

NEW SPECIES OF *IDIOSTEMMA* PILSBRY & VANATTA, 1898 (MOLLUSCA: PULMONATA: UROCOPTIDAE) FROM THE EASTERN CUBAN REGIONAlejandro FERNÁNDEZ VELÁZQUEZ^{1*} y Alexis SUÁREZ TORRES²

1. Centro de Investigaciones y Servicios Ambientales y Tecnológicos (CISAT) CITMA, Holguín. Departamento de Recursos Naturales.
2-Sociedad Cubana de Zoología.

* Autor para correspondencia: ale@cisat.cu

ABSTRACT: It is described the new species *Idiostemma frankei* into the subgenus *Maceo* Pilsbry & Vanatta 1898, with type locality at Farallones de Moa, on the northeastern region of Holguín province. For diagnosis were used conchological characters, that make it different from the rest of species into this genus because have whorls almost flattened or plane and semitransparent, with fine ribs on surface of shell. Columella with well-developed lamellae on "S" form, ornamented by ribs like cords that crossing on upper part on both side of the wall, give striated appearance.

KEYWORDS: Gastropoda, Urocoptidae, *Idiostemma*, new species, Cuba.

RESUMEN: Nueva especie de *Idiostemma* Pilsbry y Vanatta, 1898 (Mollusca; Pulmonata: Urocoptidae) de la región oriental de Cuba. Se describe la nueva especie *Idiostemma Frankei* para el subgénero *Maceo* Pilsbry y Vanatta 1898. Para la diagnosis fueron usados caracteres conchológicos que la hacen diferente de las especies conocidas del género, porque la concha tiene vueltas casi planas y semitransparente, con finas costilla en la superficie. La columela con lamela bien desarrollada en forma de "S", ornamentada por costillas semejante a cordones que cruzan la parte superior de ambos lados de la pared de la lamela, dando apariencia estriada.

PALABRAS CLAVES: Gastropoda, Urocoptidae, *Idiostemma*, especie nueva, Cuba.

known from the Cuban eastern region, with four described species, recognized by Espinosa and Ortea (2009), and by Franke and Fernández (2007).

Restricted to limestones, these species share the same ecological characters than other urocoptids, appearing on isolated patches at calcareous substrates (Kabat *et al.*, 2012). The most diagnostic character of this genus is to have a columella without oblique axial ribs, been this subdivided in three subgenus with different features (Torre & Bartsch, 2008), as follow:

Columella with hook.

whorls with axial ribs or tubercles *Idiostemma*

Columella without a hook

columellar lamella spinose *Fibricutis*

Columellar lamellae not spinose

columella with a single granulose fold *Maceo*

The locality Farallones de Moa has been not cited like a place with interesting malacological values, and no species have been described for this locality, indeed. It is possible that no field exploration works were made never before. A first visit to this locality, on September 6-9, 2015, gave us the possibility of looking for malacological novelties, and like result, this new species was localized, at some 200 meters over the sea level. This article attempts to describe a new species from *Maceo* subgenus, on *Idiostemma* genus.

MATERIALS AND METHODS

For the description of this new taxon, 10 specimens were used: 2 specimens alive, one selected as Holotype, and in ethylic alcohol 90 degree was preserved, and the other was used broken the shell for anatomical studies, been both killed by drowning in water with menthol crystal during 24 hours. From the rest of specimen one of them, Paratype, was slowly polished with a nail file, until the interior was showed; others were used for statistical analysis. Following variables (in millimeters) were considered:

- total number of whorls. (Starting at the decollation point, parts of whorls above the decollation area were regarded as 0th whorl)

INTRODUCCIÓN

The Cuban terrestrial malacofauna with more than 96% of endemism (Espinosa and Ortea, 1999), must be considered an important "hotspot" for the biodiversity conservation, been recognized 1403 land snails species (Herrera-Uria and Espinosa, 2016; Herrera-Uria *et al.*, 2016, Hernández *et al.*, 2017; Espinosa *et al.*, 2017), and for the group, 588 are urocoptids, having the most important urocoptids diversity into the Caribbean area (Espinosa and Ortea, 2009). The genus *Idiostemma* Pilsbry and Vanatta, 1898, is only

- height (maximum length of shell)
- diameter (maximum diameter of the cylindrical part of the shell without the aperture)
- greater diameter (maximum diameter including aperture, measured perpendicularly to shell axis)
- number of axial lines (tiny axial riblets) in the intercostals area, counted on penultimate whorl and neck (solute part).

Used Abbreviations: H: height; D: diameter; Gd: greater diameter; W: total number of whorls. IES: Instituto de Ecología y Sistemática; m.a.s.l: meters above the sea level.

Radule was obtained immersing soft parts in a 10 % solution of Sodium Hydroxide until no presence of soft parts were observed. Later it was located using a stereoscopic microscope and transferred to distilled water. After several washes it was tinted with Eosina 10 %, collocated on a microscope slide, and observed under 40 x magnifications to define the structure elements.

RESULTS

SYSTEMATIC

Clase GASTROPODA
Subclase PULMONATA
Orden STYLOMMATOPHORA.
Family Urocoptidae Pilsbry, 1898.
Subfamily Urocoptinae Pilsbry, 1898
Genus *Idiostemma* Pilsbry & Vanatta, 1898.
Subgenus Maceo Pilsbry & Vanatta 1898
Idiostemma frankei new specie
(Figs. 1 A, B, C, D; Fig. 2 and Fig. 3)

DIAGNOSIS: Shell cylindrical and elongated, having the majority of adults the conch fractured on apical region (decollated); from nuclear whorls its size has continuous increase, but it in mature specimens is broken, separated apex (Fig. 1 A); with whorls almost flattened or plane; brown and semitransparent, with fine ribs in surface, becoming in axial cords like small hollowed teeth on upper part and periphery of each whorl, at both side of suture, while the growing of the shell. Shell sculpture on *I. frankei* sp. nov., it is well differentiated from the known species of the genus, because a microscopic pattern of nodules at both sides of the suture given bi-denticulate or nodular appearance, and very weak ribs are evidenced, although they are well evidenced at the first sight in the last three turns and fine axial hair-like riblets between intercostal spaces of ribs, also deep suture characterize this new specie (Fig. 1, B, C, D). Columella with well-developed lamellae on "S" form, ornamented by ribs that crossing on upper part on both side of the wall, give striated appearance (Fig. 1 E,F), here details of columellar axis on the three last whorls are showed (Fig. 2), exclusive character of the new species.

DIAGNOSIS (en español): Concha cilíndrica y alargada, la mayoría de los adultos con fractura apical (decolada); desde las espiras nucleares su tamaño tiene aumento continuo, pero en los especímenes maduros está roto el ápice

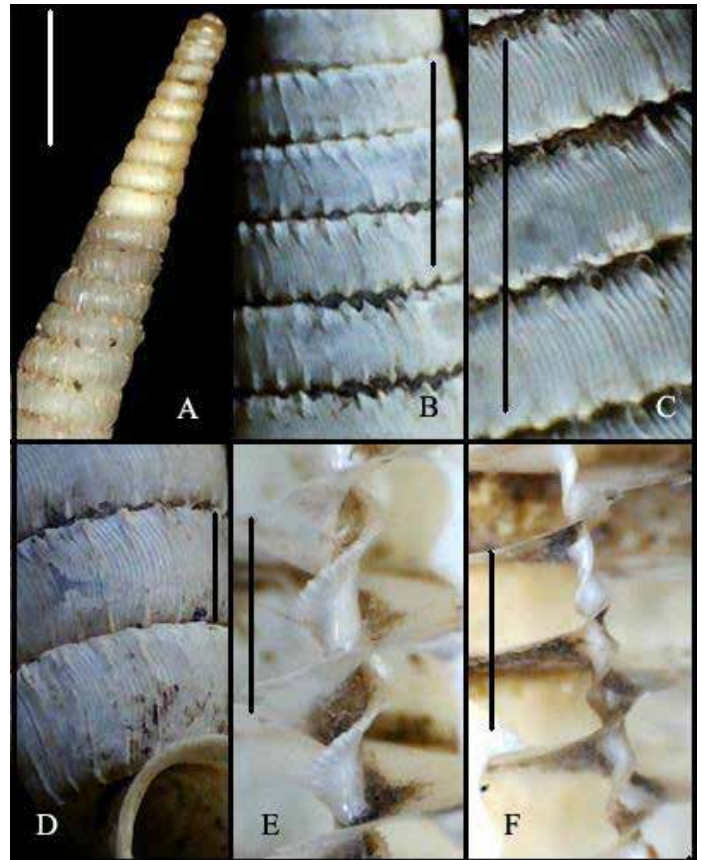


FIGURE 1. General features of shell of *Idiostemma frankei* n. sp.: A, Apex; B, sculpture after decollation with slightly axial ribs or cords interrupted and C, fine axial hair-like riblets between intercostal spaces of ribs; D, interrupted ribs and fine axial hair-like riblets on the last three whorls; E, sculpture of columella and lamellae on last whorls and F, the same but after decollation on the first whorls. Scale 2 mm, white bar.

FIGURA 1. Características generales de la concha de *Idiostemma frankei*: A, Ápice; B, escultura después de la decolación con costillas ligeramente axiales o cordones interrumpidos y C, costillas axiales finas, similares a pelos entre los espacios intercostales de las costillas; D, costillas interrumpidas y costillas axiales finas similares a pelos en las últimas tres vueltas; E, escultura de columela y laminillas en los últimas vueltas y F, similar a la imagen anterior pero después de la decolación en las primeras vueltas. Escala 2 mm, barra blanca.

(Figura 1 A); espiras casi planas; color castaño y semitransparente; costillas finas en la superficie de la concha similar a cordones axiales, que a ambos lados de la sutura engruesan en forma de dientes o nódulos pequeños y ahuecados, que a nivel de la sutura en la parte superior y periferia de cada espira dan aspecto bi-denticulado o bi-nodulado, pero mucho más pronunciado con el crecimiento de la concha. La escultura de la concha en *I. frankei* n sp., difiere de las especies conocidas del género, porque se visualizan microscópicamente costillas muy débiles, interrumpidas en las primeras vueltas de las conchas fracturadas, aunque se hacen evidentes a simple vista en las dos o tres últimas vueltas y entre los espacios intercostales evidencia finas costillitas semejantes a pelos o hilos, también la sutura profunda caracteriza esta nueva especie (Fig. 1 B, C, D). Eje columelar robusto con lamella bien-desarrollada en forman de S, y ornamentada por costillas romas o semejante a cordones que al cruzar por la parte superior de la pared de la lamela dan apariencia estriada (Fig. 1 E, F). Los



FIGURE 2. Details of the columellar axis with strog lamellae and ornamented by ribs like cords crossing on upper wall.

FIGURA 2. Detalles del eje columelar con estrías laminares y ornamentadas por costillas como cordones que se cruzan en la pared superior.

detalles del eje columelar en las tres últimas espiras están mostrados (Fig. 2), carácter exclusivo de la nueva especie.

TYPE MATERIAL: Holotype at IES in ethanol 950 (catalogue number: CZACC8. 1.302); Paratypes at IES in ethanol 950 (catalogue number: CZACC8. 1.302). Both from Farallones de Moa, Holguín, Cuba (20° 34.3' N; 74° 42.2' W; 210 meters a. s. l.).

HOLOTYPE DESCRIPTION: Different views of holotype (Fig. 3). Shell cylindrical and elongated, with 14.25 whorls; height 25.5 mm; lesser diameter 4.6 mm; greatest diameter 6.3 mm; brown and semitransparent, specimen adult with fractured conch on apical region (decollated), with whorls almost flattened (Fig. 3). In the first third of the conch, after the nucleus, appear the teleoconch, with two whorls and half, where are observed very fine and closed ribs. After teleoconch, the surface shows separated and slightly axial cords, which change their elongated aspect when reach the second third of the conch, where disappear their continuity in length, for appearing on interrupted form, mixed with fine ribs that cover this entire portion. These interrupted axial cords appear like small hollowed teeth on upper part and periphery of each whorl (like enclosed to the suture line), in general one in front the other, at both side of suture, with a slight displacement, giving

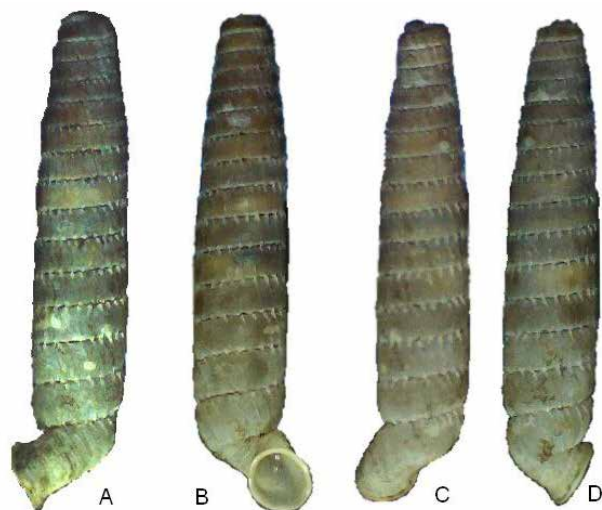


FIGURE 3. Different views of holotype: A, left lateral; B, ventral; C, dorsal and D, right lateral. Scale 2 mm, black bar.

FIGURA 3. Diferentes vistas del holotipo: A, lateral izquierdo; B, ventral; C, dorsal y D, lateral derecho. Escala 2 mm, barra negra.

to the conch a bi-denticulate or nodular appearance. On the third portion of the conch, appear the high axial cords again, but in this case these are not interrupted, and are mixed with the fine axial hair-like riblets. At the solute shell level, ribs are higher in number from 3 to 6, which are distributed on uniform way, with an oblique inclination and like striated appearance, very near one from another, having the intercostals spaces a width three or four times the ribs's broad. Columella is strong and twisted, straight in the last whorl, having a well-developed lamellae on S form at precedent whorls, showing small ribs on walls, that crossing the upper part showing a striate appearance like canals. At first whorls, after fractured portion, the lamellar characteristics are absent. In general, from the first and sixth whorls until successive, after the fractured portion of the conch, the lamellae increase regularly its height. The last whorl is separated, with subcircular and oblique aperture of shell, with almost white lip, thin, widespread and reflected, turned back and toward inside forming a circum-lip canal. The small ribs of this part of the shell can be watched against the light. The navel it narrow and not so deep; animal is semitransparent of pale color (Fig.3).

ANATOMY: Radule: Odontophore with 0.075 mm in length and 0.045 mm on wide. Radule formula 5-11-1-11-5 (central tooth very narrow and long, laterals teeth with developed cusps, and the rest, five marginal teeth on transition form from laterals, with not well developed cusps.

VARIATIONS: The decollated shells are cylindrical and its meddle size to small characterize this new species, varying in height from 21.90 to 25.50 mm; in diameter from 4.40 to 5.00 mm, in greater diameter from 4.70 to 6.45 mm and in number of whorls from 13 to 15.75 (Table 1), being the most large of the known species into the genus.

DISTRIBUTION: Only known from type locality

ETYMOLOGY: This new species is dedicated to Steffen Franke, member of German Malacozoological Society, who has devoted more than 15 years on several Cuban malacological contributions.

HABITAT: The new mollusks were collected in karstic Mogotes' s summit, on shaded areas, inside crevices, covered by death leaves, fallen twigs, and other parts of plants. Usually specimens occur under the leaf litter and rarely outside and upper of it. The vegetation that grows in the area belongs to an evergreen forest. Here the big calcareous system is formed from large blocks of rocks with cliffs. All the specimens collected alive were found with some soil particles attached at surface.

COMPARATIVE REMARKS

On shell linear dimension, the height and diameter of *I. frankei* sp. nov., is most similar to *Idiostemma uncata* (Gundlach) Pfeiffer, 1859, the type species of genus *Idiostemma* Pilsbry and Vanatta, 1898, but *I. frankei* sp. nov., the height has a biggest size ($X = 23.84$ mm; $SD = 0.29$) than all the known species of the genus, with Confidence Interval for mean of 22.59-25.10 mm; the diameter on both species a similar value showed, but *I. frankei* sp. nov., with Confidence Interval for mean 4.34-4.76 mm

TABLE 1. Lineal dimensions and number of whorls on shells (decollated adults) of *Idiostemma frankei*. (H: Height; D: Diameter; G. D: greater Diameter; W: number of whorls, CI: Confidence Interval, SD: Standard Deviation, Min: Minimum, Max: Maximum). The first specimen is it holotype, the rest are paratype.

TABLA 1. Dimensiones lineales y número de espirales en conchas (adultos descoloridos) de *Idiostemma frankei*. (H: Altura; D: Diámetro; G. D: Diámetro mayor; W: número de espirales, IC: Intervalo de confianza, SD: Desviación estándar, Mín.: Mínima, Máx.: Máxima). El primer espécimen es el holotipo, el resto son paratipo.

Sample	Measurements			
	H	D	G. D	W
1	25.50	4.60	6.30	14.25
2	25.20	5.00	4.70	15.75
3	23.40	4.65	6.45	14.50
4	21.90	4.40	5.50	14.00
5	25.00	4.95	6.25	15.25
6	23.80	4.65	6.15	14.15
7	20.10	4.00	5.30	13.00
8	23.25	4.45	5.90	13.25
9	25.05	4.50	6.10	13.50
10	25.25	4.30	5.35	15.75
Mean	23.84	4.55	5.80	14.34
CI	22.59-25,10	4,34-4..76	5.40-6.20	13.64-15.04
SD	1.75	0.29	0.56	0.98
Min	20.10	4..00	4.70	13.00
Max	25.50	5.00	6.45	15.75

(SD= 0.29), and *I. uncata* is within of this interval; both species have more than 4.5 mm in diameter; the number of whorls is similar to *I. uncata* and *Idiostemma interrupta neyi* (Jaume and Torre, 1972; Torre and Bartsch, 2008). These interrupted ribs and nodules on both side of suture of shell, is similar to *I. interrupta* "Gundlach" Pfeiffer, 1856, these structures are watched through macroscopic view, showing after decollation, nodules on superior part and in the periphery of each whorl, from where the hollow ribs extend which are incomplete or interrupted in the half surface of almost all whorls.

Idiostemma frankei sp. nov., has similar columellar axis to *Idiostemma interrupta* "Gundlach" Pfeiffer, 1856, what justifies its inclusion in the subgenus Maceo Pilsbry and Vanatta 1898, but they differ on lamella ornamentation, because in *I. interrupta*, granular lines are clearly seen (Torre and Bartsch, 1972; Torre and Bartsch, 2008) and in *I. frankei* sp. nov., and ornamented lamellae with blunt ribs like cords on the walls are crossing near upper part. Both species have almost similar columellar axis, differing on the lamellae ornamentation; *I. interrupta* has granulo-se lines and on *I. frankei* sp. nov., the axis with lamella is more robust having small ribs or cords on walls, crossing on superior part.

ACKNOWLEDGMENTS: We thank to Steffen Franke, Dennis Uit Weerd, José Espinosa, Maike Hernández and two anonymous reviewers who provided useful comments to the earliest version of this paper. A special gratitude to Cedilber Pérez, our guide during the field work at Farallones de Moa; also to the administration of the National Park Alejandro de Humboldt, for lodging support. Also thanks to Idea Wild by donation of laptop used in this work. This result was associated to the project of investigation CISAT: Evaluation of the risks of the biological diversity in key ecosystems of the municipalities Mayarí, Gibara and Moa, from Holguín province. Project not associated to program I+D 01/13 (2013 - 2015).

REFERENCES

- Espinosa, J. and J. Ortea. 1999. Moluscos terrestres del archipiélago cubano. *Avicennia* Suplemento 2: 1-137.
- Espinosa, J. and J. Ortea. 2009. *Moluscos terrestres de Cuba*. Vaasa. Finlandia. 191 pp.
- Franke, S and A. Fernández. 2007. A new land snail of the genus *Idiostemma* Pilsbry et Vanatta, 1898 (Gastropoda: Urocoptidae) from eastern Cuba. *Schriften zur Malakozoologie aus dem der Natur - Cismar* 23: 79- 86. www.cismar.de/hnc_home/schrdeu.htm
- Hernández, M., L. Alvarez-Lajonchere, D. Martínez, D. Maceira, A. Fernández and J. Espinosa. 2017. Moluscos terrestres y dulceacuícolas. Pp. 168-195. In: *Diversidad biológica de Cuba: métodos de inventario, monitoreo y colecciones biológicas* (C. A. Mancina and D. D. Cruz, Eds.). Editorial AMA, La Habana, 502 pp.
- Herrera-Uria, J., J. Espinosa and J. Ortea. 2016. Dos nuevas especies del género *Cochlodinella* Pilsbry & Vanatta, 1898 (Mollusca: Gastropoda: Urocoptidae) de la isla de la Juventud, Cuba. *Revista de la Academia Canaria de Ciencias* 28: 89-96.
- Herrera-Uria, J. and J. Espinosa. 2016. Descripción de dos especies nuevas de *Liocallonia* y *Tetrentodon* (Gastropoda: Pulmonata: Urocoptidae) procedentes de la colección "Miguel L. Jaume" del Museo Nacional de Historia Natural de Cuba. *Novitates Caribaea* 10: 31-37.
- Jaume, M. L. and A. de la Torre. 1972. Catalogo de la fauna Cubana - XXIX to XXXV- Los Urocoptidae de Cuba (Mollusca - Pulmonata). *Circulares del Museo y Biblioteca de Zoología de la Habana*: 1526 -1649.
- Kabat, A., R. Hershler and A. González. 2012. Resolution of taxonomic problems associated with the complex publication History of the seminal Torre and Bartsch monograph on cuban Urocoptidae (Gastropoda, Pulmonata). *Zootaxa* 3362: 43- 53.
- Torre, C. de la and P. Bartsch. 2008. *Los moluscos terrestres cubanos de la familia Urocoptidae*. Editorial Científico-Técnica, Ruth Casa Editorial, La Habana. 730 pp.