

Spiralix (Burgosia) vetusta (Gastropoda: Moitessieriidae) a new species from Asturias (North of Spain)

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A new species of the family Moitessieriidae Bourguignat, 1863 is described from Asturias (north of Spain), belonging to the genus *Spiralix* Boeters, 1972, and included in the subgenus *Burgosia* Boeters, 2003. It is the second species known in the area. It differs from other species by its conchological characteristics, including teleoconch and protoconch microsculpture. The description of *Spiralix vetusta* sp. n. raises to twelve the number of *Spiralix* species present in Spain and to six the species included in the subgenus *Burgosia*.

Keywords: *Gastropoda*, *Moitessieriidae*, *Spiralix*, *Burgosia*, new species.

Spiralix (Burgosia) vetusta (Gastropoda: Moitessieriidae) una nova espècie d'Astúries (nord d'Espanya)

Es descriu una nova espècie de la família Moitessieriidae Bourguignat, 1863 d'Astúries (nord d'Espanya), pertanyent al gènere *Spiralix* Boeters, 1972, que s'inclou dins el subgènere *Burgosia* Boeters, 2003, es tracta de la segona espècie coneguda per a la família a la zona. Es diferencia d'altres espècies descrites pels seus caràcters conquiliològics, entre ells la microescultura de la teleoconquilla i de la protoconquilla. Amb la descripció de *Spiralix vetusta* sp. n. s'eleva a dotze les espècies del gènere *Spiralix* presents a Espanya i a sis les incloses dins el subgènere *Burgosia*.

Mots clau: *Gastropoda*, *Moitessieriidae*, *Spiralix*, *Burgosia*, espècie nova.

Introduction

The family Moitessieriidae Bourguignat, 1863 includes small sized freshwater gastropods, mainly from stygobiotic habitats. In Spain, it is represented by five genera: *Moitessieria* Bourguignat, 1863; *Palaospeum* Boeters, 2003; *Baldufa* Alba, Tarruella, Prats, Guillén & Corbella, 2010; *Sardopaladilhia* Manganelli, Bodon, Cianfanelli, Talenti & Giusti, 1998; and *Spiralix* Boeters, 1972. It is distinguished from *Hydrobiidae* Troschel, 1857 by anatomical characters (Boeters & Gittenberger, 1990).

The genus *Spiralix* is represented in Spain by eleven species and subspecies. In the Levantine area of the Iberian Peninsula it is represented by *Spiralix gloriae* (Rolán & Martínez-Ortí, 2003), *Spiralix valenciana valenciana* Boeters, 2003, *Spiralix valenciana*

castellonica Boeters, 2003, *Spiralix pequenoensis* Boeters, 2003 and *Spiralix calida* Corbella et al., 2014 (Boeters, 2003; Rolán & Martínez-Ortí, 2003; Corbella et al., 2014). In the northeast (Basque Country, Castilla y León, Cantabria & Asturias) six species have been described, all included in the subgenus *Burgosia* Boeters, 2003 (Boeters, 2003; Quiñonero-Salgado et al., 2017).

The taxonomy of *Burgosia* has recently experienced some changes. Boeters (2003) described the subgenus *Burgosia* based on conchological and anatomical differences, by describing two species: *Spiralix (Burgosia) burgensis* Boeters, 2003, the type species, in Cantabria and Castilla y León, and *Spiralix (Burgosia) affinitatis* Boeters, 2003, from Castilla y León.

Later on, Rolán & Ramos (1995) described “*Paladilhopsis*” *septentrionalis* based on material collected in the provinces of Álava, Vizcaya, Burgos and Cantabria, which was later also cited in Asturias (Rolán & Arconada, 2003). Recently, however, this species has been included in the genus *Spiralix* and subgenus *Burgosia* (Quiñonero-Salgado et al., 2017), and its distribution reduced, by redescribing the Cantabrian specimens as belonging to *Spiralix (Burgosia) burgensis*, while the Asturian records are identified as a new species, *Spiralix (Burgosia) asturica* Quiñonero-Salgado et al., 2017. Finally, these authors described two additional species in Cantabria, *Spiralix (Burgosia) clarae* Quiñonero-Salgado et al., 2017 and *Spiralix (Burgosia) mieraensis* Quiñonero-Salgado et al., 2017 (Boeters, 2003; Quiñonero-Salgado et al., 2017).

By carrying on with the systematic samplings of springs and fountains in search for stygobiotic mollusk species in the north of Spain, the authors found a species which could be attributed to the genus *Spiralix*, but showing an aspect and proportions which clearly separate it from all the known species in this area. SEM pictures revealed a microsculpture of protoconch and teleoconch typical of the subgenus *Burgosia*, thus allowing the description of a new species, the second of the subgenus for Asturias.

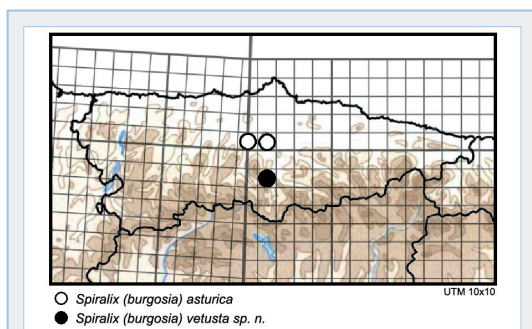


FIGURE 1. Map of Asturias showing the known localities for *Spiralix (Burgosia) asturica* and *Spiralix (Burgosia) vetusta* sp. n.

Mapa d' Astúries senyalitzant les localitats conegudes per *Spiralix (Burgosia) asturica* i *Spiralix (Burgosia) vetusta* sp. n.

Material and methods

The shells of the species here described were collected from sediment and shell grit from the Fuente Vieya, Palacios, Asturias (7-2017, SQS & AA col.). Sieves used were of 2 mm, 1 mm and 0.5 mm mesh size. Shells were separated under a stereomicroscope for their determination, and thereafter cleaned with water with the help of a small brush.

Though genitalia study or even DNA analysis have become widely used in recent years for the description of new species of mollusks, it is still quite difficult to find live samples of some stygobiotic genera, which may only be found after heavy rains, when the phreatic level raises up and some samples can pass outside. However, no live specimens were recovered in the several samplings obtained at the type locality.

Abbreviations:

MZB: Museu de Ciències Naturals de Barcelona

SEM: Scanning Electron Microscopy

CSQS: Collection Sergio Quiñonero Salgado

CAA: Collection Álvaro Alonso

s: Shell

Results

Family: MOITESSIERIIDAE Bourguignat, 1863

Genus *Spiralix* Boeters, 1972

Subgenus *Burgosia* Boeters, 2003

Type species: *Spiralix (Burgosia) burgensis* Boeters 2003, by original designation.

***Spiralix (Burgosia) vetusta* sp. n.**
(Figs 2, 3).

Type material: (Fig. 2A) Holotype in MZB 2018-0511, Paratypes: 1 s in MZB 2018-0512, 4 s in CSQS, 4 s in CAA.

Type locality: Fuente Vieya, Palaciós, Lena, Asturias, [30TTN68], 390m. This is a small spring close to the river Naredo, at the side of a “caleya” (unpaved

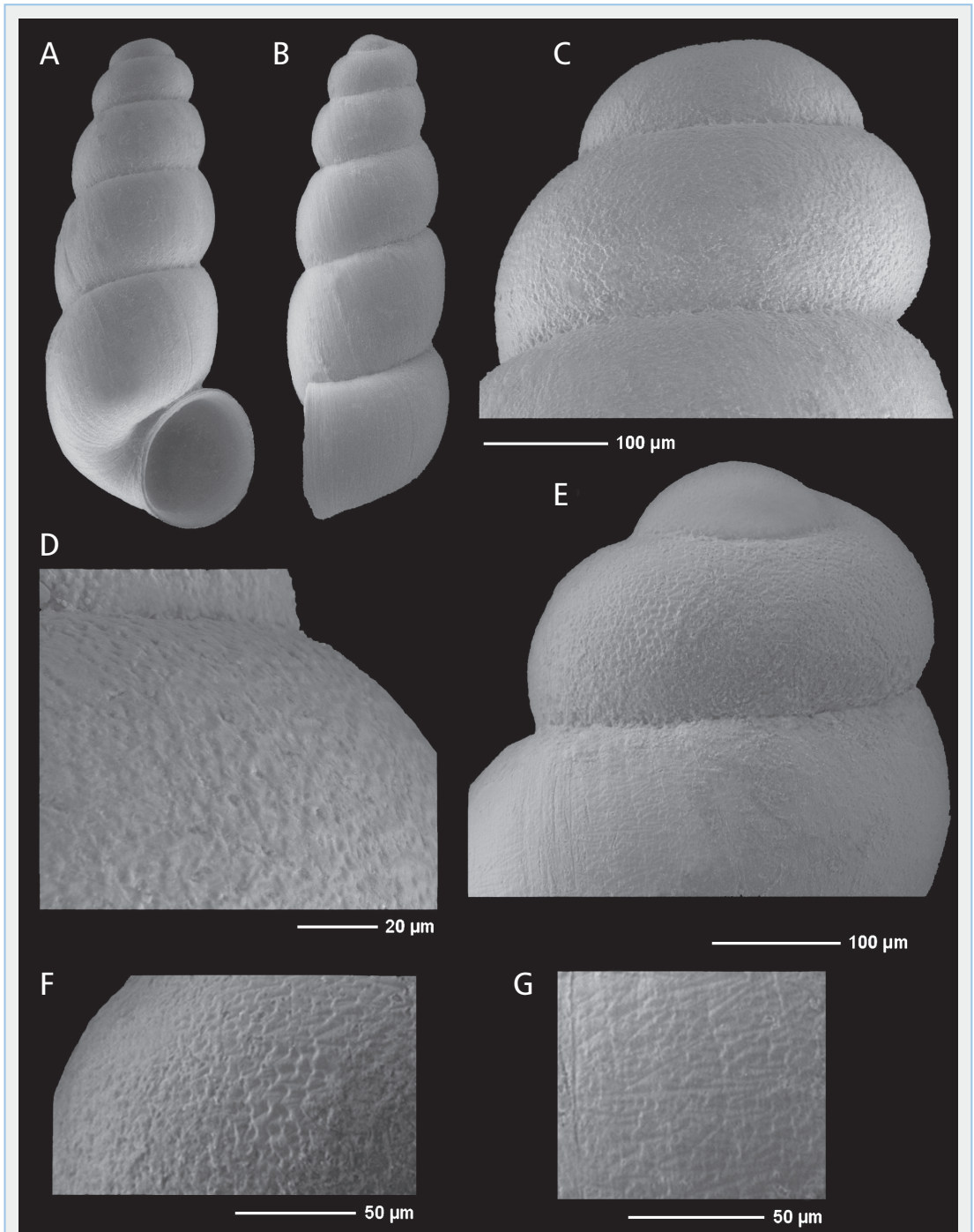


FIGURE 2. A-G: Holotype of *Spiralix (Burgosia) vetusta* sp. n. A-B: shell; C-F: protoconch and detail; G: detail of teleoconch microsculpture.

A-G: Holotip de *Spiralix (Burgosia) vetusta* sp. n. A-B: conquilla; C-F: protoconquilla i detall; G: detall de la microescultura de la teleoconquilla.

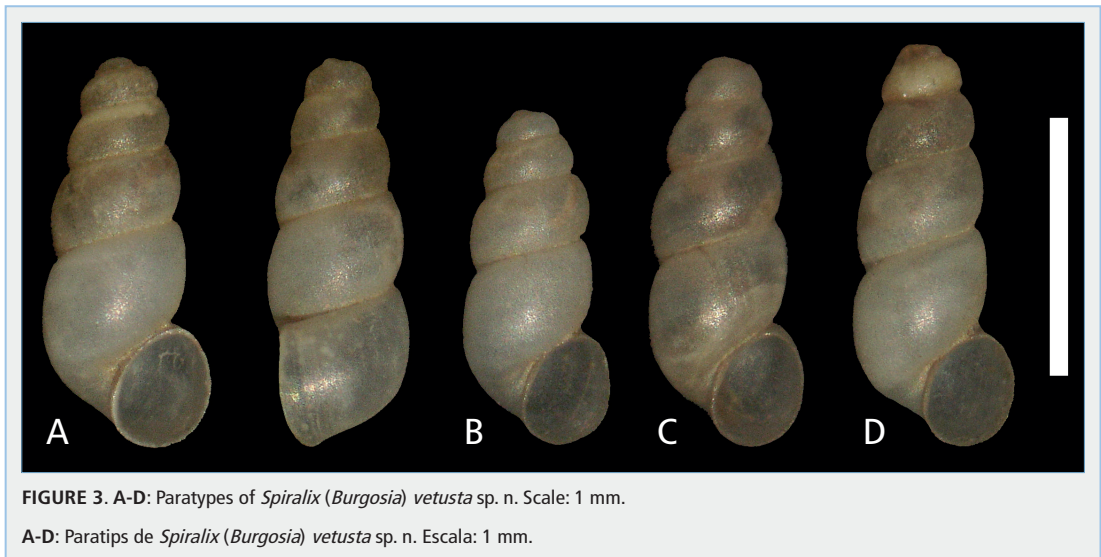


FIGURE 3. A-D: Paratypes of *Spiralix (Burgosia) vetusta* sp. n. Scale: 1 mm.

A-D: Paratips de *Spiralix (Burgosia) vetusta* sp. n. Escala: 1 mm.

mountain road) at the bottom of a calcareous hill. (Fig. 1, 4)

Etymology: The specific name *vetusta* is the Latin translation of the fountain's name (Fuente Vieya), which means 'old spring' in the local language known as bable.

Description

Shell subcylindrical to ovoid, fragile, with 4 ½ whorls, convex outline, white or slightly translucent when specimens are fresh. Deep suture. The dimensions of



FIGURE 4. Fuente Vieya, type locality for *Spiralix (Burgosia) vetusta* sp. n.

Fuente Vieya, localitat tipus de *Spiralix (Burgosia) vetusta* sp. n.

the shell, based on the measurement of 10 specimens (Table 1), ranged from 1.37 to 1.65 mm in length, with diameter between 0.57-0.67 mm, and with the last whorl accounting an average of 57% of the total shell length.

The shell has convex or almost flat outline, not ascendant, or only in the final part. Aperture ovoid, of 0.41-0.46 mm high, and 0.34-0.38 mm width. Peristome continuous, not thickened, not reflected except very slightly in the columellar part (Fig. 2A), and slightly separated from the previous whorls (Fig. 2A & 3). Growth lines not very conspicuous and showing variable thickness (Fig. 2A-B), and no trace of spiral striation. Teleoconch showing irregular cuneiform marks all over its surface (Fig. 2G). Protoconch with dense microsculpture formed by angular depressions or marks (Fig. 2C-F) and about 1½ whorls.

Dimensions: The holotype is 1.65 mm in height and 0.67 mm in diameter. See Table 1 for further measurements.

Habitat: Stygobiotic.

Distribution: Only known from the type locality.

Remarks

Comparison of the new species with its congeneric partners shows the following differences:

Spiralix (Burgosia) asturica is the closest species, both geographically and conchologically. However, comparison of morphometric data from 10 specimens of each species, including both holotypes (Fig. 1 and Table 1), shows that *S. (Burgosia) asturica* has a wider and more conical shell, and shorter spire. The aperture is also more detached from the previous

whorl. The microsculpture of the protoconch is more regular, and formed by smaller, deeper and denser circular depressions. Teleoconch sculpture is formed by oblique lines.

Regarding other species of the genus, it differs from *S. (Burgosia) mieraensis*, *S. (Burgosia) burgensis*, *S.*

		SH	SW	BWH	PH	PW
<i>Spiralix vetusta</i> (n=10)	HOLOTYPE	1.65	0.67	0.89	0.48	0.39
	Minimum	1.37	0.57	0.80	0.41	0.34
	Maximum	1.65	0.67	0.91	0.46	0.38
	Mean	1.50	0.62	0.86	0.45	0.36
	St. Deviation	0.085	0.029	0.034	0.022	0.017
<i>Spiralix asturica</i> (n=10)	HOLOTYPE	1.46	0.69	0.89	0.47	0.39
	Minimum	1.37	0.69	0.80	0.46	0.38
	Maximum	1.68	0.78	0.96	0.53	0.43
	Mean	1.47	0.73	0.90	0.48	0.41
	St. Deviation	0.091	0.029	0.039	0.024	0.014

TABLE 1. Measurements of the shell of *Spiralix (Burgosia) vetusta* sp. n. and *Spiralix (Burgosia) asturica*. SH: Height. SW: Width. BWH: Base Whorl Height, PH: Peristome Height. PW: Peristome Width. See Fig. 5.

Mesures de la conquilla de *Spiralix (Burgosia) vetusta* sp. n. i *Spiralix (Burgosia) asturica*. SH: Alçada. SW: Diàmetre. BWH: Alçada de l'última volta. PH: Alçada de l'obertura. PW: Amplada de l'obertura. Ver Fig. 5.

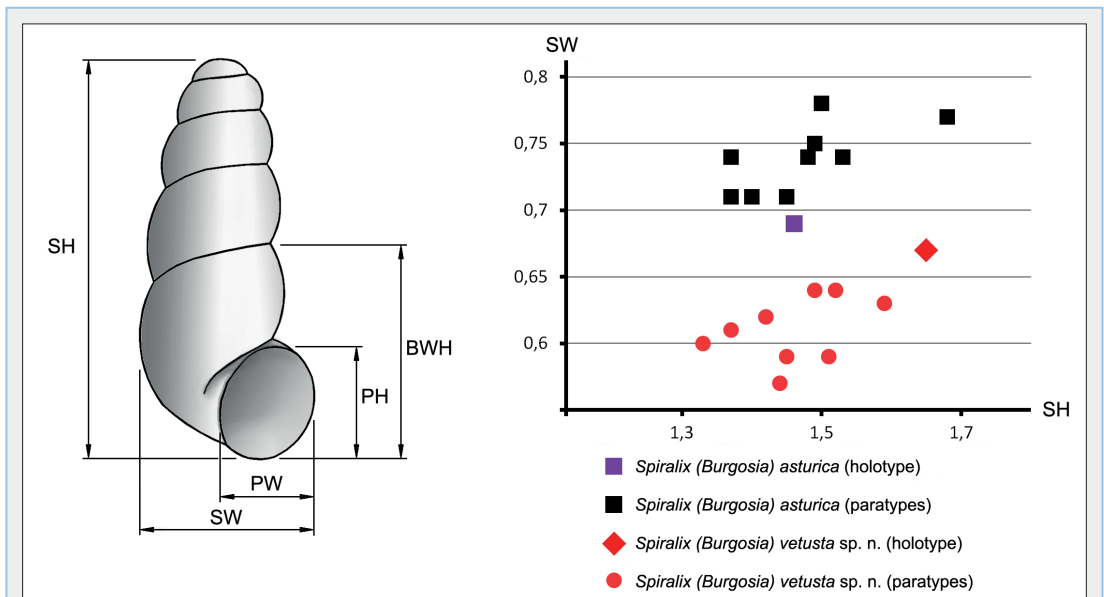


FIGURE 5. Dimensions and size comparison between *Spiralix (Burgosia) asturica* and *Spiralix (Burgosia) vetusta* sp. n. SH: Height. SW: Shell Width. PH: Peristome Height. PW: Peristome Width.

Dimensions de la conquilla i comparació de mesures entre *Spiralix (Burgosia) asturica* i *Spiralix (Burgosia) vetusta* sp. n. SH: Alçada. SW: Diàmetre. PH: Alçada de l'obertura. PW: Amplada de l'obertura.

(*Burgosia affinitatis* and *S. (Burgosia) septentrionalis* by having a shell which is much more ovoid-conical. *S. (Burgosia) clarae*, by contrast, has a more lengthened aspect, larger size, higher number of whorls (which are also more convex) and the peristome is more separated from last whorl and shows subtle differences in the microsculpture of the protoconch.

Discussion and conclusions

Spiralix (Burgosia) vetusta sp. n. is described from Asturias (N Spain), being the second species of the genus in this autonomous community. As with other interstitial species, it is extremely rare to find live or fresh samples meaning that the diagnosis and description is based only on conchological characters, allowing it to be distinguished from the closest species.

Its attribution to the genus is based on its conico-cylindrical to subcylindrical shape, high number of whorls and wide peristome. Shells in this genus generally show little ornamentation in the teleoconch and slightly more evident, but still weak ornamentation in the protoconch.

Regarding its attribution to *Burgosia* subgenus, this group includes species with conical-ovoid to cylindrical shells, showing a microsculpture in the teleoconch formed by irregular cuneiform marks and more marked protoconch microsculpture.

It differs from other genera such as *Palaospeum* by having less conical shape and less widen aperture, and form *Moitessieria* by lacking the well-defined spiral ornamentation present in all the species of this genus.

Regarding the conservation of the new species here treated, given that it is known from a single and well preserved locality, some actions should be taken: the species should be protected and included in the Spanish Red List of endangered invertebrates, the avoidance any potential damage to the aquifer or the spring itself, the major threat being water pollution from farming activities. Any nearby mining activity,

such as limestone quarry construction, should be avoided and also any piping of the unaltered spring. This should include what it is known in Spanish as *adecentar* (loosely translated as “to tidy up”), a term usually employed for small masonry works at well preserved natural places, often involving the canalization of over free water flows, removing nearby natural vegetation, paving over of the natural soil and installing benches, among others things.

Finally, the nearby Fuente de Vegadiego spring was also sampled with the same technique. Though being only 700 m away from the type locality, on the same hillside and also quite close to the river, not a single specimen was recovered there which points to a very narrow range for *Spiralix vetusta* sp. n.

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