

A new species of the genus *Moitessieria* Bourguignat, 1863 (Gastropoda: Moitessieriidae) from Catalonia, Spain

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A new species of the genus *Moitessieria* Bourguignat, 1863 from Catalonia (Spain) is described, found in sediments from a spring in Sant Joan les Fonts (Girona). The new species is compared with other congeneric species from which it conchologically differs.

Keywords: Gastropoda, Moitessieriidae, *Moitessieria*, new species.

Èspècie nova del gènere *Moitessieria* (Gastropoda: Moitessieriidae) per a Catalunya, Espanya

Es descriu una espècie nova del gènere *Moitessieria* Bourguignat, 1863 per a Catalunya (Espanya), trobada en sediments procedents d'una font a Sant Joan les Fonts (Girona). L'espècie nova es diferencia de les altres espècies conegudes del gènere per diferents caràcters conquiliològics.

Mots clau: Gastropoda, Moitessieriidae, *Moitessieria*, espècie nova.

The family Moitessieriidae Bourguignat, 1863 is represented by freshwater species, with several characters related to their strictly stygobiotic habitat, such as the colourless shell and the anophtalmy (lack of eyes).

In Spain, this family is represented by five genera: *Moitessieria* Bourguignat, 1863; *Palaospeum* Boeters, 1999; *Baldufa* Alba, Tarruella, Prats, Guillén & Corbella, 2010; *Sardopaladilhia* Manganelli, Bodon, Cianfanelli, Talenti & Giusti, 1998; and *Spiralix* Boeters, 1972. They differ from Hydrobiidae Stimpson, 1865 in base to several anatomical characters (Boeters & Gittenberger, 1990).

The species of the genus *Moitessieria* Bourguignat, 1863 are characterized by their small size, semi-translucent shell, spiral ornamentation and, in most cases, a high number of whorls. In Spain, this genus includes a large number of species, distributed throughout Catalonia, Comunitat Valenciana, Aragón and Navarra (Altimira, 1960; Boeters, 2003; Alba et al., 2011; Corbella et al., 2011, 2012; Tarruella et al., 2012, 2013, 2015; Quiñonero-Salgado & Rolán, 2017).

In the present work, a new species of this genus is described for Catalonia (Spain), differing from other congeneric species already described by its conchological characteristics.

Material and methods

The shells of the species here described were collected from sediment from the spring known as font de les Molleres, at Sant Joan les Fonts (Girona, Catalonia, Spain). Dried sediment was sorted with 2 mm, 1 mm and 0.5 mm sieves and then the shells were separated under a stereomicroscope for their determination. Finally, they were cleaned with water and a small brush.

Abbreviations: MZB: Museu de Ciències Naturals de Barcelona. ZUPV: Colección de Fauna cavernícola (departamento de Zoología) de la Universidad del País-Vasco-Euskal Herriko Unibertsitatea, Bilbao, Spain. SEM: Scanning Electron Microscopy. CQS: Collection Quiñonero-Salgado. S: Shell/s.

Results

Family: Moitessieriidae Bourguignat, 1863

Genus *Moitessieria* Bourguignat, 1863

Type species: *Paludina simoniana*

Saint-Simon, 1848

***Moitessieria pesanta* sp. n.**

Figs. 1 i 2.

Type material: (Fig. 2A) holotype MZB2019-0010; paratypes: 2sMZB20190011, 8sZUPV-5561, 20 sin CQS.

Type locality: font de les Molleres, Sant Joan les Fonts (Fig. 3). Sediment was collected from the nearby canal that drains water from the spring. UTM coordinates: 31T 458430 4673240. Height: 360 m. This spring is located in the Fluvià hydrological basin.

Etymology: the new species is dedicated to the mythological entity known as “Pesanta”, from la Garrotxa. During the day, this being hides in one of the several volcano cones that make the area geologically remarkable. At night, carried by the wind, it squeezes into locket houses through keyholes, and then lies resting on the chest of sleeping people, suffocating them with its large weight and causing nightmares.

Description: shell small (height from 1.3 to 1.4 mm, width from 0.5 to 0.6 mm), quite fragile, translucent when fresh, subcylindrical (Fig. 1A-B), with 4-5.5 whorls and deep suture. Teleoconch sculpture of very fine spiral cordlets, with wider intermediate spaces (Fig. 1C-D), being more irregular under the suture. Protoconch sculpture complex, alternating quite fine spiral lines with spirally arranged elongated tubercles (Fig. 1E-G). Last whorl is straight in the final section. Aperture oval, umbilicus narrow.

Dimensions: see Table 1, Fig. 4 for further measurements.

Habitat: stygobiotic

Distribution: only known from the type locality.

Differential diagnosis: general conchological characters allow us to place the new species in the genus *Moitessieria*: translucent turricated shell, small size, marked spiral ornamentation and stygobiotic habitat. The species differs from other genera in the family in these primary characters:

Baldufa Alba, Tarruella, Prats, Guillén & Corbella, 2010 has a marked thickening in the shell, with trochoid shape, smaller number of whorls, and protoconch ornamentation formed by a very marked, spirally distributed pitting.

Henrigirardia Boeters et Falkner, 2003 has similar ornamentation, but trochoid shape, smaller number of whorls and wider umbilicus.

Palaospeum Boeters, 1999 has a bigger shell and a very faint or even absent microsculpture.

Sorholia Boeters et Falkner, 2009 has the last whorl detached from the spire.

Sardopaladilhia Manganelli, Bodon, Cianfanelli, Talenti & Giusti, 1998 has a different microsculpture,

bigger size and a wider and more expanded aperture.

Spiralix Boeters, 2003 has normally bigger shells and an attenuated spiral ornamentation. In the subgenus *Burgosia* Boeters, 2003 the sculpture is formed by cuneiform marks, and also has a protoconch microsculpture formed by angular depressions, irregularly placed.

The new species is compared with the most similar species of the genus, giving the diagnostic conchological characters that lead us to consider it as new

For this comparison, the following works have been employed: Bertrand, 2001; Boeters, 2003; Corbella Alonso et al., 2006; Alba et al., 2007; Corbella et al., 2011, 2012; Alba et al., 2013; Callot-Girardi, 2013; Quiñonero - Salgado & Rolán, 2017.

Moitessieria barrinae Alba et al 2007 has a different microsculpture, including a smooth protoconch and teleoconch formed by crests and pitting.

Moitessieria fontsainteii Bertrand, 2001 has a larger shell and slightly oval aperture, with the lip more expanded than *M. pesanta* sp. n. Its protoconch microsculpture consists of spiral striations, formed by regularly arranged, small axially elongated papillae. On the contrary, *M. pesanta* sp. n. microsculpture alternates quite fine spiral lines with spirally arranged elongated tubercles. Teleoconch microsculpture is reticulated for *M. fontsainteii*, while *M. pesanta* sp. n. features only spiral lines, slightly wider and more regularly arranged.

Moitessieria foui Boeters, 2003 has a conical shell and a microsculpture formed by spirally arranged pitting in the teleoconch and irregularly arranged papillae.

Moitessieria garrotxaensis Quiñonero-Salgado & Rolán, 2017 has a bigger and slender shell, with to 2 mm in height, and a similar microsculpture. However, some differences can be seen in the protoconch, formed by spirally arranged tubercles, while in *M. pesanta* sp. n. these cords can fuse with each other, forming oblique lines.

Moitessieria juvenisanguis Boeters & Gittenberger, 1980 is slightly larger and wider in the last whorls. Protoconch microsculpture consists of tubercles grouped and spirally oriented, lacking the spiral lines of *M. pesanta* sp. n. Teleoconch microsculpture is almost reticulated for *M. juvenisanguis*, with spiral lines crossed by prominent growth lines, while in *M. pesanta* sp. n. spiral sculpture domains. Aperture of *M. juvenisanguis* has deeper subtural notch, and outer lip is quite expanded from shell outline.

Moitessieria massoti Bourguignat, 1863 has a more

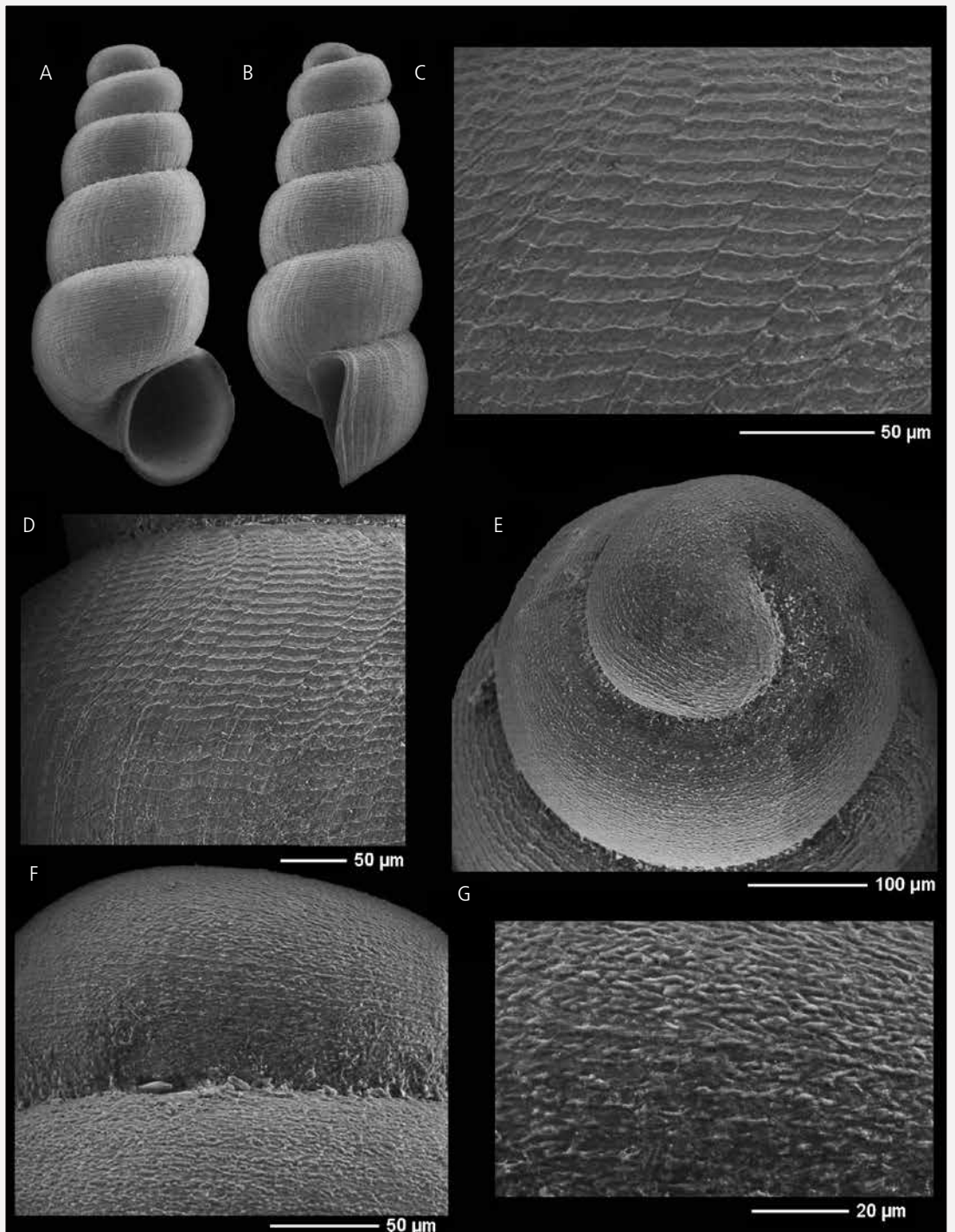


FIGURE 1. A-G: *Moitessieria pesanta* sp. n. **A-B:** shell; **C-D:** detail of the microsculpture of the teleoconch. **E-G:** protoconch and details of the microsculpture.

A-G: *Moitessieria pesanta* sp. n. **A-B:** conquilla; **C-D:** detalls de la microescultura de la teleoconquilla. **E-G:** protoconquilla i detalls de la microescultura.

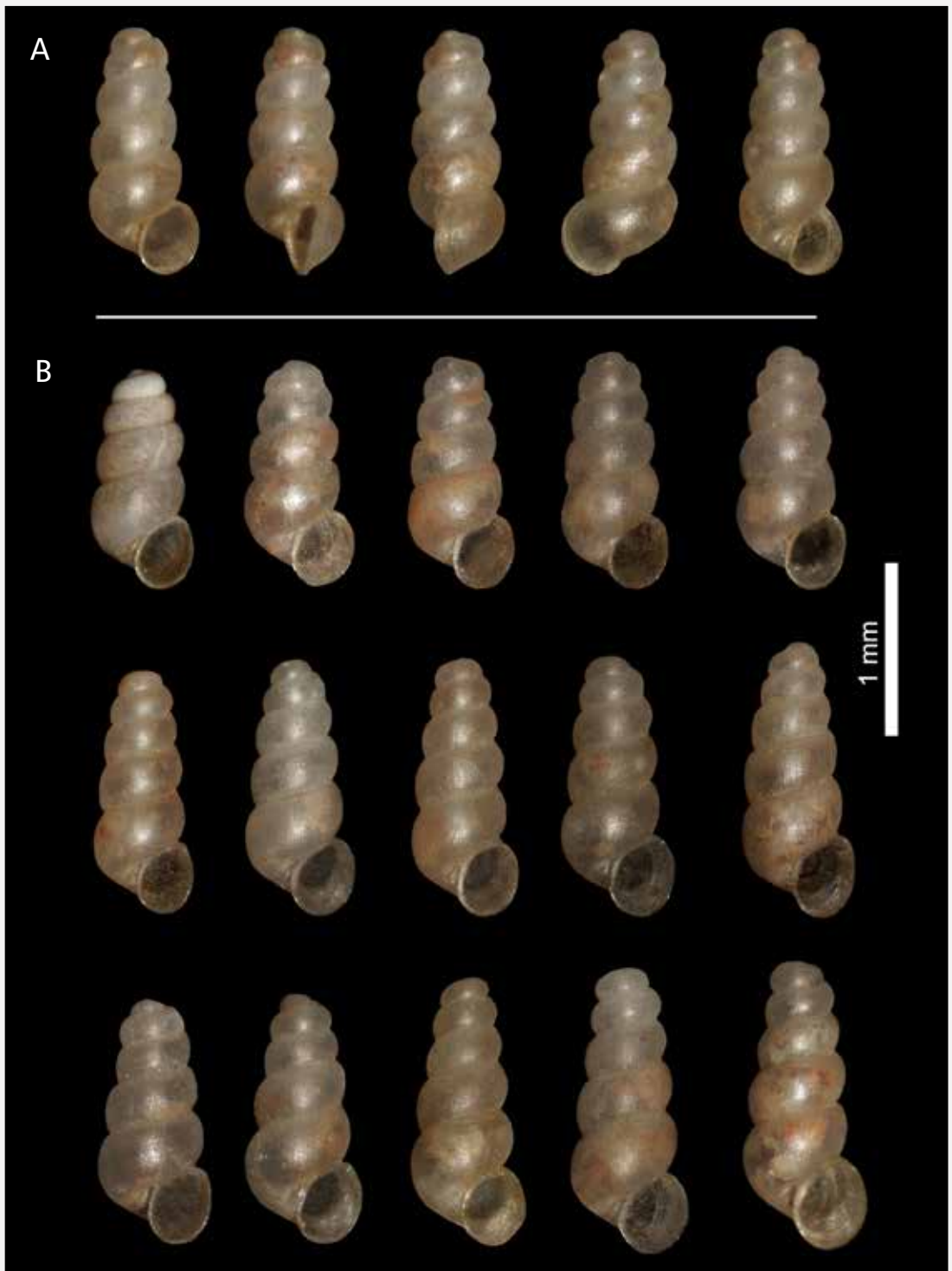


FIGURE 2. A-B: *Moitessieria pesanta* sp. n. **A:** holotype. **B:** paratypes.

A-B: *Moitessieria pesanta* sp. n. **A:** holotip. **B:** paratips.

slender and elongated shell, slightly less convex whorls, and closed umbilicus. While teleoconch microsculpture is similar, the protoconch microsculpture of *M. massoti* is weak, contrasting with the strongest one of *M. pesanta* sp. n.

Moitessieria mugae Corbella et al 2006 has a more turriculated and elongated shell. Its protoconch has no ornamentation, and teleoconch is formed by a little marked mesh of quadrangular depressions.

Moitessieria ollerii Altimira, 1960 has a more slender shell, growing slightly more than 2 mm, with subcylindrical to almost conicocylindrical shape. Differences in microsculpture are also evident by a teleoconch formed by a reticulum of quadrangular depressions, highly dense and a protoconch with mild spiral crests, and sporadic papillae.

Moitessieria racamondi Callot-Girardi, 2013 has a larger shell with higher number of whorls, oblique aperture, and umbilicus limited to a tight slit. Protoconch microsculpture consists of tight, fine spiral lines, mostly continuous, some formed by aligned small tubercles. In *M. pesanta* sp. n. these lines are crossed by small oblique lines, irregularly arranged.

Moitessieria servaini (Bourguignat, 1863) has a more elevated conicocylindrical shell, and also some differences in microsculpture, since teleoconch is formed by rounded pitting, and protoconch is formed by moderately marked ornamentation, formed by spiral cords and spirally arranged papillae, less evident in the first than in the second whorl.

***Moitessieria* spp. in the hydrological basin of the Fluvià river.**

Moitessieria pesanta sp. n. inhabits the hydrological basin of the Fluvià river, where two other species are also described: *Moitessieria garrotxaensis* and *Moitessieria* sp. This latter was originally cited by Haas (1929) in the font de la Cirera, at Hostalets d'en Bas (Girona province), as *Moitessieria rolandiana* Bourguignat, 1863. However, a posterior revision of the original material, housed at Museu de Ciències Naturals de Barcelona, showed that this species is not in fact *M. rolandiana*, (Alba et al., 2011). Given its unknown status, it could represent either *M. garrotxaensis*, the newly described *M. pesanta* sp.n., or even as a yet to be described species, so it should still be cited as *Moitessieria* sp.



FIGURE 3. Water canal near font de les Molleres (Sant Joan les Fonts, Girona), type locality of *Moitessieria pesanta* sp. n.

Canal d'aigua pròxim a la font de les Molleres (Sant Joan les Fonts, Girona), localitat tipus de *Moitessieria pesanta* sp. n.

Discussion and conclusions

Though genitalia study or even DNA analysis have become widely used in recent years for the description of new species of molluscs, it is still quite difficult to find live samples of some stygobiotic genera such as *Moitessieria*, which may only be found after heavy rains, when the phreatic level rises and some samples can pass outside. However, no live specimens were recovered in the sampling at the type locality, so the description of the new species relied necessarily on

empty shells. In Spain, this genus is present in Navarra, Aragón, Comunitat Valenciana and Catalonia, this last being the community where more species have been described, many of them with quite limited known distribution.

Regarding the conservation of the new species here treated, known from a single locality, some actions should be taken: avoiding any potential damage to the aquifer or the spring itself, the major threat being water pollution from farming activities.

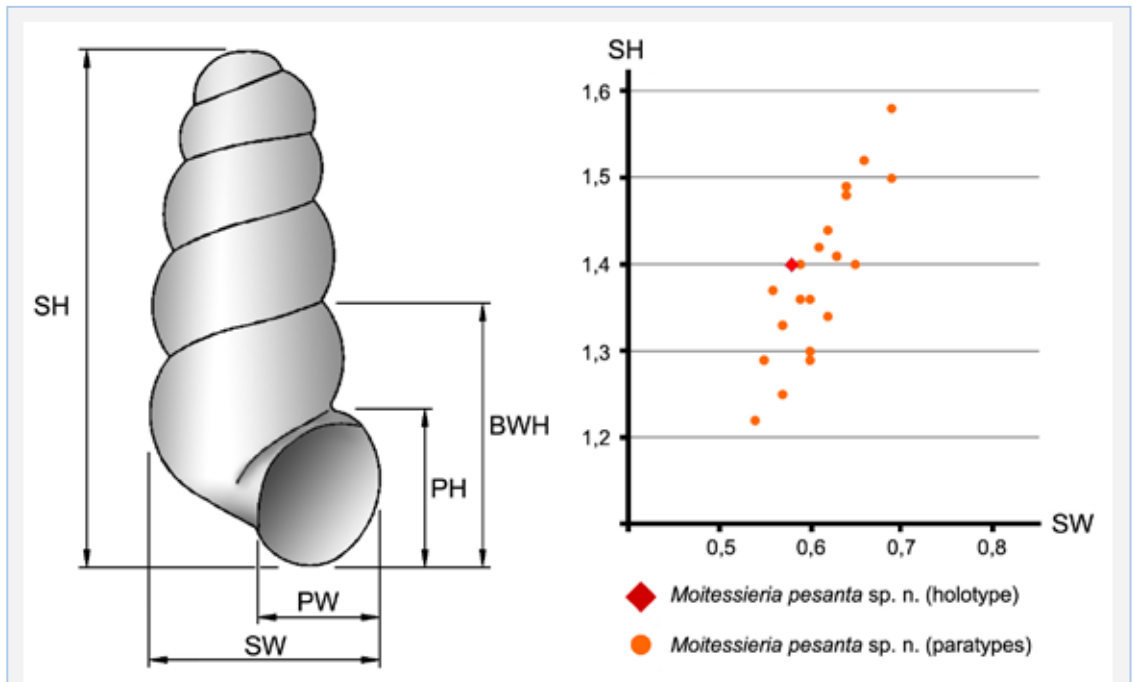


FIGURE 4. Shell measurements of *Moitessieria pesanta* sp. n. SH: shell height. SW: shell diameter. BWH: last whorl height. PH: aperture height. PW: aperture width.

Dimensions de la conquilla de *Moitessieria pesanta* sp. n. SH: alçada. SW: diàmetre. BWH: alçada de l'última volta. PH: alçada de l'obertura. PW: amplada de l'obertura.

		SH	SW	PH	PW	BWH
<i>Moitessieria pesanta</i>	HOLOTYPE	1,4	0,58	0,4	0,26	0,71
(n=21)	min	1,22	0,54	0,37	0,26	0,65
	max	1,58	0,69	0,48	0,4	0,79
	mean	1,388	0,610	0,410	0,324	0,722
	st.dev.	0,093	0,042	0,028	0,029	0,041

TABLE 1. Measurements of the shells of *Moitessieria pesanta* sp. n. SH: shell height. SW: shell diameter. BWH: last whorl height. PH: aperture height. PW: aperture width. See also Fig. 4.

Mesures de la conquilla de *Moitessieria pesanta* sp. n. SH: alçada. SW: diàmetre. BWH: alçada de l'última volta. PH: alçada de l'obertura. PW: amplada de l'obertura. Cal veure també la Fig. 4.

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