Samoana Medana, New Species (Gastropoda, Pulmonata: Partulidae)

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ABSTRACT

A new small (12.0 × 8.0 mm), dextral species of *Samoana* from the Marquesas Islands is described and named *Samoana medana* in honor of the discoverer of the Islands, Alvaro de Medaña. The species is found on 3 islands, Hivaoa, Tahuata, and Fatuhiva, and is added to the 6 species of *Samoana* already known from the Marquesas. The new species is characterized by its tiny size, which makes it the smallest known Partulidae; its fragile, thin, dark brown shell; and its rotundate shape.

INTRODUCTION

The land snail family Partulidae is represented in the Marquesas Islands by the single genus *Samoana* Pilsbry & Cooke, 1934, of which 6 species previously have been recognized. Listed chronologically by their dates of 1st description, these 6 species are *S. inflata* (Reeve, 1842) (found on Tahuata and Hivaoa), *S. ganymedes* (Pfeiffer, 1846) (Hivaoa), *S. decussatula* (Pfeiffer, 1849) (Nukuhiva, Hivaoa, Tahuata), *S. strigata* (Pease, 1868) (Nukuhiva, Uahuka, Fatuhiva), *S. bellula* (Hartman, 1885) (Uapou) and *S. magdalinae* (Hartman, 1885) (Fatuhiva). A 7th species, found on Hivaoa, Tahuata, and Fatuhiva, is now recognized for the Marquesas Islands. Its description follows.

SYSTEMATICS

Samoana medana, new species

Figs. 1, 3–7

Description of holotype. *Shell* of holotype (Fig. 1) dextral, very small for the family, rimate-perforate, conic, thin, fragile, translucent, dull, and uniformly dark brown in color. Surface of shell sculptured with fine spiral striae that on crossing delicate growth striae form wavy lines, resulting in a decussate pattern. There are 4½ whorls, of which the 1st 2½ are embryonic; the 1st embryonic whorl is also decussate, with spiral and transverse striae. Whorls of spire slightly convex; sutures only slightly impressed; last whorl is rotund, capacious. Shell aperture is large and ovate. Peristome white, out-curving, thin, its inner side forming a slight ledge, its outer curvature forming a broad flange. Columella simple, forming a narrow triangularly curved flap near the rimation.

Animal. The mantle is maculate, the opaque white maculae occurring on a clear, transparent background.

Genitalia (Fig. 3). Ovotestis (hermaphrodite gland, not shown) is located ½ whorl from tip of visceral mass. Ovotestis is very small, four-lobate, with a few tiny follicles. Albumen gland large; prostate gland is large and overlies pre-uterine oviduct. Uterus is inflated with a single

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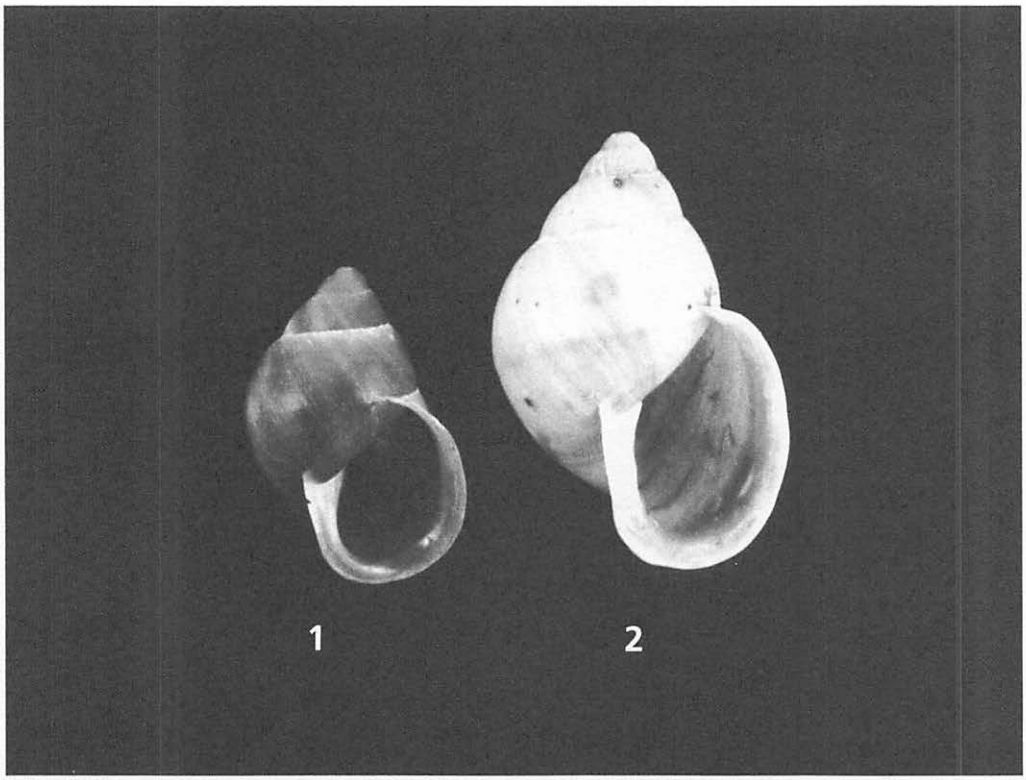


Figs. 1–2. **1,** *Samoana medana*, n. sp., holotype. **2,** *Samoana decussatula* (Pfeiffer), Tahauku Valley, Hivaoa, Bishop Museum coll. no. 1969-47.2.

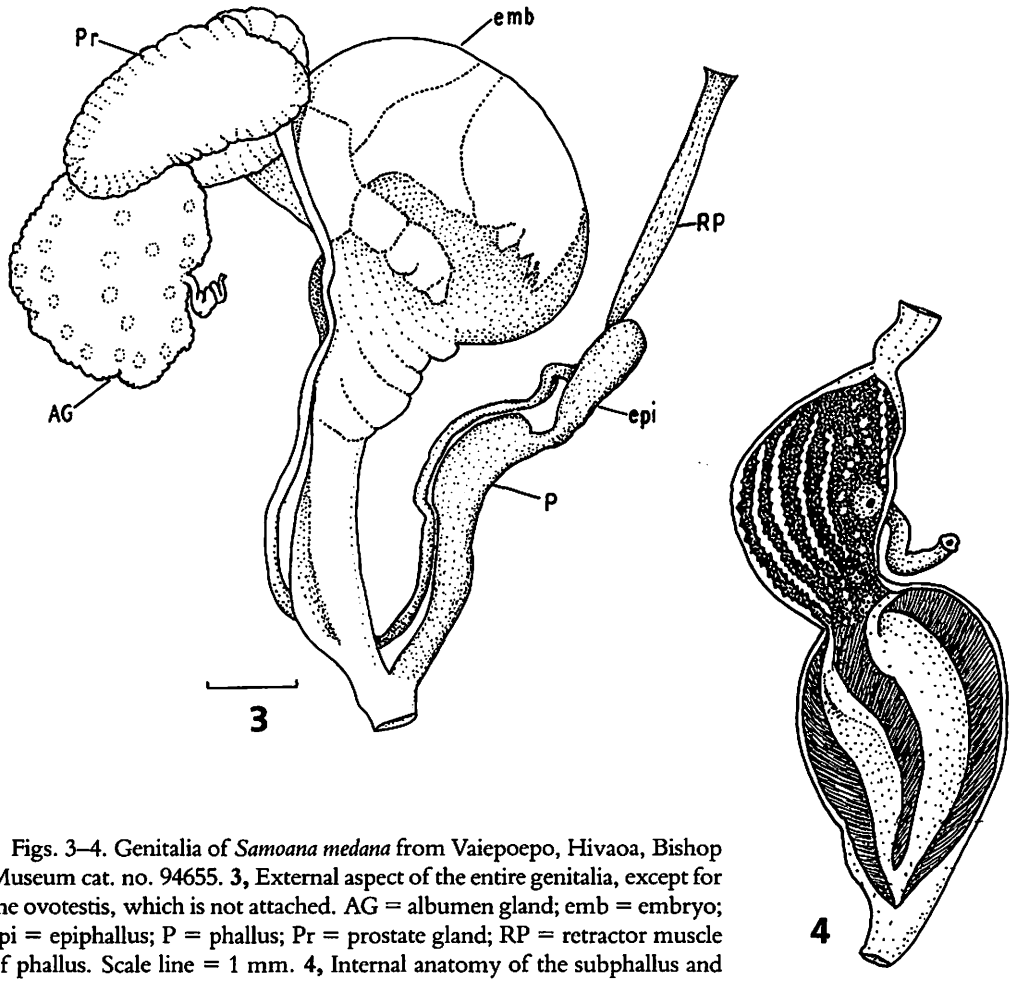
emerging embryo, its fragmenting eggshell dissolving. Spermatheca long, terminating at upper oviduct. Vagina is short. Phallus is large and long, ¾ length of oviduct. A deep pinch divides epiphallus from subphallus. Vas deferens is subterminal. Penial or phallic retractor muscle large and long; vestigial retractor (not shown in Fig. 3) conspicuously silky. It terminates at head of subphallus. Interior of phallus is shown in Fig. 4. Epiphallus ornamented with 5 or 6 vertical zigzag ridges; 1 ridge strong, others smaller, some appearing only as isolated tubercles. Subphallus has single broad, vertical, fleshy pilaster; right wing swollen and conspicuous, left wing flat.

Type data. Holotype: cat. no. 11879 ex 94655; shell size, 12 × 8 mm. Paratypes: cat. nos. 94655–94658, 11 adults. Collected by E. P. Mumford, 2.VI.1929.

Type locality. MARQUESAS IS: Hivaoa I: Vaiepoepo, on shrubs, 710–732 m (2,330–2,400 ft). Other localities on Hivaoa: Kapaafaa, Tepuna, Teipunui, Maunaofefe, Temetiu, Kaava, and Ootua, 610–1,158 m (2,000–3,800 ft), on *Freycinatia*, *Metrosideros*, *Weimannia*, and other native plants, collected by the Bishop Museum's Pacific Entomological Survey (PES). *Samoana medana* has been found also on Tahuata (4 populations) and Fatuhiva (8 populations).

Remarks. The Bishop Museum has 301 adult *Samoana medana*, as follows: Hivaoa, 153 specimens (145 collected by PES in 1929, 8 by Kondo in 1969); Tahuata, 63 specimens collected by PES; Fatuhiva, 85 specimens (12 by PES, 73 by Kondo).

Samoana medana is named for Alvaro de Medaña, who discovered the Marquesas Islands in



Figs. 3–4. Genitalia of *Samoana medana* from Vaiepoepo, Hivaoa, Bishop Museum cat. no. 94655. **3,** External aspect of the entire genitalia, except for the ovotestis, which is not attached. AG = albumen gland; emb = embryo; epi = epiphallus; P = phallus; Pr = prostate gland; RP = retractor muscle of phallus. Scale line = 1 mm. **4,** Internal anatomy of the subphallus and epiphallus.

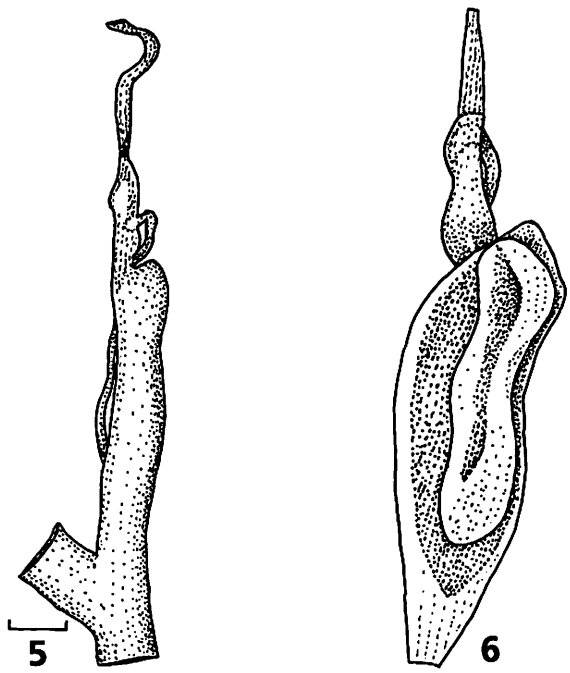
1595.[3] This name was suggested to Dr. Charles Montague Cooke, Jr., by Henry A. Pilsbry, who had inspected specimens and agreed with Cooke that this was a distinct, undescribed species.

COMPARISONS OF POPULATIONS OF *SAMOANA MEDANA*

Shells

Comparisons of the shells of the various populations were made by randomly selecting 6 specimens from each colony, counting their whorls, and measuring the shells' lengths and

3. Medaña named the islands Las Islas de Marquesas de Mendoza in honor of the Viceroy of Peru. Medaña gave the following names to his discoveries: Magdalena (Fatuhiva), Santa Christina (Tahuata), Dominica (Hivaoa), and San Pedro (Motane) (Buck 1953).



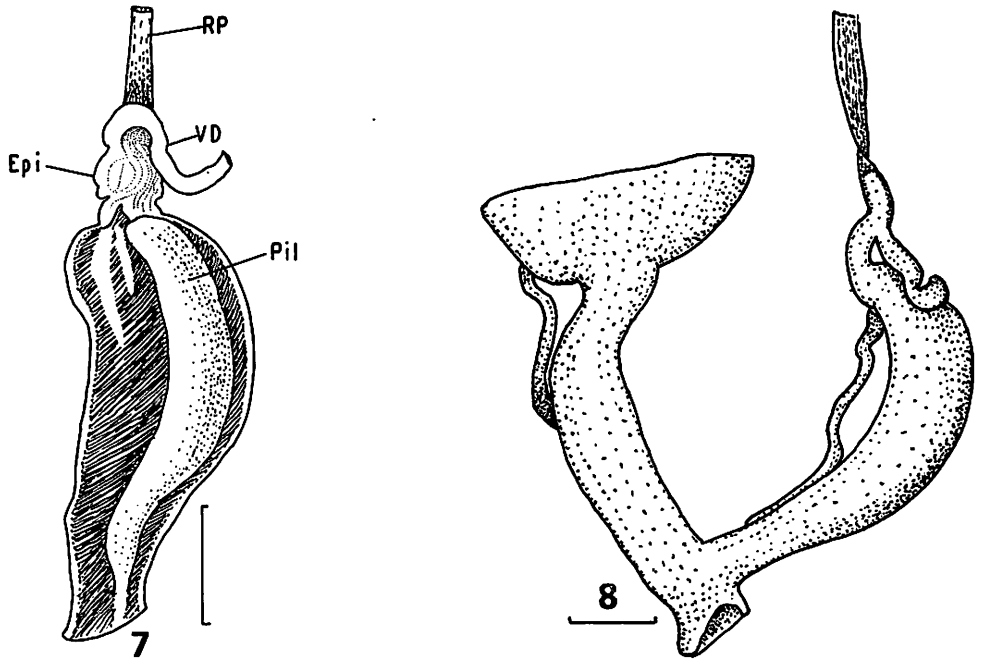
Figs. 5–6. Phallus of *Samoana medana* from Vaitupaahei, Tahuata, Bishop Museum cat. no. 99823. **5,** External view. **6,** Internal aspect of subphallus. Scale line = 1 mm.

widths. For example, for the Vaiepoepo population, from which the Bishop Museum has 17 specimens, measurements for the 6 selected specimens are as follows:

Whorls	*Dimensions (mm)*
4⅓	11 × 8
4½	12 × 8
4½	12 × 8
4½	12 × 8 (median)
4½	12 × 8 (holotype)
4⅓	12 × 8

Here, the median specimen had 4½ whorls and measured 12 × 8 mm. Measurements of the median specimens selected the same way from the other 7 Hivaoan populations are as follows:

Location	*Whorls*	*Dimensions (mm)*
Kapaafaa	4½	11 × 8
Tepuna	4½	13 × 9
Teipunui	4½	13 × 9
Maunaofefe	4½	13 × 8
Temetiu	4½	13 × 8
Kaava	4½	13 × 8
Ootua	4½	13 × 9



Figs. 7–8. **7,** Internal aspect of the subphallus of *Samoana medana* from Mt Upe, Fatuhiva, Bishop Museum coll. no. 1969-4. Epi = epiphallus; Pil = pilaster; RP = retractor of phallus; VD = vas deferens. **8,** Lower genitalia of *Samoana decussatula* from Tahauku Valley, Hivaoa, Bishop Museum coll. no. 1969-4. Scale line = 1 mm.

A summary of median shell measurements of *Samoana medana* for the 3 islands (Hivaoa, 8 populations; Tahuata, 4; Fatuhiva, 8) is as follows:

Location	*Range (mm)*	*Median (mm)*
Hivaoa	11 × 8–14 × 10	13 × 8
Tahuata	10 × 7–15 × 10	12 × 7
Fatuhiva	12 × 8–14 × 10	13 × 9

The average shell measurement from these median figures is 12.6 × 8 mm.

Phallic Anatomies

As a supplement to the description of the genitalia of *Samoana medana*, the following comparisons of the phalluses of specimens from the 3 islands are given.

In specimens from Hivaoa (Figs. 3, 4), a vertical slit the length of the phallus (Fig. 4) reveals the internal characteristics of the subphallus and epiphallus. In the subphallus, a vertical double-winged, fleshy, white pilaster is attached solidly to the penial sheath. The right wing of the pilaster is larger and is incurved to form a shallow median concavity. The left wing is thinner, its edge forming a thin flap. In the epiphallus, small vertical ridges attach to the epiphallic sheath. These subphallic and epiphallic structures are considered to be stimulator-papillae.

In specimens from Tahuata (the island closest to Hivaoa), the phallus (Figs. 5, 6) is similar to that found in Hivaoan specimens, but the epiphallus is shorter and smaller and the pilaster

of the subphallus is not as elaborate. In specimens from Fatuhiva (an island more distant from Hivaoa), the epiphallus (Fig. 7) is very short, and the right wing of the subphallic pilaster is well developed, but the left wing is smaller, indicating that some degeneration may be taking place. The phalluses (not shown) of the 2 specimens from Hivaoa dissected (Ootua, Bishop Museum coll. no. 1969-41) were like those observed in the Vaiepoepo specimens.

It is concluded that the differences in the phalluses among the populations of the 3 islands are too slight to warrant insular subspecific designations.

Comparisons with Other Marquesan *Samoana* Species

The simplest way to describe *Samoana medana* is as a minature *S. decussatula* (Pfeiffer) (Fig. 2), the species from which it could have evolved. The 1930 collections of Guilliaume Le Bronnec for PES from Tahuata were arranged according to size by Dr. Cooke to illustrate this concept:

S. medana, small to very small, 10 × 7 to 12 × 7 mm, 609–823 m (2,000–2,700 ft).

S. medana, medium to large, 12 × 8 to 15 × 10 mm, 313–732 m (1,028–2,400 ft).

S. decussatula, very large, 15 × 9 to 18 × 12 mm, 313–533 m (1,028–1,750 ft).

There appears to be a slight gradation in size in conjunction with altitude. The melding point in size (perhaps of no significance) appears to be 15 × 9 mm.

The number of whorls and shell dimensions of the Marquesan species of *Samoana* are given here to illustrate the differences in these conchological characters between *S. medana* and the other 6 species. (The average dimensions of the Marquesan species are from 2–3 samples of each species given in Pilsbry [1909, 169–75].)

Species	*Whorls*	*Average dimensions (mm)*
S. inflata	5½	22.0 × 16.8
S. ganymedes	5½	21.6 × 11.6
S. strigata	4¾	19.7 × 11.8
S. bellula	4½	14.9 × 9.7
S. decussatula	4¼	15.5 × 9.6
S. magdalinae	4½	14.0 × 10.3
S. medana	4¼	12.6 × 8.0

It should be noted that *S. medana* is the smallest known Partulidae.

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LITERATURE CITED

Adamson, A.M. 1939. Review of the fauna of the Marquesas Islands and discussion of its origin. Bernice P. Bishop Mus. Bull. 159. 93 p.

Buck, P.H. 1953. Explorers of the Pacific. Bernice P. Mus. Spec. Publ. 43. 135 p.

Kondo, Y. 1955. A revision of the family Partulidae (Gastropoda, Pulmonata). Ph.D. thesis, Harvard Univ. 218 p., 33 pls.

——. 1968. Partulidae: Preview of anatomical revision. Nautilus 81(3): 73–77.

——. 1970. Some aspects of Mariana Islands Partulidae (Mollusca, Pulmonata). Occas. Pap. Bernice P. Bishop Mus. 24(5): 73–90.

——. 1973. *Samoana* of the Society Islands (Pulmonata: Partulidae). Malacol. Rev. 6: 19–33.

——. 1980. *Samoana jackieburchi*, new species (Gastropoda: Pulmonata). Malacol. Rev. 13: 25–32.

Pilsbry, H.A. 1909. *Caecilioides*, *Glessula* and Partulidae. Manual of Conchology. Vol. 20, i–iii, 1–336, pls. 1–43. Conchological Department, Academy of Natural Sciences of Phildelphia.

Pilsbry, H.A. & C.M. Cooke, Jr. 1934. Partulidae of Tonga and related forms. Occas. Pap. Bernice P. Bishop Mus. 10(14): 13–22.