

Little known land snails from the French Alps (Pulmonata)

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Three species of land snails found in the French Alps are tentatively identified with 'forgotten' nominal taxa originally described from about the same area, viz. *Limax erythrus* Bourguignat, 1864, *Trichia phorochoetia* (Bourguignat, 1864) and *Phenacolimax stabilei* (Lessona, 1880), and are redescribed in detail.

Key words: Gastropoda, Pulmonata, Limacidae, *Limax*, Hygromiidae, *Trichia*, Vitrinidae, *Phenacolimax*, taxonomy, France, Alps.

The present paper deals with three species of Stylommatophora described in the second half of the 19th century from (very close to) the French Alps, which species have remained unnoticed in the recent literature (cf. Kerney et al., 1983).

Unless stated otherwise, all material mentioned in this paper is incorporated in the collections of the Nationaal Natuurhistorisch Museum, formerly Rijksmuseum van Natuurlijke Historie (RMNH), Leiden.

Thanks are due to Dr. E. Wawra (Vienna) who enabled me to study some specimens from the Draparnaud collection, and to Dr. E. Gittenberger, who independently had reached the same conclusion with respect to *Trichia phorochoetia*; he kindly allowed his material to be incorporated in this study. I am much indebted to Messrs. Th. Heijerman and J. Goud for taking the photographs and S.E.M. photographs respectively.

Limax erythrus Bourguignat, 1864 (fig. 1)

Limax erythrus Bourguignat, 1864: 33, pl. 2 figs. 1-8 (type loc.: France, Dépt. Isère, massif de la Grande-Chartreuse, "... à 500 pas environs au-dessus de la maison des Dames en remontant le long d'un torrent desséché").

Material. — Dépt. Hautes Alpes: Le Pré Premier, about 2.5 km NW. of Brunissard, UTM LQ16, alt. 2100 m, N.-exposed limestone slope, 29.vii.1988, Th. Heyerman & A.J. de Winter leg. (1 specimen); Forêt de Marassan, between Aiguilles and Abriès, larch forest, LQ36, alt. 1700-1780 m, 27.vii.1988, Th. Heyerman & A.J. de Winter leg. (3 specimens).

Description. — Externally this slug is quite variable. Dark specimens are not unlike *L. cinereoniger* Wolf, 1803, because of the darker outer fields of the sole, which contrast with the unpigmented central field. However, in *L. cinereoniger* the pigmented parts of the sole are almost black, whereas in *L. erythrus* they are at best greyish or brownish. Length of the preserved specimens just over 60 mm. Adult specimens of *L. cinereoniger* are at least 1.5 times longer and wider. The three specimens from the Forêt de

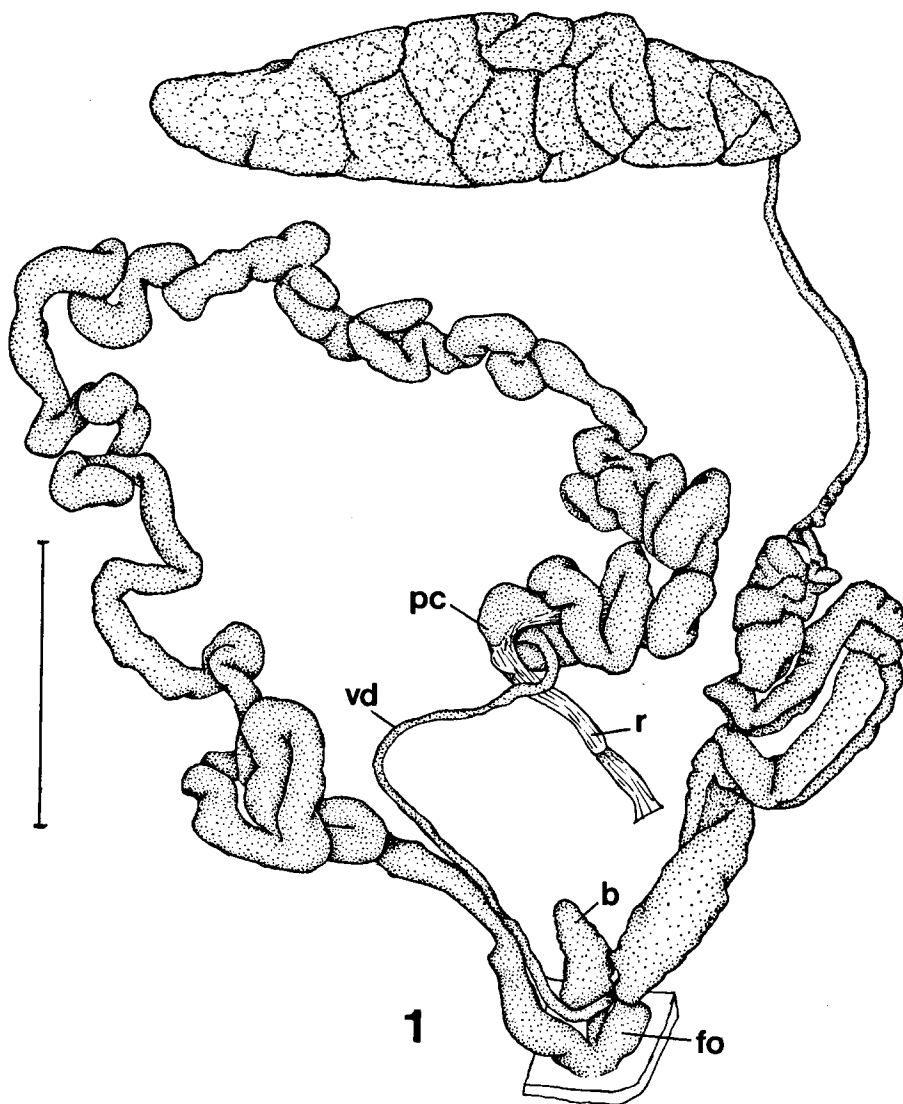


Fig. 1. Genitalia of *Limax erythrus* Bourguignat, c. 2.5 km NW. of Brunissard (Hautes Alpes), France. Scale 10 mm. Abbreviations: b, bursa copulatrix; fo, free oviduct; pc, penial caecum; r, penial retractor muscle; vd, vas deferens.

Marassan vary in pigmentation from almost unicolourous dark grey to pale grey with lighter bands on the dorsum and with pale flanks. The two paler specimens have an almost unicoloured pale sole with barely pigmented outer fields. When alive, some animals were noticed to have a reddish tinge.

Penis extremely long and strongly convoluted; convolutions are kept together by mesenteria and reach about three quarters of the total body length. In one specimen a conservative estimate of the penis length is 250 mm. Vas deferens relatively short, only about 1/8 of the penis length. It enters the penis subapically, leaving a short penial caecum. Penial retractor muscle about 10 mm long.

Remarks. — Several names have been used for *Limax* species with very long penis. Wiktor (1983) recorded one s.n. *L. punctulatus* Sordelli, 1870, from Bulgaria. Originally this species was described from Esino near Verona, Italy. According to Wiktor (1983) *Limax redii* Gerhardt, 1933, described from Tessin, Switzerland is a junior synonym of this name. Giusti & Mazzini (1970) provided information on one more species, *L. callichrous* Bourguignat, 1861. This species was not considered by Wiktor (1983), although it seems the oldest available name in this group. *L. callichrous* was described from the French Alps Maritimes region (Bourguignat, 1861), and extends into the adjoining Italian Alpi Apuane (Giusti & Mazzini, 1970). Germain (1930) classified it as a subspecies of *L. corsicus* Moquin-Tandon, 1855, which, however, is a different species with a penis considerably shorter than in *L. callichrous* (Giusti, 1968; Giusti & Mazzini, 1970).

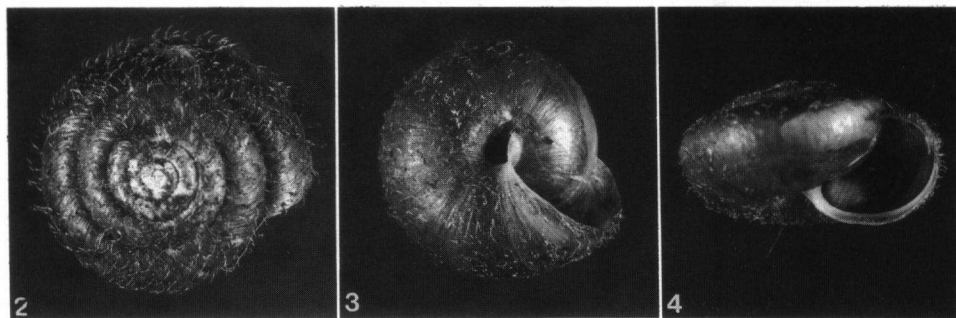
It seems doubtful whether these nominal taxa belong to one and the same species. They appear to differ in external colouration (on the base of which most were described), size, habitat, and possibly in genital anatomy, although too little about the range of variation is known to reach definitive conclusions.

Bourguignat's (1964) description and figure of the external appearance of *L. erythrus* is very much in accordance with my own observations, and the specimens were found not far from the type locality. The specimens reported upon here differ from *L. punctulatus* sensu Wiktor, 1983, in the more or less darkly pigmented outer fields of the sole, smaller body size, and conspicuously shorter vas deferens. The original description of the external habitus of *L. callichrous* is not unlike that of *L. erythrus*, but from the figure in Giusti & Mazzini (1970) the former appears to possess a relatively longer vas deferens, and a longer free oviduct. Awaiting a thorough revision of all forms, I prefer to consider *L. erythrus* a separate species. It may be identical with "*Limax* sp. A" of Boato et al. (1985).

Trichia (Trichia) phorochaetia (Bourguignat, 1864) (figs. 2-9)

Helix phorochaetia Bourguignat, 1864: 52, pl. 6 figs. 9-14 (type loc.: Dépt. Isère, "le long des sentiers de Saint-Bruno et de Chartreuse").

Material. — (Collectors: EG, E. Gittenberger, ix-1975; HW, Th. Heyerman & A.J. de Winter, vii-1988) Dépt. Isère: between St. Laurent-du-Pont and Col de la Charmette, GL12, alt. 660 m (EG/4); N.-side of Col de la Croix Haute, GK05, alt. 1100 m (EG/1); Gorges de la Bourne, 12 km W. Villard-de-Lans, FK99, alt. 550 m (EG/7); Gorges de Guiers Mort, near l'Oeillette, GL12, alt. 680 m (EG/2). Dépt. Drôme: N.-side Col de la Machine, 6 km SE. St. Jean-en-Royans, FK88, alt. 975 m (EG/1); *Fagus-Picea* woodland on Col de la Machine, FK88, alt. 1000-1150 m (HW/8); Cirque d'Archiane, E. of Die, FK95, alt. 900-1100 m (EG/2); Les Barraques-en-



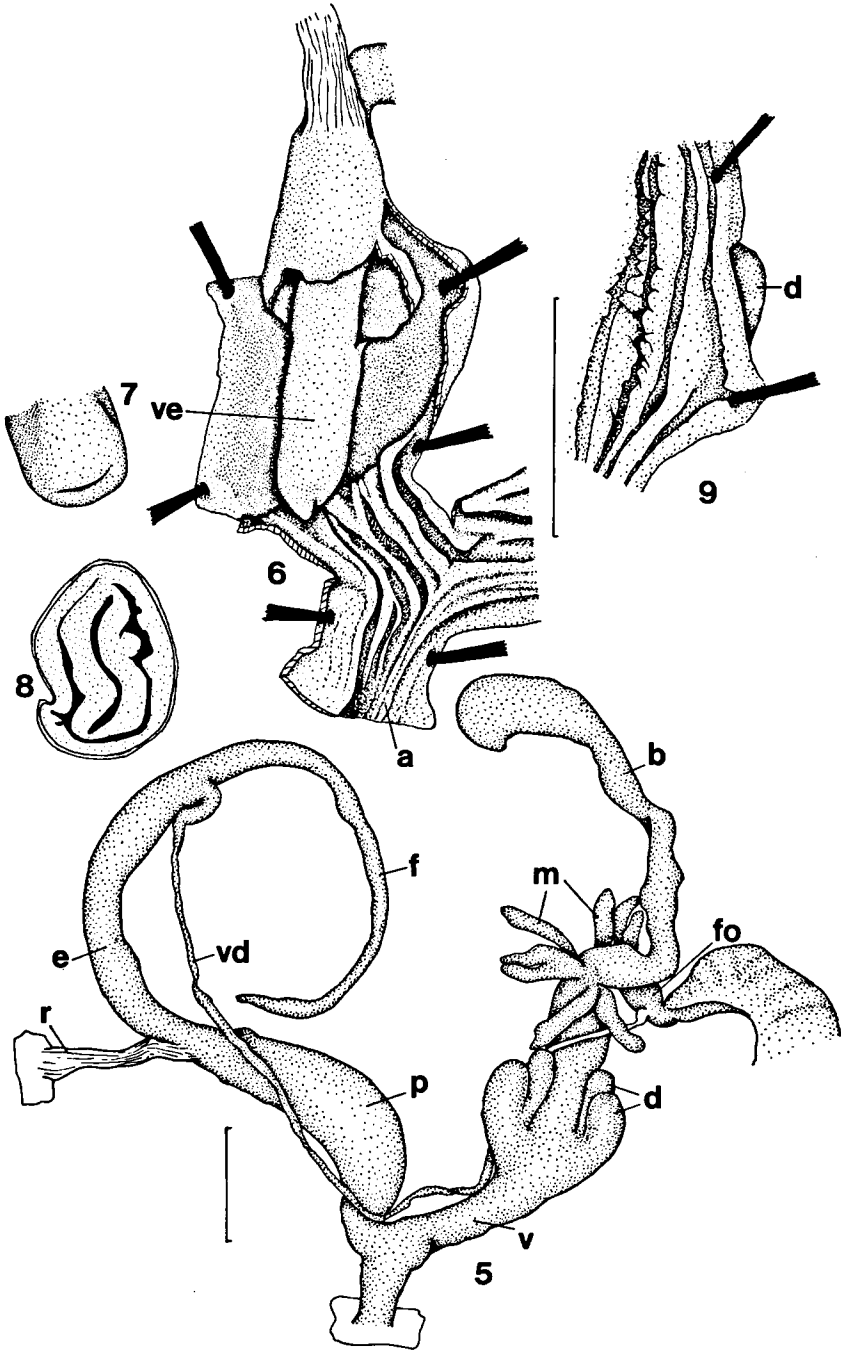
Figs. 2-4. Different views of shell of *Trichia phorochaetia* (Bourguignat), Col de la Machine, 6 km SSE. of St. Jean-en-Royans (Drôme), France. Actual width 8.2 mm. Photographs by Th. Heyerman.

Vercors, N. La Chapelle-en-Vercors, FK98, alt. 675 m (EG/5); Col de la Bataille, FK77, alt. 1200-1300 m (HW/7 + many juv.); Riverine woodland along river Cholet, 2 km ENE. St. Jean-en-Royans, FK89, alt. 250 m (HW/2 + 1 in alcohol); "Les Basses Massières", chestnut woodland 2 km E. St. Jean-en-Royans, FK88, alt. 350 m (HW/2); W.-side of Combe Lavall, 5-6 km ESE. St. Jean-en-Royans, in *Fagus* forest, FK88, alt. 900-1050 m (HW/9 + 4 in alcohol); E.-side of Combe Lavall, 4-5 km ESE. St. Jean-en-Royans, mixed secondary woodland, FK88, alt. 400-800 m (HW/11).

Description. — Shell with long curved hairs, which are retained on the adult shells. Umbilicus relatively narrow, taking up only 1/8 to 1/9 of the shell width. Maximum width of adult shells varies between 7.4 and 9.7 mm, with 4.7 and 5.5 whorls respectively. Height/width ratio between 0.64 and 0.68. Shell pale to darker brown, with growth ridges and traces of very fine spiral sculpture. The species is best characterized in relation to other hairy *Trichia* species.

As already remarked by Bourguignat (1864: 53), it resembles a small *T. villosa* (Studer, 1820), because of its conspicuous, long hairs. However, *T. villosa* has a larger and flatter shell, with longer, more widely spaced, almost straight hairs, and a much wider umbilicus. Notwithstanding the good description and figures provided by Bourguignat (1864), the species was placed by both Hesse (1921) and Germain (1930) in the synonymy of *T. villosa*, no doubt because of Bourguignat's reputation. It is certainly not identical with *Fruticicola villosa* var. *alpicola* Eder, 1921, described from the Kanton Unterwalden, Switzerland. Topotypes from this form are flatter, widely

Figs. 5-9. *Trichia phorochaetia* (Bourguignat). 5, Combe Lavall, 5.5 km ESE. of St. Jean-en-Royans (Drôme), France, anterior genitalia (scale 2 mm); 6-9, 2 km ENE. of St. Jean-en-Royans (Drôme); 6, anterior genitalia opened, showing verge (penial papilla); 7, different view on apex of verge; 8, cross-section through verge; 9, part of vagina, opened at position of dart sacs (scale to figs. 6 and 9: 2 mm). Abbreviations: a, atrium; b, bursa copulatrix; d, dart-sac(s); e, epiphallus; f, flagellum; fo, free oviduct; m, mucus glands; p, penis; r, penial retractor muscle; v, vagina; vd, vas deferens.



umbilicate, and possess stiff, relatively straight, hairs and a very prominent periostracal sculpture of fine spiral ridges. The status of this peculiar form will be discussed elsewhere by Gittenberger & Neuteboom (in preparation).

In view of the long curved hairs, shells of *T. phorochaetia* are not unlike those of the Carpathian *T. villosula* (Rossmässler, 1838), but this species has a wider umbilicus (cf. Ložek, 1964, pl. 24 fig. 2c; Shileyko, 1978, fig. 29a-c; Kerney et al., 1983, textfig. on p. 263).

T. hispida (L. 1758) has a wider umbilicus, as well as almost straight, shorter, and more close-set hairs, if present at all in adult specimens.

Conchologically *T. phorochaetia* is closely resembling the species complex usually referred to either as *T. sericea* "(Draparnaud, 1801)" or *T. plebeia* (Draparnaud, 1805). The status of both names is very uncertain.

Forcart (1966) equated *Helix sericea* Müller, 1774, with *T. hispida*, but according to Falkner (1982) it is a juvenile *T. (Petasina) unidentata* (Draparnaud, 1805). Anyway, Müller's species is clearly not identical to Draparnaud's interpretation of *H. sericea*, which may be close or even identical with *T. phorochaetia*. However, in view of the poor condition of the single shell in the Draparnaud collection, and as no locality was provided other than "habite dans les jardins" (Draparnaud, 1805: 103), we cannot be certain of this. More important, the use of *T. sericea* with Draparnaud as author (as suggested by Falkner, 1982) is not admissible, because of primary homonymy.

Forcart (1965, 1966) considered *Helix plebeia* the proper name for *H. sericea* sensu Draparnaud, but did not give any arguments for this view. From the original description and figure of *H. plebeia* such an opinion is not very obvious, and the fact that Draparnaud (1805) mentioned both taxa separately remains unexplained. No type locality was given. In the Draparnaud collection in Vienna, the single shell labeled as type is not a *Trichia*, but a *Monachoides* species, and was no doubt mislaid, as was already remarked by Locard (1895). According to Falkner (1982), Forcart's opinion is incorrect, as the name *H. plebeia* refers to a quite different species from the Swiss and French Jura, but unfortunately no further details were given. Forcart's view has been followed in the popular book by Kerney et al. (1983).

Compared to *T. phorochaetia*, shells of '*T. plebeia*' from Belgium, Luxembourg, and southern Germany are generally smaller, with about the same number of whorls, a higher spire, and often still more narrowly umbilicate; these shells also possess a dense cover of curved hairs, which are clearly shorter and finer than in *T. phorochaetia*. In Shileyko's key (1978: 49), *T. villosula* and *T. plebeia* are characterized in the same couplet by respectively "hairs long" versus "hairs rather short", whereas the hairs of *T. phorochaetia* are at least as long as those of *T. villosula*. In contrast, some samples labeled as *T. plebeia* from the Swiss Alps appear conchologically indistinguishable from *T. phorochaetia*.

Anatomically *T. phorochaetia* differs from both *T. villosa* and *T. villosula* by its long flagellum. Its verge (penial papilla) is of equal width, whereas in *T. villosa* the verge is apically strongly inflated, giving it a club-shaped appearance. The size of the inter-papillar cavity is rather variable, possibly dependent on the mode of relaxation/fixation, but resembles best that found in *T. hispida* and *T. 'plebeia'* (cf. Shileyko, 1978). The inner wall of the vagina in the region of the dart-sacs is covered by conspicuous longitudinal folds, the central ones of which have a fringed appearance, because of many small incisions. *T. phorochaetia* differs from East German and Czechoslovakian specimens of *T. 'plebeia'*, as figured by Shileyko (1978), by the lower portion of the

vagina, which is longer and well differentiated from the dart-sac complex, and by the much shorter bursal duct. In these respects *T. phorochaetia* resembles the figure and measurements of the genitalia of *T. 'sericea'* by Klöti-Hauser (1920) from the Zürichberg (Switzerland), from which area also very similar shells were seen.

Because the names *T. sericea* and *T. plebeia* are poorly defined, it is suggested to use the well typified name *T. phorochaetia* for the species from the French and Swiss alpine region. The both conchologically and anatomically different forms from other areas may be provisionally named *T. plebeia*, pending further research.

Phenacolimax (Phenacolimax) stabilei (Lesson, 1880) (figs. 14-18)

Vitrina major var. *stabilei* Lesson, 1880: 24, pl. 4 figs. 5-7 [type loc. (restricted by Pollonera, 1884): Italy, Piemonte, "Lago Fiorenza e Piano del Re ai piedi del M. Viso (oltre i 2000 m)"].

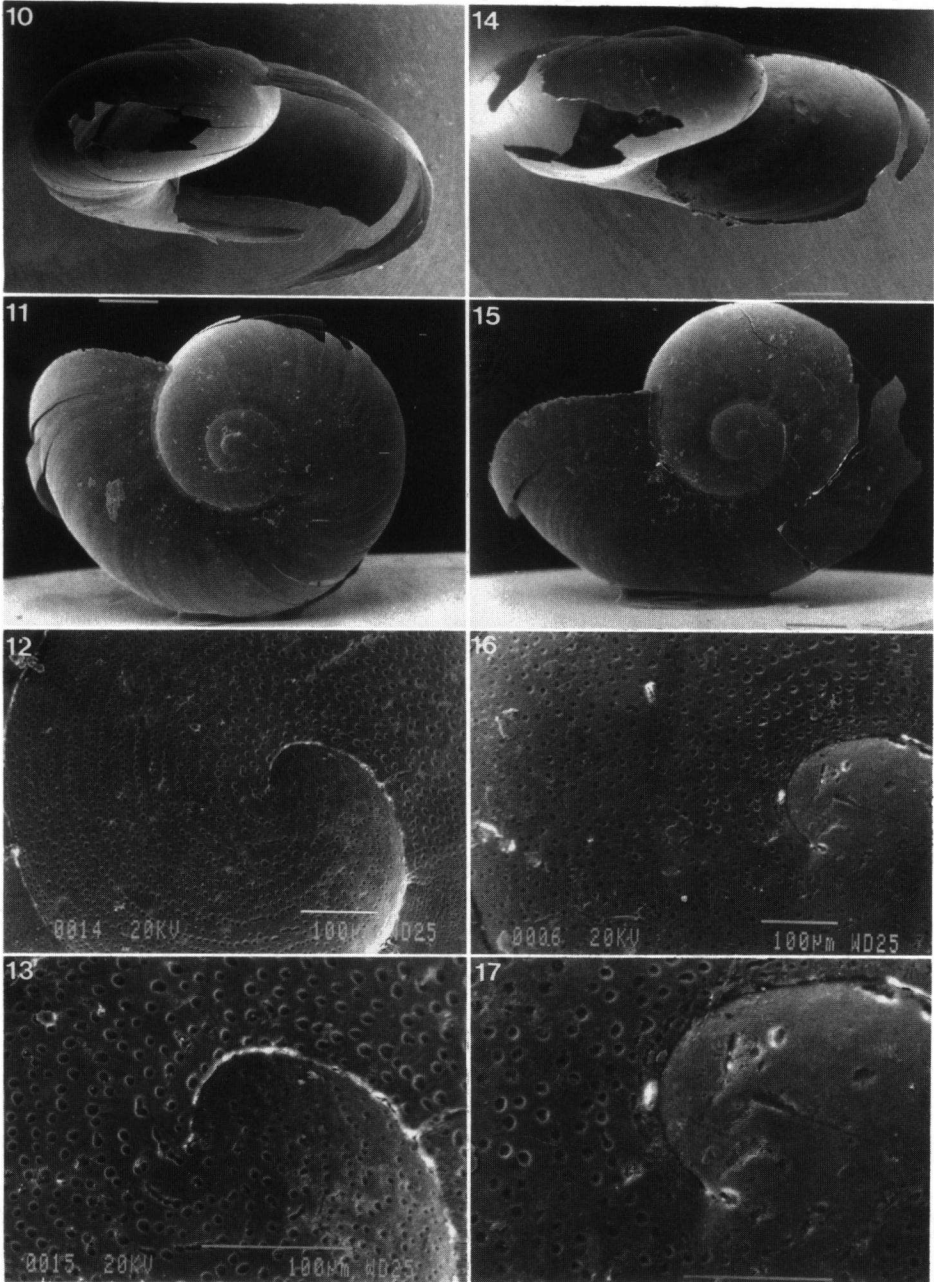
Material. — Dépt. Hautes Alpes: between Col Vieux (alt. 2800 m) and N.-side of Lac Foréant (alt. 2600 m), 10 km E. of St. Véran, under stones, LQ45, 26.vii.1988, Th. Heyerman & A.J. de Winter leg. (several empty shells and specimens in alcohol, 2 dissected); Le Pré Premier, about 2.5 km NW. of Brunissard, LQ 16, alt. 2100 m, 29.vii.1988, Th. Heyerman & A.J. de Winter leg. (2 shells).

Description. — Shell about similar in size to *Phenacolimax major* (Férussac, 1807), the only member of *Phenacolimax* s.s. generally recognized (but see Forcart, 1956, and Boato et al., 1985), but with about 1/3 to 1/2 whorl less at the same size. Spire very depressed, much more so than in *P. major*, and with less convex whorls. Last whorl wider and more slowly descending than in *P. major*. The microsculpture on the embryonic whorl of *P. stabilei* consists of irregularly and relatively widely spaced pits, which do not enter the nucleus, whereas in *P. major* the pits are denser together and more regularly arranged in spiral lines, which extend into the nucleus.

Some differences in genital anatomy with *P. major* could be observed, the most important perhaps being the very blunt tip of the vagina papilla, which hardly extends into the soft-walled lower portion of the vagina, in contrast to *P. major*, where the tip is acute and very prominent. The glandular cover of the vagina papilla is much less developed, and the free oviduct is relatively wider than in *P. major* (cf. Forcart, 1949, fig. 1). Forcart (1956: 116) described the upper part of the vagina of *P. stabilei* as "wrapped in glandular tissue", whereas that of *P. major* as "covered by two glandular lobes". All specimens found alive were relatively small, and the genital differences observed may be due to the specimens not being fully mature.

Remarks. — In my experience *P. major* is typically a lower altitude species. It was therefore somewhat of a surprise when dissection revealed specimens from over 2600

Figs. 10-17. Shells and details of sculpture of embryonic whorls of *Phenacolimax major* (Férussac) (10-13), 8 km ENE. of Millau (Aveyron), France, and *P. stabilei* (Lesson) (14-17), 10 km E. of St. Véran (Hautes Alpes), France. Photographs in the same row are of the same magnification and directly comparable. Figs. 12-13 are rotated over 180° as compared to fig. 11, in order to facilitate comparison with figs. 16-17, which are in the same position as fig. 15. Scale to figs. 10, 11, 14, 15: 1 mm; to other figs.: 0.1 mm. SEM-photographs by J. Goud. → (p.t.o.)



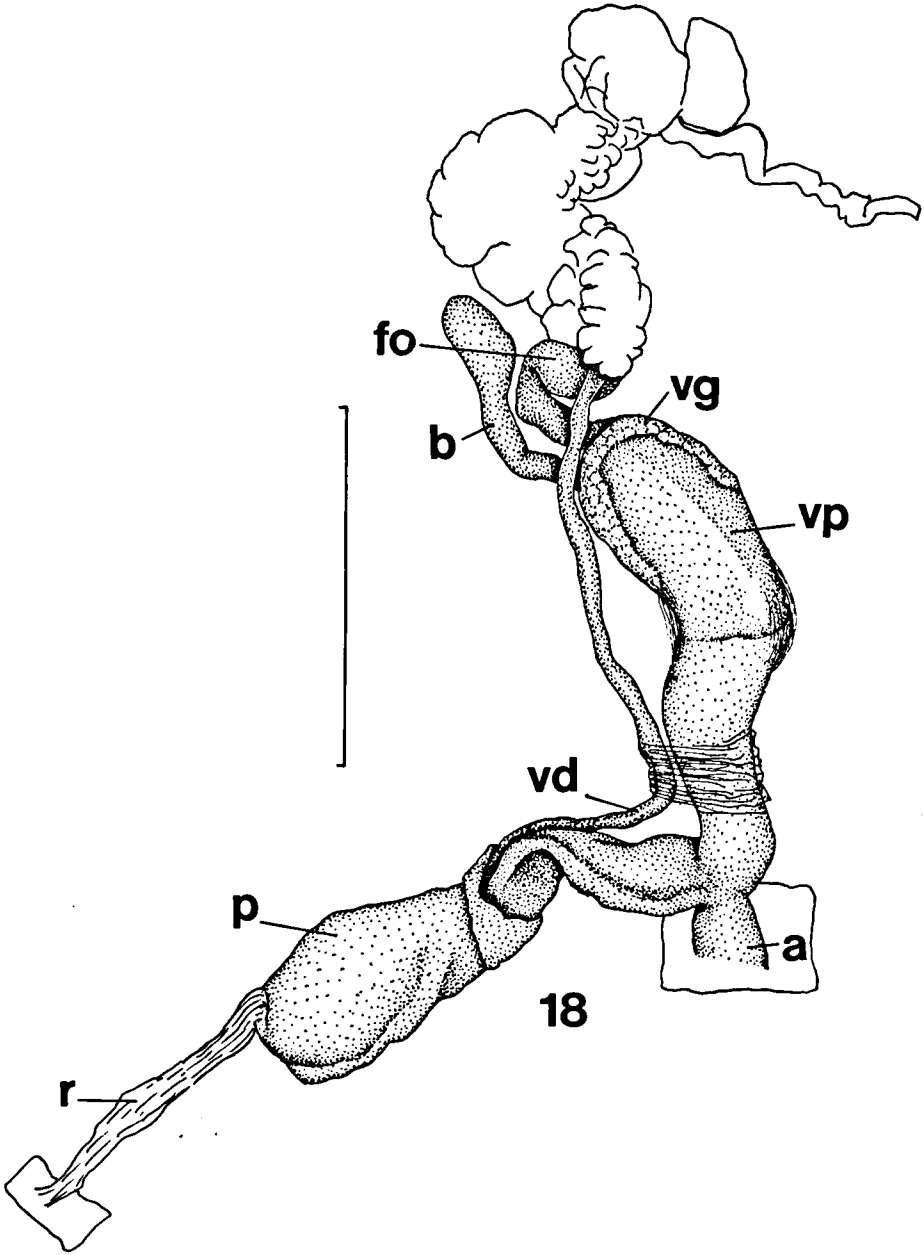


Fig. 18. Genitalia of *Phenacolimax stabilei* (Lesson), 10 km E. of St. V eran (Hautes Alpes), France. Scale 2 mm. Abbreviations: a, atrium; b, bursa copulatrix; fo, free oviduct; p, penis; r, penial retractor muscle; vd, vas deferens; vg, vaginal gland (glandula armatoria); vp, vaginal papilla.

m a.s.l. to belong to the genus *Phenacolimax* s.s. These specimens are very similar to *P. major*, but appear distinguishable at least by their shells, and perhaps by anatomical features. I am inclined to consider the higher altitude specimens as belonging to a separate species, *P. stabilei*.

Part of the material has been collected very close to the type locality. The species turned out to be already recorded from France by Caziot (1912), who also mentioned conchological differences to *P. major*. He reported the species from the northern part of the Alpes Maritimes at 1800 m a.s.l. Germain (1930) quoted Caziot's record as a variety of "*P. major*".

Forcart (1956) mentioned *P. stabilei* as a species different from *P. major* while discussing the status of *Phenacolimax* in the context of extra-European Vitrinidae. The species apparently has not been mentioned in the literature since.

Boato et al. (1985: 292) listed a specimen of *P. "cfr. major"* from the Ligurian Alps at 2250 m a.s.l., which might well be *P. stabilei*.

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