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# New records and new species of cones from deeper water off Fiji (Mollusca, Gastropoda, Conidae)

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## ABSTRACT

A little less than 100 species of cones are known in the literature from waters around the Fiji islands, all intertidal to subtidal. We report here on the species taken by recent off-shore and deep-water benthic sampling expeditions. Samples were taken to depths of 1300 m, although cones were taken not deeper than 680 m. Leaving aside two taxa of uncertain identity, the material contains 22 species from depths deeper than 100 m, all of which are new records for Fiji, including four new species (*Conus cakobau* spec. nov., alive in 414-567 m; *C. joliveti* spec. nov., alive in 150-353 m; *C. fijiulcatus* spec. nov., alive in 150-188 m; and *C. gigasulcatus* spec. nov., alive in 290-300 m). A further 19 species are from depths shallower than 100 m, and these include six new records for Fiji, including two new species (*C. fijiensis* spec. nov., alive in 80-120 m; and *C. sutanorcum* spec. nov., alive in 32-50 m).

## INTRODUCTION

The Recent cones of Fiji are essentially known to us from two publications. Walter Cernohorsky, a long time resident of Viti Levu, recorded some 80 species, most of them new or verified records, with 10 records originating from the literature only (Cernohorsky, 1964). Subsequently, several additions to the inventory of Fiji cones and new records were published in the *Annual Magazine of the Fiji Shell Club* (Lewis, 1973; Gilchrist, 1987; Parkinson, 1987), *Hawaiian Shell News* (Lewis, 1980), and in locally circulated technical reports (Koven, 1997). All these records were compiled, critically evaluated and updated by Johnson Seeto, a resident of Fiji and lecturer at the University of the South Pacific in Suva. Seeto (1998) listed 99 species which he treated as "confirmed" for Fiji, and another 17 as "possible and/or unlikely

records". Although the majority of the published records are likely to be correct, it is difficult to judge their accuracy because the relevant material was not illustrated. However, it can be concluded that, based on current knowledge, a little less than 100 species of cones are known from waters around the Fiji Islands, all intertidal to subtidal. In addition, several species of cones that have been recorded from Fiji as Pleistocene fossils may not have been recorded in the Recent fauna. Ladd (1982) and Seeto (1998) had summarized what was then known, and that has been largely superseded by Kohn & Arua (1999a, b), who described an early Pleistocene molluscan assemblage comprising 23 identified *Conus* species.

The present paper reports on the species of *Conus* collected during two expeditions conducted in Fiji waters on board the research vessel 'Alis' by Institut de Recherche pour le Développement (IRD) and Muséum National d'Histoire Naturelle, Paris (MNHN). MUSORSTOM 10, in August 1998, surveyed Bligh Water, a deep basin between the two main islands of Viti Levu and Vanua Levu (Richer de Forges et al., 2000b); the following year, BORDAU 1, in March 1999, surveyed the eastern part of the archipelago, from Somo-somo Strait, between Vanua Levu and Taveuni, to the Lau Group (Richer de Forges et al., 2000a). Samples were taken to depths of 1300 m, although cones were taken not deeper than 680 m. In addition, we report on the species taken during the SUVA 2 and SUVA 4 expeditions, also on board research vessel 'Alis', to survey ecological parameters of the coral reef lagoon of southern Viti Levu, some of which represent new records or confirm doubtful records. Unless otherwise stated, the material is deposited in MNHN. The species are discussed mainly in alphabetical order. We restrict references to Cernohorsky (1964) and Seeto (1998), and refer to Röckel et al. (1995) for glossary, references to the original descriptions, and other relevant literature.

## ABBREVIATIONS

CP	chalut à perche (trawl)
DR	drague à roche (rock dredge)
DW	drague Warén (Warén dredge)
Stn	station
lv	live collected specimen(s)
dd	dead collected specimen(s)
spm	specimen(s), doubtful if collected alive or dead
sp	species
pnw (s)	post nuclear whorl(s)
IRD	Institut de Recherche pour le Développement, Paris and Nouméa
MNHN	Muséum National d'Histoire Naturelle, Paris, France
ZMA	Zoölogisch Museum Amsterdam, the Netherlands

## SYSTEMATICS

## CONIDAE Fleming, 1822

*Conus* Linnaeus, 1758*Conus acutangulus* Lamarck, 1810

Cernohorsky, 1964: 66, pl. 17 fig. 54; Seeto, 1998: 4; Kohn & Arua, 1999b: 8.

Material examined. — Bligh Water: MUSORSTOM 10: Stn CP1323, 17°16.1'S, 177°45.7'E, 143-173 m, 5 dd.

Viti Levu: SUVA 2: Stn DW38, 17°56.1'S, 177°14.4'E, 16 m, 2 dd; Stn DW44, 17°51.7'S, 177°13.0'E, 33 m, 1 dd; Stn CP45, 17°51.6'S, 177°13.3'E, 35 m, 1 dd; Stn CP48, 17°56.2'S, 177°14.3'E, 16 m, 2 lv, 1 dd; Stn BS49, 17°45.3'S, 177°11.9'E, 23 m, 1 lv; Stn DW74, 17°49.1'S, 177°12.2'E, 38 m, 1 lv.

SUVA 4: Stn DW04, 18°12'S, 178°35'E, 100-122 m, 2 dd; Stn DW10, 18°20.8'S, 178°07.5'E, 39-43 m, 1 dd; Stn CP18, 18°25.5'S, 178°05.7'E, 44-45 m, 1 dd; Stn CP19, 18°26.3'S, 178°04.0'E, 48-50 m, 48-50 m, 1 lv; Stn CP20, 18°26.4'S, 178°02.4'E, 50-51 m, 1 dd; Stn CP30, 18°16.9'S, 178°04.3'E, 32 m, 2 lv, 6 dd.

Remarks. — According to Cernohorsky (1964), this is a rare species in depths ranging from 4 to 30 m; however, it here appears to be rather common in shallow offshore dredgings. The empty shells from deeper water were probably washed downslope.

*Conus ammiralis* Linnaeus, 1758

Cernohorsky, 1964: 66, pl. 13 fig. 24; Seeto, 1998: 4.

Material examined. — Vanua Levu: BORDAU 1: Stn CP1394, 16°45'S, 179°59'E, 416 m, 4 dd; Stn DW1455,

16°47'S, 179°58'E, 300-450 m, 1 dd.

South of Viti Levu: SUVA 4: Stn DW08, 18°22.3'S, 178°02.4'E, 28-30 m, 1 lv.

*Conus articulatus* Sowerby III, 1873

Pl. 1 fig. 1

Material examined. — Viti Levu: MUSORSTOM 10: Stn DW1384, 18°18.5'S, 178°05.8'E, 260-305 m, 1 dd. SUVA 2: Stn BS11, 18°11.8'S, 178°28.1'E, 213 m, 1 dd.

Vanua Levu: BORDAU 1: Stn CP1394, 16°45'S, 179°59'E, 416 m, 13 dd (1 ZMA).

Remarks. — First record from this area. This is usually a sublittoral species and the empty shells have most probably been washed downslope.

*Conus baileyi* Röckel & Da Motta, 1979

Pl. 1 fig. 2

Material examined. — Viti Levu: MUSORSTOM 10: Stn CP1351, 17°31.1'S, 178°40.0'E, 292-311 m, 1 dd.

Lau Group: BORDAU 1: Stn CP1506, 18°09'S, 178°37'W, 294-300 m, 1 dd; Stn CP1507, 18°09'S, 178°38'W, 294-300 m, 1 lv, 1 dd; Stn DW1440, 17°11'S, 178°43'W, 190-308 m, 1 lv.

Remarks. — First record from this area. A deep water species known from northern Queensland, the Solomon Islands, New Caledonia and the Philippines.

*Conus boholensis* Petuch, 1979

Pl. 1 fig. 3

Material examined. — Bligh Water: MUSORSTOM 10: Stn CP1318, 17°15.6'S, 178°03.4'E, 330-335 m, 1 lv; Stn CP1325, 17°16.4'S, 177°49.8'E, 282-322 m, 7 lv; Stn CP1325, 17°16.4'S, 177°49.8'E, 282-322 m, 7 lv (2 ZMA); Stn CP1326, 17°14.3'S, 177°49.7'E, 265-300 m, 3 lv (1 ZMA); Stn CP1327, 17°13.3'S, 177°51.6'E, 370-389 m, 9 lv; Stn CP1360, 17°59.6'S, 178°48.2'E, 402-444 m, 1 lv.

Viti Levu: MUSORSTOM 10: Stn CP1348, 17°30.3'S, 178°39.6'E, 353-390 m, 7 lv (2 ZMA), 1 dd; Stn CP1368, 18°10.9'S, 178°23.5'E, 380-469 m, 1 dd.

Vanua Levu: BORDAU 1: Stn DW 1421, 17°08'S, 178°59'E, 403-406 m, 1 lv, 1 dd; Stn CP1429, 17°17'S, 179°01'E, 400-410 m, 1 lv; Stn CP1394, 16°45'S, 179°59'E, 416 m, 1 dd.

Lau Group: BORDAU 1: Stn DW1499, 18°40'S, 178°27'W, 389-400 m, 1 lv, 1 dd; Stn CP1503, 18°12'S, 178°35'W, 430 m, 1 lv; Stn CP1504, 18°13'S, 178°34'W, 427-440 m, 1 lv.

Remarks. — First record from this area. The shells from Viti Levu are relatively small (the largest is 27 mm), with rather strong nodules on the spirals on the body whorl.

***Conus boucheti* Richard, 1983**

Pl. 1 fig. 4

Material examined. — Lau Group: BORDAU 1: Stn DW1477, 20°58'S, 178°45'W, 390-405 m, 1 lv.

Remarks. — First record from this area. Otherwise known from the Coral Sea to Vanuatu (Röckel, Richard & Moolenbeek, 1995).

***Conus cakobai* spec. nov.**

Pl. 1 figs 5-7, pl. 4 fig. 39

Holotype. — MNHN 21030 (lv), Fiji, South of Vanua Levu, Somo-somo Strait, 16°45'S, 179°59.5'E, 426-487 m [BORDAU 1, Stn DW1393] (Pl. 1 figs 5a-b).

Paratypes. — Vanua Levu: BORDAU 1: 2 paratypes MNHN 21031, Stn DW1393, 16°45'S, 179°59.5'E, 426-487 m, 1 lv, 1 dd (type locality); 2 paratypes MNHN 21032, Stn CP1394, 16°45'S, 179°59'E, 416 m, dd; 1 paratype ZMA Moll. 4.01.036, Stn DW1451, 16°45'S, 179°59.5'E, 400-460 m, lv; 2 paratypes MNHN 21033 Stn DW1453, 16°45'S, 179°59'E, 414-510 m, lv.

Description holotype. — Shell small, thin and narrowly conical. Protoconch smooth, paucispiral, of 1.5 convex whorls, diameter 1025 µm. Teleoconch of 7.5 whorls with rather deep suture, spire rather high, profile nearly flat, slightly stepped apically, shoulder angulate. First 3 teleoconch whorls with fine tubercles, gradually disappearing on subsequent whorls. Last whorl with 4 fine spiral grooves on periphery and about 15 on the base, no axial sculpture other than incremental lines.

Colour: Protoconch transparent white. First teleoconch whorls creamy white with a brown spiral band on the periphery, extending over the row of tubercles or just apically of it. On later whorls, this brown band is interrupted by white areas. Last whorl white with an irregular brown pattern. Tip of base white. Periostracum thin light brown translucent.

Dimensions: height 18.9 mm, width 8.4 mm.

Distribution. — Known from Fiji and Tonga.

Derivatio nominis. — Named after Seru Epenisa Cakobau, warlord of the 'Cannibal Islands'; in 1871, he brought for the first time under his rule what today constitutes the Fiji Islands.

Remarks. — There is some variation in the material with regard to the colour of the last whorl. In some specimens the brown markings form a zigzag pattern, in others they tend to form axial stripes. The largest specimen (height 24.9 mm, width 10.3 mm) is more slender than the holotype.

*Conus cakobai* spec. nov. is part of a species group in the so-called "Profundiconus"-complex that also includes *C. vaubani* Röckel & Moolenbeek, 1995 from the New

Caledonia region, and *Conus* sp. 4 from Wallis and Futuna islands (Moolenbeek & Röckel 1996). All are from deep water and all have paucispiral protoconchs indicating non-planktotrophic larval development. It is a matter of personal appreciation to decide whether these allopatric populations from New Caledonia, Fiji, Tonga, and Wallis and Futuna should be treated as geographical subspecies of one species or as separate species. Due to the absence of planktotrophic larvae, we hypothesize that the distinctly recognizable morphological entities correspond to separate gene pools, and we treat them as full species.

*Conus cakobai* spec. nov. differs from *C. vaubani* in having a slightly larger and wider protoconch, and in its colour pattern where the tubercles on the first three teleoconch whorls are always situated in a brown band, somewhat smaller and more in number (about 30%). In colour pattern, *C. cakobai* spec. nov. also resembles *C. darkini* Röckel & Richard, 1993, which differs by its larger adult size (50-87 mm) and its protoconch of about 3.5 whorls, indicating a planktotrophic larval development.

Material examined. — Bligh Water: MUSORSTOM 10: Stn CP1330, 17°09.5'S, 177°56.3'E, 567-699 m, 1 lv.  
TONGA ISLAND: BORDAU 2, Stn DW 1538, 21°39'S, 175°19'W, 471-508 m, 1 dd.

***Conus capitaneus* Fulton, 1938**

Pl. 1 fig. 8

Material examined. — Viti Levu: MUSORSTOM 10: Stn CP1377, 18°18.4'S, 178°02.5'E, 233-248 m, 1 lv.  
Vanua Levu: BORDAU 1, Stn CP1394, 16°45'S, 179°59'E, 416 m, 1 dd.

Remarks. — First record from this area. Röckel et al. (1995) recorded this species from around New Caledonia.

***Conus capitaneus* Linnaeus, 1758**

Cernohorsky, 1964: 69, pl. 14 fig. 30; Seeto 1998: 17.

Material examined. — Viti Levu: SUVA 2: Stn DW74, 17°49.1'S, 177°12.2'E, 38 m, 1 lv.

Remarks. — A common littoral species.

***Conus corallinus* Kiener, 1845**

Pl. 1 fig. 9

Material examined. — Viti Levu: SUVA 4: Stn DW04, 18°12'S, 178°35'E, 100-122 m, 1 dd.

Remarks. — First record from this area.

***Conus dayriti* Röckel & Da Motta, 1983**

Pl. 1 fig. 10

Material examined. — Vanua Levu: BORDAU 1: Stn CP1394, 16°45'S, 179°59'E, 416 m, 6 dd (1 ZMA).

Remarks. — First record from this area. Röckel et al. (1995) recorded this species from around New Caledonia and the Philippines.

***Conus eugrammatus* Bartsch & Rehder, 1943**

Remarks. — Mentioned by Kohn & Arua (1999a) as the most common species in an early Pleistocene assemblage from Viti Levu. As there is no modern record, their identification needs confirmation.

***Conus excelsus* Sowerby III, 1908**

Pl. 1 fig. 11

Material examined. — Viti Levu: MUSORSTOM 10: Stn CP1387, 18°18.5'S, 178°04.7'E, 229-370 m, 2 dd.

Remarks. — First record from this area. A specimen with a height of 98 mm is relatively large for this species.

***Conus exiguus* Lamarck, 1810**

Pl. 2 fig. 12

Material examined. — Viti Levu: MUSORSTOM 10: Stn CP1371, 18°12.4'S, 178°32.8'E, 135-151 m, 1 dd.

Remarks. — First record from this area. The single empty shell was probably washed downslope; in general it lives in depths ranging from 0.5 to 55 m. *Conus exiguus* was thought to be endemic around New Caledonia (Estival, 1981), but recent finds (Moolenbeek, unpublished data) indicate that it has a larger distribution ranging from the Moluccas to Western Samoa.

***Conus fijiensis* spec. nov.**

Pl. 2 figs 13-14, pl. 4 fig. 40

Holotype. — MNHN 21034 (lv), Fiji, South-East of Viti Levu, 17°48.5'S, 178°46.7'E, 80-120 m [MUSORSTOM 10 Stn CP1357-1358] (Pl. 2 figs 13a-b).

Paratypes. — 9 paratypes (3 lv, 6 dd) MNHN 21035; 2 paratypes (1 lv, 1 dd) ZMA Moll. 4.01.009, all from the type locality.

Description holotype. — Shell of medium to small size for the genus, thin, narrowly conical, slightly pyriform, spire slightly concave with slightly stepped whorls. Protoconch

blunt, paucispiral, of nearly 2 smooth, transparent whorls. Teleoconch of 7.7 whorls with nodular shoulder, first whorl with 12 sharp nodules, nodules gradually fading out in subadult and adult whorls. Shoulder ramp with 3 or 4 fine spiral threads and numerous fine axial wrinkles. Last whorl (with one large repaired scar) with 32 grooves, interrupted by broad incremental scars, giving an overall impression of spirally punctuated grooves, interspaces between grooves smooth and flat. Colour of last whorl white with two ill-defined brown bands, an irregular pattern of axially elongated brown blotches, and one fine, semicontinuous, brown line in the center of many groove interspaces; spire white with regular, radiating brown patches, 5 on last whorl, a little darker near shoulder. Aperture white, with outer pattern visible by transparence.

Dimensions: Height 17.8 mm, width 6.8 mm.

Distribution. — Known only from Fiji and Tonga.

Derivatio nominis. — Although the distribution of this species is not restricted to Fiji, the specific epithet refers to its occurrence in the island group.

Remarks. — The colour pattern shows little variation among the material examined. The largest specimen is 21.1 mm high and 8.4 mm wide.

Initially we identified this species as *C. saecularis* Melville, 1898, a species occurring from the Persian Gulf to Fiji (see below). However, that species differs in having a glossy, pointed multispiral protoconch, whereas *C. fijiensis* spec. nov. has a paucispiral blunt protoconch. Also the larger *C. comatosa* Pilsbry, 1904 shows resemblance but has a multispiral protoconch and a more straight to convex last whorl.

Seeto (1998) recorded *C. saecularis* from off Suva Barrier Reef in tangle nets. Unfortunately, he neither described nor figured his material, so this identification remains questionable. Also the specimens figured as *C. insculptus* by Cernohorsky (1964, fig. 55) and by Kohn & Arua (1999a, fig. 65) are *C. saecularis* or *C. fijiensis* spec. nov. The true *C. saecularis* occurs in Fiji but usually in more shallow water (see below).

Other material examined. — Bligh Water: MUSORSTOM 10: Stn CP1334, 16°51.4'S, 178°13.9'E, 251-257 m, 1 dd; Stn CP1371, 18°12.4'S, 178°32.8'E, 135-151 m, 1 dd.

Viti Levu: MUSORSTOM 10: Stn DW1376, 18°18.7'S, 178°09.1'E, 497-504 m, 1 dd.

TONGA ISLAND, Vava'u Group: BORDAU 2: Stn DW1581, 18°41'S, 174°02'W, 76-85 m, 8 dd.

***Conus fjiisulcatus* spec. nov.**

See *Conus sulcatus* complex

***Conus floridulus* A. Adams & Reeve, 1848**

Seeto, 1998: 11; Kohn & Arua, 1999b: 8.

Material examined. — Vanua Levu: BORDAU 1: Stn CP1394, 16°45'S, 179°59'E, 416 m, 4 dd.

Viti Levu: SUVA 2: Stn DW44, 17°51.7'S, 177°13.0'E, 33 m, 1 lv, 1 dd. SUVA 4: Stn DW04, 18°12'S, 178°35'E, 100-122 m, 2 dd.

Remarks. — Often confused with, or considered a synonym of, *C. muriculatus* Sowerby I, 1833 (= *C. sugillatus* Reeve, 1844), but we follow Röckel et al. (1995) in treating them as different species. The empty shells from deep water were certainly washed down slope.

***Conus geographus* Linnaeus, 1758**

Seeto, 1998: 12.

Material examined. — Vanua Levu: BORDAU 1: Stn DW1393, 16°45'S, 179°59'E, 426-487 m, 1 dd.

Remarks. — The large fragment of this intertidal to shallow subtidal species was certainly carried down slope.

***Conus gigasulcatus* spec. nov.**

See *Conus sulcatus* complex

***Conus ichinoseanus* (Kuroda, 1956)**

Pl. 2 fig. 15

Material examined. — Viti Levu: BORDAU 1: Stn CP1504, 18°13'S, 178°34'E, 427-440 m, 1 lv; Stn CP1505, 18°12'S, 178°37'W, 420-450 m, 2 lv (1 ZMA).

Lau Group: BORDAU 1: Stn DW1496, 18°43'S, 178°23'W, 392-407 m, 1 lv.

Remarks. — First record from this area. According to Röckel et al. (1995) this species has a very disjunct distribution pattern in the Indo-Pacific; the nearest records are from around New Caledonia.

The specific epithet *ichinoseana* was originally combined with the feminine genus *Asprella*; as an adjective, it must be grammatically combined with *Conus* in its masculine form, *ichinoseanus*.

***Conus insculptus* Kiener, 1845**

Cernohorsky, 1964: 76, pl. 17 fig. 55a; Seeto, 1998: 13; Kohn & Arua, 1999b: 8.

Material examined. — Bligh Water: MUSORSTOM 10: Stn CP1323, 17°16.1'S, 177°45.7'E, 143-173 m, 1 dd.

Remarks. — The specimens illustrated by Cernohorsky

(1964, pl. 17 fig. 55) are not *C. insculptus*, but more probably represent *C. fijiensis* spec. nov. or *C. saecularis*. The identification of fossil material (Seeto, 1998) needs verification.

***Conus joliveti* spec. nov.**

Pl. 2 figs 16-17, pl. 4 fig. 41

Holotype. — MNHN 21036 (lv), Fiji, Bligh Water, 17°16.8'S, 177°53.6'E, 290-300 m [MUSORSTOM 10 Stn CP1320] (Pl. 2 figs 16a-b).

Paratypes. — 6 paratypes (dd) MNHN 21037, 2 paratypes (1 lv, 1 dd) ZMA Moll. 4.01.008, all from the type locality.

Description holotype. — Shell medium-sized for the genus, thin, shape narrowly conical, slightly pyriform. Protoconch multispiral, consisting of nearly 3 glossy, convex whorls; protoconch I broken and apex of protoconch sealed; protoconch whorls smooth except for 5 curved axial ribs just before the protoconch/teleoconch transition. Teleoconch of 8 whorls, spire slightly concave, suture deep, impressed. Spire whorls with strongly tubercular keel situated at periphery on first three whorls, then on subsequent whorls gradually less pronounced and situated lower on the whorl, with a proportionally broader ramp; 18 sharp tubercles on first teleoconch whorl, 22 lower, and spirally elongated on last whorl. Shoulder ramp occupied by finely beaded spiral cords, a single one on first teleoconch whorl, gradually increasing in number on subsequent whorls, 5 on last whorl, interspaces narrower than cords. Last whorl with 33 smooth, convex spiral cords, interspaces slightly narrower than, to as broad as, cords. Strong incremental riblets, opisthocline and continuous on shoulder, forming beads where they cross over spiral cords, prosocline and discontinuous, restricted to grooves between cords on last whorl. Colour of the protoconch creamy semitransparent. Overall teleoconch colour creamy white with 3 rather distinctly set off, brown, broad spiral bands, and less well defined, narrow, axial stripes alternatingly brown and white. Spire creamy white with irregular axial brown patches extending from suture to shoulder, shoulder with spirally arranged white and brown streaks that do not correspond regularly with the tubercles.

Dimensions: Height 29.1 mm, width 10.1 mm.

Distribution. — Known from two disjunct areas, Fiji and Indonesia.

Derivatio nominis. — The specific epithet honours Michel Jolivet, Ambassador of France in Fiji at the time of the Musorstom and Bordau expeditions, and a keen cone collector, to acknowledge his interest in the deep-sea exploring expeditions in Fiji and Tonga.

Remarks. — The material shows little variation in colour or sculpture when fresh (long dead specimens have of course altered colouration). Live collected specimens have a very thin, light brown periostracum. The largest specimen is 38 mm and its shoulder is almost smooth on the last whorl.

*Conus joliveti* spec. nov. closely resembles *C. orbigny*

and *C. pseudorbignyi*, which both live sympatrically with it in Indonesia and Fiji. The bathymetrical ranges of *C. jolivetii* spec. nov. and *C. orbignyi* overlap, and the two species have even been taken together at MUSORSTOM 10 Stn CP1355 in 302-310 m (1 dd *C. jolivetii* spec. nov., 1 lv *C. orbignyi*). In Fiji, *C. pseudorbignyi* occurs in more shallow water (alive in 143-144 m) than both *C. jolivetii* and *C. orbignyi*. *Conus jolivetii* spec. nov. differs from both *C. orbignyi* and *C. pseudorbignyi* by its finer, more numerous spiral cords on the last whorl, and smaller adult size (*C. pseudorbignyi* reaches up to 46 mm). *Conus orbignyi* further differs by being proportionally broader, with a strongly tuberculated shoulder, also on the last adult whorl, and *C. pseudorbignyi* further differs by its shoulder being tuberculated on the first 3-5 whorls, and smooth on subsequent whorls, and by its protoconch being yellowish brown.

Other material examined. — Viti Levu: MUSORSTOM 10: Stn CP1348, 17°30.3'S, 178°39.6'E, 353-390 m, 1 dd; Stn CP1355, 17°49.5'S, 178°49.4'E, 302-310 m, 1 dd; Stn CP1368, 18°10.9'S, 178°23.5'E, 380-469 m, 1 dd.  
Vanua Levu: BORDAU 1: Stn CP1402, 16°38'S, 179°36'E, 260-279 m, 2 dd.  
INDONESIA, Strait of Makassar: CORINDON: Stn CH267, 01°56'S, 119°17'E, 134-186 m, 2 lv (1 ZMA); Stn CH273, 01°57'S, 119°15'E, 220 m, 1 lv.

***Conus kimioi* (Habe, 1965)**

Pl. 2 fig. 18

Material examined. — Vanua Levu: BORDAU 1: Stn DW1450, 16°44'S, 179°58'E, 327-420 m, 1 dd; Stn CP 1394, 16°45'S, 179°59'E, 416 m, 1 dd.

Remarks. — First record from this area of this species so far known from New Caledonia, the Philippines and southern Japan (Röckel et al., 1995).

***Conus mustelinus* Hwass in Bruguière, 1792**

Cernohorsky, 1964: 81-82, pl. 14 fig. 31; Seeto 1998: 17.

Material examined. — Viti Levu: SUVA 4: Stn DW08, 18°22.3'S, 178°02.4'E, 28-30 m, 1 lv.

Remarks. — One of the most common species in the Marquesas Archipelago. This species lives from the littoral until depths of about 100 m.

***Conus nussatella* Linnaeus, 1758**

Seeto, 1998: 17-18.

Material examined. — Viti Levu: MUSORSTOM 10: Stn CP1387, 18°18.5'S, 178°04.7'E, 229-370 m, 1 dd.

Remarks. — This worn specimen of a littoral species was certainly washed down slope.

***Conus ochroleucus* Gmelin, 1791**

Pl. 2 fig. 19

Röckel et al., 1995: 115-116, map 35 (as *Conus ochroleucus* ssp. *tmetus*); Seeto, 1998: 18; Kohn & Arua, 1999b: 9.

Material examined. — Bligh Water: MUSORSTOM 10: Stn CP1323, 17°16.1'S, 177°45.7'E, 143-173 m, 1 lv, 1 dd.  
Viti Levu: MUSORSTOM 10: Stn CP 1366, 18°12.4'S, 178°33.1'E, 149-168 m, 1 lv, 2 dd (1 ZMA); Stn CP 1387, 18°18.5'S, 178°04.7'E, 229-370 m, 2 dd; Stn CP1390, 18°18.6'S, 178°05.1'E, 234-361 m, 1 dd. SUVA 4: Stn DW04, 18°12'S, 178°35'E, 100-122 m, 1 dd.

Remarks. — Cernohorsky (1964: 92) discussed an unconfirmed record by Cotton (1945) and concluded that *C. ochroleucus* does not occur in Fiji. However, Kohn & Arua (1999a) recorded it from Pleistocene beds in Viti Levu. According to Röckel et al. (1995) the Fijian population belongs to the subspecies *tmetus* Tomlin, 1937 (a senior synonym of *C. pilkeyi* Petuch, 1974).

***Conus orbignyi* Audouin, 1831**

Pl. 2 fig. 20

Seeto, 1998: 29; Kohn & Arua, 1999a: 121; Kohn & Arua, 1999b: 9.

Material examined. — Viti Levu: MUSORSTOM 10: Stn CP1355, 17°49.5'S, 178°49.4'E, 302-310 m, 1 lv; Stn CP1365, 18°12.7'S, 178°32.4'E, 295-302 m, 1 dd; Stn CP 1374, 18°18.5'S, 178°05.9'E, 259-348 m, 2 dd; Stn DW1384, 18°18.5'S, 178°05.8'E, 260-305 m, 3 dd; Stn CP1387, 18°18.5'S, 178°04.7'E, 229-370 m, 2 lv (1 ZMA), 4 dd; Stn CP1389, 18°18.6'S, 178°04.7'E, 241-417 m, 1 lv, 3 dd; Stn CP1390, 18°18.6'S, 178°05.1'E, 234-361 m, 3 lv (2 ZMA), 4 dd.

Lau Group: BORDAU 1: Stn DW1464, 18°09'S, 178°38'W, 285-300 m, 2 lv; Stn DW1494, 18°55'S, 178°29'W, 240-319 m, 1 dd; Stn DW1498, 18°41'S, 178°28'W, 300-307 m, 3 lv; Stn CP1506, 18°09'S, 178°37'W, 294-300 m, 1 lv; Stn CP1507, 18°09'S, 178°38'W, 294-300 m, 1 lv.

Remarks. — First recent record from this area. Up to now (Seeto, 1998; Kohn & Arua, 1999a, b) only fossils were known.

***Conus planorbis* Von Born, 1778**

Cernohorsky, 1964: 83, pl. 14 fig. 29; Seeto, 1998: 19.

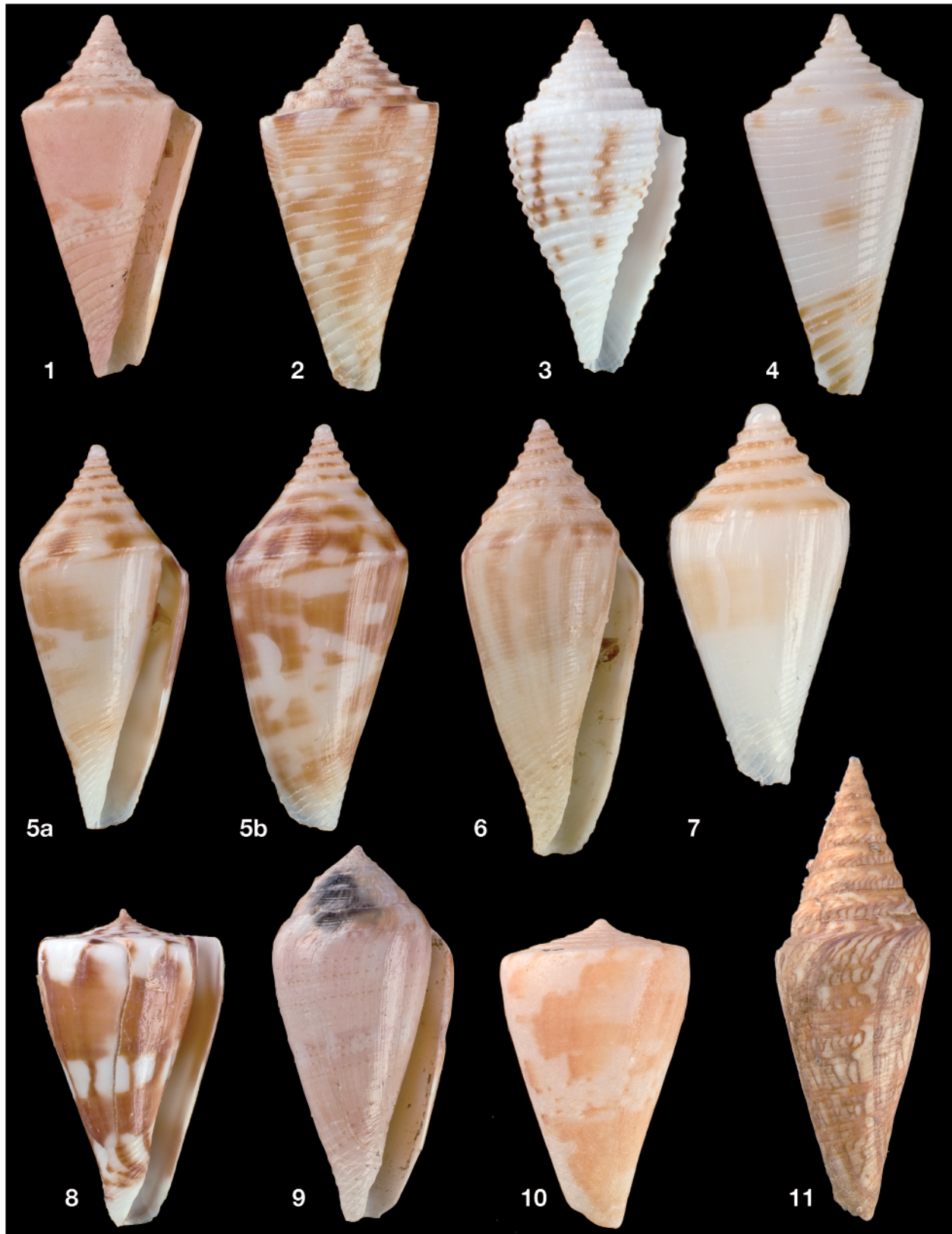


PLATE 1

**Fig. 1.** *Conus articulatus*, Viti Levu, Stn CP1394, length 16.6 mm. **Fig. 2.** *C. baileyi*, Viti Levu, Stn DW1440, length 18.0 mm. **Fig. 3.** *C. boholensis*, Viti Levu, Stn CP1348, length 24.6 mm. **Fig. 4.** *C. boucheti*, Lau Group, Stn DW1477, length 16.1 mm. **Figs 5a-b.** *C. cakobaui* spec. nov., Vanua Levu, holotype Stn DW1393, ventral and dorsal view, length 19.0 mm. **Fig. 6.** *C. cakobaui* spec. nov., Bligh Water, paratype Stn CP1330, length 25.1 mm. **Fig. 7.** *C. cakobaui* spec. nov., Vanua Levu, paratype Stn CP1393, length 9.6 mm. **Fig. 8.** *C. capitaneus*, Viti Levu, Stn CP1377, length 29.7 mm. **Fig. 9.** *C. corallinus*, Viti Levu, Stn SUVA 4, length 20.2 mm. **Fig. 10.** *C. dayriti*, Viti Levu, Stn CP1394, length 18.9 mm. **Fig. 11.** *C. excelsus*, Viti Levu, Stn CP1387, length 95.6 mm.



Material examined. — Viti Levu: SUVA 4: Stn DW 08, 18°22.3'S, 178°02.4'E, 28-30 m, 1 lv.

Remarks. — A common littoral species.

***Conus plinthis* Richard & Moolenbeek, 1988**

Pl. 2 fig. 21

Material examined. — Lau Group: BORDAU 1: Stn DW1472, 19°40'S, 178°10'E, 262-266 m, 1 dd.

Remarks. — *Conus plinthis* was so far known only from New Caledonia and the Kermadec Islands. The present record of a juvenile specimen significantly extends its known distribution.

***Conus praecellens* A. Adams, 1854**

Pl. 3 fig. 22

Seeto, 1998: 27; Kohn & Arua, 1999b: 9.

Material examined. — Viti Levu: MUSORSTOM 10: Stn CP1349, 17°31.1'S, 178°38.8'E, 244-255 m, 1 lv; Stn CP1374, 18°18.5'S, 178°05.9'E, 259-348 m, 1 dd. BORDAU 1: Stn DW1472, 19°40'S, 178°10'E, 262-266 m, 1 dd; Stn CP1507, 18°09'S, 178°38'E, 294-300 m, 1 lv.

Remarks. — First confirmed record from this area. Seeto's (1998) and Kohn & Arua's (1999a) records were doubtful or referred to fossils.

***Conus proximus* Sowerby II, 1859**

Cernohorsky, 1964: 81, pl. 17 fig. 53 [as *Conus moluccensis*]; Seeto, 1998: 19-20.

Material examined. — Viti Levu: MUSORSTOM 10: Stn CP1371, 18°12.4'S, 178°32.8'E, 135-151 m, 1 dd. SUVA 4: Stn DW04, 18°12'S, 178°35'E, 100-122 m, 2 dd; Stn DW10, 18°20.8'S, 178°07.5'E, 39-43 m, 3 dd; Stn DW21, 18°26.2'S, 177°58.1'E, 41 m, 1 dd.

Remarks. — Seeto (1998: 20) recorded a live collected specimen off Wainunu, Fiji.

***Conus cf. pseudokimioi* Da Motta & Martin, 1982**

Pl. 3 fig. 23

Material examined. — Vanua Levu: BORDAU 1: Stn CP1394, 16°45'S, 179°59'E, 416 m, 2 dd.

Remarks. — The identity of these two worn specimens is doubtful. They also resemble to *C. alisi* Moolenbeek, Röckel

& Richard, 1995, from New Caledonia. However, the colour pattern resembles more that of *C. pseudokimioi*, so we tentatively assign them to that species, so far known only from the Philippines.

***Conus pseudorbignyi* Röckel & Lan, 1981**

Pl. 3 fig. 24

Material examined. — Bligh Water: MUSORSTOM 10: Stn CP1323, 17°16.1'S, 177°45.7'E, 143 m, 3 lv (1 ZMA), 10 dd (1 ZMA); Stn CP1329, 17°19.3'S, 177°47.4'E, 102-106 m, 1 dd.

Viti Levu: MUSORSTOM 10: Stn CP1363, 18°12.4'S, 178°33.0'E, 144-150 m, 2 lv; Stn CP1366, 18°12.4'S, 178°33.1'E, 149-168 m, 1 dd; Stn CP1371, 18°12.4'S, 178°32.8'E, 135-151 m, 1 lv.

Remarks. — First record from this area.

***Conus quercinus* [Lightfoot], 1786**

Cernohorsky, 1964: 83-84, pl. 13 fig. 15; Seeto, 1998: 20.

Material examined. — Viti Levu: MUSORSTOM 10: Stn CP1387, 18°18.5'S-178°04.7'E, 229-370 m, 1 dd.

Remarks. — This empty shell was certainly carried down slope.

***Conus radiatus* Gmelin, 1791**

Cernohorsky, 1964: 84, pl. 12 fig. 6; Seeto, 1998: 20; Kohn & Arua, 1999b: 9.

Material examined. — Viti Levu: SUVA 2: Stn CP47, 17°53.5'S, 177°13.6'E. 25 m, 1 lv.

Remarks. — According to Cernohorsky (1964), a rare shallow water species.

***Conus saecularis* Melvill, 1898**

Kohn & Arua, 1999a: 122, fig. 65 [?].

Material examined. — Viti Levu: SUVA 2: Stn CP45, 17°51.6'S, 177°13.3'E, 35 m, 2 dd. SUVA 4: Stn CP20, 18°26.4'S, 178°02.4'E, 50-51 m, 2 dd.

Remarks. — This cone, originally described from the Persian Gulf region, is very similar in outline and colouration to *C. fijiensis* spec. nov. However, *C. saecularis* has a planktotrophic larval development as inferred from its multispiral protoconch, whereas *C. fijiensis* spec. nov. has a paucispiral

protoconch indicating non-planktotrophic larval development (see description *C. fijiensis* spec. nov.).

***Conus shikamai* Coomans, Moolenbeek & Wils, 1985**

Pl. 3 fig. 25

Material examined. — Bligh Water: MUSORSTOM 10: Stn CP1323, 17°16.1'S, 177°45.7'E, 143-173 m, 9 lv (2 ZMA), 15 dd.

Remarks. — First record from this area. *Conus shikamai* resembles *C. recluzianus* Bernardi, 1853, which has been recorded from Fiji as fossil; the identification of that material, however, requires confirmation.

***Conus smirna* Bartsch & Rehder, 1943**

Pl. 3 fig. 26

Material examined. — Lau Group: BORDAU 2: Stn DW1485, 19°03'S, 178°30'W, 700-707 m, 1 dd.

Remarks. — A large specimen (height 70.4 mm), damaged and without a protoconch. First record for this area.

The *Conus sulcatus* species complex

***Conus fjijsulcatus* spec. nov.**

Pl. 3 figs 27-28, pl. 4 fig. 42

Holotype. — MNHN 21038 (lv), Fiji, Vanua Levu, Natewa Bay, 16°40'S, 179°36'E, 220-224 m [BORDAU 1, Stn CP1403] (Pl. 3 figs 27a-b).

Paratypes. — 1 paratype MNHN 21040, 1 paratype ZMA Moll. 4.01.028 Vanua Levu: BORDAU 1: Stn CP1402, 16°38'S, 179°36'E, 260-279 m, 2 lv; 2 paratypes MNHN 21039, Vanua Levu: BORDAU 1: Stn CP1403, 16°40'S, 179°36'E, 220-224 m, 2 lv (type locality).

Description holotype. — Shell medium to large, broadly conical, moderately solid. Spire rather high and straight. Protoconch of 2.3 whorls, smooth, glossy and transparent. Teleoconch of 11.2 whorls. Whorls slightly concave with 2 spiral grooves in the first teleoconch whorl, gradually growing to about 5 grooves axially crossed by opisthocline growth-markings. First teleoconch whorl with about 14 fine nodules, gradually diminishing and lacking on the last two whorls. Suture deep. Colour on the first whorls dominated by brown blotches, gradually becoming more white. Shoulder angulate with a prominent white rim. Body whorl straight, slightly convex near the shoulder, with 3-4 repair scars. Upper part smooth other 3/4 with about 30 spiral grooves. In these grooves fine axial riblets. On the lower spiral ribs fine nodules. Colour brown with a few white spirals of which the one in the middle is most prominent. Base white

Dimensions: Height 54.9 mm, width 25.6 mm.

Distribution. — Only known from Fiji. Alive in 150-353 m, empty shells to 497 m.

Derivatio nominis. — As far as we know endemic to Fiji and a member of the *Conus sulcatus* complex. Hence the name.

Remarks. — Some adult specimens are more uniformly brown; however, all have a white band on the shoulder and a white base. The sculpture of spiral grooves is variable; most juveniles have more pronounced spiral grooves and more nodules on the spiral ribs.

*Conus fjijsulcatus* spec. nov. differs from *C. sulcatus* by being more slender, and having a higher spire. Adult specimens of *C. fjijsulcatus* spec. nov. have a smooth upper part of the last whorl, whereas the true *C. sulcatus* is always entirely grooved, and is white. *Conus sulcatus* fa. *brettinghami* Coomans, Moolenbeek & Wils, 1982 has a similar brown colour pattern, but is more slender and has a lower spire. *Conus gigasulcatus* spec. nov. differs by being larger, having a pattern of interrupted dark brown/white spiral lines and a flatter, more nodulated spire. A subadult specimen from MUSORSTOM 10 Stn DW1356 shows similarities in sculpture to *C. rolani* Röckel, 1986, but lacks the brown pattern.

Other material examined. — Bligh Water: MUSORSTOM 10: Stn DW1319, 17°15.6'S, 178°01.9'E, 341-347 m, 1 dd; Stn CP1325, 17°16.4'S-177°49.8'E, 282-322 m, 1 dd.

Viti Levu: MUSORSTOM 10: Stn CP1348, 17°30.3'S, 178°39.6'E, 353-390 m, 1 lv; Stn CP1352, 17°31.4'S, 178°39.4'E, 241-245 m, 2 dd; Stn DW1356, 17°50.3'S, 178°48.0'E, 203-208 m, 1 dd; Stn CP1359, 17°49.7'S, 178°47.8'E, 183-188 m, 1 lv (ZMA), 1 dd; Stn CP1363, 18°12.4'S, 178°33.0'E, 144-150 m, 1 lv; Stn CP1374, 18°18.5'S, 178°05.9'E, 259-348 m, 2 dd; Stn CP1376, 18°18.7'S, 178°09.1'E, 497-504 m, 1 dd; Stn CP1384, 18°18.5'S, 178°05.8'E, 260-305 m, 1 dd; Stn CP1387, 18°18.5'S, 178°04.7'E, 229-370 m, 1 dd; Stn CP1389, 18°18.6'S, 178°04.7'E, 241-417 m, 3 dd (1 ZMA); Stn CP1390, 18°18.6'S, 178°05.1'E, 234-361 m, 1 dd.

***Conus gigasulcatus* sp. nov.**

Pl. 3 figs 29-31, pl. 4 fig. 43

Holotype. — MNHN 21041 (lv), Fiji, South of Viti Levu, 18°12.4'S, 178°33.0'E, 144-150 m [MUSORSTOM 10 Stn CP1363] (Figs 29a-b).

Paratypes. — 1 paratype MNHN 21042, 1 paratype ZMA Moll. 4.01.029, Viti Levu: MUSORSTOM 10 Stn CP1363, 18°12.4'S, 178°33.0'E, 144-150 m, 2 lv (type locality); 1 paratype Viti Levu: MUSORSTOM 10 MNHN 21043, Stn CP1366, 18°12.4'S, 178°33.1'E, 149-168 m, 1 lv.

Description holotype. — Shell large, broadly conical, moderately solid. Spire rather low and slightly concave. Protoconch missing. Teleoconch of about 11 whorls. Whorls

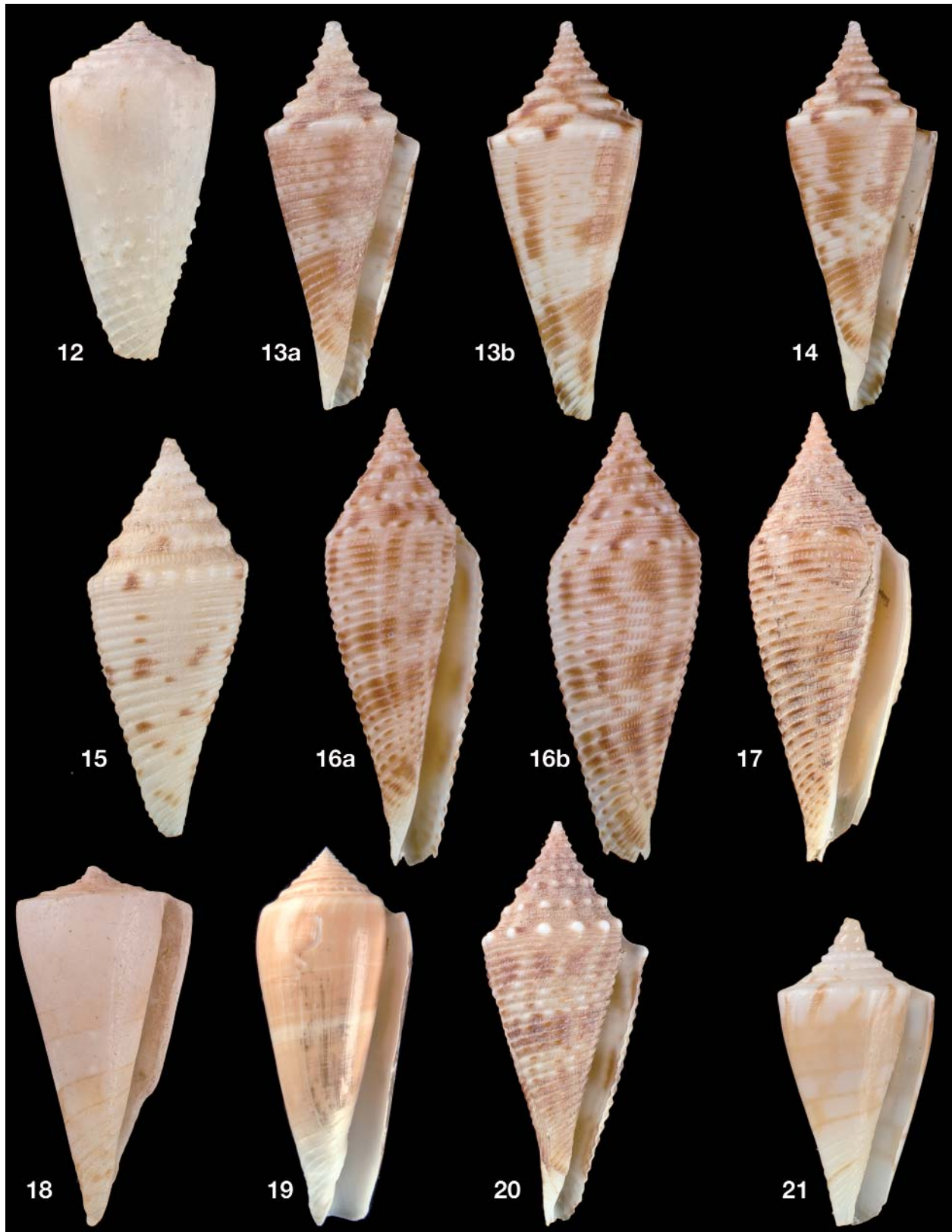


PLATE 2

**Fig. 12.** *Conus exiguus*, Viti Levu, Stn CP1371, length 20.9 mm. **Figs 13a-b.** *C. fijiensis* spec. nov., Viti Levu, holotype Stn CP1358, ventral and dorsal view, length 17.7 mm. **Fig. 14.** *C. fijiensis* spec. nov., Viti Levu, paratype Stn DW1357, ventral view, length 12.2 mm. **Fig. 15.** *C. ichinoseana*, Lau Group, Stn DW1496, length 16.7 mm. **Figs 16a-b.** *C. joliveti* spec. nov., Bligh Water, holotype Stn CP1320, ventral and dorsal view, length 29.0 mm. **Fig. 17.** *C. joliveti* spec. nov., Bligh Water, paratype Stn CP1320, ventral view, length 33.8 mm. **Fig. 18.** *C. kimioi*, Vanua Levu, Stn CP1394, length 18.2 mm. **Fig. 19.** *C. ochroleucus*, Bligh Water, Stn CP1323, length 98.2 mm. **Fig. 20.** *C. orbigny*, Viti Levu, Stn CP1390, length 32.1 mm. **Fig. 21.** *C. plinthis*, Lau Group, Stn DW1472, length 9.3 mm.

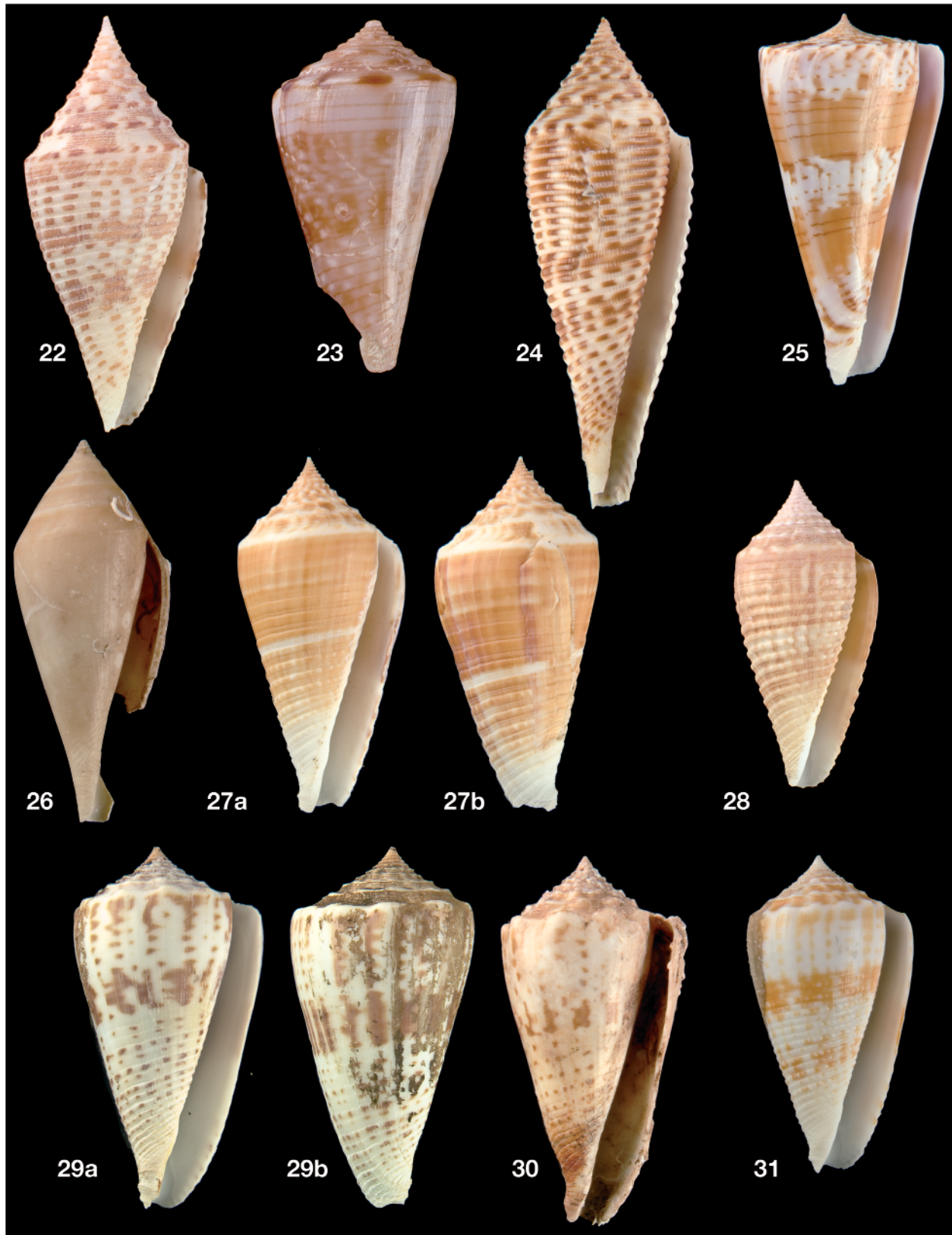


PLATE 3

**Fig. 22.** *Conus praecellens*, Viti Levu, Stn CP1349, length 38.8 mm. **Fig. 23.** *C. cf. pseudokimioi*, Vanua Levu, Stn CP1394, length 20.2 mm. **Fig. 24.** *C. pseudorbignyi*, Viti Levu, Stn CP1371, length 46.2 mm. **Fig. 25.** *C. shikamai*, Bligh Water, Stn CP1323, length 45.0 mm. **Fig. 26.** *C. smirna*, Lau Group, Stn DW1484, length 70.6 mm. **Figs 27a-b.** *C. fijosulcatus* spec. nov., Vanua Levu, holotype Stn CP1403, ventral and dorsal view, length 38.6 mm. **Fig. 28.** *C. fijosulcatus* spec. nov., Vanua Levu, paratype Stn CP1403, ventral view, length 18.8 mm. **Figs 29a-b.** *C. gigasulcatus* spec. nov., Viti Levu, holotype Stn CP1363, ventral and dorsal view, length 73.1 mm. **Fig. 30.** *C. gigasulcatus* spec. nov., Viti Levu, paratype Stn CP1387, ventral view, length 87.9 mm. **Fig. 31.** *C. gigasulcatus* spec. nov., Viti Levu, paratype Stn CP1387, ventral view, length 28.5 mm.

slightly concave with 2 spiral grooves in the first teleoconch whorl, gradually increasing to about 5 grooves axially crossed by opisthocline growth marks, and fine axial riblets. First teleoconch whorls with fine nodules, gradually growing larger on subsequent whorls. Last whorl with 12 strong nodules. Suture rather deep. Colour basically white interrupted by brown blotches. Shoulder angulate. Last whorl straight, slightly convex near the shoulder. Apical half smooth, abapical part with about 26 spiral grooves, crossed by irregular fine axial riblets. On the abapical spiral cords, a few small nodules. Colour dark white with a pattern of brown dotted spirals. In the middle these brown/white spiral lines have a broader band of brown blotches. Base white. Periostracum rather thick, brown to dark brown.

Dimensions: Height 73.1 mm, width 38.4 mm.

Distribution. — Only known from Fiji. Alive in 150-183 m, empty shells in 120-260 m.

Derivatio nominis. — From *gigas*, very large, with reference to the large adult size, and the epithet *sulcatus*, with reference to the species complex.

Remarks. — Juvenile specimens are entirely covered with spiral grooves and irregular fine brown spots. Gradually the regular brown/white spiral lines are formed with the larger brown band in the middle. There is some variation in this spiral brown pattern, sometimes more pronounced sometimes less prominent. Protoconch of 2.5 smooth, somewhat convex whorls (pl. 4 fig. 43).

*Conus gigasulcatus* spec. nov. differs from *C. sulcatus* in being a little more slender and in adult specimens lacking spiral grooves all over the last whorl. Also the colour pattern differs from the entirely white typical *C. sulcatus*. *Conus sulcatus* fa. *bocki* Sowerby III, 1881 has a more triangular shape, with a nearly equal brown background and stronger nodules on the spire. The colour pattern shows some resemblance to the form *samiae* Da Motta, 1982 of *C. sulcatus* but that form has more pronounced pustulated spiral cords and a convex spire.

Other material examined. — Bligh Water: MUSORSTOM 10: Stn. DW1334, 16°51.4'S, 178°13.9'E, 252-257 m, 1 dd.

Viti Levu: MUSORSTOM 10: Stn CP1349, 17°31.1'S, 178°38.8'E, 244-252 m, 1 dd; Stn CP1358, 17°48.5'S, 178°46.7'E, 80-120 m, 1 dd; Stn CP1359, 17°49.7'S, 178°47.8'E, 183-188 m, 1 lv, 1 dd; Stn CP1371, 18°12.4'S, 178°32.8'E, 135-151 m, 2 lv; Stn DW1384, 18°18.5'S, 178°05.8'E, 260-305 m, 2 dd; Stn CP1387, 18°18.5'S, 178°04.7'E, 229-370 m, 2 dd; Stn CP1389, 18°18.6'S, 178°04.7'E, 241-417 m, 1 dd; Stn CP1437, 17°11'S, 178°46'W, 160-177 m, 1 lv.

SUVA 4: Stn DW04, 18°12'S, 178°35'E, 100-122 m, 1 dd.

#### ***Conus sulcicastaneus* Kosuge, 1981**

Pl. 4 fig. 32

Material examined. — Lau Group: BORDAU 1: Stn CP1501,

18°40'S, 178°30'W, 350-357 m, 1 dd.

Remarks. — A deep-water species known from the Philippines, the Marshall Islands, and Wallis and Futuna (Moolenbeek & Röckel, 1996). First record for Fiji.

#### ***Conus sutanorcum* spec. nov.**

Pl. 4 figs 33-35, 44

Holotype. — 21044 (lv), Fiji, Viti Levu, 18°16.9'S, 178°04.3'E, 32 m [SUVA 4: Stn CP30] (pl. 4 figs 33a-b).

Paratypes. — MNHN 21045 (3 lv, 65 dd), ZMA Moll. 4.01.030 (1 lv, 6 dd), Fiji, Viti Levu, 18°16.9'S, 178°04.3'E, 32 m [SUVA 4: Stn CP30] (type locality).

Description holotype. — Shell medium-sized, moderately solid. Shape conical to broadly ovate. Spire concave. Protoconch glassy white, two nearly smooth tapering whorls. Teleoconch of 9.5 whorls. The first 3 post nuclear whorls with fine nodules gradually disappearing. Spire whorls starting with one and ending with 4 spiral grooves. Suture rather deep. Colour white with irregular axial brown markings, penultimate whorl with about 12 markings. Last whorl with about 35 spiral cords which are narrower than the axially striated interspaces. On the basal part of the whorl the interspaces are about 5 times as broad as the cords. Upper cords brown with now and then a white area in between, on lower cords the brown and white portions are nearly equal. Base white. Aperture rather slender, white with the brown lines shining through the edge.

Dimensions: Height 29.7 mm, width 13.8 mm.

Distribution. — Fiji and probably Vanuatu (Moolenbeek, in study).

Derivatio nominis. — Resembling *C. mucronatus*, hence the anagram *sutanorcum*; used as a noun in apposition.

Remarks. — At first impression these specimens resemble *Conus grangeri* Sowerby III, 1900 and *C. batheon* Sturany, 1904. However, we consider *C. grangeri* a nomen dubium since the type specimen lacks its larval shell which is essential for the identification of this group of closely related cones; *C. batheon* is endemic to the Red Sea. *Conus sutanorcum* spec. nov. shows most resemblance to *C. alabaster* Reeve, 1849 but differs in having a planktotrophic larval shell (pl. 4 fig. 44). Typical fullgrown *C. mucronatus* from the Philippines differs from the Fiji ones by being smoother (upper part of body whorl), having the spiral ribs on lower part of body whorl equal or wider than the grooves and having a more straight outline.

It is very likely that several earlier fossil records (Seeto 1998, as *C. mucronatus*; Kohn & Arua 1999a: figs 62-63, as *C. sulcatus*) refer to *C. sutanorcum* spec. nov. Ladd (1982: 75, pl. 27 figs 3-4) reported Pleistocene specimens (as *C. mucronatus* Reeve, 1843) from the New Hebrides [now Vanuatu] which agree in detail with our specimens from Stn CP1323. Röckel et al. (1995) also recorded and illustrated a

Recent specimen from Vanuatu. Their figure (pl. 46 fig. 28) shows a specimen identical in shape and sculpture to the ones from Fiji.

Other material examined. — Bligh Water: MUSORSTOM 10: Stn CP1323, 17°16.1'S, 177°45.7'E, 143-173 m, >25 dd (5 ZMA).

Viti Levu: SUVA 4: Stn CP19, 18°26.3'S, 178°04.0'E, 48-50 m, 10 lv (2 ZMA), 1 dd; Stn CP20, 18°26.4'S, 178°02.4'E, 50-51 m, 6 lv, 18 dd; Stn DW26, 18°24.1'S-178°04.8'E, 42-43 m, 3 dd.

***Conus teramachii* (Kuroda, 1956)**

Pl. 4 fig. 36

Material examined. — Lau Group: BORDAU 1: Stn CP1501, 18°40'S, 178°30'W, 350-357 m, 1 dd.

Remarks. — A range extension to the east of its known range.

***Conus tribblei* Walls, 1977**

Pl. 4 fig. 37

Material examined. — Viti Levu: MUSORSTOM 10: Stn CP1389, 18°18.6'S, 178°04.7'E, 241-417 m, 1 lv; Stn CP1390, 18°18.6'S, 178°05.1'E, 234-361 m, 1 lv.

Remarks. — First record from this area. Shells with this colour pattern are named *C. tribblei* fa. *queenslandis* Da Motta, 1984.

***Conus varius* Linnaeus, 1758**

Cernohorsky, 1964: 88; Seeto, 1998: 24.

Material examined. — Vanua Levu: BORDAU 1: Stn CP1394, 16°45'S, 179°59'E, 416 m, 1 dd.

Remarks. — This empty shell was certainly carried down slope from the sublittoral to deeper water.

***Conus* spec. A [nov.]**

Pl. 4 fig. 38

Material examined. — Bligh Water: MUSORSTOM 10: Stn CP1325, 17°16.4'S, 177°49.8'E, 282-322 m, 2 dd.

Viti Levu: MUSORSTOM 10: Stn CP1348, 17°30.3'S, 178°39.6'E, 353-390 m, 1 dd.

Remarks. — We have 3 specimens of a species resembling *C. acutangulus*, which differs in having tubercles [=strong knobs] instead of nodules [=more vague knobs, less

bounded] on the spire, in having just below the suture a row of prosocline axial threads followed by 2-3 spiral grooves, and the last whorl having rather flat cords which are broader than their interspaces. *Conus* spec. A lacks this row of prosocline axial threads, has a slightly larger larval shell and has the interspaces broader than the spiral cords. We believe this is a new species, but additional and better material is needed before we want to formally name it.

**DISCUSSION**

Two distinct faunal assemblages are present in the material studied.

Shallow-water assemblage. Twelve species are recorded from depths shallower than 100 m, most of them represented by live-taken specimens: *Conus acutangulus* (lv, 16-48 m, dd to 143 m), *C. ammiralis* (lv, 28-30 m, dd to 416 m), *C. capitaneus* (lv, 38 m), *C. corallinus* (dd, 100-122 m), *C. fijiensis* spec. nov. (lv, 80-120 m, dd to 497 m), *C. floridulus* (lv, 33 m, dd to 416 m), *C. mustelinus* (lv, 28-30 m), *C. planorbis* (lv, 28-30 m), *C. proximus* (dd, 41-135 m), *C. radiatus* (lv, 25 m), *C. saecularis* (dd, 35-50 m), *C. sutanorcum* spec. nov. (lv, 32-50 m). A further seven species can be assigned, based on their bathymetric occurrence elsewhere in the Pacific, to the shallow-water fauna, but are represented in the study material only by empty shells that have obviously been carried down-slope: *Conus articulatus* (dd, 213-416 m), *C. exiguus* (dd, 135-151 m), *C. geographus* (dd, 426-487 m), *C. insculptus* (dd, 143-173 m), *C. nussatella* (dd, 229-370 m), *C. quercinus* (dd, 229-370 m), *C. varius* (dd, 416 m).

Of these 19 species, six are new records for Fiji (*C. articulatus*, *C. corallinus*, *C. exiguus*, *C. fijiensis* spec. nov., *C. saecularis*, *C. sutanorcum* spec. nov.), including two new species.

Deep-water assemblage. Sixteen species are recorded alive from deeper than 100 m: *C. bailyei* (lv, 190-294 m), *C. boholensis* (lv, 300-430 m), *C. boucheti* (lv, 390-405 m), *C. cakobaui* spec. nov. (lv, 414-567 m), *C. capitaneus* (lv, 233-248 m, dd to 416 m), *C. fijiulcatus* spec. nov. (lv, 150-353 m), *C. gigasulcatus* spec. nov. (lv, 150-188 m, dd to 260 m), *C. ichinoseanus* (lv, 407-427 m), *C. jolivetii* spec. nov. (lv, 290-300 m, dd, 279-380 m), *C. ochroleucus* (lv, 149-168 m, dd to 234 m), *C. orbigny* (lv, 300-310 m), *C. praecellens* (lv, 255-294 m), *C. pseudorbigny* (lv, 143-144 m), *C. shikamai* (lv, 143-173 m), *C. teramachii* (lv, 656-669 m), *C. tribblei* (lv, 234-361 m). A further eight are recorded only by empty shells, but based on their bathymetric occurrence elsewhere in the Pacific, can be assigned to deep-water assemblages: *Conus* cf. *acutangulus* (dd, 322-353 m), *C. dayriti* (dd, 416 m), *C. excelsus* (dd, 229-370 m), *C. kimioi* (dd, 416-420 m), *C. plinthis* (dd, 262-266 m), *C. cf. pseudokimioi* (dd, 416 m), *C. smirna* (dd, 700-707 m), *C. sulcicastaneus* (dd, 350-357 m).

Leaving aside the two taxa of uncertain identity (identi-

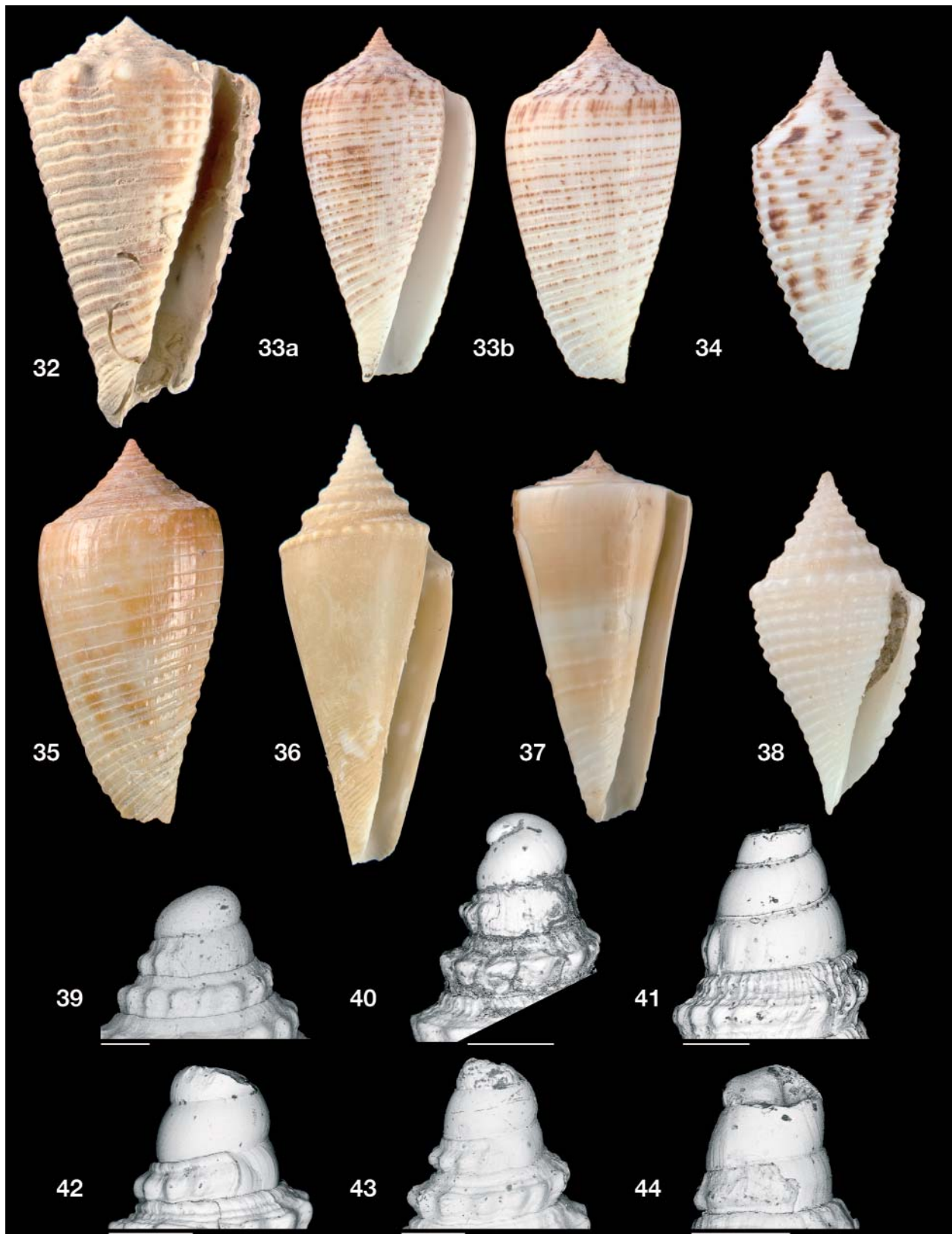


PLATE 4

**Fig. 32.** *Conus sulcocastaneus*, Lau Group, Stn CP1501, length 71.1 mm. **Figs 33a-b.** *C. sutanorcum* spec. nov., Viti Levu, holotype Stn CP30, ventral and dorsal view, length 29.7 mm. **Fig. 34.** *C. sutanorcum* spec. nov., Viti Levu, paratype Stn CP30, length 18.4 mm. **Fig. 35.** *C. sutanorcum* spec. nov., Bligh Water, paratype Stn CP1323, length 39.4 mm. **Fig. 36.** *C. teramachi*, Vanua Levu, Stn CP1413, length 52.2 mm. **Fig. 37.** *C. tribblei*, Viti Levu, Stn CP 1390, length 70.2 mm. **Fig. 38.** *C.* spec A., Viti Levu, Stn CP1348, length 17.6 mm. **Fig. 39.** protoconch paratype of *C. cakobau* spec. nov. **Fig. 40.** protoconch paratype of *C. fijiensis* spec. nov. **Fig. 41.** protoconch paratype of *C. joliveti* spec. nov. **Fig. 42.** protoconch paratype of *C. fjisulcatus* spec. nov. **Fig. 43.** protoconch paratype of *C. gigasulcatus* spec. nov. **Fig. 44.** protoconch paratype of *C. sutanorcum* spec. nov. Scale bar figs 39-44: 500 $\mu$ .

fied as *Conus* spec. A [nov.] and *C. cf. pseudokimioi*), this is a total of 22 species, and all are new records for Fiji, including four new species.

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