



A NEW SPECIES OF THE GENUS *GUILLARMODIA* (MOLLUSCA: GASTROPODA: PULMONATA: SPIRAXIDAE) FROM NORTHEASTERN MEXICO

UNA NUEVA ESPECIE DEL GÉNERO *GUILLARMODIA* (MOLLUSCA: GASTROPODA: PULMONATA: SPIRAXIDAE) DEL NORESTE DE MÉXICO

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ABSTRACT. A new land snail, *Guillarmodia* (*Guillarmodia*) *marcelae* n. sp., Correa-Sandoval, Barrientos-Lozano & Strenth is described from the mountains of Sierra Los Soldados state of Tamaulipas in northeastern Mexico. This new species differs from other regional species of *Guillarmodia* by its smaller size and distinctive subsutural striations. Habitat information of the species and geographic distribution of related taxa are provided.

Key words: terrestrial Gastropoda, Spiraxidae, *Guillarmodia*, northeastern Mexico, new species.

RESUMEN. Un nuevo caracol terrestre, *Guillarmodia* (*Guillarmodia*) *marcelae* n. sp. Correa-Sandoval, Barrientos-Lozano & Strenth es descrita para las montañas de la Sierra Los Soldados, región del estado de Tamaulipas en el noreste de México. Esta nueva especie difiere de otras especies regionales de *Guillarmodia* por su tamaño pequeño y distintivas estriaciones subsuturales. Se incluye información del hábitat de la especie y de la distribución geográfica de especies relacionadas.

Palabras clave: Gastrópodo terrestre, Spiraxidae, *Guillarmodia*, noreste de México, nueva especie.

INTRODUCTION

The Neotropical and partially Nearctic family Spiraxidae is very well represented in Mexico with three subfamilies (Thompson, 1995); it is not only one of the most diverse groups, but also exhibits the largest number of endemics from the northeastern region of the country (Thompson, 2011; Correa-Sandoval *et al.*, 2012). Six genera, 34 species and five subspecies are known from northern Veracruz, San Luis Potosí, Tamaulipas and Nuevo León. There are 16 species and four subspecies reported from Tamaulipas alone. Within the family Spiraxidae, the genus *Guillarmodia* presents similar diversity and distributional patterns. The current distribution of the genus is almost entirely restricted to Mexico, with only a single species reported from Costa Rica. In Mexico, the genus is known along the southwestern coast from Colima south to

Oaxaca and northern along the east coast of Nuevo León and Tamaulipas. Forty-one species and seven subspecies are recognized within the genus (Thompson, 2011). The purpose of this paper is to describe an additional species of the genus *Guillarmodia*.

MATERIALS AND METHODS

Shells were collected in submesic mountain habitat in the southwestern region of Tamaulipas (Thompson & Correa-Sandoval, 2011) from under stones during February 2006 to June 2008. Collection site coordinates were taken with GPS receivers. Live specimens were not obtainable.

The systematics in the Results section is according to Baker (1941, 1943) and Thompson (2011) who possessed the best knowledge on the family Spiraxidae in Mexico.



Length and width of the specimens were measured with a vernier calliper. The height of the aperture is parallel to the shell axis and it was obtained from the outer edge of the basal lip to the outer edge of the posterior corner. The length of aperture is the diagonal axis from the outside of the posterior corner to the outside of the basal columellar lip. The width of the aperture is the longest perpendicular distance with respect to the aperture length.

RESULTS

Systematics

FAMILY Spiraxidae H. B. Baker, 1939

SUBFAMILY Euglandininae H. B. Baker, 1941

GENUS *Guillarmodia* H. B. Baker, 1941

Guillarmodia H. B. Baker, 1941; Nautilus, 55: 54, 57.-Thompson, 1995; Bull. Fla. Mus. Nat. Hist., 39: 54-56.

TYPE SPECIES.- *Euglandina pupa* H. B. Baker, 1941.

DISTRIBUTION.- Mexico in general with one species from Costa Rica.

TAXONOMY.- *Guillarmodia* was previously treated as a subgenus of *Euglandina*. Its distinct shell characters and reproductive anatomy justify recognition as a separate genus, with two subgenera, *Guillarmodia* and *Proameria*; forty-one species and seven subspecies are recognized within the genus (Thompson, 2011).

SUBGENUS *Guillarmodia* s. s.

DISTRIBUTION.- Mexico, generally from states along the Pacific coast from Colima south to Oaxaca, and north along the east coast of Veracruz and Tamaulipas (Thompson, 2011).

TAXONOMY.- In this subgenus the shell is slender and sculptured with weak growth striations and nearly uniform in color. It lacks color bands or flames (Thompson, 1995). The new species of this study has these characteristics. Fifteen species are recognized within the subgenus.

Guillarmodia marcelae n. sp. Figs. 1-3 (1: frontal view; 2: lateral view; 3: sculpture along suture of the last whorl).

DIAGNOSIS: A medium size species of *Guillarmodia* that exhibits a total length up to 8.7 mm. The ovate-cylindrical shell is sculptured with strongly remarkable, short and vertical subsutural striations.

DESCRIPTION: Medium-size, adults 8.7- 11.7 mm long., 0.35- 0.42 times as wide as high. Shell moderately thin; with weak growth striations; semi translucent; glossy; color uniform light brown- bronzed; ovate- cylindrical in shape; apex obtuse; specimens with 8.2- 8.7 weakly arched whorls. Suture very impressed, very clear subsutural



Figures 1-3. *Guillarmodia marcelae*, n. sp.: 1) frontal view, 2) lateral view. Holotype (ITCVZ 8363). 3) Subsutural striations along of last whorl of holotype. Scale bar for figures 1 and 2 represent 2 mm.

hyaline area. Protoconch consisting of about 2.5 smooth and rounded whorls separated by a superficial suture. Teleoconch and to the last whorl with strongly remarkable, short and vertical subsutural striations. Last whorl with 50-68 vertical subsutural striations. Aperture very narrow and elongated 0.22- 0.29 times as wide as long. Outer lip thin and slightly advanced near middle. Columella white, rounded and obliquely truncated with slopes about 30-35° from the vertical axis.

Measurements in mm for holotype and eight paratypes are in Table 1.

TYPE LOCALITY. Mountains of Sierra Los Soldados, road to La Marcela, Miquihuana, Tamaulipas, México (23° 42' 07" N, 99° 49' 36" W; 2735 m). Sierra Los Soldados is 7.8 km northwestern of Ejido Valle Hermoso, municipality of Miquihuana, Tamaulipas (near the border with the state of Nuevo León, municipality of Dr. Arroyo).

The type specimens are deposited at the Mollusks collection of Instituto Tecnológico de Ciudad Victoria (ITCVZ; official register: TAM-CEVS-CC-0001-15).

HOLOTYPE. ITCVZ 8363, collected 30 Aug 2006 by Alfonso Correa Sandoval.

PARATYPES. Tamaulipas: Same data as the holotype (ITCVZ 8364, 1 specimen); same locality as holotype, 21 Feb 2006 by Alfonso Correa Sandoval and Rubén Rodríguez Castro (ITCVZ 8365, ITCVZ 8366, ITCVZ 8367, three specimens); same data as the holotype, 25 Oct 2007 (ITCVZ 8368, one specimen); same locality as the holotype, 24 Jun 2008 by Alfonso Correa Sandoval and Víctor Martínez (ITCVZ 8369, ITCVZ 8370, ITCVZ 8371, three specimens).

Additional specimens are deposited in the Florida Museum of Natural History, University of Florida.

Table 1. Measurements of the holotype and paratypes of *Guillarmodia marcelae* n. sp. Height of the aperture: ApH, length of aperture: ApL, width of the aperture: ApW, vertical subsutural striations in the last whorl: Slw. All the measurements are in mm.

Specimen	Length	Width	ApH	ApL	ApW	Whorls	Slw
HOLOTYPE	11.4	4.1	5.5	5.7	1.7	8.5	68
ITCVZ8364	11.7	4.1	5.8	6.1	1.5	7.3	63
ITCVZ8365	8.7	3.7	5.1	5.3	1.3	7.5	53
ITCVZ8366	11.3	4.3	5.7	6	1.5	8.5	53
ITCVZ8367	11.1	4.1	5.4	5.5	1.6	8.5	57
ITCVZ8368	10.6	4.3	5.9	5.8	1.5	8.3	63
ITCVZ8369	11.3	4.1	5.8	6.0	1.5	8.3	61
ITCVZ8370	9.6	3.9	5.3	5.4	1.2	7.8	57
ITCVZ8371	11.1	3.8	5.6	5.5	1.4	7.0	50

HABITAT. The type locality is in an area of limestone hills with submesic shrub forest of palms, herbaceous vegetation, *Yucca* sp., izotal or sotol (*Dasyilirion* sp.), lechuguilla (*Agave lechuguilla*) and small oaks (*Quercus* sp.). The average annual precipitation is 500 mm (INEGI 1985). Specimens of shells were found under the stones. This is the same location where specimens of *Hendersoniella miquihuanae* were collected by Thompson and Correa-Sandoval (2011).

DISTRIBUTION. Known only from the type locality.

ETYMOLOGY. The specific epithet “*marcelae*” is proposed in reference to the area surrounding the Ejido la Marcela which constitutes the very unique and isolated area where this land mollusk was collected.

DISCUSSION

The shell of *Guillarmodia* (*Guillarmodia*) *cymatophora* (Pilsbry, 1910), [San Luis Potosí: Las Canoas (type locality)] is very big (38 mm) in relation with *G. marcelae* n. sp. In two additional related species in the subgenus *Guillarmodia* from northeastern Mexico the shell is oblong and smaller (5.5- 9 mm). It is the case of *G. minuta* (Pilsbry, 1910), [San Luis Potosí: Las Canoas (type locality)] and *G. pygmaea* (Pilsbry & Vanatta, 1936), [Tamaulipas: González (type locality)].

The shell of other geographically related species of *Guillarmodia* but in the subgenus *Proameria* in many localities in the region (Thompson, 2011) is larger (18-20 mm) and elongated in comparison with *G. marcelae* n. sp., and with little aperture and without subsutural striations. Such is the case of *G. dalli* (Pilsbry 1899), [Nuevo León: Diente, near Monterrey (type locality); municipality

of Santiago (Correa-Sandoval, 1993), Tamaulipas: numerous localities in southern part of state (Correa-Sandoval & Rodríguez Castro, 2002)]. An additional example is *G. delicata* Pilsbry 1903, whose shell is even larger (15-23 mm) and oblong without subsutural striations, [Tamaulipas: Calamaco Canyon 4 miles west of (Ciudad) Victoria (type locality)]. Other examples are *G. potosiana potosiana* Pilsbry 1908, [San Luis Potosí: Ciudad Valles (type locality), Cascadas Micos (Sierra Colmena) (22°06'35" N, 99°09'44" W, 240 masl); 1 km E of Platanito, 1320 masl (22°28'02" N, 99°28'25" W); Hwy. Cd. del Maíz-El Naranjo, km 10 (22°30'00" N, 99°22'06" W); Hwy. Cd. del Maíz-El Naranjo, km 35 (22°30'00" N, 99°22'06" W), (Correa-Sandoval *et al.*, 1998)], and *G. potosiana tamaulipensis* (Pilsbry, 1903), [Tamaulipas: Calamaco Canyon about 4 miles west of (Ciudad) Victoria (type locality) and numerous localities in the southern part of state (Correa-Sandoval & Rodríguez Castro, 2002), Nuevo León: Iturbide (Correa-Sandoval, 1996-1997), numerous localities in the southern part of the state (Correa-Sandoval & Salazar Rodríguez, 2005)].

All the aforementioned species of Spiraxidae are typically endemic in the northeastern region of Mexico (Correa-Sandoval *et al.*, 2012).

Almost all the species treated herein are distributed along the Sierra Madre Oriental biogeographic province and the topography in the area gives rise to natural fragmentation and ecological isolation. Local vegetation types, humidity conditions, rainfall, leaf-litter, soil types, altitude and rock piles favor local endemisms (Correa-Sandoval *et al.*, 2009).

The shell of *Guillarmodia* (*Guillarmodia*) *marcelae* n. sp. exhibits some similarities with *G. (Guillarmodia) comma* (Thompson, 1995) (Holotype in University of



Florida: UF 34663) from Pantla, Guerrero. However, the shell of *G. comma* is more elongated (13-18 mm) and more globose, the suture is very impressed or deep, and the aperture is more rounded and short in relation to the length of the shell. In the new species herein described the striations are more compacted.

The shell of *G. comma* is light brown-reddish and in *G. marcelae* n. sp. is brown-bronzed. *G. comma* has the columella more rounded and obliquely truncated.

Differences in shell morphology can establish generic and subgeneric subdivisions in some taxonomic groups of terrestrial mollusks belonging to Spiraxidae, as well as other families like Urocoptidae (Thompson, 1995; Thompson & Mihalcik, 2005). Subtle differences in shell sculpture even in juvenile stages and other shell characteristics (color patterns, embryonic sculpture and postembryonic sculpture) can be highly significant for distinguishing species like the family Humboldtianidae (Thompson & Correa-Sandoval, 1994; Thompson, 1995; Thompson 2006).

This is specially important for this new spiraxid and for other terrestrial mollusks because the seasonal weather conditions influence the availability of the live specimens, many of the isolated rocky places in which they occur are difficult to access (Thompson, 2006) and most have very localized geographic distributions confined to areas of a few square meters (Thompson & Mihalcik, 2005).

The natural history and phylogenetic relationships of all these spiraxids remain unknown.

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