

# THE GENUS *GYRAXIS* PILSBRY, 1903 (GASTROPODA: UROCOPTIDAE) FROM THE BAHÍA DE SAMANÁ AREA OF THE DOMINICAN REPUBLIC

G. THOMAS WATTERS

Department of Evolution, Ecology and Organismal Biology, Ohio State University, Columbus, Ohio 43212, USA

*Abstract* The genus *Gyraxis* in Hispaniola is reviewed, currently only known from the area of the Bahía de Samaná in the Dominican Republic. It includes three taxa: *Gyraxis samana* (Clench, 1966), *G. sericata* (Pilsbry, 1903) and *G. excalibur* new species. The radular morphology and isolation from Cuban *Gyraxis* suggest they may yet require a new genus.

*Key words* Urocoptidae, Hispaniola, Dominican Republic, systematics, *Gyraxis*

## INTRODUCTION

Our knowledge of the urocoptid fauna of Hispaniola, particularly the Dominican Republic, is woefully inadequate. Little has been published on the fauna there since Pilsbry (1902–1904, 1933) – Clench (1935, 1966) and Thompson & Franz (1976) being rare exceptions. Pilsbry's monograph of the group (1902–04) included fewer than 40 nominal Hispaniolan species of urocoptines, the majority occurring in Haiti. Of these, 13 were described from a single place (Jérémie, Haiti). This study concerns the purported genus *Gyraxis* in Hispaniola, currently only known with certainty from the area of the Bahía de Samaná in the Dominican Republic.

## MATERIALS AND METHODS

Descriptions and measurements were based on adult shells oriented with the spire up and the aperture facing the viewer. Length was measured from the tip of the protoconch to the opposite anterior-most extension of the peristome. Numbers in parentheses after catalog numbers are the number of specimens in the lot.

Radulae were removed from ETOH preserved specimens and placed in commercial bleach until all attached tissue had been dissolved (typically 10–15 minutes). The remaining radular ribbon was washed in two changes of 100% ETOH and placed on an SEM stub. Specimens were sputter-coated with gold-palladium using an EMS 150TS and viewed with a Philips XL30 scanning electron microscope at an accelerating voltage of 20 kv.

## *Institutional abbreviations used*

ANSP – Academy of Natural Sciences, Philadelphia, Pennsylvania, USA

BMSM – Bailey-Matthews National Shell Museum, Sanibel, Florida, USA

GTW – Collection of the author

OSUM – Ohio State University Museum of Biological Diversity, Columbus, Ohio, USA

UF – Florida Museum of Natural History, Gainesville, Florida, USA

## SYSTEMATIC DESCRIPTIONS

Superfamily Urocoptoidea

Family Urocoptidae

Subfamily Brachypodellinae

Genus *Gyraxis* Pilsbry, 1903

Type species *Cylindrella brooksiana* Pfeiffer, 1859, by original designation (Cuba)

*Remarks* Described as a subgenus of *Brachypodella* by Pilsbry (1903), *Gyraxis* was raised to genus-level by Torre & Bartsch (1972). *Gyraxis* was based on eastern Cuban taxa having smooth apical whorls; these whorls are costate in the Hispaniolan species. Indeed Pilsbry (1903: 63) commented on these Hispaniolan species: “the costellate apex would indicate rather alliance with *Brevipodella*. The true position of the species [the “group of *B. gouldiana*,” including *G. sericata*] depends upon the dentition, which is unknown.” Pilsbry (1903), Clench (1966), and Torre & Bartsch (1972) placed *Gyraxis* in the Brachypodellinae. Pilsbry (1903: 59) commented that the radula of Cuban *Gyraxis* was “as in the

typical group of *Brachypodella*" but he did not have any Hispaniolan specimens with radulae.

The dentition of all three Hispaniolan *Gyraxis* species were examined in this study. They were all very similar to each other and clearly resemble other brachypodelline radula in having a narrow rhachidian tooth flanked by two pairs of enormous lateral teeth. However, whereas the rhachidian tooth of Cuban *Gyraxis* has a wide, feeble cusp (Pilsbry, 1903: pl. 9, figs. 11, 12), the rhachidian tooth of Hispaniolan *Gyraxis* has a much larger elongated cusp (Figs 15, 16). The differences in apical sculpture and the great distance separating eastern Cuban *Gyraxis* from eastern Hispaniolan taxa (ca. 500km), with no intermediates (except possibly *Cyclostoma gouldiana* Pfeiffer, 1851, see below), suggest the possibility of a different genus for the Hispaniolan species. The radula of *Gyraxis* more closely resembles the Hispaniolan *Brachypodella* (*Brevipodella*) *angulatum* (Gundlach, 1858) and *B. (B.) imitatrix* Pilsbry, 1904, the type of *Brevipodella*, and *B. (Strophina) laterradii* (Grateloup, 1839), although conchological differences would seem to eliminate these from *Gyraxis*. The phylogenetic analysis of Uit de Weerd *et al.* (2016), also indicated a potential close relationship between *Brevipodella*, *Strophina*, and *Gyraxis*. Of the purported species of *Gyraxis*, only *G. sericata* has been phylogenetically studied (Uit de Weerd *et al.*, 2016). Further considerations of generic placement must await inclusion of Cuban *Gyraxis*, including the type species. For now the Hispaniolan taxa are retained in *Gyraxis*.

The subfamilial placement of *Gyraxis* also remains unsettled. *Gyraxis* was not included in the phylogenetic review of urocoptids by Uit de Weerd (2008) but the Hispaniolan *G. sericata* was included in Uit de Weerd *et al.* (2016) under Tetrentodontinae following the review of Schileyko (1999). However, that phylogenetic study clearly demonstrated that the Tetrentodontinae taxa as delineated by Schileyko (1999) were not monophyletic. Pilsbry (1902–1904) suggested parallel evolutionary trends between Tetrentodontinae and Brachypodellinae. No Cuban *Gyraxis*, including the type species, were included in that phylogenetic study. Based on the radular similarities with other species assigned to the Brachypodellinae by Pilsbry, the unknown phylogenetic position of the type species of *Gyraxis*, and the polyphyletic nature of

the Tetrentodontinae, I maintain *Gyraxis* under Brachypodellinae in lieu of more study.

*Gyraxis samana* (Clench, 1966)  
(Figs 1–3, 14)

*Brachypodella (Gyraxis) samana* Clench, 1966: 11, pl. 2, fig. 5.

*Brachypodella samana*: Wetherbee & Clench, 1987: 30.

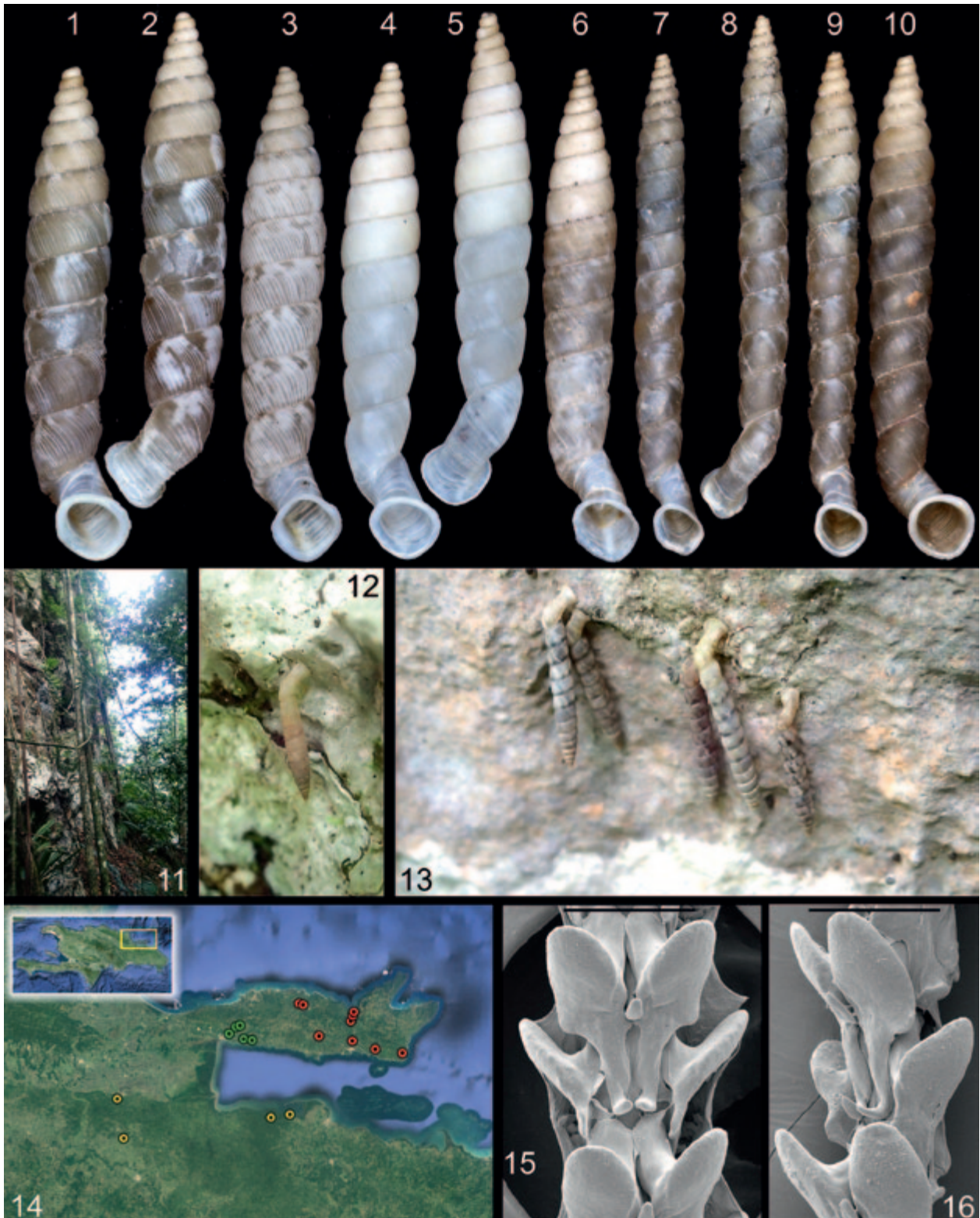
*Type locality* "Peñon de Maria Luisa, Santa Bárbara de Samaná, República Dominicana." This is a cliff ca. 2km N of Samaná.

*Holotype* MCZ 57214, 14.5mm length.

*Paratypes* MCZ 57218 (3 specimens).

*Material examined* (448 specimens) **Dominican Republic. Samaná Province.** UF 179326 (200), 5km E of Sánchez; UF 179334(2), 8km WNW of Sánchez; UF 179330(154), 50m, 11km E of Sánchez; UF 179335(27), sea level, 9km E of Las Terrenas; UF 179329(16), sea level, 10km E of Las Terrenas; UF 179357(2), UF 179359(5), El Valle; GTW 16517a (17, preserved), 13m, road to El Valle, 0.7km SSW of El Valle playa, 19.2766° N, -69.3329° W; UF 179358(25), 2km S of El Valle.

*Redescription* Shell very elongated, posterior half slightly wider than anterior half, tapering at both ends, whorls shouldered. Maximum adult length seen, including peristome, 13.4mm; minimum adult length seen, including peristome, 8.9mm. Nuclear whorls 2, tan or white, rounded, faintly axially costate, rather bulbous. Teleoconch whorls, from demarcation with nuclear whorls to point of detachment at anterior end, 9.5–11.5; last whorl detached and deflected downward for another ¼–½ whorl. Axial sculpture of coarse threads, separated by more than their width, opening slightly concave towards anterior end, stronger on detached portion of whorl. Base with narrow keel that extends to peristome. Internal columella simple, lacking any keels, thin, almost straight. Peristome narrowly expanded, rounded to nearly square. Base color pale tan (translucent when wet), unicolored or with tan, axially aligned blotches, columellar side of keel often brown. Earlier whorls often uniformly cream colored. Peristome white without, often brown within.



Figures 1–16 1–3 *Gyraxis samana*, 1, 2 GTW 16517a, 14.1mm. 3 UF 179358, 14.1mm. 4–6 *Gyraxis sericata*, 4, 5 GTW 16514a, 14.2mm. 6 UF 179354, 14.0mm. 7–10 *Gyraxis excalibur* sp. nov., 7, 8 (holotype, OSUM 41641, 18.6mm). 9 (paratype 3, BMSM 120064, 17.2mm). 10 (paratype 6, UF 179327, 13.3mm). 11 Habitat of *Gyraxis sericata* on cliff face, Boca del Infierno. 12 *Gyraxis sericata* in situ, Boca del Infierno. 13 *Gyraxis excalibur* in situ, at type locality. 14 Distribution of *Gyraxis* in the Bahía de Samaná area. **Red** – *Gyraxis samana*. **Green** – *Gyraxis excalibur*. **Yellow** – *Gyraxis sericata*. All maps Google™ Earth Pro. Image Landsat. © 2018 Google. Data: SIO, NOAA, US Navy, NGA, GEBCO. Inset – general area covered. 15, 16 *Gyraxis sericata* radula, bar=50 $\mu$ .

*Etymology* After Samaná, Dominican Republic.

*Distribution* Both coasts of the Samaná Peninsula from Las Terrenas to its eastern-most extent in the Sierra de Samaná of the Cordillera Septentrional (Fig. 14).

*Habitat* Attached to the vertical faces of wet limestone outcrops at and just above sea level, locally abundant.

*Diagnosis* The axial sculpture is very fine in *G. sericata* and *G. excalibur*, usually separated by spaces less than or equal to the width of the threads; in *G. samana* the sculpture is coarser and the threads are separated by more than their width. Both *G. samana* and *G. sericata* have ca. 10–12 teleoconch whorls (from end of nuclear whorls to point of detachment of final whorl), whereas *G. excalibur* has 11–15 whorls.

***Gyraxis sericata*** (Pilsbry, 1903)  
(Figs 4–6, 11, 12, 14–16)

*Brachypodella* (*Gyraxis*) *gouldiana* var. *sericata*  
Pilsbry, 1903: 63–64, pl. 8, figs. 54–56.

*Brachypodella sericata*: Clench, 1966: 11.

*Gyraxis sericata*: Uit de Weerd *et al.*, 2016: fig.1 [phylogenetic tree].

*Type locality* “Santo Domingo” restricted by Clench (1966: 11) to “San Lorenzo Bay, Bahía de Samaná.”

*Lectotype* ANSP 73258, 11.7mm, broken since original description.

*Paralectotypes* ANSP 465457 (15 specimens).

*Material examined* (40 specimens) **Dominican Republic. Hato Major Province.** GTW 16514a (15, preserved), 55m, Boca del Infierno, 8.6km WNW of Sabana de la Mar, 19.0744° N, -69.4675° W; UF 179354(16), 12km W of Sabana de la Mar. **Duarte Province.** UF 179352(7), 105m, 7km N of Majagual. **Monte Plata Province.** UF179356(2), 200m, 2km S of Majagual.

*Redescription* Shell very elongated, posterior half slightly wider than anterior half, tapering at both ends, whorls rounded or shouldered. Maximum adult length seen, including peristome, 14.3mm; minimum adult length seen, including peristome, 10.8mm. Nuclear whorls

2, tan or white, rounded, faintly axially costate, rather bulbous. Teleoconch whorls, from demarcation with nuclear whorls to point of detachment at anterior end, 10.5–12; last whorl detached and deflected downward for another ¼–½ whorl. Axial sculpture of microscopic threads, separated by less than their width, opening slightly concave towards anterior end, stronger on detached portion of whorl. Base with low, wide keel that extends to peristome. Internal columella simple, lacking any keels, thin, almost straight. Peristome narrowly expanded, rounded posteriorly, more triangular anteriorly. Base color pale tan to white (translucent when wet), unicolored or with tan, axially aligned blotches, columellar side of keel often brown. Earlier whorls often uniformly cream colored. Peristome white without, often brown within.

*Etymology* Latin, *sericus* meaning silky.

*Distribution* Northwestern foothills of the Cordillera Oriental (Fig. 14). *Gyraxis sericata* is isolated from *G. excalibur* and *G. samana* by the extensive Río Yuna valley. Most of its range is contained in the Parque Nacional Los Haitises. The numerous islands in the Bahía de San Lorenzo offshore of the Parque could harbor additional species but they have not been investigated.

*Habitat* Attached to the vertical faces of wet limestone outcrops to at least 200m, locally uncommon (Figs 11, 12).

*Diagnosis* See Diagnosis under *G. samana*.

***Gyraxis excalibur*** sp. nov.  
(Figs 7–10, 13, 14)

*Type locality* 321m elevation, bluffs/mogotes along Carretera Las Terrenas-Sánchez, 2.4km NE of Sánchez, Samaná Province, Dominican Republic, 19.2412° N, -69.5951° W.

*Holotype* OSUM 41641, 18.6mm, preserved.

*Paratypes* Paratype 1, OSUM 41642, 17.2mm, preserved, from type locality. Paratype 2, OSUM 41642, 16.2mm, preserved, from type locality. Paratype 3, BMSM 120064, 17.2mm, preserved, from type locality. Paratype 4, BMSM 120065, 15.4mm, preserved, from type locality. Paratype 5, UF 179327, 17.2mm, 7km E of

Sánchez. Paratype 6, UF 179327, 13.3mm, 7km E of Sánchez.

*Material examined* (368 specimens) **Dominican Republic. Samaná Province.** GTW 16511a(45, preserved), 321m, bluffs/mogotes along Carretera Las Terrenas-Sánchez, 2.4km NE of Sánchez, 19.2412° N, -69.5951° W; UF 179332(3), 270m, 4km NE of Sánchez; UF 179331(19), 5km E of Sánchez; UF 179328(19), 250m, 5km ENE of Sánchez; UF UF 179333(82), 507910(200), 7km E of Sánchez.

*Description* Shell extremely elongated, posterior half very slightly wider than anterior half, tapering at both ends, whorls shouldered. Maximum adult length seen, including peristome, 18.6mm; minimum adult length seen, including peristome, 10.5mm. Nuclear whorls 2, tan or white, rounded, faintly axially costate, rather bulbous. Teleoconch whorls, from demarcation with nuclear whorls to point of detachment at anterior end, 10.5–15.5; last whorl detached and deflected downward for another  $\frac{1}{4}$ – $\frac{1}{2}$  whorl. Axial sculpture of microscopic threads, separated by less than their width, facing slightly concave towards anterior end, stronger on detached portion of whorl. Base with narrow keel that extends to peristome. Internal columella simple, lacking any keels, thin, almost straight. Peristome narrowly expanded, rounded posteriorly, more triangular anteriorly. Base color pale tan, copper, brown, or white, shining (translucent when wet), with brown, axially aligned blotches. Earlier whorls often uniformly cream colored. Peristome white without, rarely brown within.

*Etymology* Excalibur, the sword of King Arthur given to him by the Lady of the Lake. A noun in apposition.

*Distribution* Only known from the southwestern end of the Sierra de Samaná of the Cordillera Septentrional in the vicinity of Sánchez on the Samaná Peninsula (Fig. 14).

*Habitat* Attached to the vertical faces of wet limestone outcrops near 300m elevation, often in groups, locally abundant (Fig. 13).

*Diagnosis* See Diagnosis under *G. samana*.

*Cylindrella gouldiana* Pfeiffer, 1853

*Cylindrella gouldiana* Pfeiffer, 1853: 149.

*Cylindrella (Trachelia) gouldiana*: Crosse, 1891: 148.  
*Brachypodella (Gyraxis) gouldiana*: Pilsbry, 1903: 63.

*Remarks* This species has never been figured and it is not clear why Pilsbry (1903) included it in *Gyraxis*; he admitted he had seen no specimens. Pfeiffer's (1853) description of "*subrimata, turrita*" with a somewhat denticulate suture does not seem to apply to *Gyraxis*. Although Pfeiffer only indicated "St. Domingo," Crosse (1891: 148, followed by Pilsbry, 1903) gave "Région Dominicaine: rochers du Tablaso, près San Cristobal (A. Sallé);" it is not clear how he knew this. This site is ca. 90km south of Bahía de Samaná.

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