

A conspicuous new terrestrial snail species (Gastropoda: Bulimulidae) from the Región de Antofagasta, northern Chile (#16438)

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A conspicuous new terrestrial snail species (Gastropoda: Bulimulidae) from the Región de Antofagasta, northern Chile

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ABSTRACT

A new species of *Scutalus* Albers, 1850 (Gastropoda: Bulimulidae), *Scutalus chango* sp. n. is described from a coastal area of northern Chile. Shells of this new species were collected buried in sand and from under boulders and rocks in the foothills of the Chilean Coastal Range at Paposo, Región de Antofagasta. The new species is distinguished from all the other Chilean terrestrial snails by its slender shell with a flared and reflected aperture, and by the presence of a columellar fold. This is the first record of the genus *Scutalus* in Chile, and the southernmost record for this endemic South American bulimulid genus. The presence of this species at Paposo highlights the need for further research and for conservation guidelines in coastal areas of northern Chile, which have a comparatively high biodiversity and endemism.

Keywords *Scutalus*, Chilean Coastal Range, Stylommatophora, Orthalicoida, South America, Peru, Bolivia, land mollusc, Pulmonata

INTRODUCTION

Terrestrial molluscs are one of the least researched invertebrate groups in Chile; the knowledge on its diversity is based in comparatively few works, most of them studies from the XIX century, with a single recent comprehensive work (Stuardo & Vega 1985) which listed 154 species in 14 families for the entire Chilean territories, including the Juan Fernández and Desventuradas Archipelagos and Easter Island. The Chilean terrestrial molluscs are mostly represented by species of the families Charopidae, Bulimulidae and Bothriembryontidae, most of them with very small distributions and high levels of endemism. Works which have reviewed terrestrial snails from the northern part of the country (characterized by its arid to hyper-arid landscape) only include the studies done by Philippi (1860), Gigoux (1932), Rehder (1945), Breure (1978), Stuardo & Valdovinos (1985), Valdovinos & Stuardo (1988), Miquel & Araya (2013), Araya & Catalán (2014), Araya (2015a) and Araya et al. (2016).

In the present study —part of ongoing work reviewing terrestrial molluscs from northern and central Chile (Araya & Aliaga 2015; Araya, 2015b) — we report an unusual new terrestrial snail species, characterized by having a shell with an expanded aperture and a columellar fold, collected buried in humus and sand, among communities of arborescent cacti (*Eulychnia iquiquensis*) and large succulent shrubs (*Euphorbia lactiflua*) and other xerophytic plants, in a narrow area in the foothills of the Chilean Coastal Range north of Paposo, Región de Antofagasta, in northern Chile. This new species represents the southernmost record of the genus *Scutalus* Albers, 1850, a South American genus belonging to the family Bulimulidae, a family which was formerly represented in Chile solely by the genus *Bostryx* Troschel, 1847.

MATERIAL AND METHODS

Material collection

Sixteen specimens, all of them empty shells, were collected buried in humus and under boulders and fallen rocks north of Paposo (24°55' S; 70°30' W, altitude 150 to 170 m), Región de Antofagasta, northern Chile (Figures 1, 2). The dimensions of the shells, measured with Vernier calipers (± 0.1 mm) are depicted in Figure 3; measurements are given in mm and they include, when appropriate, the additional thickness of the lip. Type specimens are deposited in the collections of the Museo Paleontológico de Caldera (MPCCL), in Caldera, Chile and in the Santa

Barbara Museum of Natural History (SBMNH) at Santa Barbara, USA. Field study permits were not required for this study and none of the species studied herein are currently under legal protection. Abbreviations used are: H: height (maximum dimension parallel to axis of coiling); HA: height of aperture; HS: height of spire; LW: height of last whorl; SA: spire angle; W: width (maximum dimension perpendicular to H); and width of aperture (WA). The distribution map (Figure 1) was prepared using SimpleMapp (Shorthouse 2010).

Nomenclature

The electronic edition of this article conforms to the requirements of the amended International Code of Zoological Nomenclature, and hence the **new names** contained herein are available under that Code from the electronic edition of this article. This published work and the nomenclatural acts it contains have been registered in ZooBank, the online registration system for the ICZN. The ZooBank LSIDs (Life Science Identifiers) can be resolved and the associated information viewed through any standard web browser by appending the LSID to the prefix “http://zoobank.org/”. The LSID for this publication is: urn:lsid:zoobank.org:pub:C9BE441E-6159-4973-888D-74660B2C25F3. The electronic edition of this work was published in a journal with an ISSN and has been archived and is available from the following digital repositories: PubMed Central, LOCKSS.

RESULTS

Systematic Account

Superfamily Orthalicoidea Martens in Albers, 1860

Family Bulimulidae Tryon, 1867

Genus *Scutalus* Albers, 1850

Type species *Bulinus proteus* Broderip, 1832

***Scutalus chango* new species**

(Figs. 4A–O, 5A–D)

Diagnosis: A species with a medium sized (H up to 25.5 mm) elongated whitish or variegated thick shell, sculptured by growth lines and sometimes presenting shallow varices. The shell is **most** characterized by the subovate peristome with an expanded and reflexed outer lip, a narrow and deep umbilicus ~~narrow~~ and by the presence of a **columellar fold**.

Description: Shell solid, of medium size (H up to 25.5 mm), elongated, fusiform; around 2.3 times as long as wide, rimate; the upper whorls conic. Surface slightly shining; color white, corneous, or white with brownish axial streaks; sculptured by faint prosocline growth lines, crossed by minute and irregular spiral lines, giving a minutely reticulated surface in some areas. Irregular, longitudinal varices formed by old peristomes are occasionally found on the shell. Protoconch one and a half whorls, white to reddish-brown in color; smooth to the naked eye but in **magnification sculptured entirely by many small nodules and striations**. Protoconch-teleoconch boundary well defined; the teleoconch sculptured with fine growth lines and minor spiral lines **most** visible **in** earlier whorls; sculpture more **marked** toward the umbilical area. Six and a half flat to slightly convex whorls; last whorl convex and slightly angulated, about 0.66-0.68 of total height. Sutures impressed but shallow. Aperture large (**AH** about 0.44-0.48 **H**), subovate (around 1.50-1.54 times as long as wide), slightly oblique and prosocline (about 27° with columellar axis). Columellar margin **concave**, short, dilated above, minutely rugose, with a **columellar fold** in the interior of its upper **side**. **The terminations of the peristome joined by an** oblique parietal callus. Outer lip expanded and reflexed, sharp, often with the internal margin thickened. Umbilicus narrow and very deep. Soft parts unknown.

Type material: Holotype MPCCL XXX1 (Figs. 4A–G): H: 24.8, HA: 10.6, LW: 16.6, NW: 7.5, SA: 47.5°, W: 10.7, WA: 7.3; paratype 1 MPCCL XXX2 (Figs. 4H–I): H: 25.3, HA: 12.4, LW: 16.8, NW: 7.5, SA: 50°, W: 11.2, WA: 8.1; paratype 2 (juvenile) MPCCL XXX3 (Figs. 4J–L): H: 18.1, HA: 9.4, LW: 12.9, NW: 7.0, SA: 59°, W: 9.2, WA: 6.2; paratype 3 (juvenile) MPCCL XXX4 (Figs. 4M–O): H: 15.3, HA: 8.1, LW: 10.6, NW: 6.5, SA: 57°, W: 8.3, WA: 5.0; paratype 4 (juvenile) SBMNH 460094 (Figs. 5A–D): H: 15.7, HA: 7.3, LW: 10.5, NW: 6.75, SA: 54°, W: 8.6, WA: 4.9; paratype 5 MPCCL XXX5: H: 25.4, HA: 12.6, LW: 17.2, NW: 7.5, SA: 47.67°, W: 11.2, WA: 8.1. All the specimens collected by M. Araya and J. F. Araya, January 17, 2016.

Type locality: Foothills of the Chilean Coastal Range, north of Paposo (**24°55' S; 70°30' W**, altitude 150 to 170 m), Comuna de Taltal, Región de Antofagasta, northern Chile.

Distribution and habitat: Only known from the type locality; the shells were found in **humus** under boulders and fallen rocks, usually near communities of the arborescent cacti *Eulychnia iquiquensis*, the large succulent shrub *Euphorbia lactiflua* and other small vegetation in the foothills of the Chilean Coastal Range. **Many old shells** and shell fragments were found buried in sediments in creeks and gullies, but no live specimens were recovered.

Etymology: A patronym (used as a noun in apposition) in honor of the Changos, local indigenous people (now extinct) who inhabited in the coastal areas of northern Chile, having their last communities at Paposo, the type locality of the new species.

Remarks: Juvenile specimens have an obtusely angulated to almost carinated last whorl (Figs. 4J–O) and a rather narrow and slanted aperture (Figs. 4J, 5A), slightly semilunar in some specimens (Fig. 4M); the external lip becomes reflexed and expanded, and the columellar lip widens in more mature specimens (Fig. 4J), while in fully mature shells the peristome is almost continuous, with a large, expanded and reflexed outer lip and a thin columellar fold (Figs. 4A and 4H). Evidence of episodic growth is seen in the irregular varices found in several specimens; this characteristic is unseen in any other Chilean terrestrial mollusc.

Comparisons with related taxa: This species differs from all the other species of Chilean terrestrial snails by its slender shell with a flared and reflected apertural lip and by the presence of a columellar fold, a feature so far unique among Chilean terrestrial species. This new taxon resembles at first face *Scutalus latecolumellaris* Preston, 1909, which was reported by Weyrauch (1967) from northern Peru at an elevation of 1700 m. However, the size difference (25 vs. 54 mm) immediately distinguishes the new taxon from *S. latecolumellaris*. All other *Scutalus* species are decidedly stouter and cannot be confused with this novelty. The protoconch of this new species, sculptured with nodules and striations, has been compared to other *Scutalus* species; these latter are described as “pit-reticulate” (Breure 1979: 80). Although the protoconch of this novelty is slightly different, the characteristics of the shell morphology, and the ecology and low altitude of the locality of this new species all point more towards the inclusion within *Scutalus* —with a coastal distribution in northern-central Peru and now in northern Chile— than the high-altitude genus *Kuschelenia* Hylton Scott, 1951, found in Andean areas in Argentina, Bolivia, Ecuador and Peru (Hylton-Scott, 1951; Weyrauch, 1967; Breure, 1978, 1979; Miquel 1998; Cuezco et al. 2013); type localities, and records housed at the Leiden Museum, of *Scutalus* and *Kuschelenia* species are shown in Figure 1. There is a remarkable gap in distribution between this novelty and other *Scutalus* species which do occur in the coastal area of central and northern Peru (Weyrauch 1967, Breure 1979). Future study of the anatomy and molecular data should provide further evidence on its possible relationships with species from neighbouring countries.

DISCUSSION

The coastal areas of the Atacama Desert in northern Chile have been found to harbor a surprisingly rich diversity of land snails, almost matching the species richness of the much more humid Juan Fernandez Archipelago, off central Chile (Miquel & Araya, 2013; Araya & Catalan 2014; Araya 2015b, Miquel & Araya, 2015). The areas near and around Paposo have already yielded a relatively rich snail harvest in early explorations, e.g. by Cuming (Broderip & Sowerby 1832a,b) and the ‘Comisión Científica del Pacífico’ (Hidalgo 1872); the latter collection recently revised by Breure & Araujo (2017). In contrast with the much more arid inland areas of northern Chile, these coastal lowlands receive periodic fogs from the sea, which helps to sustain unique communities of plants in ravines and gullies in the West side of the Chilean Coastal Range. Taltal-Paposo in particular has a very rich diversity of endemic plant species, including some relict species with micro-ranges, acting as a local biodiversity island (Ricardi, 1957; Dillon, 1991; Pizarro-Araya & Jerez, 2004). The particular habitat of *S. chango* sp. n., living among and under large boulders, may provide a microclimatic condition similar to humid areas; this rock habitat is also relatively stable and buffered from climatic change. These litho-refugia have already been documented for Australian territories (Couper and Hoskin 2008), and they may also explain the presence of charopid species in northern Chile, which require humid environments to thrive.

This fragile ecosystem is in peril due to urbanization and industrialization in the area, where a thermoelectric industry has already been built. Land snails are currently not taken into account in local governmental policies; a proper knowledge of the species present in northern Chile and of their distributions is essential for future conservation efforts, especially in hotspots of biodiversity like Paposo.

CONCLUSIONS

A new terrestrial bulimulid species (Gastropoda: Orthalicoidea), *Scutalus chango* sp. n., is described from Paposo, Región de Antofagasta, northern Chile, being the first record of the genus *Scutalus* in Chile and the southernmost record for this endemic South American genus. The new species may represent part of a relict fauna at the coastal area of northern Chile, with close relationship with species from central-northern Peru.

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Figure 1

Location map

Figure 1. Geographical location of *Scutalus chango* sp. n. (red star: type locality), Peruvian *Scutalus* species (yellow circles), and *Kuschelenia* species (black squares).

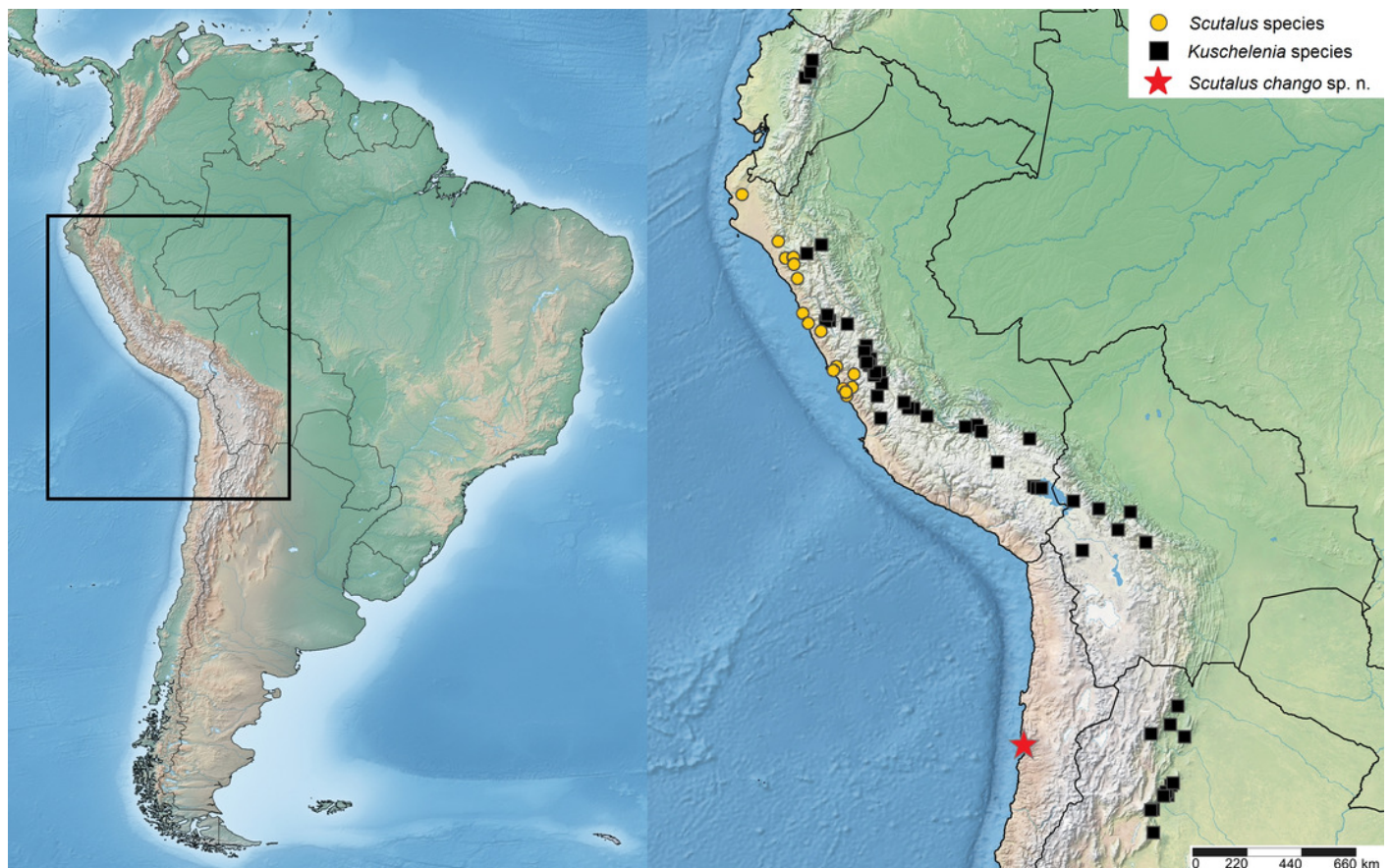


Figure 2

Type locality

Figure 2. Type locality and habitat of *Scutalus chango* sp. n.: under boulders at foothills of the Chilean Coastal Range (SE view), north of Paposo, Región de Antofagasta, northern Chile.



Figure 3

Measurements performed on shells

Figure 3. Measurements taken on specimens and counting of whorls. Abbreviations are: diameter (D: maximum dimension perpendicular to H); height (H: maximum dimension parallel to axis of coiling); height of aperture (HA); height of last whorl (LW); height of aperture (HA); spire angle (SA), and width of aperture (WA).

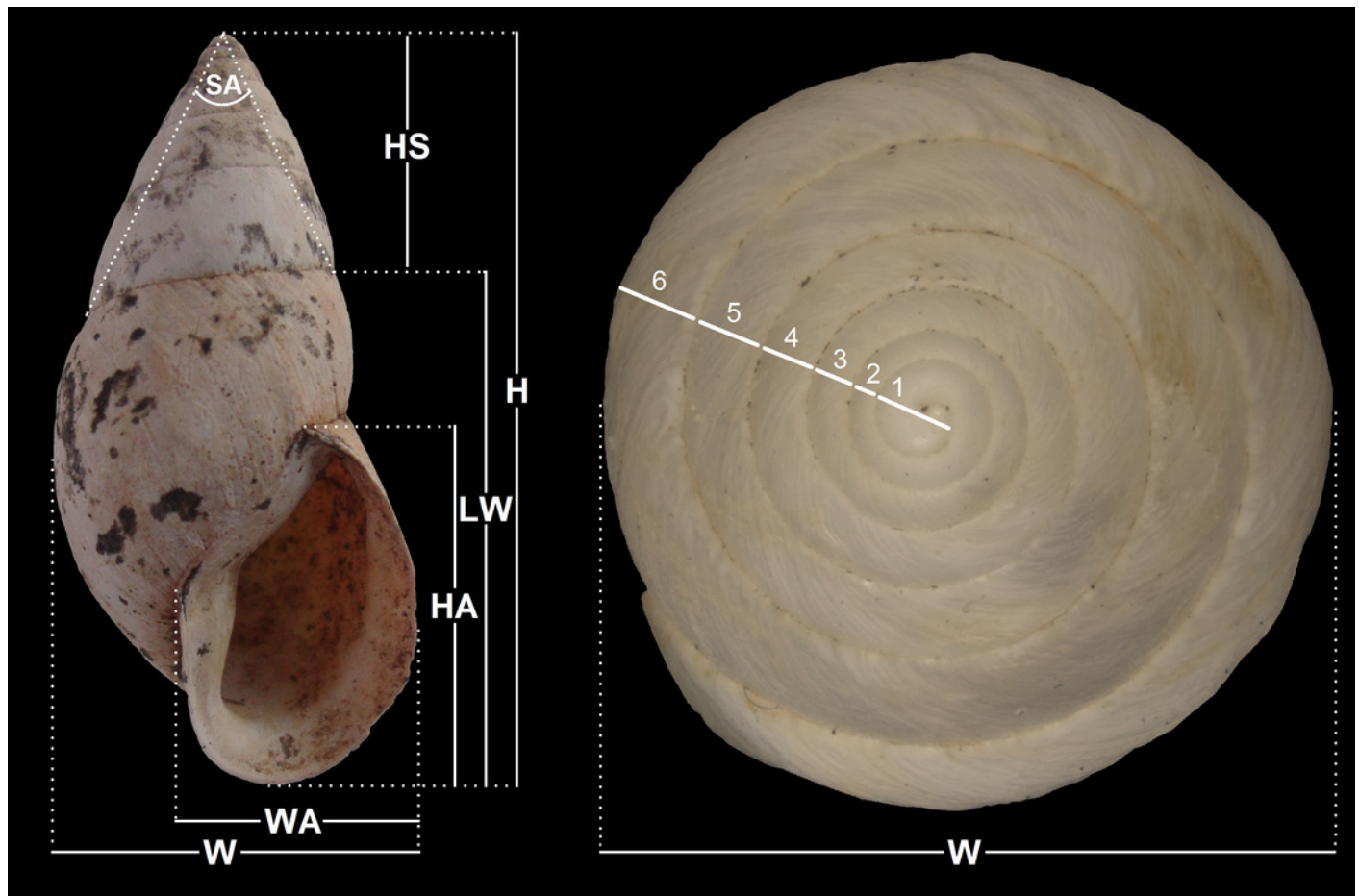


Figure 4

Scutalus chango n. sp.:

Figure 4. *Scutalus chango* n. sp. A-G: Holotype MPCCL XXX1, A: apertural view, B: side view (external lip view), C: abapertural view, D: side view (umbilical view), E: basal view, F: detail of umbilicus and columellar lip, G: detail of sculpture and sutures; H-I: Paratype 1 MPCCL XXX2, H: apertural view, I: abapertural view; J-L: Paratype 2 MPCCL XXX3 (juvenile specimen), J: apertural view, K: side view (external lip view), L: abapertural view; M-O: Paratype 3 MPCCL XXX4 (juvenile specimen), M: apertural view, N: side view (external lip view), O: abapertural view. Scale bars are 10 mm for A – E, 5 mm for F-G, and 10 mm for J-O.

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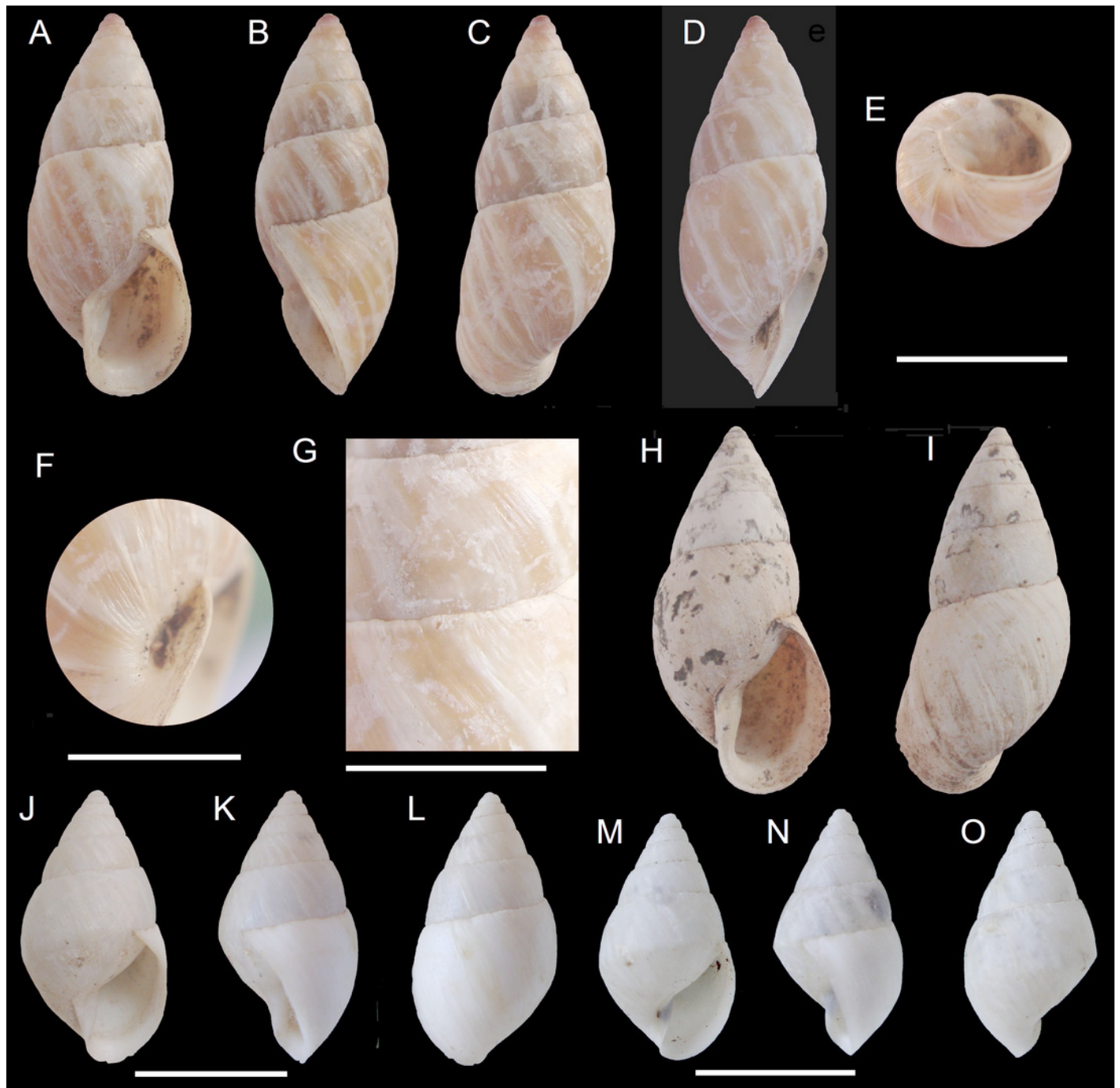


Figure 5

Scutalus chango n. sp.

Figure 5. *Scutalus chango* n. sp. A-D: Paratype 4 SBMNH 460094, A: apertural view, B: apical view, C: SEM side view of protoconch, E: SEM apical view of protoconch. Scale bars are 5 mm for A and B, and 1 mm for C and D.

