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A NEW SPECIES OF LAND SNAIL (STYLOMMATOPHORA: PARTULIDAE) FROM RAIATEA, FRENCH POLYNESIA, OCEANIA[1]

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ABSTRACT – A newly discovered land snail species, *Partula meyeri* n. sp., of the highly threatened South Pacific pulmonate gastropod family Partulidae, is described for Raiatea, one of the Society Islands, French Polynesia. This species is distinct from other members of its family by the morphology of its shell, which is thin and translucent, both characteristics similar to most members of the partulid genus *Samoana*. However, molecular data, to be published in a separate paper, show *P. meyeri* to belong to the genus *Partula*. Other distinguishing characters of the shell of *P. meyeri* are its relatively short, attenuate spire, correspondingly large body whorl, and—in combination with the other characters—its brown shade of coloration and expanded but thin peristome.

Key words: *Partula meyeri*, Partulidae, Stylommatophora, Raiatea, Society Islands, French Polynesia.

INTRODUCTION

Raiatea is one of the islands in the Leeward Group of the Society Islands (Fig. 1), French Polynesia, and is known as the island richest in number of species of the Oceanic land snail family Partulidae. Nearly 50 nominal partulid species have been ascribed to this island since the first species, *Partula faba* (obtained during Capt. James Cook's visit to the island in 1769; see Garrett, 1884) was figured by Thomas Martyn in 1784, and again in 1789. Of the various subsequent publications that have included Raiatean partulid snails, those naming new species, or significantly dealing with taxonomy, were by Broderip (1832), Pease (1864, 1866), Garrett (1884), Pilsbry (1909), Crampton & Cooke (1953) and Crampton (1956). Garrett recognized 20 species (and several "varieties") of *Partula*, while placing 46 *nomina* into synonymy. Pilsbry recognized 16 species (and eight subspecies). Since then, 13 additional species have been added to the Raiatean partulid fauna (Crampton & Cooke, 1953; Crampton,

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1956). Subsequently, Kondo (1968) had begun studying Raiatean Partulidae, but other than presenting a list of 34 species that he considered valid (all but six of which he dissected and observed the soft anatomy), he did not live to finish his work. Kondo recognized 13 of Pilsbry's (1909) species, five of Pilsbry's subspecies (as species), and resurrected one species from Pilsbry's synonymy. Kondo accepted all of Crampton & Cooke's, and Crampton's, species.

Considering this early taxonomic activity, it seemed unlikely that a species could have missed notice, especially by such an ardent collector as Garrett, who lived close-by on Huahine for many years, or to have remained undetected by the predatory snail, *Euglandina rosea* (Férussac), which in recent years has decimated the land snail fauna of Raiatea and other islands of French Polynesia (as well as land snails on more distant Pacific islands). Nevertheless, in 2006, Jean-Yves Meyer discovered, during a botanical survey on Raiatea, a partulid species still extant and not previously described. The purpose of this article is to describe this newly discovered species.

Partula meyeri, **new species**

(Figs. 2, 3a)

Description of holotype. The shell has a conical, evenly descending spire, evenly rounded whorls, and a relatively large aperture, the length of which is about 2/3 of the total shell length. The aperture is edentate, surrounded by a moderately expanded, only slightly thickened, lighter colored, peristome. The peristome is incomplete, not continuing on the parietal side. The color of the shell is brown. The shell is thin, translucent, allowing the melanin pigment pattern of the mantle to be clearly visible through the shell. The whorls are moderately rounded, and separated by modestly indented sutures. There is an umbilical chink formed by the expanded columellar lip, but no further opening. The shell surface is marked with close-set, prominent, indented, spiral striae, stronger on the penultimate and antepenultimate whorls, but becoming weaker on the ultimate whorl, except on the base (the umbilical area).

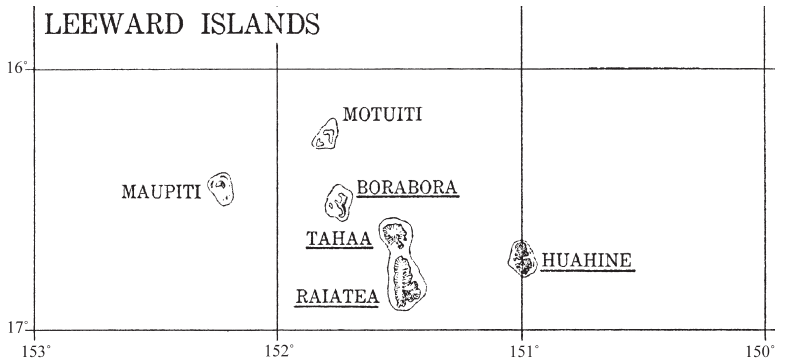

Fig. 1. Map of the leeward islands of the Society Islands, French Polynesia. Underlined names indicate islands inhabited by Partulidae. (From Crampton, 1932).

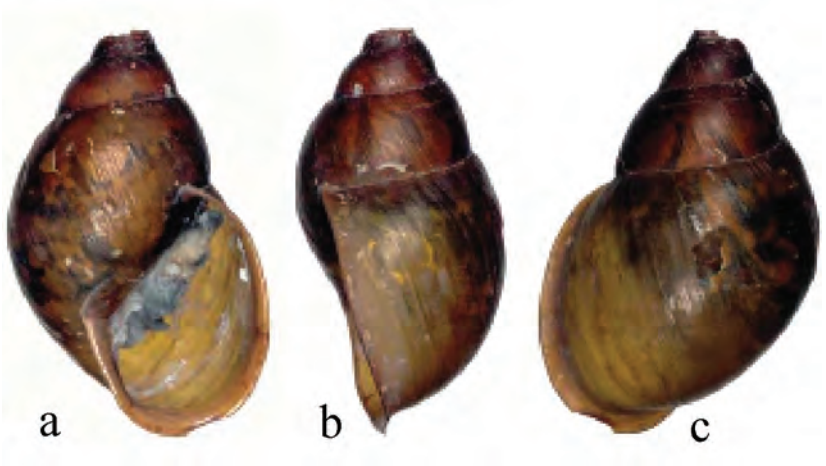

Fig. 2. Three views of *Partula meyeri*, n. sp., BPBM 255947.

The tip of the shell spire is broken, but other than a small hole and crack on the dorsal body whorl and a small chip off the anterior peristome, the shell is rather well preserved. Extrapolating for the broken tip of the spire, the shell measures approximately 16.5 mm in length and 10.5 mm in width.

The lower sides of the foot of the preserved animal are medium gray. The more dorsal sides of the foot, and the head, are paler gray. The mantle, as seen through the translucent shell, is mottled with black pigment alternating with white or very pale irregular blotches and stripes. The white markings are more prominent than the melanin blotches and stripes on the upper whorls.

Type material. This detailed characteristics of this species at present is known only from the holotype. The shell contains the contracted animal, fixed and preserved in 95% ethanol. The specimen (catalog number BPBM 255947) is deposited in the collections of the Bernice Pauahi Bishop Museum, Honolulu, Hawaii, which houses the premier collection of alcohol-preserved (65% ethanol) Partulidae.

Habitat. The holotype and two other specimens were collected in a wet gulch at about 950 meters elevation on the highest summit of the island of Raiatea, Mount Tefatua (Toomaru), French Polynesia, by Jean-Yves Meyer.

Diagnosis. This species of *Partula* has a conical spire, evenly rounded whorls, and a brown, translucent shell with whorls terminating in a large, oval aperture (2/3 the shell length) that has a thin, expanded peristome.

Comparisons. There are no other species that closely compare to *Partula meyeri* on Raiatea. Thirty-two species of the Raiatean *Partula* have thick, opaque shells, with thickened, reflected apertural lips (members of the "*dentifera*," "*hebe*," and "*faba*" species groups of Pilsbry (1909); see Fig. 3f, g, h). Among the other species of Raiatean shells, *Partula turgida* (Pease) has a thin shell with expanded apertural lip, but its shape is globose and its color is tan (Fig. 3b). *Partula tristis* Crampton & Cooke has a twisted columella, flat-sided whorls, and smaller body whorl (Fig. 3e). The other partulid shells that

resemble the shell of *P. meyeri* are the three closely related species of *Samoana*, *S. dryas* (Crampton & Cooke), *S. hamadryas* (Crampton & Cooke), and *S. oreas* (Crampton & Cooke) from Raivavae Island in the Australs (Crampton & Cooke 1953). In comparing *"Partula" dryas* with the only other partulid

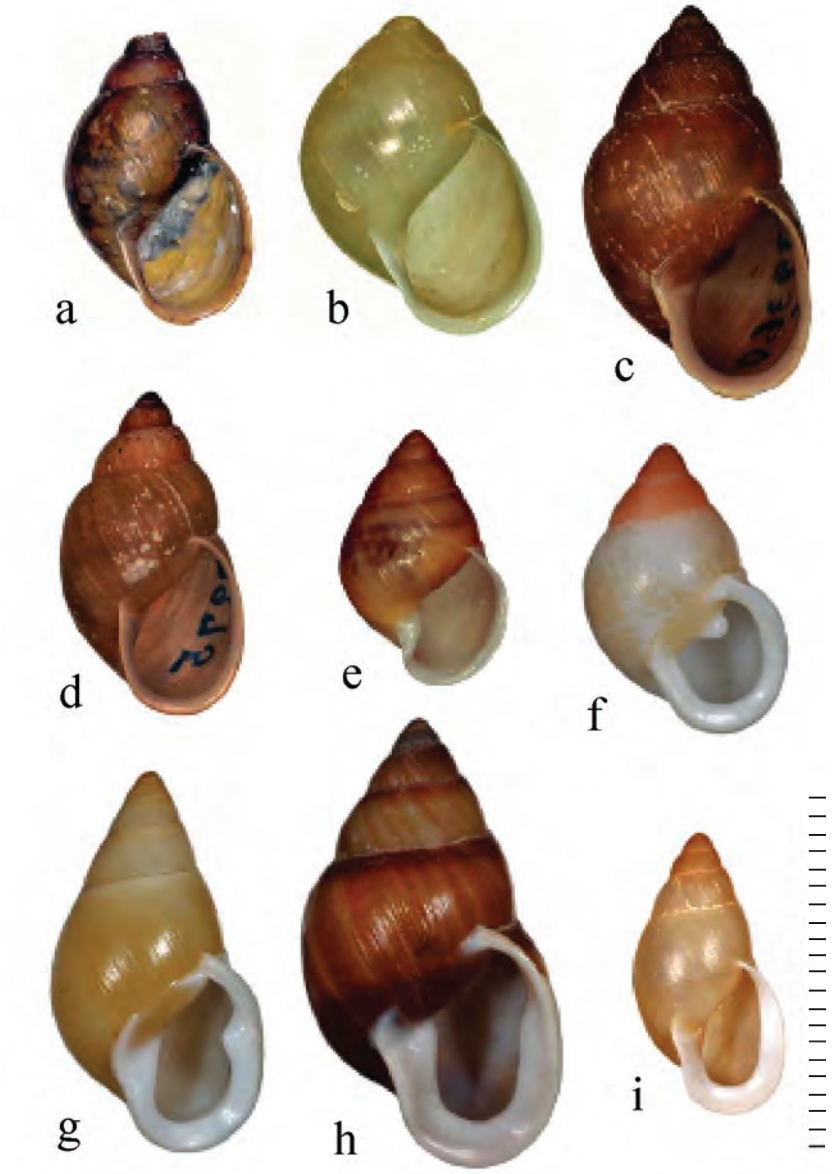

Fig. 3. Partulidae of Raiatea, X2.5. **a**, Holotype of *Partula meyeri* n. sp., BPBM 255947; **b**, *P.* (*Leptopartula*) *turgida* (Pease), holotype, Museum of Comparative Zoology; **c**, *P. labrusca* Crampton & Cooke, BPBM 139360; **d**, *P. dolorosa* Crampton & Cooke, BPBM 9975; **e**, *P. tristis* Crampton & Cooke, UMMZ 300629; **f**, *P. hebe* Pfeiffer, UMMZ 14018; **g**, *P. dentifera* Pease, UMMZ 14053; **h**, *P. faba* (Gmelin), UMMZ 175703; **i**, *Samoana attenuata* (Pease), UMMZ 41287. Scale line in mm.

species of Raivavae, Crampton & Cooke (1953) state, "the shell of *dryas* is much thinner, the lip is far less thickened, the whorls are more convex, and the suture is deeper. … *Partula dryas* more closely resembles the members of a widely distributed group that includes *P. attenuata* of Raiatea, Tahiti, and Bora Bora, as well as *P. annectens* of Huahine, *P. clara* of Tahiti, and *P. fragilis* of the far-distant island of Guam, in the Marianas. All of these species possess thin and translucent shells and greatly attenuated lips … ." And these are the same shell characteristics that define *P. meyeri*. All three of these Raivavaean species are now included in the genus *Samoana* by soft anatomy (Kondo, 1968), but *P. meyeri* belongs not to *Samoana*, but to the genus *Partula*, as determined by molecular data (to be published in a forthcoming paper).

In comparison to *Partula meyeri*, the Tahitian *P. clara* Pease has a less attenuate spire, the shell is pale yellowish-corneous in color rather than brown, over which is often marked darker transverse streaks. Also, the shell aperture of *P. clara* is proportionately smaller, and the umbilicus, although narrow, is more open than in *P. meyeri.*

Etymology: This species is named in honor of its discoverer, Jean-Yves Meyer.

DISCUSSION

The two authors that were the most active in describing partulid species of Raiatea were Pease (1864, 1866) and Crampton (Crampton & Cooke, 1953; Crampton, 1956). Between them, they named 25 of the Raiatean species. Crampton's shell descriptions were detailed, but those of Pease, who had never visited the island, were meager at best, in Latin, without figures, and with little or no other pertinent information, including the specific islands on which the species were first collected (by Garrett). Garrett (1884) later gave a good account of the partulid snails on Raiatea, including their distributions as he knew them. The last taxonomic treatment of the Raiatean Partulidae was by Pilsbry (1909), who also had never visited Raiatea, but was a much better taxonomist than Pease. Pilsbry divided the then known Partulidae of Raiatea—and neighboring Tahaa (contained within the same fringing coral reef)—into two basic groups, which he called "sections," which are roughly equivalent to subgenera in today's nomenclatural practice. These two sections, very unequal in size, he formalized with names, "section *Leptopartula* n. sect." for *Partula arguta* Pease of Huaheine, and *P. turgida* Pease of Raiatea, and "section *Partula s.str.*" for the other species of Raiatea and Tahaa. For the distinguishing features of *Leptopartula,* Pilsbry gave the following: "The shell is ovate with short spire, and composed of few (4 to 4½) whorls; very thin, fragile and somewhat transparent, pale; aperture large, ovate; lip expanded, not thickened. Type *P. arguta*. Two species, the most fragile of the genus, compose this section, which is confined to Huaheine and Raiatea." All of Pilsbry's *Partula s.str.* species, in contrast to the two species of *Leptopartula*, have thicker, sturdier, opaque shells, with relatively smaller apertures and thicker apertural lips.

Pilsbry (*loc. cit.*) further divided the Raiatean-Tahaan *Partula s.str.* into

three groups based on shell morphology and habitat, the "*dentifera*," "*hebe,*" and "*faba*" groups (see Fig. 3f, g, h). The *P. dentifera* group (see Fig. 3g) he characterized as being arboreal, and having shells usually light in color, with apices being yellow, white, pink or purple, and "lip white, thickened within, more or less strongly toothed within the outer lip and excised above the tooth; columella and parietal wall often toothed." Species of the *P. hebe* group (see Fig 3f) are "rather small forms [in which] the spiral striae are usually somewhat better developed than in most Raiatean species." These speces are arboreal (except for *P. crassilabris* Pease which is a ground species), or live on small bushes. Species of the Raiatean *P. faba* group live on the ground, or near the ground "on the lower parts of the trunks of trees." Pilsbry did not characterize the *P. faba* group morphologically, but included in it six Raiatean species: *P. faba* (Martyn) (Fig. 3h), *P. auriculata* Broderip, *P. fusca* Pease, *P. lugubris* Pease, *P. navigatoria* (Pfeiffer), and *P. radiata* Garrett.

The defining anatomical differences between *Partula* and *Samoana* are found in the male genitalia (Pilsbry & Cooke, 1934): "The essential character of *Samoana* is that there is a well-developed epiphallus with terminal retractor muscle. In other Partulidae examined, the *vas deferens* is not continued beyond the apex of the penis, but proceeds directly to the anterior or basal end, either from an apical insertion, as in *Eua*, or from a point below the apex, as in *Partula* proper; and it has no connection with the penial retractor." The distinction between *Samoana* and *Partula* has been corroborated by Kondo (1968, 1973, 1980) and Kondo & Burch (1989).

On casual observation of the shell of *Partula meyeri*, I initially thought it was yet another species of the subgenus *Leptopartula*, or perhaps a species of the partulid genus *Samoana*, a group of species with anatomical differences from *Partula*, and characterized (with only several exceptions) by thin, translucent shells. However, molecular results showed otherwise; *P. meyeri* is clearly a *Partula*, not a *Samoana*, and it is conchologically distinctly different from other Raiatean members of the genus *Partula*.

Only three specimens of *Partula meyeri* were found during four days of collecting. The area where they were found is difficult to access, which makes future collecting on the mountain problematic (Meyer, personal communication). For that reason, and because of the convenience of having a scientific name for this species for the forthcoming papers being produced by our concurrent molecular studies on the Pacific islands endemic family Partulidae, I am naming this species, even though there is as yet only three specimens known, two of which are still in the wild.

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