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A REVIEW OF THE LAND SNAILS OF MONA ISLAND,
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UNIVERSITY OF FLORIDA

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A REVIEW OF THE LAND SNAILS OF MONA ISLAND, WEST INDIES

FRED G. THOMPSON*

ABSTRACT

The fauna consists of 24 species and subspecies. Nine taxa are endemic to the island, four are related to species on Puerto Rico, and three are related to species on Hispaniola. The biogeographic relationships of two are less clear. Thirteen species are regarded as introduced. The remaining nonendemic native species show mixed affinities with Puerto Rican and Hispaniolan taxa.

The following new taxa are described from Mona Island: Stoastomops grada new species, Varicella (Sigmataxis) nesiotes new species, Microceramus stenegrus new species, Hojeda insularis eurytrema new subspecies, and Plagioptycha musicola fortisculpta new subspecies. Hojeda i. insularis new species is described from the satellite island of Monita. The following is a new name combination: Drymacus virgulatus beattyi for D. elongatus beattyi Clench.

RESUMEN

La fauna de la Isla Mona consiste de 24 especies y subespecies. Nueve taxones son endémicos a la isla. Cuatro están emparentados con especies de Puerto Rico y tres con especies de Hispaniola. Las relaciones biogeográficas de dos de las especies no son muy claras. Trece especies se consideran introducidas. Las restantes especies nativas no endémicas muestran afinidades tanto con taxones de Puerto Rico como de Hispaniola. Se describen los siguientes taxones para la Isla Mona: Stoastomops grada nueva especie, Varicella (Sigmataxis) nesiotes nueva especie, Microceramus stenegrus nueva especie, Hojeda insularis eurytrema nueva subespecie, y Plagioptycha musicola fortisculpta nueva

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subespecie. La nueva subespecie, Hojeda i. insularis se describe para la isla satélite de Monita. La siguiente es una nueva combinación: Drymaeus virgulatus beattyi en vez de D. elongatus beattyi Clench.

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INTRODUCTION

In 1972 studies on the flora, fauna, and mineral resources of Mona Island were initiated because of proposed economic developments and a proposed national park on the island (Wadsworth 1975). I visited the island for four days during May 1974 to survey the land snail fauna. A second visit of three days was made during November 1978 for the same purpose. Both visits were at the height of long dry periods, and only dead shells of most species were found.

Mona Island lies in the Mona Passage about halfway between Puerto Rico and Hispaniola at 18°06'N, 67°55'W. It is a small, bean-shaped desert island about 11 km long by 7 km wide. The island is capped by the Miocene Lirio Limestone, which is rugged and dog-toothed. This overlays the middle or lower Miocene Isla de Mona Dolomite (Aaron 1975). The island is bordered on all sides by abrupt cliffs that rise about 45

m high. The island is bounded along its southern and western sides by narrow Holocene coastal plains that were inhabited by Taino Indians at the time of Columbus. It has been inhabited intermittently by settlers since then. Apparently the name of the island is derived from the Taino name Amona and not from the Spanish mona, meaning monkey (Wadsworth 1975).

The island plateau is covered with a dense submesic scrub thorn forest similar in floral composition to that of other low-lying limestone islands in the West Indies (Woodbury 1975). This thorn forest contains scattered patches of mesic high forest toward the center of the island and a narrow fringe of low xeric scrub along the north and east edges of the plateau. The coastal plains generally are covered with submesic thorn forests. Along the southwestern base of the plateau, near Sardinero (Station 3), grows a narrow fringe of wet evergreen forest fed by ground-water seepage from the cliffs.

FIELD STATIONS

Mollusk collections were made at thirteen field stations (Fig. 1). A brief description of each follows.

STATION 1. Slopes and bluff behind Sardinero, amid limestone boulders and along cliff. Mesic forest.

STATION 2. Base of limestone cliff at Sardinero in an area with a high mesic forest.

STATION 3. Base of limestone cliff at Sardinero in high mesic forest with patches of wet evergreen forest.

STATION 4. Punto Oeste, among grasses over sandy soil on low coastal plain.

STATION 5. Coastal plain near landing field. Snails collected on grasses and shrubs over sandy soil.

STATION 6. Uvero. Snails collected on grasses and shrubs over sand-gravel soils in a submesic thorn forest.

STATION 7. Talus slope 1 km E of Uvero in a submesic thorn forest.

STATION 8. Limestone cliffs east of Uvero along road-cut. Area covered with a dense submesic thorn forest.

STATION 9. Playa Pajaro. A submesic forest with dense thickets of Manchanilla. Cliffs with clusters of small bromeliads and cactae. Snails were collected from debris and loose soil at the base of cliff.

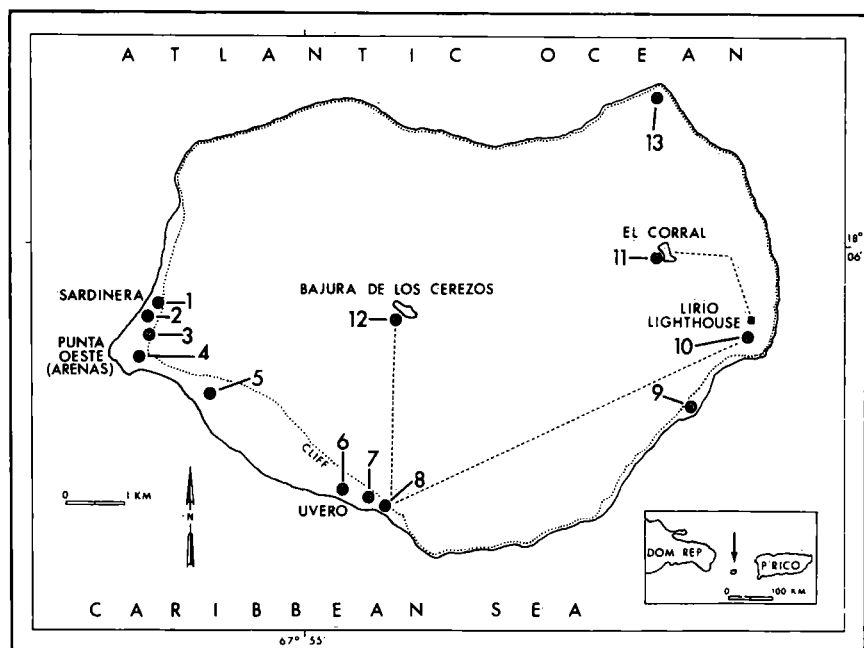


FIGURE 1.- Map of Mona Island showing major physical features, and stations from which specimens were collected.

STATION 10. Lirio Lighthouse. Snails collected at night on shrubs and small trees in submesic forest.

STATION 11. Coral de Los Indios, 1.3 km NE of Lirio Lighthouse. A high mesic forest.

STATION 12. Bajura de Los Cerezos. A limestone depression with a clay-soil substrate in a high mesic forest.

STATION 13. Cabo Norte. An area of low sparse xeric scrub on rugged dog-toothed limestone.

Specimens were also collected along transects from Station 8 to Station 10 and from Station 10 to Station 12.

ACKNOWLEDGEMENTS

Financial support for field work on Mona Island was provided by the U.S. Fish and Wildlife Service contracts No. 14-16-0008-785 and No. 85910-0339. Field work in Puerto Rico essential to this project was sponsored by the Florida State Museum. The U.S. Coast Guard Service at Aguadilla, Puerto Rico, through arrangements made by the U.S. Fish and Wildlife Service, provided helicopter transportation to Mona and Monita islands. The following persons assisted me in field work on Mona Island: Howard W. Campbell, Steven P. Christman, Ronald I. Crombie, and Thomas A. Wiewandt. George M. Davis (Academy of Natural Sciences, Philadelphia), Joseph Rosewater (National Museum of Natural History), and Ruth D. Turner (Museum of Comparative Zoology) loaned me specimens in their charges and handled other queries relating to this study. The illustrations of the island map (Fig. 1), and of *Microceramus* (Figs. 32-36) were skillfully executed by Nancy Halliday, Gainesville, Florida. Wendy Zomlefer, Florida State Museum, Staff Artist, rendered the excellent illustrations of *Hojeda*. Kurt Auffenberg, Florida State Museum Biologist, produced the SEM photographs used in this paper and did many other tasks essential for the completion of the project. I am deeply grateful to all of the above persons for their help.

THE MOLLUSCAN FAUNA

The land snail fauna of Mona Island was first reported upon by Clench (1950), based upon collections made by Harry Beatty and given to the Museum of Comparative Zoology (Harvard University), and upon collections made by Paul Bartsch and deposited in the National Museum of Natural History (Washington, D.C.). Clench recorded 15 species and subspecies from the island. These are listed below along with the taxa found during the present survey.

| Clench (1950) | This report |
|--|---|
| <u>Lucidella umbonata</u> (Shuttl.) | = <u>Helicina umbonata pitheca</u> Thompson |
| <u>Stoastomops puertoricensis</u> Baker | = <u>Stoastomops grada</u> new species |
| <u>Chondropoma turnerae</u> Clench | = <u>Licina aguadillensis turnerae</u> (Clench) |
| - | <u>Gastrocopta rupicola marginalba</u> |
| - | (Pfeiffer) |
| - | <u>Gastrocopta pellucida</u> (Pfeiffer) |
| <u>Cerion monaensis</u> Clench | <u>Cerion monaensis</u> Clench |
| <u>Guppya gundlachi</u> (Pfeiffer) | <u>Guppya gundlachi</u> (Pfeiffer) |
| <u>Habroconus</u> sp. | absent |
| - | <u>Cecilioides aperta</u> (Swainson) |
| - | <u>Obeliscus</u> sp. |
| - | <u>Obeliscus swiftianus</u> (Pfeiffer) |
| - | <u>Subulina octona</u> (Brug.) |
| <u>Lamellaxis micra</u> (Orbigny) | <u>Lamellaxis micra</u> (Orbigny) |
| - | <u>Opeas pumilum</u> (Pfeiffer) |
| - | <u>Varicella nesiotis</u> new species |
| <u>Bulimulus g. guadelupensis</u> (Brug.) | absent |
| <u>Bulimulus g. eyriesi</u> (Drouet) | absent |
| - | <u>Bulimulus d. diaphanus</u> (Pfeiffer) |
| <u>Drymaeus elongatus beattyi</u> Clench | = <u>Drymaeus virgulatus beattyi</u> Clench. |
| <u>Brachypodella beattyi</u> Clench | <u>Brachypodella beattyi</u> Clench |
| <u>Microceramus guanicanus</u> Baker | = <u>Microceramus stenegrus</u> new species |
| <u>Hojeda inaguensis</u> (Weinland) | <u>Hojeda inaguensis</u> (Weinland) |
| - | <u>Hojeda insularis eurytrema</u> new |
| - | subspecies |
| - | <u>Thysanophora plagioptycha</u> (Shuttl.) |
| <u>Hemitrochus gallopovonis</u> (Pfeiffer) | <u>Hemitrochus gallopovonis</u> (Pfeiffer) |
| <u>Plagioptycha euclasta</u> (Shuttl.) | = <u>Plagioptycha musicola fortisculpta</u> new |
| | subspecies |

The biogeographic affinities of the Mona Island land snail fauna are summarized in Table 1. The nine species considered to be introduced onto the island by humans are mainly small forms, widely distributed in the West Indies and elsewhere, and characteristically are associated with tropical fructiculture. Three other species, *Habroconus* sp., *Obeliscus swiftianus*, and *Bulimulus d. diaphanus*, also may be human-introduced but are more restricted in their present distribution around Puerto Rico and the Virgin Islands. The remaining 12 species are considered to be natural

Table 1. Biogeographic relationships of the land snail fauna of Mona Island.

| Species | Endemic | Puerto Rico | Hispaniola | Widespread Introduced |
|---|---------|-------------|------------|-----------------------|
| <i>Helicina umbonata pitheca</i> | + | + | | |
| <i>Stoastomops grada</i> | + | + | | |
| <i>Licina aguadillensis turnerae</i> | | + | | |
| <i>Gastrocopta rupicola marginalba</i> | | | | + |
| <i>Gastrocopta pellucida</i> | | | | + |
| <i>Cerion monaensis</i> | + | | + | |
| <i>Guppya gundlachi</i> | | | | + |
| <i>Habroconus</i> sp. | | + | | ? |
| <i>Ceciliodes aperta</i> | | | | + |
| <i>Obeliscus</i> sp. | | | + | ? |
| <i>Obeliscus swiftianus</i> | | + | | |
| <i>Subulina octona</i> | | | | + |
| <i>Lamellaxis micra</i> | | | | + |
| <i>Opeas pumilum</i> | | | | + |
| <i>Varicella nesiotis</i> | + | | + | |
| <i>Bulimulus d. diaphanus</i> | | + | | ? |
| <i>Drymaeus virgulatus beattyi</i> | + | + | | |
| <i>Brachypodella beattyi</i> | + | | + | |
| <i>Microceramus stenegrus</i> | + | + | | |
| <i>Hojeda inaguensis</i> | | | + | |
| <i>Hojeda insularis eurytrema</i> | + | | | |
| <i>Thysanophora plagioptycha</i> | | | | + |
| <i>Hemitrochus gallopovonis</i> | | | | + |
| <i>Plagioptycha musicola fortisculpta</i> | + | + | | |

inhabitants of the island. Of these, six are endemic species, and three are endemic subspecies, yielding an endemism of 50% at the species level and 83% at the subspecific level for the native land snail fauna of the island. Of the endemic taxa, four have systematic affinities to species occurring on Puerto Rico, three are related to Hispaniolan species, and two are of uncertain relationships.

HELICINIDAE

Helicina umbonata pitheca THOMPSON

Lucidella umbonata (Shuttleworth), Clench 1950:271; fig. 2.

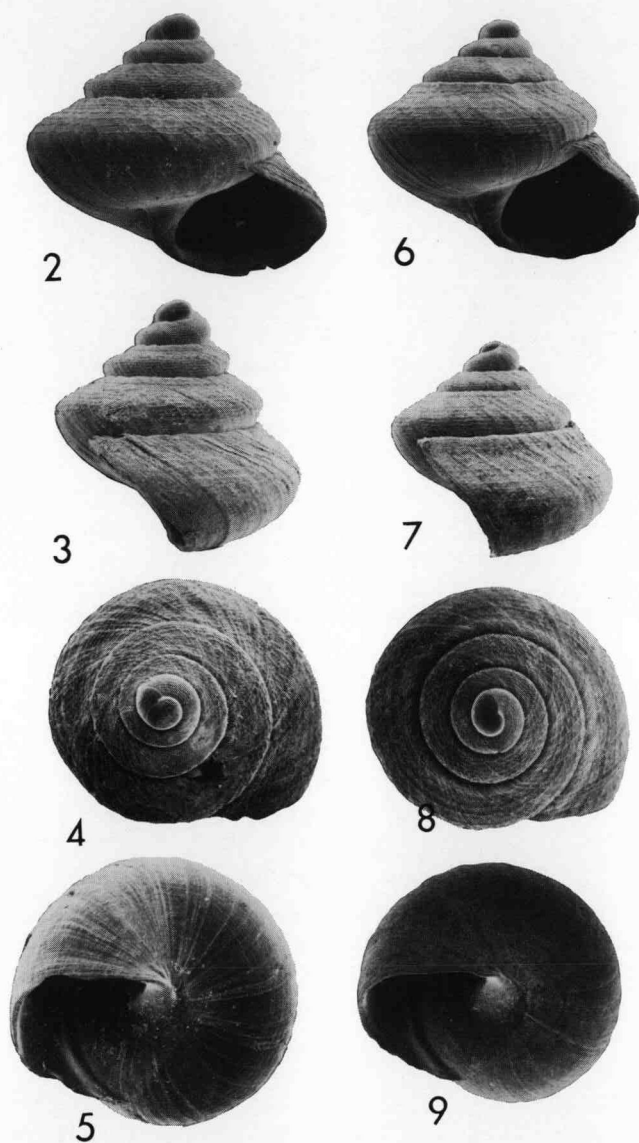
Helicina umbonata pitheca Thompson 1982:15-17; Figs. 36-43.

The taxonomic status of the Mona Island population of *Helicina umbonata* has been discussed recently (Thompson 1982). *H. u. pitheca* is distributed ubiquitously on the island. Live specimens commonly are found aestivating on low shrubs, grasses, and vines. The brightly colored shell is adaptive for a cryptic existence in this habitat.

Stoastomops grada new species

Stoastomops puertoricensis Baker, Clench 1950:271.

SHELL (Figs. 2-5).-- Small 2.2-2.6 mm wide; 0.81-0.92 times as high as wide; depressed turbate-conical with 3.9-4.2 whorls. Two color phases: one phase citron yellow, other phase light orange (holotype). Whorls subangular at the periphery and scalariform; flattened or weakly concave above periphery, convex below, umbilical region nearly flat. Protoconch (Fig. 10) raised, slipper-shaped, consisting of 3/4 of a turn; 0.37 mm long and 0.26 mm wide; sculptured with a few weak incremental striations and irregular, oblique spiral striations. Subsequent half whorl with about 10 fine, raised spiral threads, which continue onto lower whorls where they become enlarged and are crossed at irregular intervals by oblique varix-like fimbriations (Fig. 11); 7-10 spiral threads on dorsal surface of last whorl. Spiral threads below periphery weak, discontinuous, and poorly defined on base (Fig. 12). Aperture ovate-auriculate in shape; 0.44-0.53 times height of shell; 0.71-0.80 times as high as wide. Columellar lip conical in



FIGURES 2-9. — FIG. 2-5: *Stoastomops grada* new species, Paratypes (UF 40715) (X 24). FIGS. 6-9: *Stoastomops puertoricensis* Baker (UF 40714; 7.0 km SE Guanica, Puerto Rico) (X 24).

shape, hollow internally (Figs. 13-15). Outer periphery of columellar lip angular so that it appears, falsely, to be rimate.

Measurements in mm based on 29 specimens are given below.

| | n | height | width | aper. h. | aper. w. | whorls |
|----------|----|---------|---------|-----------|-----------|---------|
| UF 40678 | 15 | 1.9-2.1 | 2.2-2.6 | 0.93-1.05 | 1.24-1.43 | 4.0-4.2 |
| UF 24989 | 3 | 1.9-2.1 | 2.2-2.4 | 0.93-0.99 | 1.19-1.36 | 4.0-4.2 |
| UF 40677 | 10 | 1.9-2.1 | 2.1-2.4 | 0.87-0.99 | 1.24-1.36 | 4.0-4.1 |
| Holotype | 1 | 1.98 | 2.17 | 0.93 | 1.30 | 4.1 |

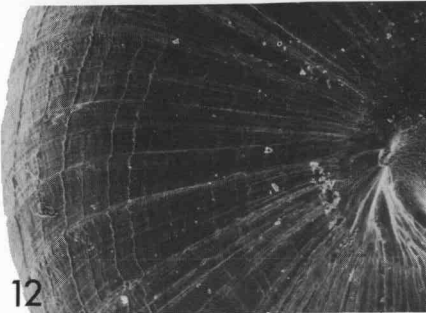
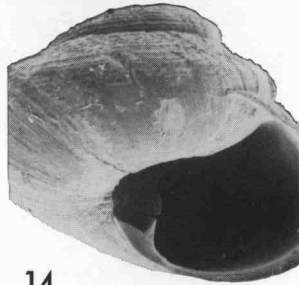
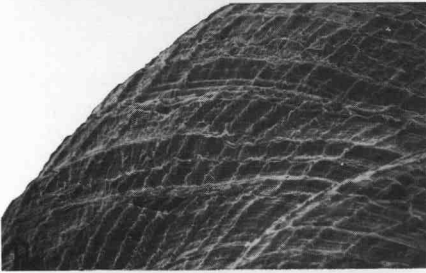
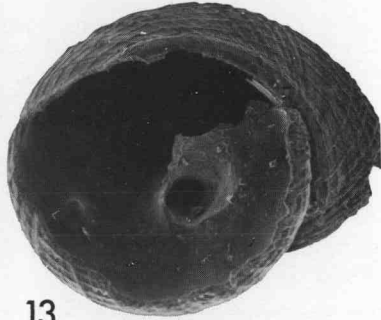
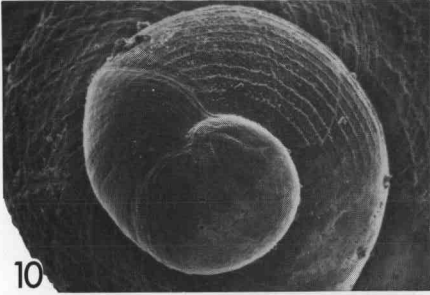
Specimens from the bluffs near Sardinero generally are larger than specimens from other localities. This may reflect the more favorable mesic habitat characterizing that area. Sexual dimorphism in size cannot be determined from the material on hand, because I found only dead shells on the two occasions I visited the island.

OPERCULUM (Figs. 16-18).-- Narrower than in *S. puertoricensis* Baker (Figs. 19-21). Calcareous plate weakly granular with a low, narrow, weakly arched ridge closely paralleling the columellar margin (Figs. 17,18).

TYPE LOCALITY.-- Mona Island, Coral de Los Indios, 1.3 km northwest of the Lirio lighthouse. **HOLOTYPE**: UF 40676; collected 22 May 1974 by Fred G. Thompson from leaf litter along the base of a low ledge in a mesic forest. **PARATYPES**: UF 40677 (49); UF 40719 (SEM opercula); same data as holotype. Other paratypes from Station 1 (UF 24989, 9 specimens), Station 3 (UF 40678, 30 specimens; UF 40715, 4 SEM shells), Station 8 (UF 40679, 30 specimens), and Station 9 (UF 40680, 9 specimens). All were found along limestone ledges in leaf litter. Isabella Anchorage (USNM 430974, 13 specimens).

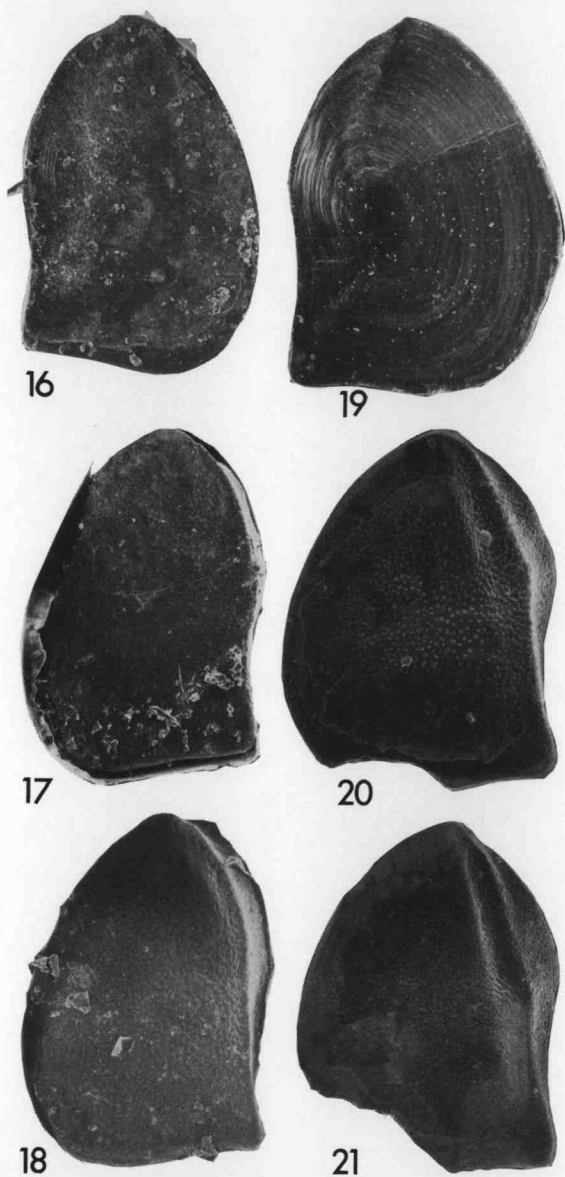
DISTRIBUTION.-- Endemic to Mona Island.

REMARKS.-- This species is most similar in shape to *S. adamsi* Baker from Jamaica. It differs from *S. adamsi* by its sculpture. *S. adamsi* has 6-7 spiral threads above, and 28-29 below on the last whorl (Baker 1934:10; 1935, fig. 1). The threads are weaker than in *S. grada* and uniform in size over the surface of the whorl. *S. grada* is similar to *S. puertoricensis* Baker in sculpture, but differs in shape and opercular structure. In *S. puertoricensis* the spire is concave-conical with the whorls separated by a deeply incised suture (Figs. 6-9). The dorsal surface of the whorls usually has a shallow furrow below the suture (Fig. 8). The operculum is broader and the calcareous plate bears a thick, wide, straight vertical ridge that is offset from the columellar margin (Figs. 19-21).



15

FIGURES 10-15.- *Stoastomops grada* new species, Paratypes. FIGS. 10-11: UF 40715 (X 80). FIG. 12: UF 40715 (X 53). FIG. 13: UF 40718 (X 27). FIG. 14: UF 40717 (X 27). FIG. 15: UF 40717 (X 16).



FIGURES 16-21. FIGS. 16-18: *Stoastomops grada* new species, opercula (UF 40719). FIGS. 19-21: *Stoastomops puertoricensis* Baker, opercula (UF 40713, 7 km SE Guanica, Puerto Rico). (X 53).

Baker (1941:1) stated that the columella of *S. puertoricensis* sometimes is rimate (narrowly perforate). This is incorrect. The outer edge of the columellar lip is angular so that when viewed from the front it appears to form a rimate opening into the columella. Such a condition does not exist in the Helicinidae, because the parietal shelf partially forms a short tube that extends into the columellar lip as a blind caecum (Figs. 13-15). A perforation would puncture this tube.

Baker (1934:10), on Pilsbry's advice, described *S. adamsi* as a new species, although Baker considered it to be synonymous with *Helicina tenuis* Adams, September 1849, p. 14. Pilsbry contended that *Helicina tenuis* Adams is not an available name, because it is preoccupied by *Helicina tenuis* Pfeiffer, April 1949, p. 124, notwithstanding the fact that Adams (1849:16), two pages later, placed *tenuis* Adams in *Trochatella*. Baker (1935:63) surreptitiously reverted to the use of Adams name as *Stoastomops tenuis* (Adams). The Jamaican species should be referred to as *Stoastomops adamsi* Baker.

ETYMOLOGY.-- The name *grada* is from the Latin *gradus*, a step or stairs, and refers to the scalariform step-like whorls.

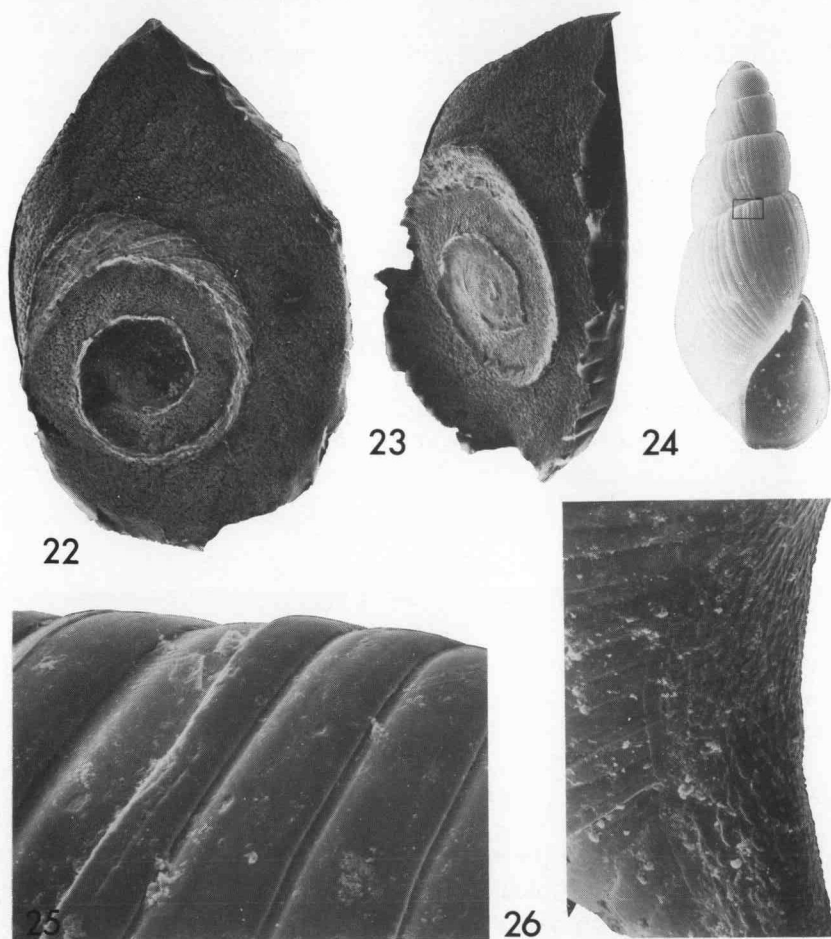
ANNULARIIDAE

Licina aguadillensis turnerae (CLENCH)

Chondropoma turnerae Clench 1950:271-272, fig. .

Licina (*Choanopomops*) *aguadillensis turnerae* Baker 1962a:23.

This snail is nearly ubiquitous on Mona Island. It was collected at all stations except 2 and 5, which are on loose sand. Baker (1962a) referred populations from Cerro Capron, near Guanica, Puerto Rico, to this subspecies and places all the Puerto Rican Annulariinae in *Choanopomops* Baker 1928. The operculum of *turnerae* (Figs. 22, 23) is typical of the subgenus by having on the outer surface a partial calcareous lamella that is reinforced from beneath by calcareous ribs and deposits. The face of the underlying chitinous plate is covered with calcareous granules.



FIGURES 22-26. FIGS. 22-23: *Licina aguadillensis turnerae* (Clench), opercula (UF 40720). (X 18). FIGS. 24-26: *Varicella (Sigmataxis) nesiotis* new species, Paratype (UF 40833). FIG. 24 (X 11). FIG. 25: Sculpture of body whorl at inset in Fig. 24. (X 212). FIG. 26: Sculpture of columella (X 108).

PUPILLIDAE

Gastrocopta rupicola marginalba (PFEIFFER)

Collected in leaf litter samples from Stations 1 and 3.

Gastocopta pellucida (PFEIFFER)

Collected in leaf litter from Stations 3, 8, 9, and 11.

CERIONIDAE

Cerion monaensis CLENCH

Abundant and generally distributed on the coastal plains along the south side of Mona Island. Locally distributed on the limestone plateau.

HELICARIONIDAE

Guppya gundlachi (PFEIFFER)

Dead shells were collected in leaf litter at Stations 3, 11, and 12 in patches of mesic forest. Live snails were found crawling on dead leaves at Station 3.

Habroconus sp.

Clench (1950:273) recorded two specimens of an apparently undescribed species which were collected at Isabella Anchorage (Sardinero). Apparently these are the same as the species common on Puerto Rico. *Habroconus* was not found on the island during this survey. The specimens reported by Clench cannot be located in the Museum of Comparative Zoology or the National Museum of Natural History. Apparently they are lost.

FERUSSACIIDAE

Cecilioides aperta (SWAINSON)

Collected at Stations 1 and 3; sifted from loose humus-rich soil.

SUBULINIDAE

Obeliscus swiftianus (PFEIFFER)

Dead shells were recovered from leaf litter at Stations 1, 3, 8, 9, and 12. The species appears to be restricted to mesic forests along the escarpment on the south side of the island and in a mesic forest at Station 12.

Obeliscus sp.

A single specimen of an unidentified species was collected at Station 12. It is similar to *O. simpsoni* Pilsbry from Hispaniola but is immature, and specific identification is uncertain.

Subulina octona (BRUGUIERE)

Nearly ubiquitous in terrestrial habitats on the island.

Lamellaxis micra (ORBIGNEY)

Collected in leaf litter at Station 1, 3, and 12 in mesic forest.

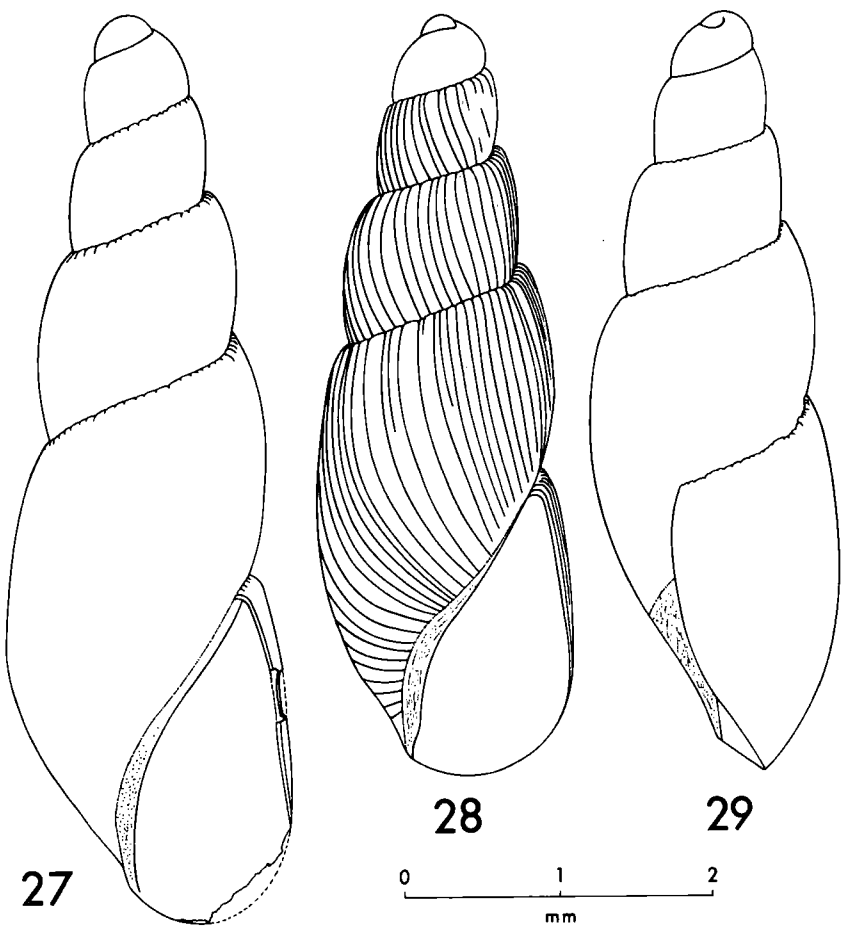
Opeas pumilum (PFEIFFER)

Found in leaf litter at Station 3.

OLEACINIDAE

Varicella (Sigmataxis) nesiotus new species

SHELL (Figs. 24, 27-29).-- Very thin, elongate-turrete. Adults about 0.31-0.34 times as wide as high and proportionally more slender than juveniles. Spire about 0.60-0.64 times length of shell (0.61 in holotype), nearly straight-sided in outline. Shell uniformly colored; translucent; axis twisted internally. Whorls 5.3-5.5 in large specimens (5.0 in holotype); embryonic shell with 1.8 whorls. Suture deeply impressed and weakly crenulated by the striate sculpture. Whorls of spire moderately



FIGURES 27-29.- *Varicella* (*Sigmataxis*) *nesiotes* new species. FIG. 27: Paratype (UF 40832). FIGS. 28, 29: Holotype (UF 40831).

arched, very narrowly shouldered along suture. Body whorl in large specimens may be flattened or even weakly concave peripherally. Periphery of last whorl slightly below middle of whorl. Embryonic whorls glossy and smooth. Subsequent whorls sculptured with nearly equally spaced arcuate transverse striations that are continuous across surface of whorl, about 8-10 striations/mm on last whorl. Striations U-shaped and about as wide as deep (Fig. 25), diminishing slightly near base. Interspaces between striations flat and glossy. Aperture elongate-pyriform, about half as wide as high and about 0.36-0.40 times length of shell (0.39 in holotype). Columella weakly concave in outline; generally slightly twisted at base but may be evenly arched in large specimens (Fig. 29). Parietal wall with a thin hyaline deposit that is slightly thickened and granular over columella (Fig. 26).

Measurements in mm of seven paratypes and the holotype (in parenthesis) are as follows: length 4.7-5.9 (4.68), width 1.6-1.8 (1.68), aperture height 1.89-2.10 (1.82), and aperture width 1.0 (0.98).

TYPE LOCALITY.-- Mona Island, Sardinero (Station 3). Specimens were collected along the base of a limestone bluff in leaf debris. HOLOTYPE: UF 40831; collected 21 May 1974 by Fred G. Thompson. Paratypes: UF 40832 (10), UF 40833 (SEM shell); same data as the holotype.

DISTRIBUTION.-- Endemic to Mona Island. Other localities from which it was collected are Stations 1, 8, and 12.

REMARKS.-- *Varicella nesiotes* is closely related to two species from Hispaniola, *V. verberata* (Pilsbry) and *V. una* (Pilsbry). Both were described as species of *Sigmataxis*, which then was regarded as a subgenus of *Spiraxis* (Pilsbry 1907:43-44). Neither has been mentioned in the literature since it was named. These three snails form a disparate group from other *Sigmataxis* by having a tendency for the columella to be truncate and by having a relatively enlarged body whorl. Other *Sigmataxis*, all of which are Jamaican, have a strongly twisted columella and a proportionally smaller body whorl. In these respects the Hispaniolan species and *V. nesiotes* are intermediate between *Sigmataxis* and *Varicella* (s. gen. *Varicellula*), which is also Jamaican. Their subgeneric relationships cannot be clarified until anatomical material is examined.

V. verberata is a more robust species than *V. nesiotes* and has a proportionally larger, more inflated body whorl. In addition *V. verberata* has a more conspicuously twisted columella, and the striations are nearly obsolete below the periphery of the last whorl. *V. una* is a smaller species than *V. nesiotes*, being just over 4 mm long. Its striations are closer (12/mm), and the columella is strongly twisted near the middle as opposed to near the base as in *V. nesiotes*.

ETYMOLOGY.-- The specific name *nesiotes* is from the classical Greek meaning insular.

BULIMULIDAE

Bulimulus guadalupensis (BRUGUIERE)

This species was recorded from Mona Island by Clench (1950:273) as *B. g. guadalupensis* and as *B. g. eyreisii* (Drouet). Breure (1974:15-26, 46-47) showed that *eyreisii* is a distinct species, and that the specimens recorded from Mona Island are typical *guadalupensis*. I did not encounter *guadalupensis* on Mona, even though I collected at the same stations from where Clench recorded it. Apparently it is no longer extant on the island. Breure (1974:51) suggested that the occurrence of this species outside of the Windward Islands is attributable to human introductions.

Bulimulus d. diaphanus (PFEIFFER)

Found at Stations 1, 4, 5, 8, 11, and 12. It was most abundant on the south coastal plain among clumps of grasses. It is generally present on the plateau but is sparser in its occurrence there. Breure (1974:32) recorded this species from Mona Island based upon specimens in the MCZ.

Drymaeus virgulatus beattyi CLENCH

Drymaeus elongatus beattyi Clench, 1950:273-274, figs. 4-6.

D. virgulatus (Ferussac) (= *elongatus* Bolten) is widespread on Puerto Rico and its satellite islands, the Virgin Islands, St. Martin, St. Eustatius, Curacao, Bonaire, and Aruba. Baker (1924:80-85) presented evidence suggesting that the species was introduced through commerce to the last five islands. Its wide distribution on Puerto Rico and the Virgin Islands apparently is natural (Pilsbry, 1899:23-27). *Drymaeus virgulatus* is highly variable in color and, to a lesser extent, in relative obesity. Several names have been proposed for some of these variants, including *liliaceus* Ferrusac (see Baker, 1962:120). *D. v. beattyi* is most similar in shape and size to the fossil form *extinctus* (Pfeiffer) from St. Croix. It is least similar to the larger, more obese forms occurring on Puerto Rico. It is distinguished from all forms of *virgulatus* by having a narrow, elongate aperture that bears a reflected basal lip. *D. v. beattyi* is common and nearly ubiquitous on Mona Island. It was collected at all stations. There is considerable local variation in size and obesity, and Mona populations overlap in these traits with *extinctus*. Measurements of selected specimens of *beattyi* taken from four lots to show maximum variation are given in Table 2.

Table 2. Measurements in mm of selected specimens of *Drymaeus v. beattyi* taken from four population samples to show maximum variation in size and proportions.

| Station: | 4 | 6 | 10 | 12 |
|--------------|-----------|-----------|-----------|-----------|
| N | 44 | 41 | 21 | 6 |
| Length | 19.5-24.0 | 19.1-26.2 | 21.6-27.4 | 19.2-22.4 |
| Width | 8.3- 9.7 | 8.2-10.5 | 9.0-11.3 | 8.3- 9.2 |
| Aperture H. | 9.1-11.4 | 9.2-11.9 | 10.3-13.1 | 9.3-10.4 |
| Aperture W. | 5.1- 6.0 | 5.1- 6.4 | 5.3- 6.8 | 5.1- 5.7 |
| Whorls | 5.6- 6.3 | 5.6- 6.5 | 5.7- 6.8 | 5.8- 6.2 |
| Width/Length | 0.38-0.46 | 0.38-0.46 | 0.38-0.48 | 0.40-0.44 |
| Ap. W/Ap. H | 0.52-0.62 | 0.50-0.60 | 0.48-0.56 | 0.52-0.55 |
| Ap. H/Length | 0.42-0.51 | 0.43-0.53 | 0.43-0.51 | 0.46-0.51 |

UROCOPTIDAE

Brachypodella beattyi CLENCH

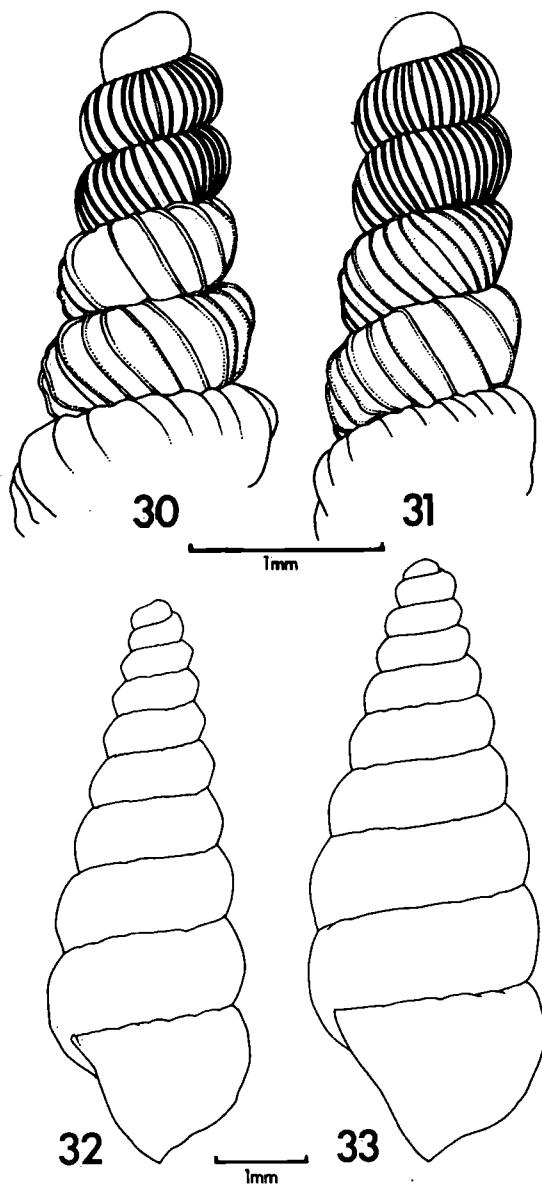
Brachypodella beattyi Clench 1950:275; fig. 3.

B. beattyi is generally distributed on Mona Island. It was found at Stations 1, 3, 4, 11, and 12. This species was described as closely related to *B. pallida* (Pfeiffer), a species found on Puerto Rico and the Virgin Islands of St. Thomas, St. Johns, and Tortola (Pilsbry 1904:84-85). *B. beattyi* differs from *B. pallida* in several respects, including thin solid ribs and finer, sparser costulate sculpture on the embryonic whorls (Fig. 30). *B. pallida* has thick hollow ribs and the sculpture on the embryonic whorl consists of denser, heavier axial threads (Fig. 31). In these respects *B. beattyi* is more similar to some forms of the *B. dominicensis* complex from Hispaniola than it is to *B. pallida*.

Microceramus stenegrus new species

Microceramus guanicanus Baker, Clench 1950:275.

SHELL (Figs. 32, 34, 35).-- Elongate-conical, about 0.40-0.48 times as wide as high. Spire slender, straight-sided, regularly increasing in diameter to base. Imperforate. Color opaque white with sparse vertical wavy brown bars that are broader and closer on upper whorls but are clearly defined throughout length of spire. Axis solid with a very weakly twisted callus. Whorls 8.3-10.5 in specimens with expanded peristome; 2.0 embryonic whorls. Suture deeply impressed. Whorls angular at periphery, particularly on upper spire. Body whorl with weak basal-lateral spiral ridge. First half embryonic whorl smooth. Subsequent embryonic whorls sculptured with uniform, thin, regularly spaced, vertical thread-riblets. Postembryonic whorl sculptured with heavier oblique ribs that are slightly recurved near the upper ends and frequently broken and irregular in thickness, more so on lower whorls than upper. Ribs slightly thickened at base, not crenulating suture. About 42-55 ribs on penultimate



FIGURES 30-33.- Fig. 30: Brachypodella beattyi Clench, (UF 40870); sculpture of apical whorls. FIG. 31: Brachypodella pallida (Pfeiffer), (UF 40878), sculpture of apical whorls. FIG. 32: Microceramus stenegrus new species. Paratype (UF 40830). FIG. 33: Microceramus guanicanus Baker, (UF 40876, 10 km SE Guanica, Puerto Rico).

whorl in larger specimens (55 in holotype). Ribs continuous, but diminished on base of last whorl. Aperture sub-rhomboid; slightly wider than high, about 0.20-0.27 times height of shell; lying at an angle of about 40° - 48° to shell axis (43° in holotype). Peristome nearly uniformly expanded and moderately thickened, incomplete across parietal wall. Columella slightly oblique to shell axis.

Measurements in mm of holotype: length 6.85, width 2.80, aperture height 1.54, whorls 10.1. Measurements of specimens from four population samples selected to show population variation are given in Table 3.

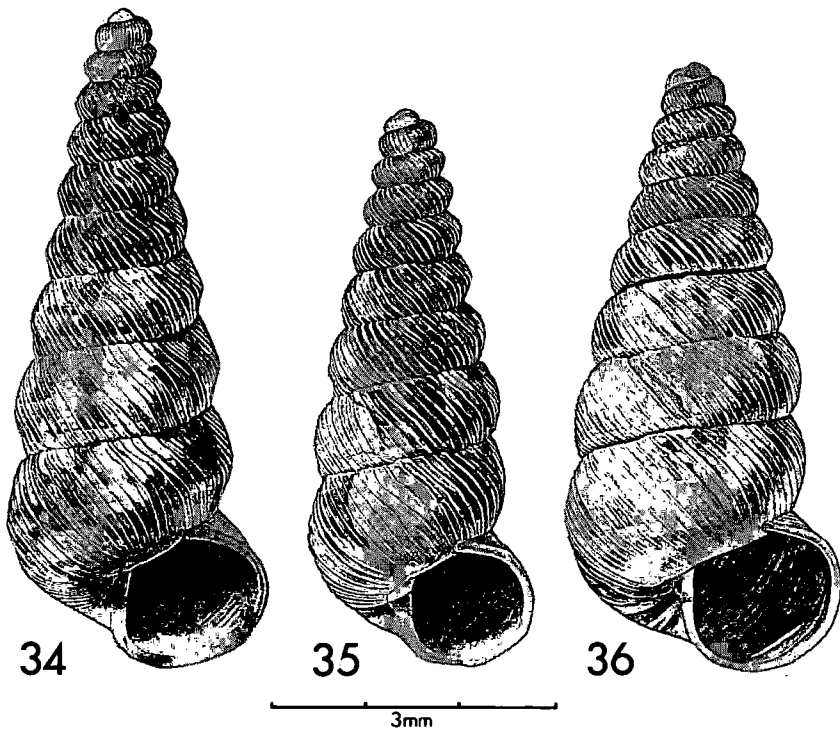
TYPE LOCALITY.--Mona Island, Sardinero; at base of limestone cliff in mesic forest (Station 1). HOLOTYPE: UF 40828; collected 12 November 1978 by Fred G. Thompson. PARATYPES: UF 40829(18), same locality as holotype; UF 40830(91), Station 3.

DISTRIBUTION.-- This snail is generally distributed over the island in mesic and submesic microhabitats. It was collected at Stations 1, 4, 8, 9, 11, 12, and 13.

REMARKS.-- *Microceramus stenegrus* is a member of a small group of southern Caribbean species that also includes *M. bonairensis* (Smith) and *M. guanicanus* Baker by virtue of having ribs that do not crenulate the suture and by being imperforate. *M. bonairensis* is confined to the Dutch Leeward Islands and includes three subspecies that differ principally in size (Baker 1924:95-98). *M. guanicanus* is known only from a small xeric limestone peninsula east of Guanica, Puerto Rico. *M. stenegrus* is most similar to *M. guanicanus* in size and sculpture. It differs from *M. guanicanus* by having a slender, attenuate spire that is uniformly conical in large specimens, whorls that are angular at the periphery, a more deeply impressed suture, generally a weak baso-lateral ridge on the last whorl, ribs that are much heavier and closer, and a more sharply defined color pattern throughout the length of the shell. *M. guanicanus* (Figs. 33, 36, see also van der Schalie, 1948: pl. 7, fig. 4) has a relatively obese spire that becomes turrete in larger specimens, the whorls are rounded with a shallow suture, the last whorl lacks a baso-lateral ridge, the ribs are narrower, lower, and more widely spaced, and the color pattern is distinct only on the upper spire. *M. stenegrus* is a more slender species than *M. guanicanus*. Both species show considerable variations in the size of the body whorl and the reflection of the peristome. Measurements of major diameter and total length incorporate both of these variables, and on the basis of overall size the two species overlap (Table 3). Measurements of the minor diameter

Table 3. Measurements in mm of specimens from samples of *Microceramus* selected to show variations in size.

| Station: | <i>M. stenegrus</i> n. sp. | | | | <i>M. guanicanus</i> Baker | |
|----------------|----------------------------|-----------|-----------|-----------|----------------------------|-----------|
| | 3 | 11 | 12 | 13 | UF 40876 | UF 40877 |
| N | 35 | 14 | 10 | 9 | 28 | 17 |
| Major D. | 2.0-2.5 | 2.0-2.4 | 2.3-2.7 | 2.3-2.6 | 2.5- 3.1 | 2.7- 3.0 |
| Length | 4.3-6.4 | 4.3-5.4 | 5.0-6.1 | 5.6-6.4 | 5.1- 7.3 | 5.7- 7.2 |
| Maj. D./Length | 0.38-0.47 | 0.41-0.51 | 0.39-0.48 | 0.39-0.44 | 0.40-0.51 | 0.39-0.47 |
| Whorls | 8.3-9.8 | 7.9-8.9 | 8.4-9.2 | 9.0-9.5 | 8.3-10.0 | 8.8-10.3 |
| Aper. H | 1.1-1.5 | 1.1-1.3 | 1.3-1.5 | 1.2-1.6 | 1.3- 2.0 | 1.4- 2.2 |
| Aper.H./Length | 0.21-0.27 | 0.23-0.28 | 0.22-0.26 | 0.21-0.27 | 0.23-0.29 | 0.23-0.27 |
| Minor D. | 1.8-2.2 | 1.8-2.1 | 2.1-2.4 | 2.1-2.3 | 2.2- 2.8 | 2.2- 3.0 |
| Spire | 3.3-5.0 | 2.7-4.3 | 3.7-5.9 | 4.4-5.1 | 3.6- 5.5 | 3.6- 6.1 |
| Min. D./Spire | 0.44-0.55 | 0.50-0.64 | 0.39-0.60 | 0.42-0.49 | 0.50-0.65 | 0.49-0.67 |



FIGURES 34-36.- FIGS. 34-35: Microceramus stenegrus new species (Fig. 34, Holotype [UF 40828]; Fig. 35, Paratype [UF 40830]). FIG. 36: Microceramus guanicanus Baker (UF 40876).

and the length of the spire include less variable parameters, and significant differences between the two species occur in the minor diameter and its ratio to the length of the spire. Most *M. stenegrus* have a minor diameter of 1.8-2.2 mm and a minor diameter/spire ratio of 0.39-0.52 mm, whereas most *M. guanicanus* have a minor diameter of 2.3-3.0 mm and a minor diameter/spire ratio of 0.52-0.67 mm. These two differences apply to about 90% of the specimens examined.

Specimens of *M. guanicanus* examined for comparison. PUERTO RICO: 7 km SE Guanica (UF 40877, 27 specimens); 10 km SE Guanica (UF 40876, 38 specimens).

ETYMOLOGY.-- *stenegrus*, from the Classical Greek *stenegros* meaning narrow, tight, alludes to the slender, compactly coiled spire.

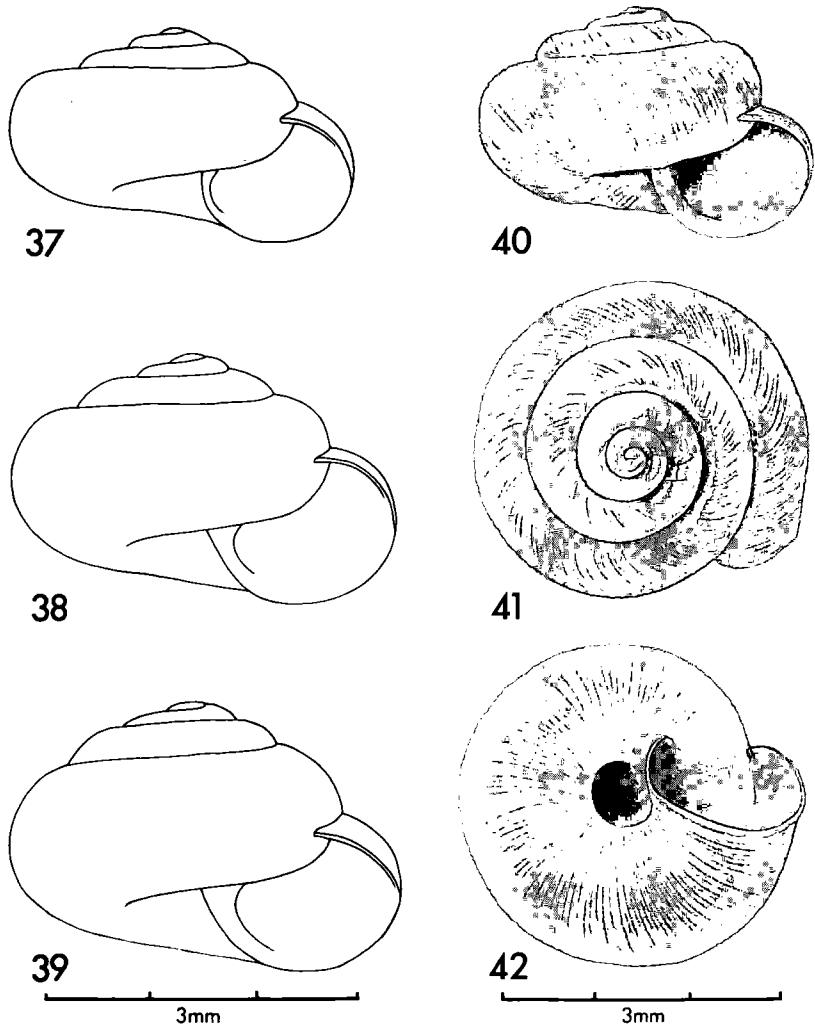
SAGDIDAE

Hojeda inaguensis (WEINLAND) (Figures 37-42)

Collected at Stations 1, 3, 8, 9, 11, 12, and 13 in leaf litter. This snail is widely distributed on the Florida Keys, the Bahama Islands, Hispaniola, and Mona Island. The use of the name *inaguensis* by Clench (1950:272) for the Mona Island and Hispaniolan populations is supported by anatomical data. I dissected preserved specimens from Station 12 (UF 40839). The reproductive anatomy essentially is identical to that of specimens from Stock Island, Florida, described by Baker (1940:60).

Pilsbry (1940:984, Figs. 571) illustrates a specimen from Boca Chica Key, Florida, as typical for the species. The specimen has an umbilical opening that is about 1/4 (0.25) the width of the shell. I have examined many series of specimens from throughout the range of the species, and none approaches this condition. The umbilicus generally is much narrower, being about 0.15-0.19 times the width of the shell. The snail is conservative in its geographic variation, and the illustrations given in this paper (Figs. 37-42) are representative for the species throughout its range. The sculpture and protoconch characteristics are illustrated in Figures 43-45.

Measurements in mm of five specimens from Station 11 on Mona Island are given for comparisons with the following species.



FIGURES 37-42.- *Hojeda inaguensis* (Weinland) (UF). FIGS. 37-39: (UF 40844). FIGS. 40-42: (UF 41575).

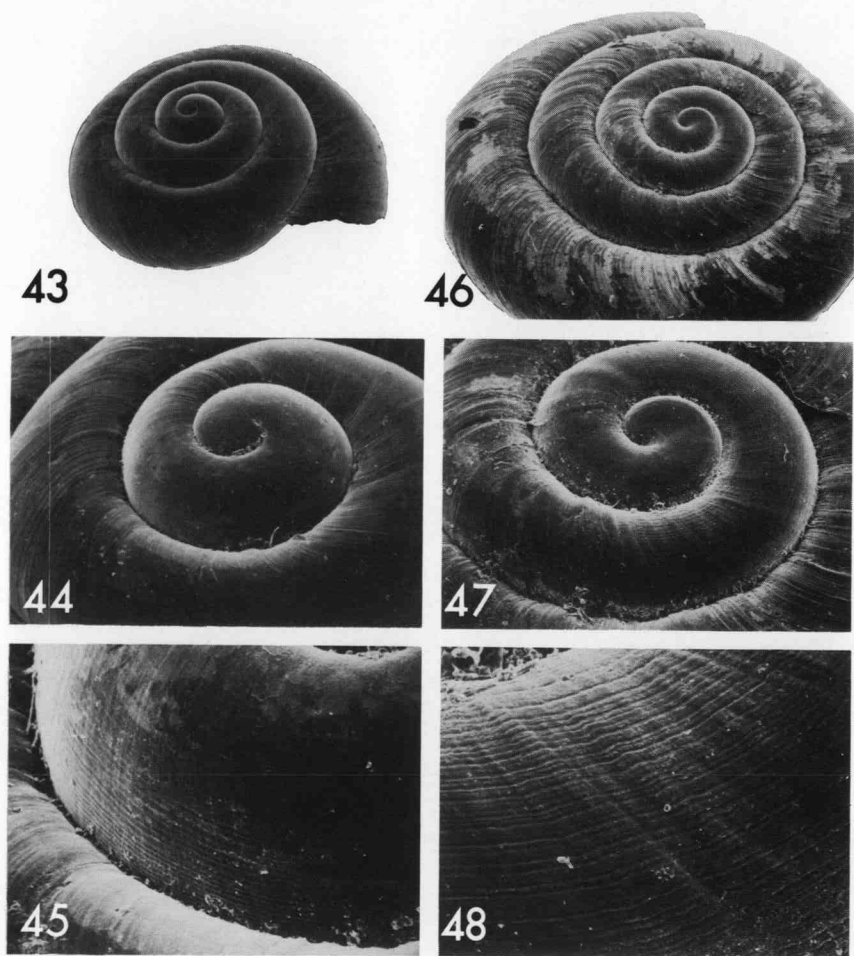
| height | width | apert.h. | apert.w. | umbil.w. | whorls |
|--------|-------|----------|----------|----------|--------|
| 2.05 | 3.16 | 1.24 | 1.43 | 0.50 | 3.9 |
| 2.02 | 3.29 | 1.30 | 1.55 | 0.50 | 4.0 |
| 2.17 | 3.39 | 1.24 | 1.49 | 0.62 | 4.0 |
| 2.42 | 3.53 | 1.30 | 1.67 | 0.62 | 4.2 |
| 2.54 | 3.60 | 1.24 | 1.74 | 0.62 | 4.2 |

Hojeda insularis insularis new species

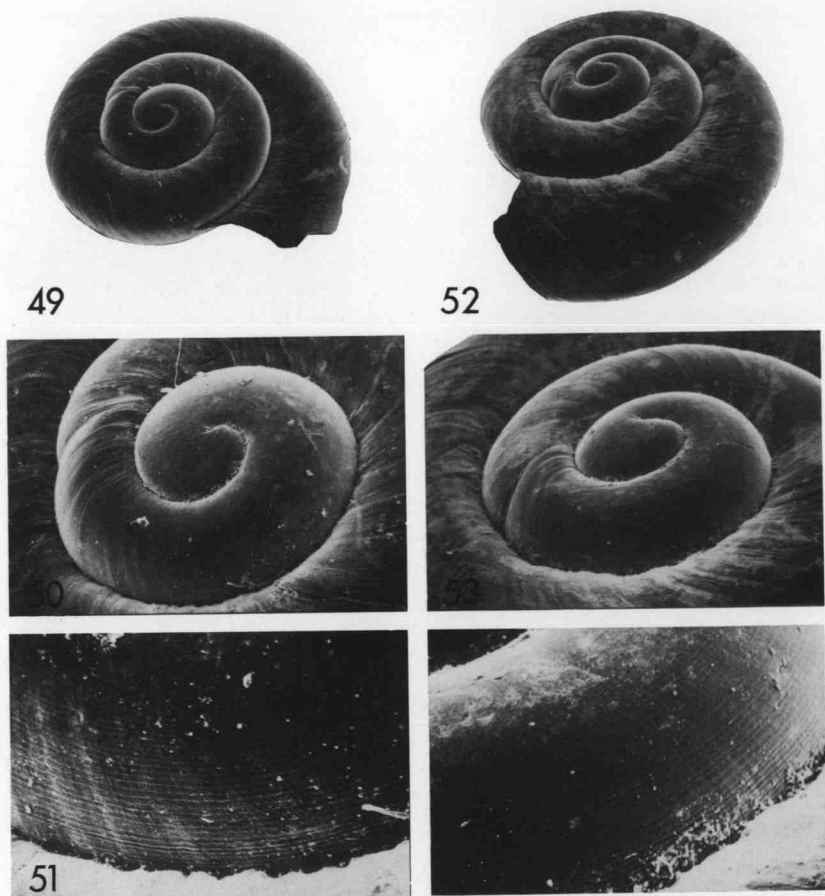
Hojeda inaguensis (Weinland) Thompson 1976; 152.

SHELL (Figs. 55-57).-- Small, about 3.4-3.7 mm wide. Depressed-turbiniform, 0.57-0.64 times as high as wide. Spire low and broadly conical, not depressed, dome-shaped as in *H. inaguensis* (Fig. 55). Umbilicus moderately wide, about 0.23-0.28 times width of shell. Shell relatively thick compared to other *Hojeda*, opaque, milky-white. Whorls about 4.0-4.1 in mature specimens. Suture deeply impressed. Protoconch (Figs. 49-51) about 1.4-1.5 whorls with numerous very fine spiral threads below periphery as in *H. inaguensis* (Figs. 43-45); last 1/4 whorl of protoconch with fine radial growth striations. Following whorls rounded; relatively narrow compared to *H. inaguensis* (Figs. 37-40); sculptured with numerous incremental growth striations that are irregular in intensity, becoming slightly rough near peristome. Sculpture more rugose than in *H. inaguensis* (Fig. 43) and nearly uniform over surface of whorls. Aperture semi-lunar in shape, 0.75-0.88 times as wide as high, height 0.57-0.67 times height of shell, width 0.44-0.47 times width of shell. Peristome slightly thickened with an internal callus and blunt-edged at maturity. Columellar lip weakly reflected. Parietal callus conspicuously thickened at maturity (Fig. 55) in contrast to other species of *Hojeda*.

Measurements in mm converted from micrometer units of five specimens selected to show variation are as follows:



FIGURES 43-48.- FIGS. 43-45: *Hojeda inaguensis* (Weinland); UF 40777. Fig. 43, X 15; Fig. 44, X 50; Fig. 45, X 150. FIGS. 46-48: *Lacteoluna selenina* (Gould); UF 40820 (Stock Island, Monroe Co., Florida). Fig. 46, X 15; Fig. 47, X 30; Fig. 48, X 150.



FIGURES 49-54.- FIGS. 49-51: Hojeda i. insularis new species, Paratype (UF 40779). Fig. 49, X 20; Fig. 50, X 53; Fig. 51, X 159. FIGS. 52-54: Hojeda insularis eurytrema new subspecies, Paratype (UF 40778). Fig. 52, X 20; Fig. 53, X 53; Fig. 54, X 159.

| | height | width | apert.h. | apert.w. | umbil.w. | whorls |
|----------|--------|-------|----------|----------|----------|--------|
| Holotype | 2.29 | 3.60 | 1.30 | 1.67 | 0.87 | 4.1 |
| Paratype | 2.05 | 3.41 | 1.18 | 1.59 | 0.87 | 4.0 |
| Paratype | 2.05 | 3.60 | 1.30 | 1.61 | 0.93 | 4.0 |
| Paratype | 2.17 | 3.53 | 1.24 | 1.55 | 0.93 | 4.0 |
| Paratype | 2.23 | 3.72 | 1.30 | 1.74 | 0.99 | 4.1 |

TYPE LOCALITY.--Monito Island ($18^{\circ}9'30''N$, $67^{\circ}57'15''W$).
 HOLOTYPE: UF 40814; collected 20 May 1974 by Fred G. Thompson.
 PARATYPES: UF 40815 (76), UF 40779 (1 SEM shell), UF 40821 (2 SEM shells); same data as holotype.

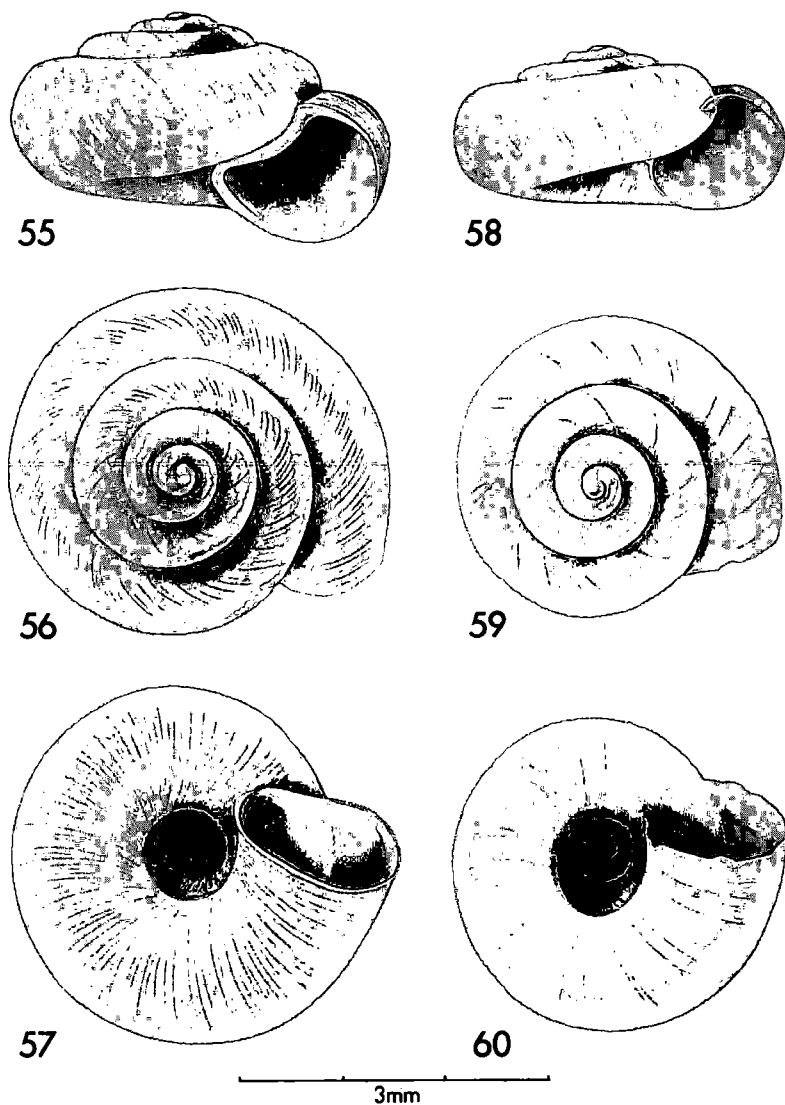
REMARKS.-- *Hojeda* includes four other species: *H. inaguensis* (Weinland) is widely distributed from the Florida Keys, through the Bahama Islands, Hispaniola, and Mona Island; *H. vanattai* Baker (1924) is endemic to Aruba; *H. boothiana* (Pfeiffer) is a large species (5 mm wide) that occurs in Cuba; *H. micromphala* Pilsbry is widely distributed on Hispaniola. *H. insularis* differs from all by the same characteristics in which it differs from *H. inaguensis*.

In general appearance, the shell of *H. i. insularis* suggests a relationship to *Lacteoluna*, which also has spiral sculpture on the protoconch (Figs. 46-48). However, the spiral sculpture in *Lacteoluna* is coarser, and it occurs over the entire surface of the protoconch. In *Hojeda* it is confined to the periphery. Moreover, all the species placed in *Lacteoluna* (s.s.) by Baker (1935a:52) have discoidal shells with a bluntly angular periphery.

The discoidal form of the following subspecies approaches that of *Lacteoluna*. The generic relationships of these two new taxa remain tentative until their reproductive anatomies are examined; nevertheless, their protoconch sculpture strongly indicates congeneric relationships with *Hojeda*.

Hojeda insularis eurytrema new subspecies

SHELL (Figs. 58-60).-- Similar to *H. i. insularis* in most aspects of color, sculpture, and protoconch characteristics (Figs. 52-54). It differs by having a thinner, transparent shell. The spire is more depressed, with the shell being about 0.53-0.57 times as high as wide. The umbilical perforation is relatively broader, being about 0.26-0.30 times the width of the shell. The parietal callus is very thin and is nearly indistinguishable.



FIGURES 55-60.- FIGS. 55-57: *Hojeda i. insularis* new species, Holotype (UF 40814).
FIGS. 58-60: *Hojeda insularis eurytrema* new subspecies, Holotype (UF 40816).

Measurements in mm converted from micrometer units based on the five largest specimens available from the type locality follow:

| | height | width | apert. h. | apert. w. | umbil. w. | whorls |
|----------|--------|-------|-----------|-----------|-----------|--------|
| Holotype | 1.74 | 3.16 | 1.05 | 1.30 | 0.87 | 3.9 |
| Paratype | 1.55 | 2.91 | 0.88 | 1.24 | 0.81 | 3.7 |
| Paratype | 1.55 | 2.91 | 0.93 | 1.30 | 0.87 | 3.7 |
| Paratype | 1.61 | 2.98 | 0.99 | 1.24 | 0.87 | 3.8 |
| Paratype | 1.80 | 3.35 | - | - | 0.93 | 4.2 |

TYPE LOCALITY.-- The base of limestone cliffs at Playa Pajaros, Mona Island (Station 9). HOLOTYPE: UF 40816; collected 23 May 1974 by Fred G. Thompson. PARATYPES: UF 40817 (5), UF 40778 (1 SEM shell), same data as holotype; UF 40819 (6), Coral de Los Indios (Station 11). All specimens are dead shells recovered from leaf litter.

REMARKS.-- *H. i. eurytrema* differs from *H. i. insularis* to an extent that would constitute specific distinctions among most members of this family. Nonetheless the two taxa are very similar in appearance and apparently are closely related. The two samples from Mona Island consist of only a few specimens and most of these appear to be immature.

ETYMOLOGY.-- The name *eurytrema* is from the Classical Greek *eurys*, meaning wide, and *trema*, a hole, and alludes to the wide umbilical perforation of this taxon.

POLYGYRIDAE

Thysanophora plagiptycha (SHUTTLEWORTH)

A single shell was recovered from leaf litter in a patch of mesic forest at Station 11.

XANTHONYCHIDAE

Hemitrochus gallapavonis (PFEIFFER)

Found at Stations 2, 4, 5, and 6. This snail occurs in the Turks and Caicos Islands. It has been found on Mona Island only on the south coastal plains, the portion of the island that was homesteaded. It probably was introduced, as discussed by Clench (1950:250).

Plagioptycha musicola fortisculpta new subspecies

Plagioptycha euclasta (Shuttleworth), Clench 1950:276.

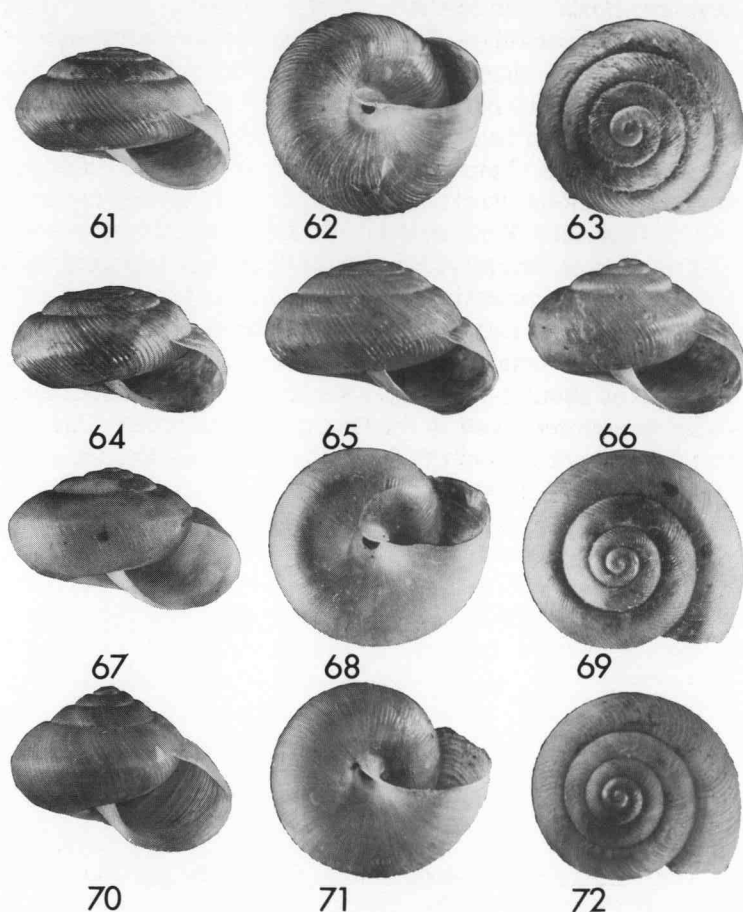
SHELL (Figs. 61-65).-- Depressed-helicoid with a low dome-shaped apex. Shell 0.51-0.66 times as high as wide. Brown, opaque; aperture, peristome, and columella lighter brown or dusky. Suture weakly impressed. Umbilicate; perforation half covered by columellar reflection. Whorls 4.6-4.7 in larger specimens. Embryonic whorls 1.8. Upper whorls weakly arched between sutures. Body whorl bluntly angulate at periphery and descending slightly to the aperture. Peripheral angle of last whorl lying below middle of whorl. Body whorl strongly curved below periphery, moderately arched above. First 1.2 embryonic whorls smooth. Subsequent whorls with strong, oblique, recurved axial ribs that are continuous across the surface of the whorls and into the umbilicus where they are only slightly diminished in size. Interspaces about 2-3 times as wide as ribs. Ribs smooth and glossy, interspaces sculptured with a meshwork of extremely fine granules. Aperture semi-elliptical, about 0.58-0.63 times as high as wide. Peristome incomplete across parietal wall; simple, not reflected or thickened internally. Parietal wall with a thin but well defined parietal callus. Columella nearly vertical and widely reflected above, continuing obliquely into basal lip.

Measurements in mm of the holotype and three paratypes selected to show maximum variation follow:

| | height | width | apert. h. | apert. w. | whorls |
|----------|--------|-------|-----------|-----------|--------|
| Holotype | 6.1 | 9.8 | 3.7 | 5.6 | 4.7 |
| UF 40825 | 5.2 | 10.0 | 3.2 | 5.5 | 4.6 |
| UF 24979 | 6.8 | 10.3 | 3.8 | 6.3 | 4.7 |
| UF 40826 | 6.7 | 11.3 | 3.7 | 6.3 | 4.7 |

TYPE LOCALITY.-- Mona Island, Bajura de Las Cerezas (Station 12). HOLOTYPE: UF 40823, collected 13 November 1978 by Fred G. Thompson. Paratypes: UF 24979 (3), same data as holotype; UF 40825 (3), Coral de Los Indios (Station 11); UF 40824 (1), Lirio Lighthouse (Station 10); UF 40826 (1), 1 km W Uvero (Station 7); MCZ 171028 (2), "Mona Island." Apparently this snail is arboreal. Fresh dead shells and one live juvenile were found in bromeliads.

REMARKS.-- *P. m. fortisculpta* is closely related to *P. m. musicola* (Shuttleworth), from which it differs by the shape of the shell, the



FIGURES 61-72.- FIGS. 61-65: *Plagioptycha musicola fortisculpta* new subspecies. FIGS. 61-63: Holotype (UF 40823). FIG. 64: Paratype (UF 24979). FIG. 65: Paratype (UF 40826). FIGS. 66-69: *Plagioptycha musicola euclasta* (Shuttleworth). FIG. 66: ANSP 28305; St. Thomas Island, Virgin Islands. FIGS. 67-69: ANSP 1032; St. Thomas Island, Virgin Islands. FIGS. 70-72: *Plagioptycha m. musicola* (Shuttleworth). ANSP 256407; Cabo Rojo, Mayaguez Dist., Puerto Rico. All figures X 5.5.

shape of the aperture, by having more whorls, and by having a shallower suture. *P. m. fortisculpta* (Figs. 61, 64, 65) has a depressed dome-shaped spire, and the peripheral angle lies below the middle of the last whorl. The aperture is narrowly elliptical. In mature specimens the shell consists of about 4.6-4.7 whorls that are separated by a shallow suture, which results in relatively flattened whorls between the suture. *P. m. musicola* (Fig. 70) has a helicoid or depressed helicoid spire and the periphery of the last whorl lies at or above the middle of the whorl. The aperture is more broadly elliptic. Seldom does the shell have more than 4.2 whorls, with a maximum of 4.4 whorls (33 lots examined; ANSP, UF), and the suture is deeply impressed, producing strongly arched whorls between the sutures. *P. m. fortisculpta* generally bears stronger sculpture than does *P. m. musicola*. All *P. m. fortisculpta* examined are rugosely costate. Generally, *P. m. musicola* is more weakly sculptured, but this trait is highly variable. In a single lot some specimens may be nearly smooth, while others may be quite strongly costate. The two subspecies also differ in the development of the parietal callus. *P. m. fortisculpta* has a distinct but thin callus. *P. m. musicola* has a thinner, hardly noticeable parietal deposit.

P. m. fortisculpta was previously reported from Mona Island as *Plagioptycha euclasta* (Shuttleworth) (Clench 1950:276). Some observations regarding the systematics of *P. musicola* (Shuttleworth 1854) are appropriate at this point. *P. musicola* was originally described as a *Helix* (Helicidae), as were most other helicoid snails at that time. Pilsbry (1894:57) placed *musicola* in *Thysanophora* (Polygyridae), where he included an heterogeneous assortment of unrelated species. Later, Pilsbry (1926:112) proposed the genus *Suavitus* (Sagdididae) and the subgenus *Euclastaria* and designated *musicola* as the type species of the latter. Baker (1943:85) showed that anatomically *Euclastaria* is in the Xanthonychidae, subgenerically related to *Plagioptycha*.

P. musicola is divided into three subspecies in addition to *P. m. fortisculpta*: *P. m. musicola* (Shuttleworth), *P. m. euclasta* (Shuttleworth), and *P. m. beattyi* Clench. *P. m. musicola* (Figs. 70-72) is widely distributed in Puerto Rico and is typical of wetter and more elevated localities. *P. m. euclasta* (Figs. 66-69) is found along lower, drier coastal areas of Puerto Rico, St. Thomas, St. Johns, Tortola, and Vieque (Baker 1961:145). Few differences occur between the two subspecies. *P. m. euclasta* is more depressed than *P. m. musicola*. Great overlap occurs in this character in some population samples from Puerto Rico and the Virgin Islands (van der Schalie 1948:83-84). Clench (1950:276) apparently overlooked van der Schalie's observations and continued to treat *euclasta* as a distinct species. Baker (1961:145) reaffirmed van der Schalie's observations. The third subspecies, *P. m. beattyi*, is known only from St. Croix (Clench 1940:244). It is characterized by having a depressed shell with an acutely carinate periphery.

ETYMOLOGY.-- The name *fortisculpta* is from the Latin *fortis*, meaning strong, and *sculpta*, carved, and alludes to the strong sculpture of this subspecies compared to other subspecies of *Plagioptycha musicola*.

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