ZOOLOGISCHE MEDEDELINGEN

UITGEGEVEN DOOR HET

RIJKSMUSEUM VAN NATUURLIJKE HISTORIE TE LEIDEN

(MINISTERIE VAN CULTUUR, RECREATIE EN MAATSCHAPPELIJK WERK)

Deel 55 no. 17 4 maart 1980

THREE NOTES ON IBERIAN TERRESTRIAL GASTROPODS

by

E. GITTENBERGER

Rijksmuseum van Natuurlijke Historie, Leiden

With 8 text-figures and 1 plate

SUMMARY

A. The present knowledge concerning the SW European *Zospeum* species is summarized. *Z. schaufussi* Von Frauenfeld, 1862, is redescribed and compared with *Z. bellesi* Gittenberger, 1973, and *Z. suarezi* spec. nov.

B. *Gasulliella* gen. nov. is introduced for *Helix simplicula* Morelet, 1845. A condensed synonymy list of *G. simplicula* is given, the shell and the genitalia of the species are described and data on its geographical distribution are presented.

Helix inchoata Morelet, 1845, is made type-species of *Portugala* gen. nov. and dealt with in the same way as *G. simplicula*.

A. ON SPANISH *ZOSPEUM* (PULMONATA, BASOMMATOPHORA)

Obviously, the discovery of a member of the genus *Zospeum* in northern Spain by X. Belles (Gittenberger, 1973) inaugurated a new era with regard to our knowledge concerning the systematics and the distribution of these minute terrestrial cave snails in SW Europe. Three species are known now. The present note intends to summarize the available data and thus to accelerate the process by which interesting new facts might come to light.

Samples with Spanish *Zospeum* were collected recently by Mr. R. Suárez and other members of the very active Espeleo Club de Gràcia (Barcelona), who gave the material to Mr. A. Lagar (Espeleo Club de Gràcia, Barcelona), and by Mr. J. G. M. Raven (Leidschendam, The Netherlands) and Mr. J. J. Vermeulen (Santpoort, The Netherlands). I owe a debt of gratitude to these successful collectors and to Mr. A. Lagar, who most kindly presented me their material for study. I also wish to thank: Dr. B. Hauser (Muséum d'Histoire Naturelle, Geneva), who sent me bottom samples taken in Spanish caves by Mr. G. Favre and Mrs. R. Emery, two of which with *Zospeum*; Mr. H. Ch. Maier (Vienna), who provided useful information; Dr. O. E. Paget and Mr. E. Wawra (Naturhistorisches Museum, Vienna), who made

the Viennese material available to me; Mr. E. Vives (Centre Excursionista de Terrassa, Secció d'Investigacions Subterrànies, Terrassa), who informed me concerning the location of some caves.

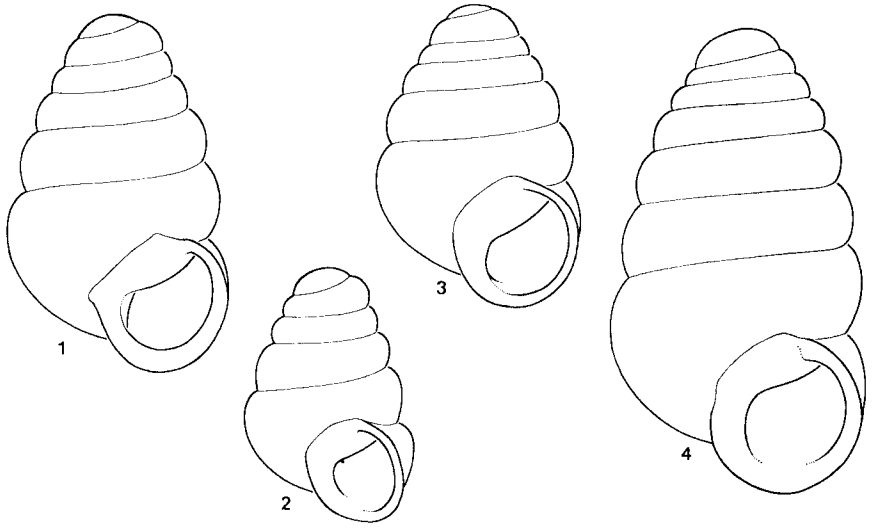
The following abbreviations are used: ECGB, Espeleo Club de Gràcia, Barcelona; JRL, Collection J. G. M. Raven, Leidschendam; MHNG, Muséum d'Histoire Naturelle, Geneva; NMW, Naturhistorisches Museum, Vienna; RMNH, Rijksmuseum van Natuurlijke Historie, Leiden.

While describing *Zospeum bellesi* from a cave in the Spanish Pyrenees, Gittenberger (1973) was not aware of an earlier description of a *Zospeum* species from SW Europe. Meanwhile, Maier (in litt., 1974) and Giusti (1975: 54) noted that Von Frauenfeld (1862) described. *Z. schaufussi* from a cave in Spain ("... in einer Höhle in Spanien ..."). In consequence the question arises whether *Z. bellesi* and *Z. schaufussi* are different. The latter species has never been figured and more exact geographical data have not been published up till now; it will be discussed below.

Von Frauenfeld (1862: 971) stated that he studied ten specimens of *Z. schaufussi*. In NMW only four damaged shells (no. 71836), glued on a piece of cardboard, are labelled as type-specimens. Despite the very bad state of preservation, not allowing any statement about the original shape of these shells, two of the specimens still clearly show a strong parietal lamella; I cannot judge of the two other specimens. Von Frauenfeld (1862: 971), however, emphasized most strongly that his species is absolutely toothless; he studied some specimens in which the wall of the body-whorl was lacking and could not discover any trace of teeth or lamellae ("... so dass ich über den stetigen Mangel der Zähne bei dieser Art nicht mehr im Zweifel sein kann.").

Nothing can be said with certainty, but for the case of stability in nomenclature, a decision should be made. We now know that a species with a well-developed parietalis is represented in the central part of the extreme north of Spain, where it may be associated, in the same cave, with a (nearly) toothless second species. Apart from the dentition, Von Frauenfeld (1862) did not give diagnostic characters for his *Z. schaufussi*, i.e. characters enabling a choise between these two species; the dimensions indicated only exclude *Z. bellesi*. The sample NMW 71836 indicates at least that *Zospeum* shells from the central part of the extreme north of Spain once reached Vienna. I cannot accept that Von Frauenfeld simply overlooked the parietalis in the two syntypes mentioned before. Therefore it is assumed that two species were represented in his material; four of the best preserved specimens were glued on a piece of cardboard and accidentally damaged after

having been studied by Von Frauenfeld. The damaged shells in which Von Frauenfeld looked in vain for teeth or lamellae most probably belong to those type-specimens which are not in NMW; if these six syntypes prove to be lost, a neotype should be designated for *Z. schaufussi*. Meanwhile, the name *Z. schaufussi* is restricted here to the (nearly) toothless species from the central part of the extreme north of Spain. This implies that *Z. schaufussi* comes very close to *Z. amoenum* (Von Frauenfeld, 1856), considered the most closely related species already by Von Frauenfeld (1862: 971), which might be considered a final argument in favour of the designation made. For data on *Z. amoenum* and other SE European *Zospeum* species, see Bole, 1974.



Figs. 1-4. Spanish *Zospeum* spec.: 1, *Z. schaufussi* (Von Frauenfeld, 1863), Cueva de Inguanzo, G. Favre & R. Emery leg., actual height 1.45 mm, MHNG; 2, *Z. suarezi* spec. nov., paratype, Cueva de Inguanzo, G. Favre & R. Emery leg., actual height 1.1 mm, RMNH 55386; 3, 4, *Z. bellesi* Gittenberger, 1973, cave 1½ km N of the Puerto de Usatequieta, J. G. M. Raven leg., actual height 1.3 and 1.9 mm respectively, RMNH. W. C. G. Gertenaar del.

Zospeum bellesi Gittenberger, 1973 (figs. 3, 4)

Zospeum bellesi Gittenberger, 1973: 137. Type-locality: Cueva de Aso in the Cañón de Añisclo Sercué, between Vio and Boltaña, Huesca; UTM BH50.

Material. — Holotype and 38 paratypes from the same locality (Museo de Zoologia, Barcelona). Additional paratypes from the type-locality (NMW/1 shell; Coll. Pezzoli, Milano/1 shell; RMNH 54982/6 shells).

Small cave along the river ca. 1½ km N of the Puerto de Usatequieta at the right side of the road to Hernani, ca. 9 km NNE of Lecumberri, Navarra; UTM WN97; J. G. M. Raven leg., vii.1978 (JRL/>100 shells; RMNH/14 shells).

Z. bellesi differs from *Z. suarezi* spec. nov. by the slightly convex sides of the shell, the more evenly rounded whorls, the larger dimensions and, most conspicuously, by the absence of apertural teeth or lamellae. It may be distinguished from *Z. schaufussi* not only by shape and dimensions, but also by the shorter parietal callus and, consequently, by a nearly circular apertural border; there is no trace of any teeth or lamellae in the aperture.

The material collected in Navarra is less fragile than the shells found at the type-locality and larger dimensions are reached. Therefore, the original description has to be amended as follows: height, 1.3-1.9 mm; breadth, 0.9-1.15 mm; number of whorls, 5¾-7¼.

Zospeum suarezi spec. nov. (fig. 2)

Shell conical, with 5-6¼ strongly inflated, somewhat shouldered whorls. Mouth-edge continuous by a distinct parietal callus, nearly circular. The shell is inconspicuously sculptured, and shiny, colourless and translucent when fresh. Near the parieto-columellar corner the beginning of a parietal lamella may be visible in oblique view; this conspicuous lamella runs inward for about one whorl, being most strongly developed after ca. ¾ whorl, where a distinct but short additional parietal lamella and a delicate basal lamella are seen in only a few of the translucent specimens. The main parietal lamella is always present. Height, 0.95-1.45 mm; breadth, 0.7-1.0 mm.

Z. suarezi differs from the sympatric *Z. schaufussi* by the more circular mouth-edge, the slightly shouldered whorls, the conspicuous parietal lamella and smaller dimensions. It differs from *Z. bellesi* by the same group of characters, except the contour of the aperture, which is nearly circular in both species; in *Z. bellesi* the sides of the shell are slightly convex, not nearly straight as in *Z. suarezi.*

Type-locality: Cueva del Buho at Puente Viesgo, Santander; UTM VN 19.

This species is named in honour of Mr. R. Suárez, member of the Espeleo Club de Gràcia, who collected most of the material studied.

Material. — Holotype; Espeleo Club de Gràcia leg., 12.x.1979 (RMNH 55383). Paratypes: With the holotype (ECGB/38 shells; NMW/1 shell; RMNH 55384/15 shells). Type-locality, Román Suárez leg., 14.iv.1979 (RMNH 55385/4 shells). Cueva del Castillo at Puente Viesgo, Santander; UTM VN19 (NMW-Coll. Edlauer 49000, ex Coll. Kuščer/1 shell, accidentally destroyed after study). Cueva de Inguanzo near Inguanzo, 2 km SW of Cabrales, between Covadonga and Panes, Oviedo; UTM UN49; G. Favre & R. Emery leg., 19.ii.1979 (MHNG/4 shells; RMNH 55386/3 shells). Cueva Los Quesos, 1 km S of Las Arenas, Cabrales, Oviedo; UTM UN59; G. Favre & R. Emery leg., 28.ii.1979 (MHNG/1 shell). Cueva di Ernialde (= Hernialde), ca. 4 km N of Tolosa, Guipuzcoa; UTM WN77 (NWW-Coll. Edlauer 48815, ex Coll. Robić/1 shell). Without any data, glued on a piece of cardboard (NMW 71837/1 shell).

The syntypes of *Z. schaufussi* without locality data (NMW 71836/4) are not considered paratypes of *Z. suarezi*, although at least two of them most probably belong to this species.

Zospeum schaufussi Von Frauenfeld, 1862 (fig. 1)

Zospeum Schaufussi Von Frauenfeld, 1862: 971. Type-locality: a Spanish cave.

Shell conical, with 5-5⅝ strongly inflated but not shouldered whorls. The columellar mouth-edge and the border of the comparatively long parietal callus join at an angle of ca. 90 degrees, which makes the aperture looking non-circular. The shell is inconspicuously sculptured; very fresh specimens could not be studied. Close to the parieto-columellar corner an inconspicuous obsolete denticle may be seen, which indicates at most the presence of an obsolete parietal lamella inside; in most specimens a parietal lamella is lacking completely. Height, 1.2-1.45 mm; breadth, 0.9-1.0 mm.

Z. schaufussi is generally slightly larger than the sympatric *Z. suarezi*, its mouth-edge is not circular and the parietal lamella is much more degenerated or even completely absent, its whorls are not shouldered. *Z. bellesi* is less straight-sided and has a more circular mouth-edge.

Material. — Cueva del Buho at Puente Viesgo, Santander; UTM VN 19; Román Suárez leg., 14.iv.1979 (RMNH/1 shell, damaged). Do.; Espeleo Club de Gràcia leg., 12.x.1979 (ECGB/4 shells; RMNH/3 shells). Cueva de Inguanzo near Inguanzo, 2 km SW of Cabrales, between Covadonga and Panes, Oviedo; UTM UN49; G. Favre & R. Emery leg., 19.ii.1979 (MHNG/1 shell; RMNH/1 shell).

B. On *Helix simplicula* Morelet, 1845 (Pulmonata, Helicodontinae)

As may be concluded from the comprehensive synonymy list below, *Helix simplicula* Morelet, 1845, in the literature has been considered to belong either to the Zonitidae or to the Helicidae, Helicodontinae. Ortiz de Zárate Rocandio & Ortiz de Zárate López (1961: 173-175), describing the radula and the genitalia of the species, demonstrated the latter opinion to be correct. Guided by characters of the genitalia, they transferred *H. simplicula* to *Soosia* Hesse, 1918, indicating, however, that the species should be assigned to "un subgrupo de ese género", because of the lack of a flagellum in *S. diodonta* (Férussac, 1822), the only Recent *Soosia* species known. In *H. simplicula* there is a flagellum in the male part of the genitalia.

Mainly because of shell characters it seems justifiable to me to rank *H. simplicula* at a higher level, i.e. to classify this species in a separate genus, for which the name *Gasulliella* gen. nov. is introduced here. The *Soosia* species known at present (see Schlickum & Strauch, 1970) are larger and differ very conspicuously from *G. simplicula* in the shape of the shell, especially that of the aperture, which is widening and descending in front

in adult specimens, showing a thickened reflected lip on which teeth may be present. In *G. simplicula* it is sometimes difficult to decide whether a shell is full grown or not, as no special apertural features are developed apart from, at best, a few more pronounced growth lines set close together. The genitalia of *G. simplicula* are similar to those of *S. diodonta* (see Hesse, 1915a: 20, 21; Soós, 1917: 122, 162, fig. 97) by the striking reduction in characters of the female part, i.e. by the absence of mucous glands and a dart sac, and by the simple spermathecal duct without a diverticle.

It might be useful to summarize some data concerning *G. simplicula.*

Gasuliella gen. nov.

Type species, by monotypy: *G. simplicula* (Morelet, 1845).

Gasulliella is named in honour of my good friend Luis Gasull, Palma de Mallorca, in recognition of his valuable contributions to the knowledge of the Iberian malacofauna.

Gasulliella simplicula (Morelet, 1845)

Helix simplicula Morelet, 1845: 56, pl. 6 fig. 2 (shell). Type-locality: „sur les hauts plateaux qui séparent Mertola de Castro Verde", Baixo Alentejo, Portugal.
Hyalina simplicula — Albers, 1860: 69.
Zonites simpliculus — Bourguignat, 1864: 361.
Helix annai Paladilhe, 1875: 82, pl. 9 figs. 13-18 (shell). Type-locality: „Alluvions de la rivière Souani, vers son embouchure, près de Tanger". Synonymy according to Hesse (1915b: 53) and Caziot (1916: 55). Considered a „*Caracollina*" by Von Martens (1875: 183).
Hyalinia (Polita) simplicula — Westerlund, 1886: 58.
Helicodonta simplicula — Hesse, 1915b: 53.
Soosia (?) *simplicula* — Ortiz de Zárate Rocandio & Ortiz de Zárate López, 1961: 173, fig. 2 (genitalia, radula, mandibula).

The dull pale-brown shell (pl. 1 figs. 1-3) is depressed and has about 4½ moderately shouldered whorls, which are irregularly sculptured with obsolete growth lines. A few more pronounced transverse lines, indicating longer periods of rest in shell growth, are seen; some of these lines placed close together near the aperture may indicate that the shell is full grown. The aperture is simple, not descending in front, which gives the shell a juvenile appearance, as was stated already by Morelet (1845: 56), who compared his species to a juvenile *Oestophora barbula* (Rossmässler, 1838). Height up to ca. 3 mm, width up to ca. 7 mm.

The genitalia (fig. 5) are simple. The genital atrium (A) is comparatively long. The most proximal part of the penis (P), comprising 1/6 of its total length or less, has a thin wall; the remaining more solid main part is slender,

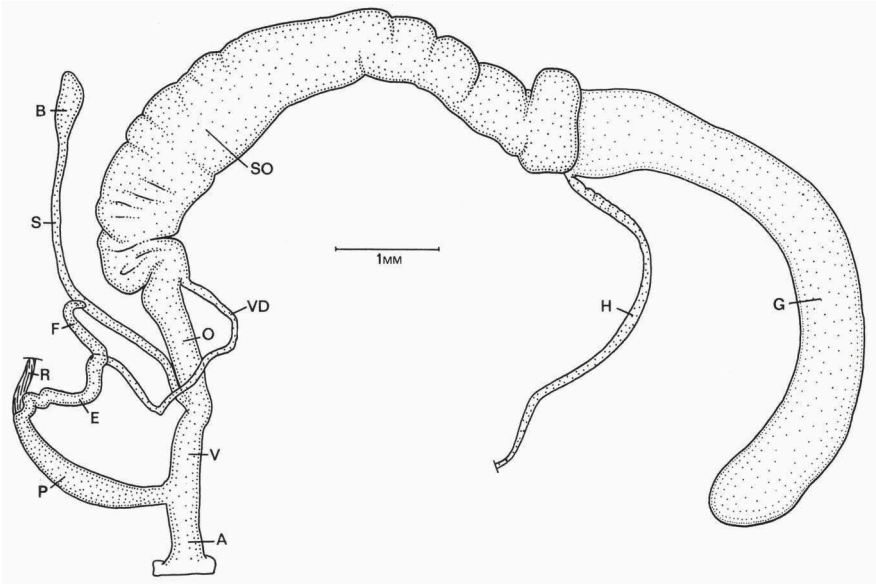


Fig. 5. *Gasulliella simplicula* (Morelet, 1845), Gibraleón, L. Gasull leg. R, retractor muscle; VD, vas deferens; other abbreviations, see the text.

spindle shaped and has a thick muscular wall. The epiphallus (E) is considerably narrower than the penis and slightly shorter. The flagellum (F) has the same diameter as the epiphallus and somewhat more than half its length. The oviductus (O) is little longer than the vagina (V); both are as broad as the genital atrium. The spermathecal duct (S) leads to a small bursa (B); there is no diverticle. I could not easily differentiate between the inconspicuous prostate and the spermoviduct (SO). The hermaphroditic duct (H) is simple. The albumen gland (G) is very long and slender.

The radula (pl. 1 fig. 4) has no special diagnostic characters. The figured specimen has 21 teeth in a half row. Ortiz de Zárate Rocandio & Ortiz de Zárate López (1961: 175) mention 19 teeth.

G. simplicula is known from a few localities in Málaga, Huelva and Cádiz in Spain and from southern Portugal; the species has also been found in NE Africa. A record from La Coruña in NW Spain neads confirmation. After the literature and material in the Rijksmuseum van Natuurlijke Historie, Leiden (RMNH), the following localities are listed, with UTM Grid codes, and indicated on a distribution map (fig. 6) as far as Iberian material is concerned:

PORTUGAL: Baixo Alentejo, between Mertola and Castro Verde (type-locality), UTM ca. PB06; Algarve, UTM ca. NB71 (Hidalgo, 1875: 207 — too vague, not indicated on the map).

SPAIN: Cádiz, Algeciras, UTM TF70 (Hidalgo, 1875: 207); Cádiz, Sierra de Arca N of San Roque, UTM TF81 (RMNH, Gasull leg.); Huelva, Gibraleón, UTM PB73 (RMNH, Gasull leg.); Huelva, San Juan del Puerto, UTM PB93 (Ortiz de Zárate Rocandio & Ortiz de Zárate López, 1961: 174); Huelva, Valverde del Camino, UTM PB96 (RMNH, Gasull leg. and Ortiz de Zárate López leg. — ex Coll. Altimira); Huelva, Puebla de Guzmán, UTM PB56 (Ortiz de Zárate Rocandio & Ortiz de Zárate López, 1961: 174); Huelva, Villanueva de los Castillejos, UTM PB55 (Ortiz de Zárate Rocandio & Ortiz de Zárate López, 1961: 174); Málaga, Vallegalanes (not localized) (RMNH — ex Coll. Altimira); La Coruña, Prado of the old monastry at Conjo, 2 km SW of Santiago de Compostela, UTM NH34 (Macho, 1871: 14 — not indicated on the map).

MOROCCO: Moyen Atlas, Ifrane, 15 km NE of Azrou, 33°31'N 5°10'W, 1800 m alt. (RMNH — ex Coll. Altimira); near Tanger, washed up along the river Souani (Paladilhe, 1875: 82 — *Helix annai*).

C. ON *HELIX INCHOATA* MORELET, 1845 (PULMONATA, HYGROMIINAE)

The systematical position of *Helix inchoata* is uncertain, as has been emphasized in the literature by Hesse (1931: 14), who stated "Nach unserer jetzigen Kenntnis der Heliceen-Anatomie weiss ich die Art nirgends recht

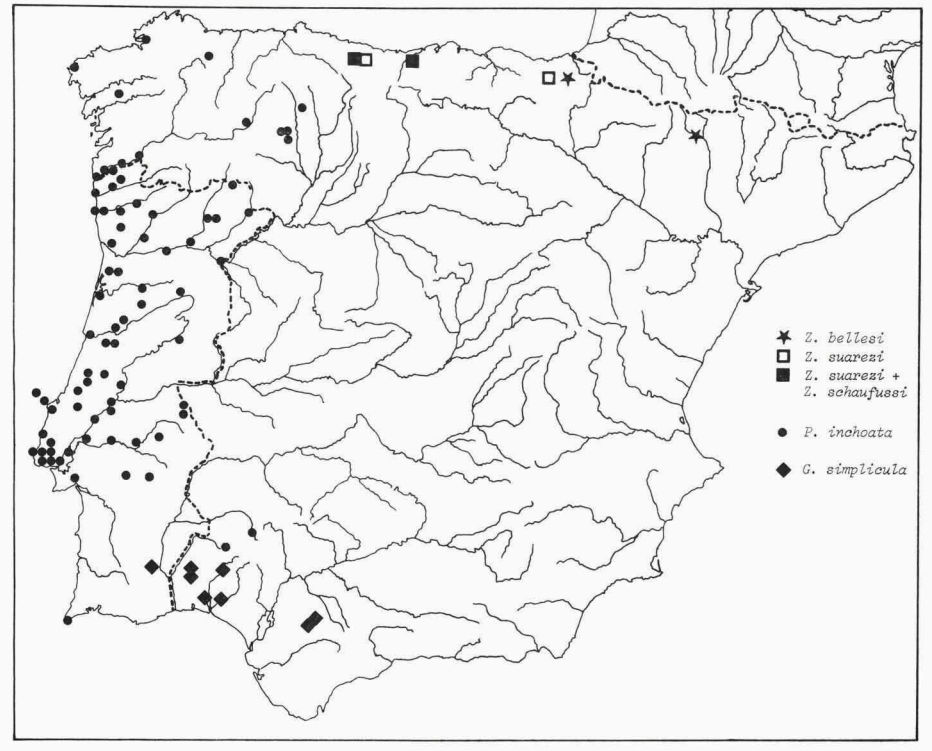


Fig. 6. Distribution map of the species dealt with. 10 × 10 km squares, U.T.M. Grid.

unterzubringen ...". Hesse eventually placed it in "*Monacha*", indicating with that name the species-group called *Monachoides* Gude & Woodward, 1921, by more recent authors. For reasons mentioned below we cannot accept this assignment. The same applies to the generic position suggested by Ortiz de Zárate Rocandio & Ortiz de Zárate López (1961: 180), classifying the species in *Hygromia* Risso, 1826. *Helix inchoata*, very well described and illustrated by Morelet (1845: 70, pl. 7 fig. 1), should be considered an isolated species, for which of new genus is introduced here. It is a typical element in the Portuguese malacofauna, known from only a limited number of localities in adjacent Spain (fig. 6), which is emphasized in the genus name.

Portugala gen. nov.

Type species, by monotypy: *P. inchoata* (Morelet, 1845).

Portugala inchoata (Morelet, 1845)

Helix inchoata Morelet, 1845: 70, pl. 7 fig. 1 (shell). Type-locality: „tout le Portugal". — Hidalgo, 1875: 197, pl. 15 figs. 149-151 (shell). — Kobelt, 1877: 20, pl. 125 fig. 1197 (shell). — Seixas, 1976: 34, fig. 7A (genitalia).
Helix (Fruticicola) inchoata — Westerlund, 1889: 72.
Hygromia (Monacha) inchoata — Pilsbry, 1895: 272.
Helix paulinoi Locard, 1895: 27. Type-locality (restr.): "Coimbra", Portugal.
Helix nobrei Locard, 1895: 27. Type-locality (restr.): "Coimbra", Portugal.
Helix goltzi Locard, 1895: 28. Type-locality (restr.): "Coimbra", Portugal.
Helix pochi Locard, 1895: 29. Type-locality (restr.): "Coimbra", Portugal.
Monacha inchoata — Hesse, 1931: 13, pl. 2 fig. 10a-h (genitalia, dart, radula, mandibula).
Hygromia (Zenobiella) inchoata — Ortiz de Zárate Rocandio & Ortiz de Zárate López, 1961: 180, fig. 7 (genitalia, dart, radula, mandibula).
Hygromia inchoata — Manga Gonzalez & Cordero del Campillo, 1979: 61, 65, fig. 7 (genitalia, mandibula).

The shell (fig. 7) is globular and has up to ca. 5¾ whorls, which are moderately inflated at the spire. It is dull yellowish brown, with a characteristic narrow dark red-brown spiral band just above the periphery, often bordered basally by a light band; the spiral band does not reach the palatal edge of the aperture. The aperture is descending in front in full-grown specimens; there is no apertural lip. The umbilicus is very narrow but open. Apart from irregular obsolete transverse lines, no special microsculpture is detectable. Dimensions (after Nobre, 1941: 117): height, 15-20 mm; width, 17-23 mm.

P. inchoata somewhat resembles banded specimens of *Bradybaena* (*B.*) *fruticum* (Müller, 1774). The latter species differs most conspicuously by

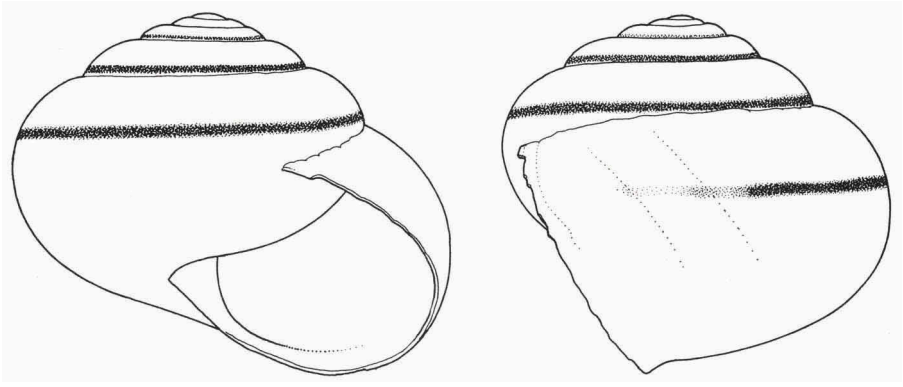


Fig. 7. *Portugala inchoata* (Morelet, 1845), Posadilla de la Vega Barruios, M. Y. Manga Gonzalez leg., actual width 18 mm. W. C. G. Gertenaar del.

the presence of an apertural lip, its umbilicus is less narrow, it has a typical micro-sculpture of spiral striae, the spiral colour band (if present at all) is broader, and it has a lower number of whorls in specimens of the same width (nearly one whorl difference).

Four nominal taxa introduced by Locard (1895) on shell characters are considered forms of *P. inchoata* by Nobre (1941: 118). Having studied the original descriptions, there appears to be no reason for disagreement. Nobre (1941: 119) erroneously synonymized also *Helix brigantina* Da Silva Mengo, 1866, as was shown by Ortiz de Zárate López (1949).

As may be concluded from the condensed synonymy-list, the genitalia of *P. inchoata* have been described or figured by several authors.

For a detailed description of the radula, the mandibula, and the genitalia (fig. 8) of *P. inchoata* we can refer to Hesse (1931: 13, pl. 2 fig. 10a-h) and Ortiz de Zárate Rocandio & Ortiz de Zárate López (1961: 180, fig. 7). Additional figures have been given by Manga Gonzalez & Cordero del Campillo (1979: 65, fig. 7) and Seixas (1976: 34, fig. 7A).

P. inchoata differs from the *Monachoides* species in the following characters of the shell: an apertural lip is not present, the microsculpture is simple (not malleated), there is a conspicuous red-brown spiral band on a yellowish brown background. It differs conchologically from the *Hygromia* species also by its conspicuous coloration, and by its large dimensions and globular shape.

Anatomically the structure of the dart is most remarkable, as has been noted by previous authors. The dart is nearly straight and is provided with a crown and four blades; it resembles most the type seen in Helicinae. Ortiz de Zárate Rocandio & Ortiz de Zárate López (1961: 181) mention "una

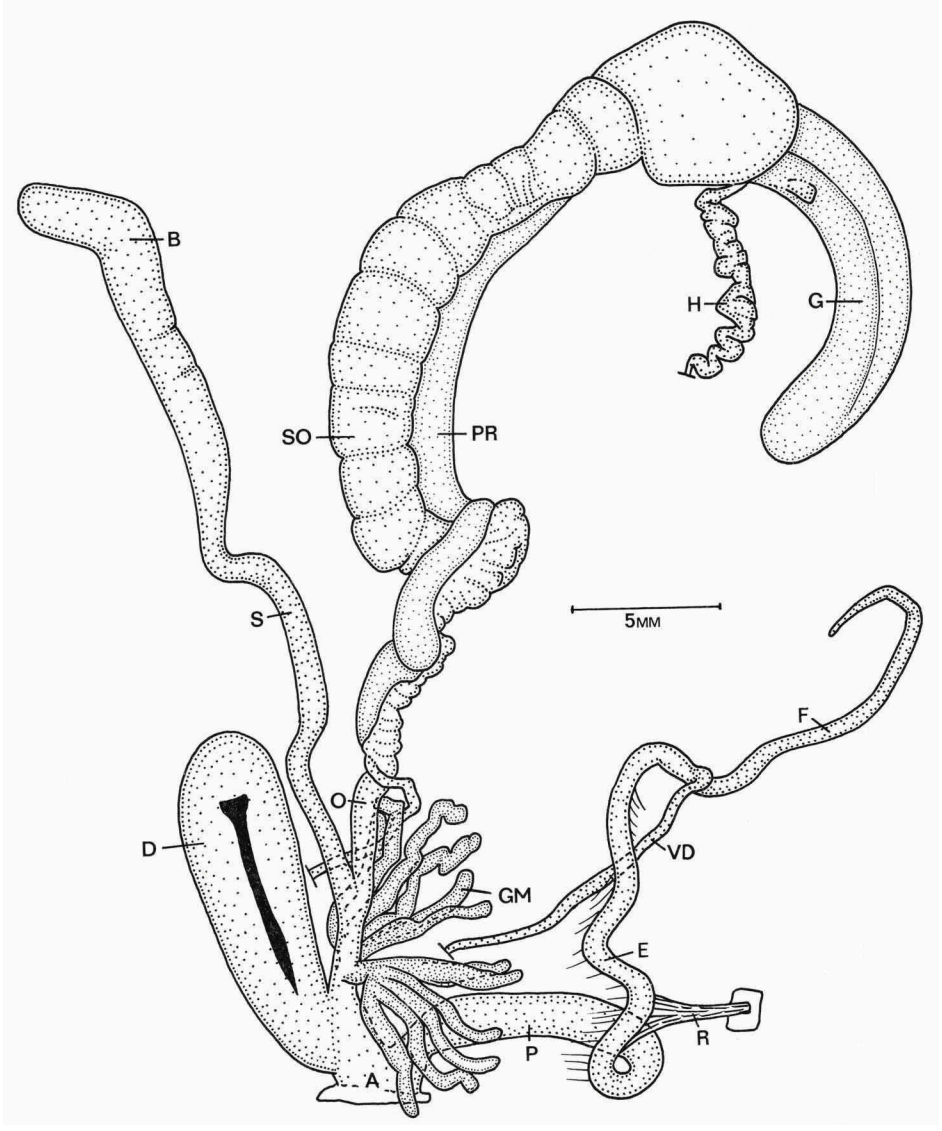


Fig. 8. *Portugala inchoata* (Morelet, 1845), Posadilla de la Vega Barruios, M. Y. Manga Gonzalez leg. Abbreviations used: A, genital atrium; B, bursa; D, dart sac, with dart; E, epiphallus (connected with the most proximal part of the genitalia by a conspicuous muscular membrane of which only the attachment on the epiphallus is indicated); F, flagellum; G, albumen gland; GM, glandulae mucosae; H, hermaphroditic duct; O, oviductus; P, penis; PR, prostate; R, retractor muscle; S, spermathecal duct; SO, spermoviduct.

zona que aparenta ser un pequeño saco del dardo". The presence of an accessory dart sac could not be confirmed, however, nor is it indicated on the various figures of the genitalia in the literature. In *Hygromia* species the accessory dart sac is clearly developed (e.g. Gittenberger, 1970). Anatomically *Portugala* comes closest to *Monachoides*.

Manga Gonzalez & Cordero del Campillo (1979: 61) indicate that they found the species in León, "at heights of 380-877 m, chiefly on alluvial terraces and silty soils with an almost pure vegetation of the Chenopodio-Scleranthea division."

All localities mentioned for *P. inchoata* by Nobre (1941: 117) are included on fig. 6. In addition have been plotted:

Spain: Badajoz, Cabeza la Vaca, UTM QC21 (Hidalgo, 1875: 198); Huelva, Jabugo, UTM PB99 (Ortiz de Zárate Rocandio & Ortiz de Zárate López, 1961: 180); La Coruña, Mugía, UTM MH87 (RMNH — ex Coll. Altimira); La Coruña, Santiago de Compostela, UTM NH34 (Hidalgo, 1875: 198); La Coruña, El Ferrol del Candillo, UTM NJ61 (Hildalgo, 1875: 198); León, Posadilla de la Vega Barruios, 11 km SE of Astorga, UTM TM59 (RMNH, Manga Gonzalez leg.); León, Carneros and La Carrera del Otero, 2 and 6 km N of Astorga respectively, UTM QH40 (Manga Gonzalez leg.); León, Rioseco de Tapía, 23 km NW of León, UTM TN73 (Manga Gonzalez leg.); León, Ponferrada, UTM PH91 (Manga Gonzalez leg.); Nistal and Barrientos, ca. 5 km SE of Astorga, UTM TN50 (Manga Gonzalez leg.); Lugo, SW of Villaodrid, between Village and Santalla de Villamea, UTM PH49 (RMNH — ex Coll. Altimira).

References

Albers, J. C., 1860. Die Heliceen nach natürlicher Verwandtschaft systematisch geordnet. Zweite Ausgabe: i-xviii, 1-359. Leipzig.

Bole, J., 1974. Rod Zospeum Bourguignat 1856 (Gastropoda, Ellobiidae) v Jugoslaviji. Die Gattung Zospeum Bourguignat 1856 (Gastropoda, Ellobiidae) in Jugoslawien. — Razprave Slov. Akad. Znan. Umetn., (4) 17 (5): 249-282, 283-289 (German text), 290-291.

Bourguignat, J. R., 1864. Malacologie de l'Algérie, 2 (6): 233-380, pls. 12, 14, 17. Paris.

Caziot, E., 1916. Sur l'identité des Helix simplicula Morelet et annai Paladilhe. — Bull. Soc. Zool. France, 41: 55-56.

Frauenfeld, G. von, 1862. Ueber ein neues Höhlen-Carychium (Zospeum Brg.) und zwei neue fossile Paludinen. — Verhandl. k.k. zool.-bot. Ges. Wien, 12: 969-972.

Gittenberger, E., 1970. Zur systematischen Stellung von Helix lanuginosa Boissy, mit Neubeschreibung eines Subgenus. — Bol. Soc. Hist. Nat. Baleares, 14 (año 1968): 63-68.

——, 1973. Eine Zospeum-Art aus den Pyrenäen, Zospeum bellesi spec. nov. — Basteria, 37: 137-140.

Giusti, F., 1975. Notulae malacologicae XXI. Prime indagini anatomiche sul genere Zospeum (Pulmonata, Basommatophora). — Conchiglie, 11 (3-4): 53-64.

Hesse, P., 1915a. Zeichnungen aus Adolf Schmidt's Nachlass. — Nachrichtsbl. Dtsch. Malakozool. Ges., 47 (1): 17-25.

——, 1915b. Kritische Fragmente. XIII. Zur Nomenklatur. — Nachrichtsbl. Dtsch. Malakozool. Ges., 47 (2): 49-53.

——, 1931. Zur Anatomie und Systematik palaearktischer Stylommatophoren. — Zoologica, 31 (81, 1-2): 1-118, pls. 1-16.

HIDALGO, J. G., 1875. Catálogo iconográfico y descriptivo de los Moluscos terrestres de Espana, Portugal y las Baleares. I: 1-224, pls. 1-24.

KOBELT, W., 1877. In: E. A. ROSSMÄSSLER, Icon. Land- & Süsswasser-Moll., 5: 1-129, pls. 121-150.

LOCARD, A., 1895. Notices conchyliologiques. XXXI. Sur les Helix du groupe de l'H. inchoata. — L'Échange, Rev. Linn., 11 (123-124): 26-29.

MACHO, D. G., 1871. Catalogo de los moluscos terrestres observados en Galicia. In: J. G. HIDALGO, Hojas Malacológicas, 1 (3): 10-16. Madrid.

MANGA CONZALEZ, M. Y. & M. CORDERO DEL CAMPILLO, 1979. New malacological records for the province of León (N.W. Spain) and percentages of infestation by Trematoda. — Malacologia, 18 (1-2): 61-66.

MARTENS, E. VON, 1875. Mollusca. In: Zoological Record, 1875: 129-205.

MORELET, A., 1845. Description des mollusques terrestres et fluviatiles du Portugal: i-vii, 1-116, pls. pls. 1-14. Paris.

NOBRE, A., 1941. Fauna malacológica de Portugal. II. Moluscos terrestres e fluviais. — Mem. Est. Museu Zool. Univ. Coimbra, 124: 1-279, pls. 1-30.

ORTIZ DE ZÁRATE LÓPEZ, A., 1949. Observaciones sobre la especie conocida con el nombre de Helix brigantina Mengo en el museo de Madrid. — Revista Las Ciencias, 16 (2): 285-292.

ORTIZ DE ZÁRATE ROCANDIO, A. & A. ORTIZ DE ZÁRATE LÓPEZ, 1961. Moluscos terrestres recogidos en la provincia de Huelva. — Bol. r. Soc. Esp. Hist. Nat., (B) 59: 169-190.

PALADILHE, A., 1875. Etude sur les coquilles terrestres et fluviatiles. Rapportées du Maroc par le Dr Bleicher. — Rev. Mag. Zool., (3) 3: 75-101, pl. 9.

PILSBRY, H. E., 1895. Guide to the Helices. — Man. Conch., (2: Pulmonata) 9 (36): 161-336.

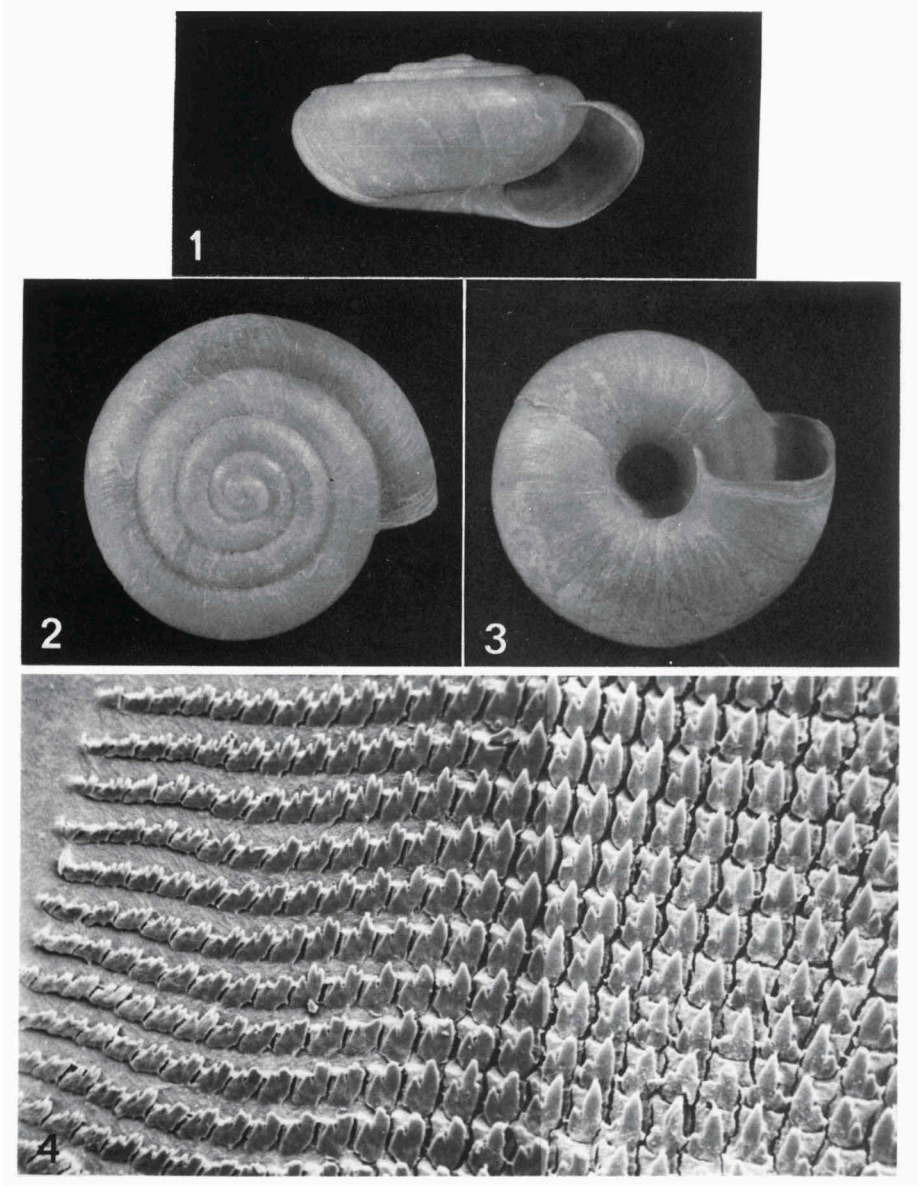
SCHLICKUM, W. R. & F. STRAUCH, 1970. Fossile Arten der Gattungen Soosia P. Hesse und Helicigona Risso. — Arch. Moll., 100 (3/4): 165-177.

SEIXAS, M. M. P., 1976. Gasterópodes terrestres da fauna portuguesa. — Bol. Soc. Port. Ciênc. Nat., 16: 21-46.

SOÓS, L., 1917. Vizsgálatok a Magyarországi pulmonáták rendszertani anatomiája köréből (Zur systematischen Anatomie der ungarischen Pulmonaten). — Ann. Mus. nat. Hungarici, 15 (1): 1-165.

WESTERLUND, C. A., 1886. Fauna der in der paläarktischen Region (...) lebenden Binnenconchylien. I. Fam. Testacellidae, Glandinidae, Vitrinidae & Leucochroidae: 1-88, 1-7 (Register).

——, 1889. Idem. II. Genus Helix: 1-473, 1-31 (Register).



Figs. 1-4. *Gasulliella simplicula* (Morelet, 1845), Gibraleón, L. Gasull leg. 1-3, shell, actual width 5.8 mm; 4, radula, × 540.

Leiden, 6 maart 1980

ERRATUM

In ZOOLOGISCHE MEDEDELINGEN, vol. 55 no. 17, p. 206, for **Gasuliella** gen. nov. read:

Gasulliella gen. nov.