

Insights on the genus *Callonia* (Mollusca: Urocoptidae) from Western Cuba

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ABSTRACT Specimens of all western Cuban species of *Callonia* are illustrated, together with images of live animals and their habitat, followed by comments about recent field work. The putative relationships among species based on the morphological characteristics of last whorl soluteness and rib shape-orientation could be biased. Seemingly ecologic equivalent pairs *C. lowei*-*C. dautzenbergiana* and *C. elliotti*-*C. gemmata* are much alike in external appearance although genetic similarities, which have not yet been assessed, could be higher between species sharing the same range. A co-occurrence of *Callonia* snails with blackish lichen is discussed, raising the inference that *Callonia* use lichens as food source.

KEYWORDS Mollusca, *Callonia*, land snails, Cuba.

INTRODUCTION

The Urocoptidae (Pilsbry, 1898), one of the oldest Antillean land snails (Uit de Weerd, 2008; Uit de Weerd *et al.*, 2015), is “a family of terrestrial pulmonate gastropods belonging to the Urocoptoidea (formerly in the Orthalicoidea), distributed in tropical and sub-tropical regions of North America, Central America, and the islands of the Caribbean.” (Kabat *et al.*, 2012)

This family is represented in Cuba by a large number of genera, species and subspecies (*e.g.* there are between 504 and 633 species recorded). The number of species is hard to define due to C. de la Torre and P. Bartsch’s 2008 publication of a monograph seemingly identical to earlier manuscripts from the 1940s. (Kabat *et al.*, 2012)

Beyond those taxonomical numerical problems there are a number of endemic genera in the Urocoptidae. One of the most morphologically interesting and aesthetically pleasing genera is *Callonia* (Crosse and Fischer, 1870). *Callonia*

etymologically meant “elegant”, which aptly describes these elusive calciphile endemic Cuban land snails.

Currently five species are recognized for this genus: *C. dautzenbergiana* (Crosse, 1890), *C. elizabethae* (Torre & Bartsch, 2008), *C. elliotti* (Poey, 1857), *C. gemmata* (Pilsbry, 1927) and *C. lowei* (Torre in Pilsbry, 1927). All located on the southwestern karstic hills of Sierra de los Órganos driest part in the Guane municipality, from Mendoza (Isabel Rubio) to Sierra de Guane, in western Cuba. (*see* Figure 1 and 5)

Considered as “exceedingly elongate-conic shells, bearing hollow axial ribs and a trilamellate columella” these “horn colored” or red-chestnut brownish beautiful species were subdivided by its external shell appearances (axial ribs direction and last whorls soluteness). The key established for these species indicated that ones with ribs pointed upward were *C. gemmata* and *C. elliotti*, in which the last whorl in *C. gemmata* was determined as “decidedly solute”. The other

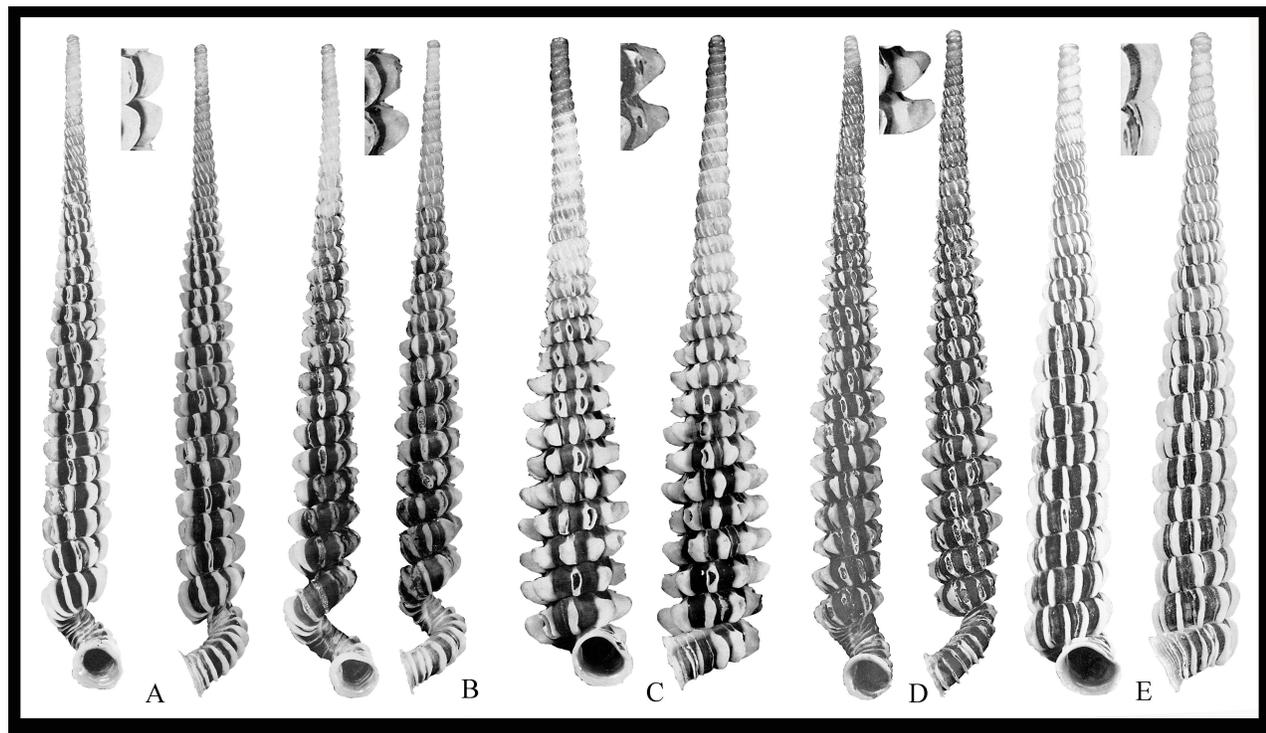


Figure 1. Western Cuban species of *Callonia*. A = *Callonia dautzenbergiana*; B = *C. elizabethae*; C = *C. elliotti*; D = *C. gemmata*; E = *C. lowei*. For diagnostic purposes close up images of ribs are positioned above the dorsal and ventral images of each figure.

species which did not have ascendant axial ribs cusps, are *C. dautzenbergiana*, *C. elizabethae*, and *C. lowei* (the only species with last whorl not solute). However, the last two species were segregated because the solute portion of *C. elizabethae* “was extending over more than one whorl.” Further defining features include the shape of the hollow ribs. The hollow ribs shape were subtriangular (*C. elliotti*), less triangular (*C. dautzenbergiana*), triangular (*C. gemmata*, *C. elizabethae*) and broad oval (*C. lowei*), in all the species the upper whorls near the upper portion of the spire present low riblets.

Until the early 20th century it was relatively easy to identify the only two *Callonia* published (*Cylindrella elliotti* and *C. dautzenbergiana*), which look very dissimilar and inhabits geographically isolated ranges. Both species appeared in the works of Poey (1857), Pfeiffer (1858 and 1869), Reeve (1878), Crosse (1890), Arango (1890), Pilsbry (1898, 1903). In 1927

Pilsbry named the other species morphologically similar to *Callonia* (under the genus *Urocopsis*).

The *Callonia* species described by Pilsbry in 1927 were previously noticed to be different by various authors: *C. dautzenbergiana* (which was seen as variety of *C. elliotti* by Poey and Pfeiffer), *C. gemmata* (which was seen as variety of *C. dautzenbergiana* by Pilsbry), and *C. elizabethae* (which was seen as variety of *C. dautzenbergiana* by Pilsbry based on Torre’s observations).

The distribution of the species from south to north follows this trend: *C. gemmata* is found from Mendoza to Sierra de Paso Real (Pilsbry wrote in 1927 that Lowe & Hand collected specimens “at the caves near Mendoza”); *C. elizabethae* is found in a “midpoint” of the west side among Mendoza and Sierra de Guane (believed to be on the west and east of current Surí town, however Pilsbry in 1927 stated that

specimens were collected by Lowe in “*Sierra de Paso Real*”); *C. dautzenbergiana* is found in Sierra de Paso Real de Guane (Hand in 1926 found them on a “Mogote back on the railroad Station” on S. de Paso Real also known as Cantera de Mendoza, from which also was collected *C. gemmata*); finally *C. lowei* and *C. ellioti* are found in Sierra de Guane and even as far as the Sierra de Gabino-Los Portales vicinities.

DISCUSSION

As earlier mentioned, Kabat *et al.* (2012) noted the taxonomic issues presented by the publication of Torre & Bartsch (2008), detailing these authors’ failure to check details quoting Alina Lomba, who wrote that: “The technical revision of the present edition was focused on verifying the adequate transcription of every nomenclatorial act proposed on this work, check the right place of illustrations, complete the bibliographical references of synonyms and verify the localities spelling.” Unfortunately, that statement was far from true. One of the confusing predicaments related to *Callonia* in this work was the publication of Poey’s name *C. ellioti* as *C. ellioti*, a mistake also extant in J. Espinosa Cuban Landshells Catalogs since 1999. The authors, Torre and Bartsch, should have referred back to the original works of F. Poey (1857), Crosse (1890), or Pilsbry (1903 and 1927), all of which were readily accessible. Further, the original USNM Urocoptidae manuscript copy showed clearly that Bartsch wrote the name rightly which implies that the Cuban copy must had the name properly recorded.

Another problem faced in *Callonia* is the species descriptions. The only ones which have “not ascendant” hollow ribs are *C. lowei* and *C. dautzenbergiana*, the others are clearly showing upward tendency and ascending point ridges. Curiously Torre & Bartsch wrote clearly for *C.*

elizabethae that “on the adult whorls the axial ribs project very strongly as narrow hollow triangular cusps. They do not point upward but merely straight out”, on the other hand in *C. gemmata* those “axial ribs become decidedly developed, forming eventually on the major portion of the spire broad, somewhat triangular, upward pointing, hollow cusps”. Nevertheless in the Species Key section *C. elizabethae* will be relegated to the species with axial ribs not upward pointed.

When looking at the whitish hollow ribs of these species, it is clear that *C. gemmata* and *C. elizabethae* are morphologically similar, both having triangular cusps. After careful examination of old collection material and specimens in the wild (in the Sierra de Paso Real vicinity) it became clear that *C. gemmata* can display on its last whorl significant deviation which often resembles *C. elizabethae*; Pilsbry in 1927 noticed that *C. gemmata* “have very high, rather triangular ribs, and nearly a whorl is free.” (emphasis added) (*see* Figure 1). It is likely that the soluteness condition found in both *C. elizabethae* and *C. dautzenbergiana* led Torre and Bartsch to make an erroneous assumption.

Interestingly, the closeness of some of these species populations in the analogous hills, but seemingly at different heights, attracted the attention of collectors, such as J. B. Henderson or C. de la Torre, who collected *C. dautzenbergiana* in high cliffs and *C. gemmata* at ground level in the same spot in Sierra de Paso Real de Guane. A similar situation happens in the northern Sierra de Gabino as the authors observed where *C. ellioti* is found from the mid-section of the hill (*see* Figure 4).and *C. lowei* is found nearby but only from the upper third to the summit. When Torre and Henderson collected *C. lowei* they said it was on the east side of Sierra de Guane, which is correct.

C. lowei and *C. dautzenbergiana* appear to be ecological equivalents which inhabit the higher altitudes, and in contrast *C. gemmata*, *C. elizabethae* and *C. elliotti* appear to occupy lower altitudes down to ground level. As noted above, *C. lowei* and *C. dautzenbergiana* also show low rounded ribs while *C. gemmata*, *C. elizabethae* and *C. elliotti* have high triangular ones. The phylogenetic relationships among these species are still unknown but *C. lowei* and *C. elliotti* both have short ‘necks’ and live in the same range, and therefore they could be more alike than *C. gemmata*, *C. elizabethae* and *C. dautzenbergiana*, which all live in the Paso Real de Guane Range areas.

The populations surveyed by the senior authors in Gabino hill since the mid-1990s (*C. elliotti* and *C. lowei*) showed high densities, sometimes reaching several dozen on a square meter. A review of the collecting records in the Torre & Bartsch manuscript reveals that some *Callonia* species populations were plentiful (over 680 specimens collected by Henderson and Bartsch for *C. gemmata* in Mendoza’s Quarry; in addition to dozens of lots, including one with 67 specimens of *C. elliotti* collected by Henderson), however other species were not so abundant since the early 20th century collecting trips (*C. elizabethae*, *C. dautzenbergiana*).

C. lowei apparently seems “scarce” according to Torre & Bartsch’s records from USNM. However it is well known that H. E. Lowe collected “lots of them” and Pedro J. Bermúdez who came after him must collected many specimens as well. It is assumed that all of the populations of *Callonia* species were denser once, but since the 20th century enhanced human influence has caused these populations to decline. The patchiness of the *Callonia* populations make their endangered status worse.

Gabino Hill (see Figure 2) is the area from Sierra de Guane where “Cueva del Obispo” (Bishop’s

Cave) is located (the original locality of *C. elliotti* where Bishop Elliott’s son Stephan Elliott collected the specimen that Poey’s described), *C. lowei* on the other hand was described from a locality named “Cueva del Agua” on the east side of Sierra de Guane. The caves are not an uncommon finding in karstic hills that look like Swiss cheese due to all of the holes; it is presumed that both caves in Sierra de Guane were close. (see Figure 3) Lowe was the collector of *C. lowei* on “the other side of Sierra de Guane” (Hand, 1926), but Pilsbry in 1927 stated that “Mr. Lowe was so lucky as to find a related but clearly distinct species in one place in the same mountain,” which supports our findings.



Figure 2. Gabino Hill is the area from Sierra de Guane, Cuba.



Figure 3. *Callonia elliotti* on Gabino Hill, Sierra de Guane, Cuba.

Rock surface linked urocoptids can be seen on walls and cliffs or isolated outcrops, but not all species are able to endure in warmer temperatures under sunlight exposed to opened areas. Some species prefer shade or humid places environs. *Callonia* seems to prefer rough textured rocky surfaces and mogotes areas where the rain streams create an environment where its food supply grows. The ostensible relationship of *C. elliotti* and *C. lowei* on Gabino hill with certain blackish lichen observed through several field trips supports the theory that those lichens are the main food source of *Callonia* on those Guane hills. Hopefully someday a lichen expert will identify the samples gathered. Little is known about the ecology of *Callonia* and a study of these lichens would be a good starting point.

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Figure 4. Live animal of *Callonia elliotti* crawling on rock surface at Gabino Hill, Sierra de Guane, Cuba.



Figure 5. Recently collected Cuban species of *Callonia*. A = *Callonia elizabethae*; B = *C. elliotti*; C = *C. gemmata*; D = *C. gemmata* - "long necked" form; E = *C. lowei*.