

Eight species of chitons were identified, representing four families and four genera, including four species new to science. The species are described and

illustrated herein, and are compared to similar species that co-occur in the Gulf of California region.

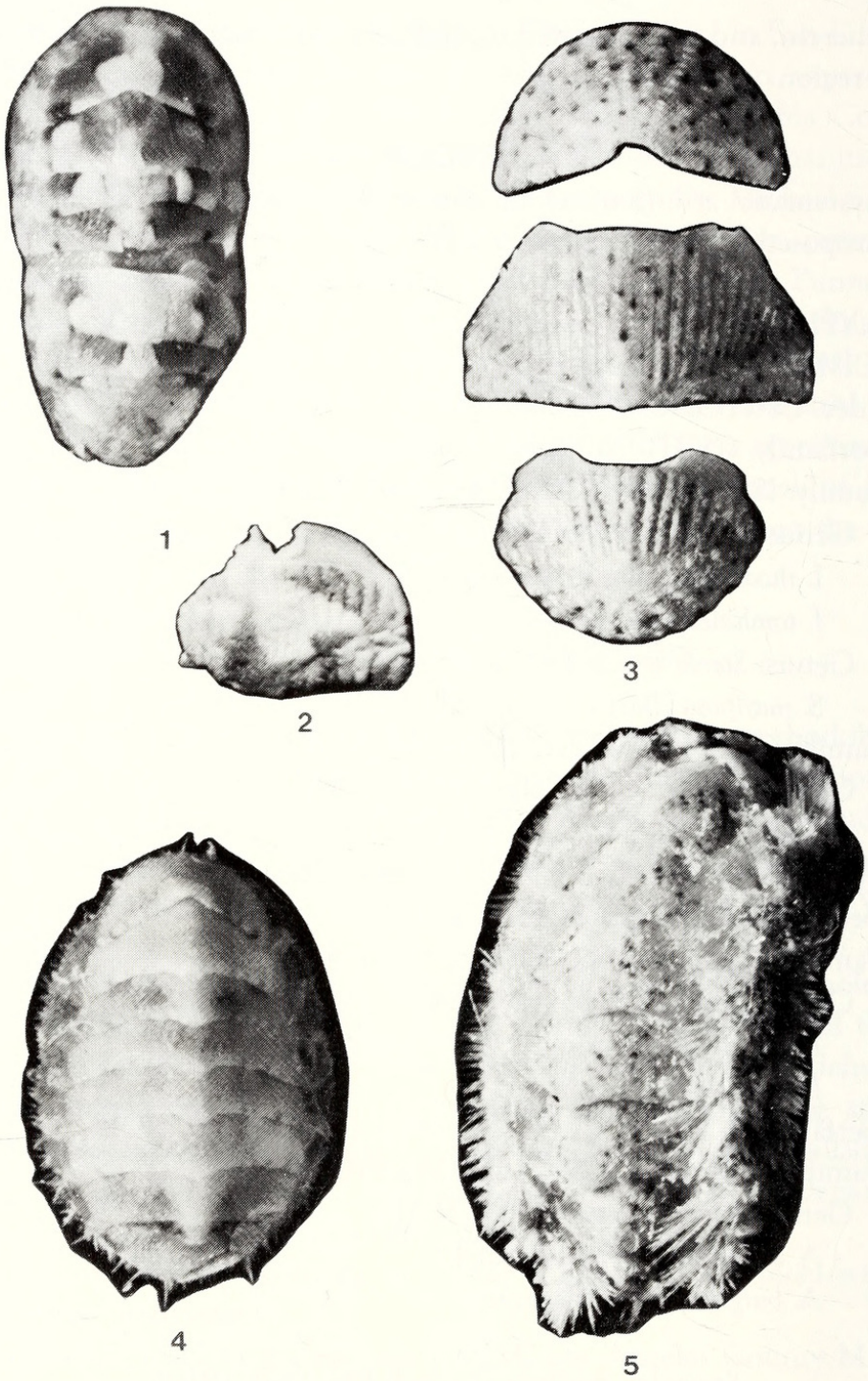
SYSTEMATICS

The systematic arrangement in this paper follows the recent system of revisions proposed by Sirenko (1993,1997).

Class: POLYPLACOPHORA Gray, 1821
Order: CHITONIDA Theile, 1910
Suborder: CHITONINA Theile, 1910
Superfamily: CHITONOIDEA Rafinesque, 1815
Family: ISCHNOCHITONIDAE Dall, 1889
Genus: *Ischnochiton* Gray, 1847
I. rhodolithophilus new species
I. tomhalei new species
Genus: *Stenoplax* Carpenter in Dall, 1879
S. mariposa (Bartsch MS, Dall, 1919)
Family: CALLISTOPLACIDAE Pilsbry, 1892
Genus: *Callistochiton* Carpenter in Dall, 1879
C. sp. cf. *elenensis* (Sowerby, 1832)
Suborder: ACANTHOCHITONINA Bergenhayn, 1930
Superfamily: MOPALIOIDEA Dall, 1889
Family: TONICELLIDAE Simroth, 1894
Genus: *Lepidochitona* Gray, 1841
L. beanii Carpenter, 1857
L. corteziana new species
Superfamily: CRYPTOPLACOIDEA H. & A. Adams, 1858
Family: ACANTHOCHITONIDAE Pilsbry, 1893
Genus: *Acanthochitona* Gray, 1821
A. avicula (Carpenter, 1864)
A. burghardtae new species

Stenoplax mariposa (Bartsch MS, Dall, 1919) (Figs. 1 & 2)

Three specimens (2.8-10 mm in length) (RNC 3130) of this common Gulf species were taken at El Pardito (leg. Marco Medina-Lopez, SCUBA,12 m, 7 April, 1995). All specimens appear typical, and although the tiny juveniles are nearly identical in color pattern (variegated with brown, black, pale green and white, with brilliant blue spots on the pleural areas) with *Ischnochiton rhodolithophilus*,



Figures 1-5. Chiton species. 1-2. *Stenoplax mariposa* (Barstch MS, Dall, 1919), RNC 3130. **1.** Whole animal, length 4.2 mm. El Pardito. **2.** Valve fragment from 10 mm specimen. El Pardito. **3.** *Callistochiton* sp., cf. *C. elenensis* (Sowerby, 1832), RNC 3131. First, fourth and eighth valves. Valve eight width 3.8 mm. Canal de San Lorenzo. **4.** *Lepidochitona beanii* Carpenter, 1857, RNC 3132. Whole animal, length 3.0 mm. Canal de San Lorenzo. **5.** *Acanthochitona avicula* (Carpenter, 1864), RNC 3133. Whole animal, length 7.0 mm. Coronados Id.

they are easily distinguished by the ribbed central areas, and rugose lateral areas of the valves.

Ischnochiton rhodolithophilus Putman MS, Clark, new species
(Figs. 6-10)

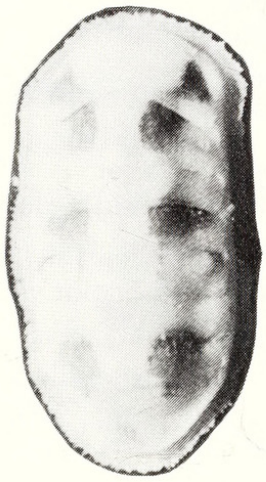
Diagnosis: Very small chitons (to 6.0 mm), elongate-oval in outline, elevated; valves roundly arched, moderately beaked; tegmentum mostly smooth, but with some quincuntial pitting on pleural areas, color variegated, dark-brown and cream with blue spots on terminal and pleural areas; sutural laminae short, bluntly triangular; girdle medium wide, with short, wide scales (to 100 μm x 60 μm) with 12-18 deep incisions on middle 1/3; radula with heavy, tricuspid major lateral teeth.

Description: Very small chitons (to 6.0 mm), elongate-oval in outline, moderately elevated; valves roundly arched, moderately beaked (Fig. 6); tegmentum mostly smooth, with some pitting (Fig. 7); articulamentum thin, white, slit formula 8-1-8; color, variegated with dark brown and cream, terminal valves and pleural areas of intermediate valves with brilliant blue spots.

Head valve semicircular, slightly convex, posterior margin widely v-shaped; insertion teeth short, sharp, fairly thick; intermediate valves rectangular, about 1/3 as long as wide; weakly beaked, slightly indented at jugal sinus; lateral areas poorly defined, slightly if at all raised, smooth; jugum smooth, pleural areas quincuntially punctate (to varying degrees, depending on size of specimen) especially on the lower portions; sutural laminae fairly long, narrow, bluntly triangular; jugal sinus very wide; insertion teeth short, thin, sharp; slit ray grooved, porous. Tail valve about 3/4 the width of the head valve, anterior margin slightly convex; mucro central, post-mucronal slope concave; ante-mucronal area quincuntially punctate, terminal area smooth; sutural laminae fairly long, rounded; jugal sinus moderately wide; insertion teeth short, relatively thick, sharp.

Girdle moderately wide, about 1/4 as wide as valve 5, clothed dorsally with relatively wide, bluntly rounded, bent scales 70-100 μm wide x 40-60 μm long, with 12-18 narrow ribs on the central 1/3, deeply incised between (Figs. 8 & 9); ventral scales rectangular, about 38 μm x 18 μm (Fig. 9); marginal spicules broad, bluntly pointed, 50 μm x 20 μm, with 5-6 oblique striations (Fig. 9).

Radula (Fig. 10, paratype 1) curled, ca. 5.0 mm long, 1.2 mm long with about 35 mature rows of teeth; central tooth very small, slender, elongated, slightly dilated distally, about 20 μm long, distal end about 5 μm wide; minor lateral teeth wing shaped, about 40 μm x 15 μm; major lateral teeth heavy, rugged, tridentate, deeply (and rather widely) indented between, about 30 μm x 25 μm; denticles very



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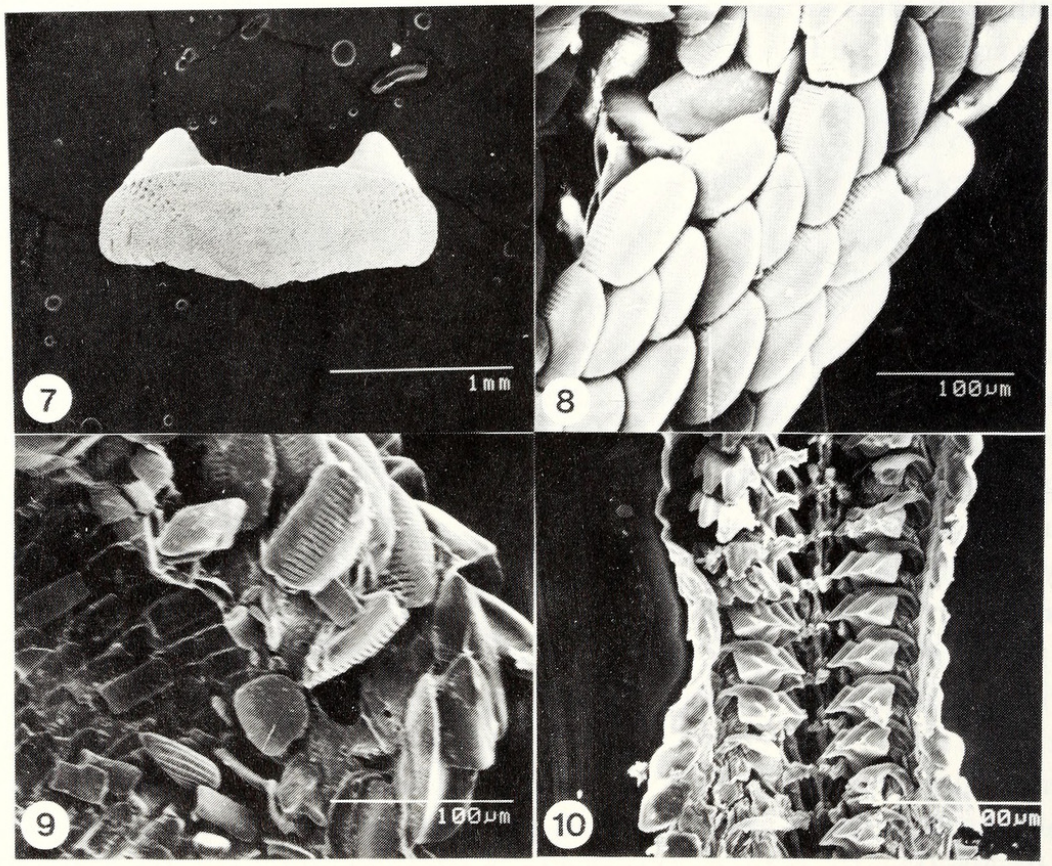


Figures 6-10. *Ischnochiton rhodolithaphilus* Clark, spec. nov. **6.** Whole animal, length 3.9 mm. Paratype, RNC 3134, Isla San Jose. **7.** Intermediate valve five (scale on figure), Paratype, CAS 098787, Bahia Concepcion. **8.** Dorsal girdle scales (scale on figure), Paratype, RNC 3138, Punta Bajo. **9.** Girdle scales (scale on figure), Paratype, RNC 3138. **10.** Radula (scale on figure), Paratype, RNC 3138.

blunt, finger-like in appearance, inner one the longest, central one slightly shorter, the outer one about 1/2 as long as the inner one.

Ctenidia about 12-15 per side in specimens 2.8-5.0 mm in length.

Type Locality: Gulf of California, Isla El Requeson, Bahia Conception, Baja California Sur, Mexico (26°43'N, 111°46'W); 4-9 m.

Type Material: Holotype (CAS 098786) and 22 Paratypes (leg. Michael S. Foster, SCUBA, January 1990) (10, CAS 098787); (10, Barry Putman, private collection); (2,RNC 3134).

Additional Material: 10 additional specimens, 3, RNC 3148, Canal de San Lorenzo, 12 m (leg. Marco Medina-Lopez, SCUBA, 2 February, 1995); 1, RNC 3149, S side of SW tip of Isla San Jose, 12 m (leg. Marco Medina Lopez, SCUBA,10 February, 1995); 4, RNC 3150, Punta Bajo, 12 m (leg. Marco Medina-Lopez, SCUBA, 11 November, 1994); 1, RNC 3151, El Pardito, N of Isla San Francisco, 12 m (leg. Marco Medina-Lopez, SCUBA, 7 April, 1995); 1, RNC 3152, N side of SW tip of Isla San Jose, 5 m (leg. Marco Medina-Lopez, SCUBA, 10 February 1995).

Distribution: Gulf of California, SE coast of Baja California Sur from the type locality, S to Canal de San Lorenzo, about 40 km N of La Paz (24°21'N, 111°15'W); 4-12 m.

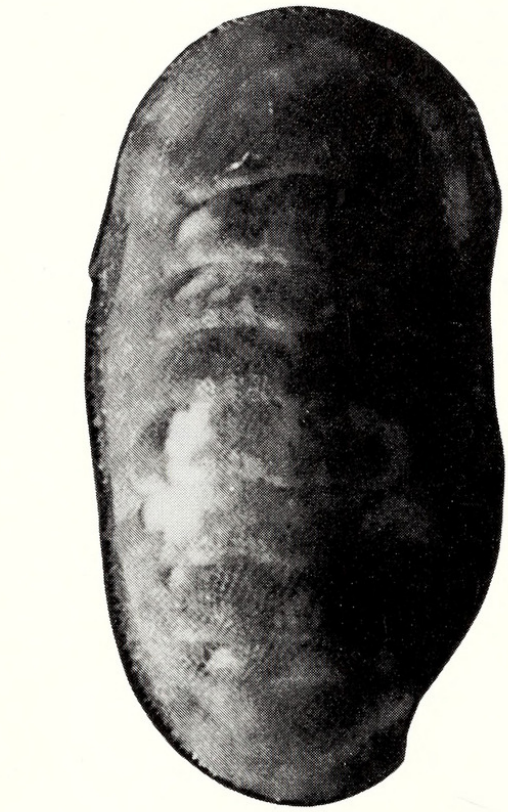
Discussion: *Ischnochiton rhodolithophilus* is very similar to *Stenoplax mariposa* (Bartsch MS, Dall, 1919), and might be mistaken for a juvenile of that species, however it may be distinguished by 1) lack of ribbing or lirae on valves; 2) less numerous, heavier ribs on the girdle scales, 12-18 instead of 45-50. Both species may be found together in the rhodolith habitat.

Etymology: The specific name is derived from the Latin rhodo (red) + the Greek lithos (stone) and philia (love); the lover of red stones (rhodoliths).

Ischnochiton tomhalei new species
(Figs. 11-14)

Diagnosis: Very small chitons (to 4.0 mm), oval in outline, valves roundly arched, not carinated, only slightly beaked; tegmentum reticula-granular; mucro of tail valve at ante-central, post-mucronal slope straight to slightly concave; girdle medium wide, about 1/3 of valve 5 width, dorsal scales with 12-16 strong ribs; radula with relatively heavy, tricuspid major lateral teeth.

Description: Very small chitons (to 4.0 mm), oval in outline, valves roundly arched, not carinated, barely if at all beaked (Fig. 11); tegmentum reticula-granular; slit formula 9-1-8; color reddish-brown to light brown or cream, with white flame-like markings, especially at the valve apices.



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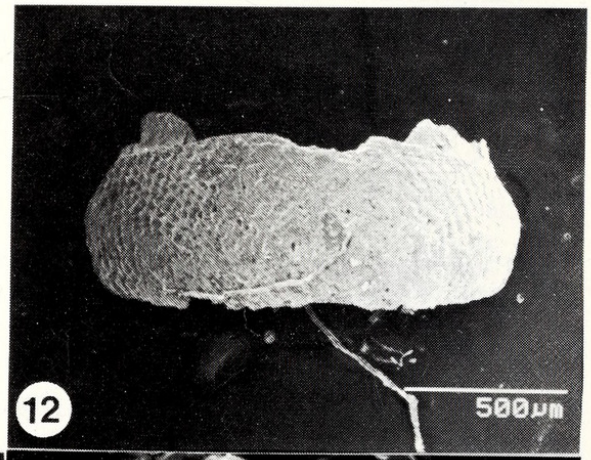
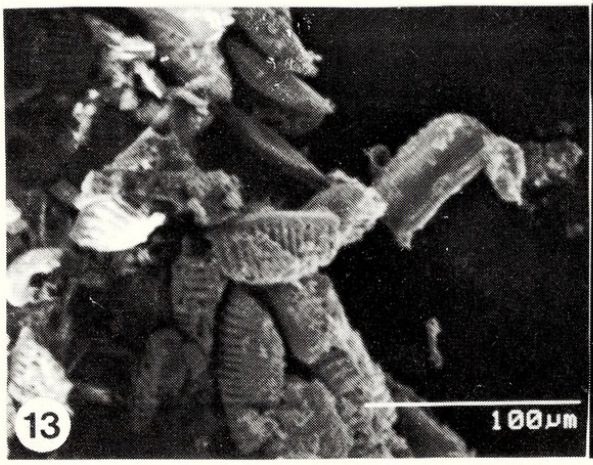




Figures 11-14. *Ischnochiton tomhalei* Clark, spec. nov. **11.** Whole animal, length 4.0 mm, RNC 3135, Isla San Jose. **12.** Intermediate valve five (scale on figure), Holotype, LACM 2877. **13.** Dorsal girdle scales (scale on figure), Holotype. **14.** Radula (scale on figure), Holotype.

Head valve semicircular, slightly convex, posterior margin widely v-shaped; sculpture, evenly reticula-granular; insertion teeth fairly short, wide and thick. Intermediate valves (Fig. 12) rectangular, about 1/3 as long as wide; lateral areas

poorly defined, slightly raised, often with faint growth costae; central areas with reticula-granular sculpture, becoming obsolete at valve apices; articulamentum thin, white; sutural laminae rather short, narrow, rounded, jugal sinus very wide; insertion teeth short, thick, triangular. Tail valve slightly wider than long, inflated, anterior margin convex, mucro ante-central, post-mucronal slope straight to slightly concave; ante-mucronal area reticula-granular, posterior area granular; insertion teeth short, thick.

Girdle moderately wide, about 1/3 the width of valve 5, clothed dorsally with broad, short, bent scales about 60-75 µm x 32 µm, with 12-16 fairly narrow ribs, deeply incised between (Fig. 13); ventral scales very small, rectangular about 25 µm x 12 µm; marginal spicules relatively short, broad, flattened, bluntly pointed, about 40 µm x 12 µm, with three oblique striations.

Radula (Fig. 14) about 800 µm long, with 20-25 mature rows of teeth; central tooth slender, elongated about 25 µm long, distal end dilated, working edge about 4 µm wide; wing shaped, elongate about 25 µm x 10 µm; major laterals fairly heavy, tricuspid, central cusp slightly longer than lateral two; cusps rather short and broad.

Ctenidia 12-16 per side in specimens 2.8-4.0 mm in length.

Type Locality: Gulf of California, Punta Bajo (about 10 km N of Loreto), Baja California Sur, Mexico (approx. 26°05'N, 112°42'W); 12 m.

Type Material: Holotype (LACM 2877), and one paratype (RNC 3142) (leg., Marco Medina-Lopez, SCUBA, 11 November, 1994).

Additional Material: 1, RNC 3139, Punta Chivado, 10-12 m (leg. Michael S. Foster, SCUBA, 18 March, 1998); 3, RNC 3140, Canal de San Lorenzo, 12 m (leg. , Marco Medina-Lopez, 2 February, 1995); 1, RNC 3141, W side of Isla Coronados, 7 m (leg. , Marco Medina-Lopez, SCUBA, "December, 1994"); 1, RNC 3153, S side of SW tip of Isla San Jose, 12 m (leg., Marco Medina-Lopez, SCUBA, 10 February, 1995).

Distribution: Gulf of California, east coast of Baja California Sur, Mexico, from Punta Chivado (about 25 km N of Mulege)(27°05'N, 112°05'W) to Canal de San Lorenzo, about 40 km N of La Paz (24°21'N, 111°15'W); 7-12 m.

Discussion: The only eastern Pacific iscnochitonid that *Ischnochiton tomhalei* is likely to be confused with is juveniles of *I. tridentatus* Pilsbry, 1893, which (rarely) may be similarly colored. However, the coarser sculpture and fewer slits in the insertion plates (8-1-9 instead of 12-18/ 2/ 11-13 in *I. tridentatus*) will distinguish them.

Etymology: It is with great pleasure that I name this species after Mr. Thomas S. Hale of Portland, Oregon, a long time shell collector who for many years has

educated and inspired a great many people in the sciences of conchology and marine biology.

Callistochiton sp. cf. *C. elenensis* (Sowerby, 1832)
(Fig. 3)

A single small (9 mm) specimen (RNC 3131) taken at Canal de San Lorenzo (leg. Marco Medina-Lopez, SCUBA, 12 m, 2 February 1995) is tentatively identified as a juvenile of this species, but may represent an undescribed species. The valves are more highly elevated and the side-slopes more convex than in specimens of *C. elenensis* that I have examined. Also I can detect no jugal laminae, another character present in (adult) *C. elenensis* , but this may be due to the size of the specimen. The valves are rust colored with dark brown specks. More material is required before a solid conclusion can be made on its identification.

The genus *Callistochiton* Carpenter, in Dall, 1879 in the tropical west-American region is in need of revision. The views of Ferreira (1979) and Kaas and Van Belle (1994) differ on several points, and there appear to be more species in the region than are currently recognized.

Lepidochitona beanii Carpenter, 1857
(Fig. 4)

Two tiny specimens (3.0 & 4.0 mm long)(RNC 3132) of this widespread species were taken at El Bajo (leg. Marco Medina-Lopez, SCUBA, 14 m, 30 March 1995). The specimens are typical in all characters, and are readily distinguished from the similar *Lepidochitona corteziana* by the presence of large (to 350 µm long) hyaline spicules on the girdle.

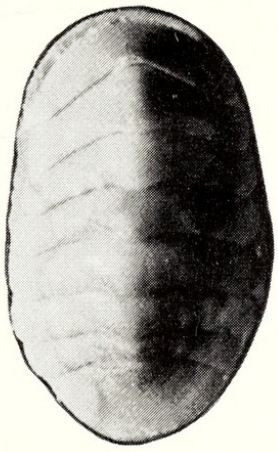
Lepidochitona corteziana new species
(Figs. 15-19)

Diagnosis: Very small chitons (to 3.5 mm); roundly oval in outline; tegmentum microscopically lirate; intermediate valves beaked, about 1/4 as long as wide; tail valve small, about 1/2 as long as wide, mucro prominent, at anterior 1/3, post-mucronal slope concave; girdle medium wide, fleshy, bearing no large spicules.

Description: Very small chitons (to 3.5 mm); roundly oval in outline; valves subcarinate, beaked, slopes slightly convex (Fig. 15); tegmentum very spongy; microscopically lirate, lirae low, broad, flattened and bearing a nearly imperceptible medial sulcus; slit formula 10-1-12; color light orange to pink-orange.

Head valve semicircular, convex, bearing about 80+ radial micro-lirae;

posterior margin widely v-shaped, insertion teeth fairly short, thick. Intermediate valves (Figs. 16,17) rectangular, central areas with 120 + micro-lirae; lateral areas barely defined, bearing about 20-25 micro-lirae; articulamentum (Fig. 17) thin, white; sutural laminae relatively short, narrow, roundly triangular, jugal sinus



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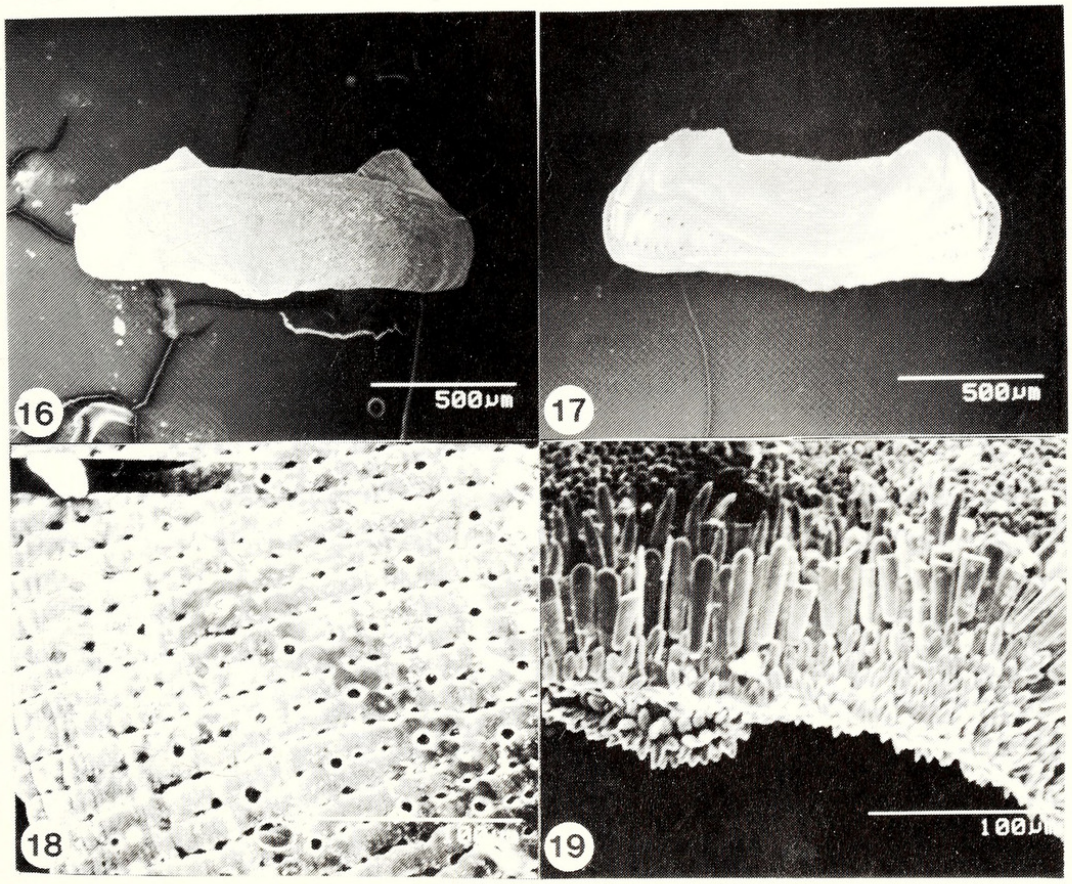


Figures 15-19. *Lepidochitona corteziana* Clark, spec. nov. **15.** Whole animal, length 3.0 mm, Paratype, RNC 3136, Canal de San Lorenzo. **16.** Intermediate valve five (scale on figure), Holotype, LACM 2878. **17.** Interior of valve five. **18.** Close-up of valve five tegmentum, showing esthete pores. Holotype. **19.** Girdle (scale on figure), Holotype.

wide, porous; insertion teeth short, broad, thick, bounded on both sides by porous slit rays. Tail valve small, about 1/2 as long as wide, low; mucro prominent, located at anterior 1/3, post-mucronal slope concave; ante-mucronal area with about 60 longitudinal micro-lirae; post-mucronal area with about 60+ radial lirae; sutural laminae short, fairly wide, anterior. edge straight, jugal sinus wide.

Macresthetes round, about 7 µm in diameter, located in single, linear row, atop the micro-lirae, each separated by two micresthetes about 3.5-4 µm in diameter; micresthetes also located in single linear row, separate by about one diameter, in grooves between micro-lirae (Fig. 18).

Girdle medium wide (somewhat less than 1/2 of valve 5 tegmentum), fleshy appearing (Fig. 19); dorsally clothed with tiny, close-set, erect, pointed spicules, about 15 µm x 5 µm; ventral surface of girdle covered with very minute, bluntly rounded granules measuring about 5 µm x 3 µm; marginal spicules about 50-60 µm in length, and up to about 12.5 µm in width, relatively slender, elongated, flattened, bluntly pointed or slightly broadened and rounded at the distal end.

Radula unknown.

Type Locality: Gulf of California, Canal de San Lorenzo, about 40 km N of La Paz, Baja California, Mexico (24°21'N, 111°15'W); 12 m.

Type Material: Holotype (LACM 2878) & three Paratypes (1, LACM 2879); 2, RNC 3154 (leg. , Marco Medina-Lopez, SCUBA, 2 February, 1995).

Additional Material: Two (RNC 3143), Punta Chivado, 10-12 m (leg. Michael S. Foster, 18 March, 1998); two (RNC 3144), S side of SW tip of Isla San Jose, 12 m (leg. Marco Medina-Lopez, SCUBA, 10 February, 1995); RNC 3136, Punta Bajo, 12 m (leg. Marco Medina-Lopez, SCUBA, 11 November, 1994).

Distribution: East coast of Baja California Sur, from Punta Chivado (about 25 km N of Mulege) (27°05'N, 112°05'W) S to the type locality at depths of 10-12 m.

Discussion: *Lepidochitona corteziana* bears a close resemblance to *Lepidochitona beanii* Carpenter, 1857, of the same size, with which it may occur, but may be easily distinguished by 1) the sculpture of the valves, and 2) the lack of large hyaline needles (up to 250 x 30 µm long) on the girdle (especially bunched at the sutures). It also shows affinities with the South African *L. turtoni* (Ashby, 1928), which likewise has fine radial micro-sculpture and a secondary slit ray behind the insertion tooth. The overall sponginess of the valves, especially the articulamentum with its multiple slit rays, and the armature of the girdle (although greatly reduced dorsally in *L. corteziana*) shows affinities with *Spongioradsia aleutica* (Dall, 1878) from the Aleutian Is. *Spongioradsia aleutica* also has a coralline algal habitat.

Etymology: Named for the Sea of Cortez (Gulf of California) where the species lives.

Acanthochitona avicula (Carpenter, 1864)
(Fig. 5)

Two specimens of this small species were taken, one at El Pardito, 12 m (RNC 3145)(leg. Marco Medina-Lopez, 7 April, 1995), and one at Coronados Id., 7 m (RNC 3146)(leg. Marco Medina-Lopez, "Winter" 1994-95). The specimens measure 7.5 mm and 7.0 mm in length respectively and appear typical.

Acanthochitona burhardtae new species
(Figs. 20-25)

Diagnosis: Very small chitons (to 3.5 mm), broadly oval in outline, intermediate valves twice as wide as long; lateral areas barely raised; tegmentum with coarse, close-set, flattened granules; granules of the central areas arranged in 15-17 longitudinal rows; girdle fleshy, with scattered spicules (to 350 µm in length).

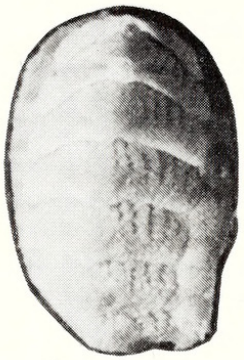
Description: Very small chitons (up to 3.5 mm), broadly oval in outline (Figs. 20,21); tegmentum consisting of coarse, flattened, close-set granules; slit formula 5-1-2; color of tegmentum light orange, or white with brown markings.

Head valve semi-circular, posterior margin broadly v-shaped; insertion teeth short, wide, fairly thick. Intermediate valves (Fig. 22) about 1/2 as long as wide, beaked; granules arranged in longitudinal rows on central areas (often obsolete at the jugum), with distinct grooves between; lateral areas poorly defined, slightly raised and bearing smaller granules than central areas; granules of jugal areas more or less obsolete; articulamentum thin, white; sutural laminae short, fairly wide; jugal sinus wide; insertion teeth very short. Tail valve (Fig. 23) small, rather oval shaped, mucro at posterior 1/3, post-mucronal slope straight or slightly convex; insertion teeth fairly short, thick, with medial sinus; sutural laminae fairly long, extending well around antero-lateral edge, jugal sinus fairly wide.

Macresthete sub central, oval about 7-8 µm x 5 µm; micresthetes six (three per side) in linear rows, about the same size as macresthete (Fig. 24).

Girdle (Fig. 25) of medium width, about 1/4 the width of valve five tegmentum, fleshy, beset dorsally with scattered long, slender, pointed spicules up to 350 µm long and 25 µm in diameter at the base, occurring singularly or in groups of two to four; ventral surface of girdle covered with rectangular scales measuring 20 µm x 7.5 µm; margin of girdle armed with pointed spicules 125-150 µm long and 20 µm wide at the base.

Radula about 800 µm long; the number of mature rows of teeth is unknown; major lateral teeth relatively small, caps tridentate, about 25 µm x 20 µm, central cusp slightly longer than lateral cusps. Unfortunately, the SEM preparation of the



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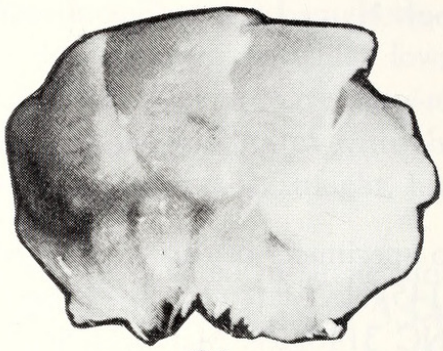

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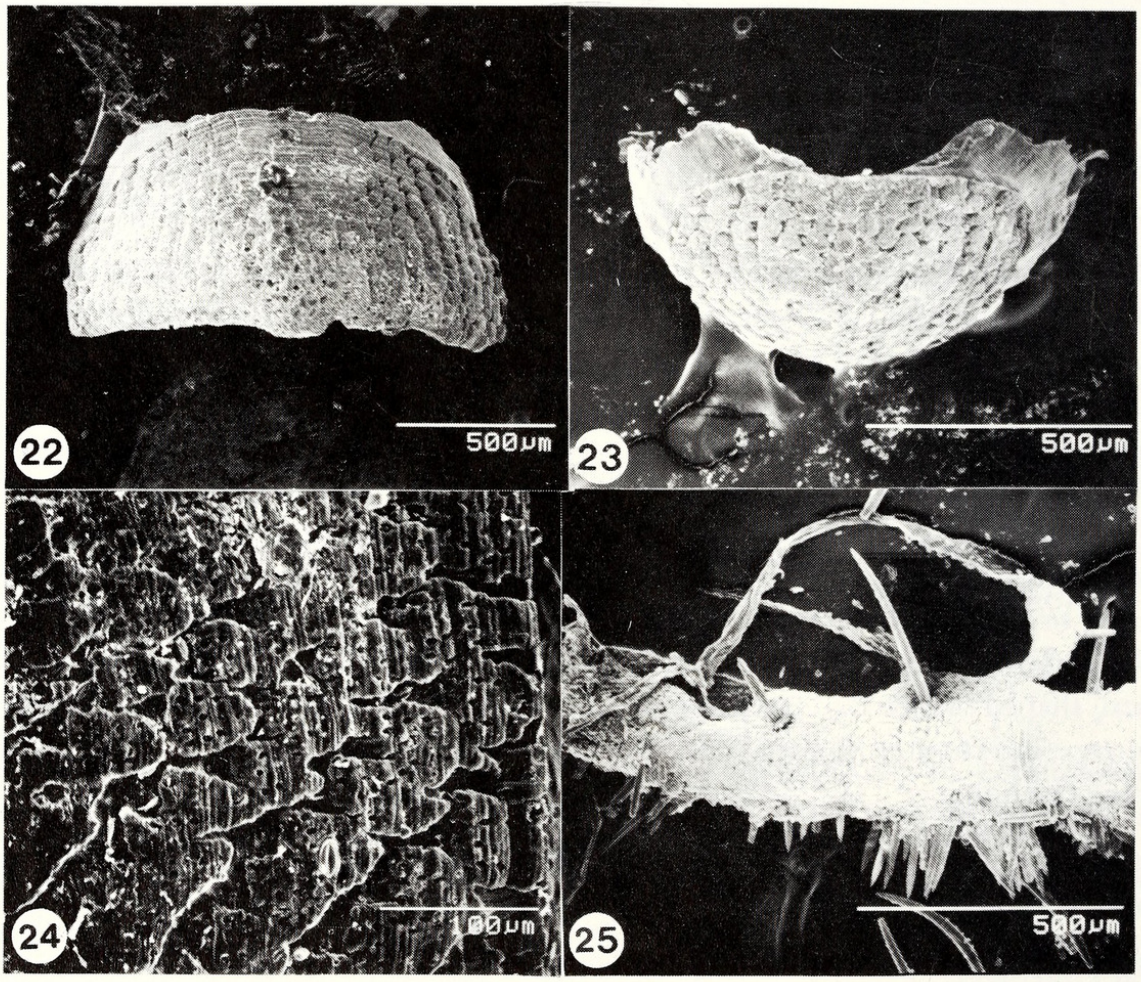

Figures 20-25. *Acanthochitona burghardtae* Clark, spec. nov. **20.** Whole animal, length 2.4 mm, RNC 3137. Isla San Jose. **21.** Whole animal, length (curled) ca. 3.0 mm, Paratype, LACM 2880. **22.** Intermediate valve five (scale on figure), Holotype, LACM 2881. **23.** Tail valve (scale on figure), Holotype. **24.** Close-up of tegmentum (valve five) showing esthete pores, Holotype. **25.** Girdle (scale on figure), Holotype.

radula of this species was unsuccessful, so the details of the radula are largely unknown.

Type Locality: Gulf of California, Canal de San Lorenzo, about 40 km N of La Paz, Baja California Sur, Mexico (24°21'N, 111°15'W); 12 m.

Type material: Holotype (LACM 2880) and two paratypes (1, LACM 2881); (1, RNC 3147).

Additional Material: One specimen (RNC 3137) N side of SW tip of Isla San Jose, 7 m. (leg. Marco Medina-Lopez, SCUBA, 10 February 1995).

Distribution: Gulf of California, east coast of Baja California Sur, vicinity of Bahia de La Paz, from the N side of the SW tip of Isla San Jose (approx. 24°52'N, 110°38'W) to the type locality. At depths of 7-12 m.

Discussion: At first this species appears to be a juvenile *Dendrochiton lirulatus* Berry, 1963, but close examination of the tegmental sculpture and the insertion teeth show that it is in fact an acanthochitonid. Due to the shape of the valves and the peculiar sculpture of the tegmentum *A. burghardtae* cannot be confused with any of the known members of *Acanthochitona* from the eastern Pacific.

Etymology: It is with great pleasure that I name this chiton after Laura and Glenn Burghardt of Oakdale, California whose book "A Collector's guide to West Coast Chitons" inspired me and many others to study these fascinating creatures.

DISCUSSION

The shallow water rhodolith beds provide good habitat for many invertebrates. Steller (1993) reports that 75 species of invertebrates had been identified from the Gulf of California rhodolith beds. The chiton fauna is particularly rich and diverse, with eight species in four genera and three families. Four of these species appear to be exclusive to the rhodolith habitat. It is likely that the investigation of rhodolith beds in other areas of the world, as well as the deeper water beds in the Gulf of California could yield many more species of chitons.

The molluscan faunas of the central eastern Pacific and Caribbean regions have many affinities. This is particularly true of many of the tropical elements of their respective chiton faunas, and at least one species *Stenoplax boogii* (Haddon, 1886) is present in both faunas. Most of the chitons found in the rhodolith habitat have affinities in the Florida-Caribbean area, however it is not known whether any of the Caribbean species occur on rhodoliths. *Ischnochiton tomhalei* shows a possible kinship with *I. papillosus* (C. B. Adams, 1843), and *I rhodolithophilus* is very similar to *I. pseudovirgatus* Kaas, 1972 particularly in the small size, color of the tegmentum, and relatively large, heavy major lateral teeth

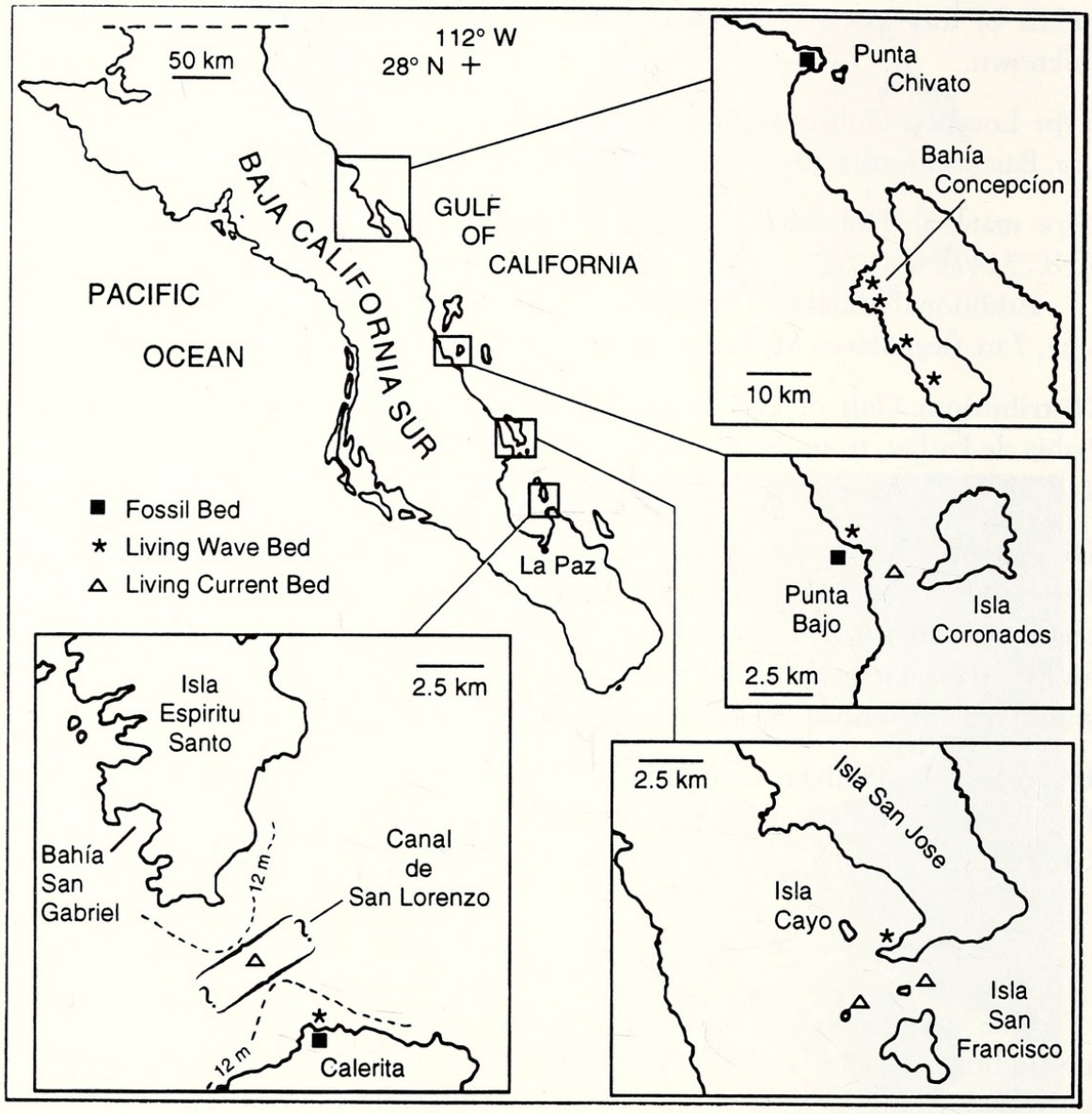

Figure 26. Map of collecting sites (after Foster *et al.*, 1997).

of the radula. *Callistochiton* sp., cf. *C. elenensis* is similar to *C. porosus* Neirstrasz, 1905 from Brazil especially in the sculpture of the radial ribs, which are topped with small pustules. *Lepidochitona* beanii shows an affinity with *L. liozonis* (Dall & Simpson, 1901) and *L. rosea* Kaas, 1972. *Lepidochitona corteziana* with its lower profile, shorter, wider valves and lack of large needle-like spicules on the girdle appears to be more distantly related to this group. *Acanthochitona avicula* is part of a complex of several closely related Panamic and Caribbean species.

Acanthochitona burghardtae is particularly interesting, and is unique among eastern Pacific acanthochitonids in the shape and form of its valves, and the distribution and sparse number of its girdle spicules. This species appears to be similar to *Acanthochitona terezae* Guerra Junior, 1983 from the Caribbean, both

species have similarly shaped and proportioned valves (including their sutural laminae, which are quite short), ill-defined juga covered with pustules and apparently similar girdle spicules. However I have not seen any specimens of *A. terezae*. *Acanthochitona minutus* Leloup, 1980 from Brazil also shows affinities with *A. burghardtae*, particularly in the ill-defined, pustulose juga, however the sutural laminae of *A. minutus* are much longer and rounder than either *A. burghardtae*, or *A. terezae*. The arrangement of the girdle spicules appears similar also.

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