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On the occurrence of *Emarginula paivana* (Crosse, 1867) on the coast of Madeira
(Gastropoda, Vetigastropoda, Fissurellidae)

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It is argued that *Emarginula fissura* (Linné, 1758) and *Semperia paivana* Crosse, 1867, are different species, whereas *Semperia* is a junior synonym of *Emarginula*.

Key words: Gastropoda, Fissurellidae, *Emarginula*, taxonomy, Madeira.

Several specimens of an *Emarginula* species were collected during the CANCAP-I expedition (van der Land, 1987), as well as by private searching of material dredged off the south-coast of Madeira. As these shells evidently did not belong to any of the well-known species mentioned from Madeira by Watson (1897: 286) and Nobre (1937: 67), viz. *Emarginula fissura* (Linné, 1758), *E. huzardii* Payraudeau, 1826, and *E. tenera* Locard, 1892, our attention was drawn to '*Semperia paivana* Crosse, 1867'. Crosse described a new genus *Semperia*, which he considered to be characterised by an anterior slit, just as in *Emarginula*; in fully grown specimens however, in contrast to *Emarginula*, this slit was closed (or nearly so) at the anterior end. *Semperia paivana*, collected near Madeira, was designated as the type species of this genus.

Watson (1897: 286), referring to *Emarginula fissura*, wrote "Everywhere; very common, in every form of transition to *Semperia paivana* Crosse ...". Later on, Thiele (1913: 45, 49),

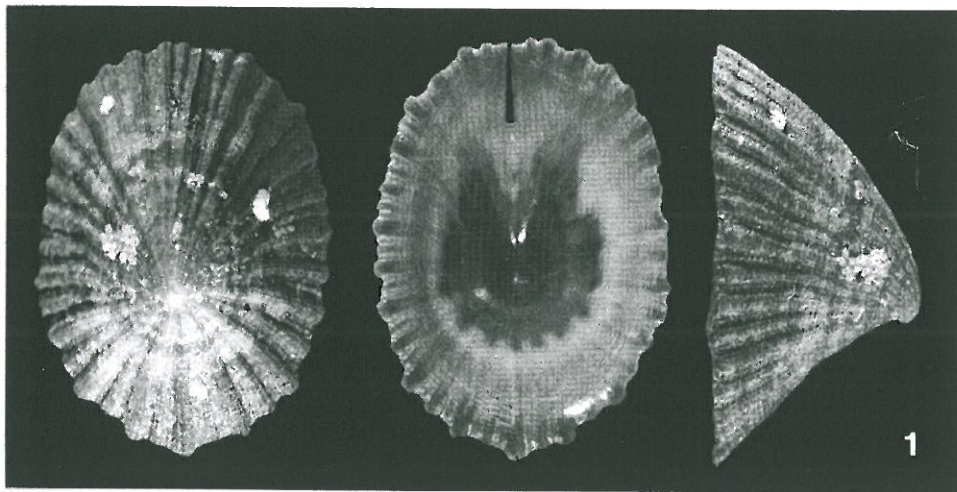


Fig. 1. *Emarginula paivana*. Specimen (6.2 x 12.5 x 8.8 mm) collected in a moderately exposed rocky littoral; Sta. 3.K10: west coast of Deserta Grande, 32°32'N 16°31'W, 19.x.1978.

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in his monograph of *Emarginula*, wrote "Der Schlitz ist schmal und tief..., zuweilen am Rande fast geschlossen (worauf Crosse die Gattung *Semperia* begründet hat)", thus also considering *Semperia* a junior synonym of *Emarginula* Lamarck, 1801.

Both Watson and Thiele synonymised *Semperia paivana* with *E. fissura* (Linné, "1767"). Since then several authors, such as Piani (1985: 198) recently, have accepted this synonymy.

Although all this looked rather convincing, also taking into account the figure given for *Semperia paivana* by Crosse (1867: pl. 2 fig. 2), we decided to study the syntypes, six of which are in the Muséum National d'Histoire Naturelle, Paris, France. It was clear immediately that on the one hand none of these syntypes is identical to *E. fissura*, whereas, on the other hand, all belong to *Emarginula*, although some shells show a tendency to closure of the slit at the anterior end. Apparently, Watson, Thiele and others correctly considered *Semperia* a junior synonym of *Emarginula*. At the same time these authors incorrectly considered *E. paivana* and *E. fissura* to be synonyms. Studying the syntypes in more detail, made clear that the one that was figured by Crosse (1867: pl. 2 fig. 2) shows an abrupt change in sculpture, from the usual fine, incised, concentric grooves to more pronounced concentric ribs which are much further apart (fig. 4). We consider this a growth-irregularity that also occurs in other specimens, in the syntypes as well as in our conspecific own material. Most of our live collected specimens show the finer sculpture, whereas the empty shells that were found more frequently have an open, reticulate pattern.

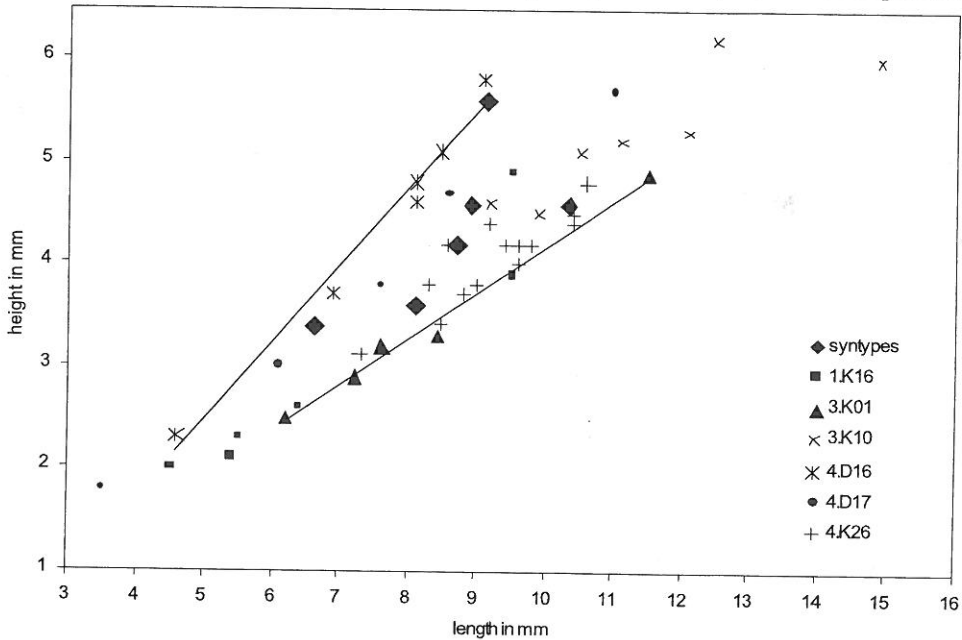
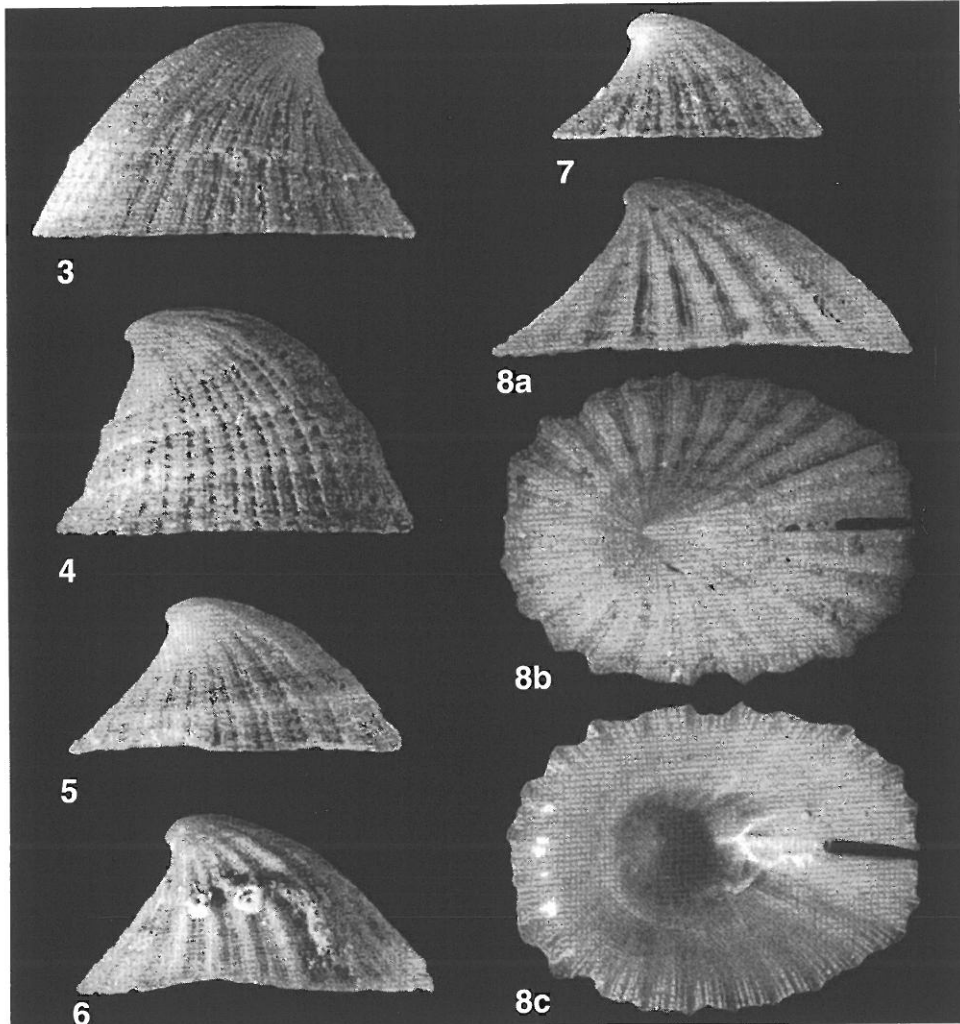


Fig. 2. Height/Length ratios of the syntypes and 6 series of specimen which were collected in areas with different exposures. Exposed areas hold significantly higher specimen (i.e. Sta. 4.D16: H/L = 0.54-0.64), whereas shallow areas have much lower specimen (i.e. Sta. 3.K01: H/L = 0.39-0.43). The syntype ratios range from 0.44 to 0.62, which shows us that they have been collected in areas of different exposure. For the data of the different stations see the listing of studied material.

In *Emarginula paivana* the shell is rather solid, although less so than in *E. fissura*, cap-shaped, with the apex curving backwards. Both the teleoconch and the protoconch have about one whorl. The mean height is less than in *E. fissura*. In our *E. paivana* height/length is 0.40-0.61, with 0.46 as the mean value ($n = 53$) (see fig. 2) versus 0.5-0.6 in *E. fissura* (after Fretter & Graham, 1976: 7). Sculpture consisting of about 24 rather



Figs 3-8. Syntypes of *Semperia paivana* Crosse, 1867, MNHN, not catalogued, Madeira Island, herein selected lectotype (fig. 8a-c) and remaining paralectotypes (figs 3-7); 3, syntype indicated by Crosse as 'Etat adulte', 4.6 x 8.9 x 7.3 mm; 4, originally figured syntype, 5.6 x 9.1 x 7.1 mm; 5, syntype indicated by Crosse as 'Etat de transition', 3.6 x 8.1 x 6.0 mm; 6, syntype indicated by Crosse as 'Etat de transition', 4.2 x 8.7 x 6.4 mm; 7, syntype indicated by Crosse as 'Etat jeune', 3.4 x 6.6 x 4.9 mm; 8a-c, syntype indicated by Crosse as 'Etat jeune', 4.6 x 10.3 x 7.9 mm. The H/L ratios range from 0.44 to 0.62.

broad primary ridges, which are densely dotted with concentrically arranged scales. Between the primary ridges usually three secondary ridges are present, the middle one of which is most prominent and occasionally becomes as large as the primary ridges. The concentric sculpture consists of close-set grooves in the furrows between the ribs (fig. 11). This sculpture can always be detected around the apex and further down, until sometimes a more or less abrupt change to a more open reticulation occurs as mentioned earlier. In other specimens the fine, incised sculpture extends towards the aperture (fig. 10). One of the syntypes with this fine, grooved sculpture throughout is chosen as the lectotype (fig. 8).

In *E. fissura* the sculpture consists of firm and simple radial ribs, with only one secondary rib between two primary ones, if any. Concentric ribs of about the same strength are present over the entire surface, whereas grooves are absent, even in young specimens.

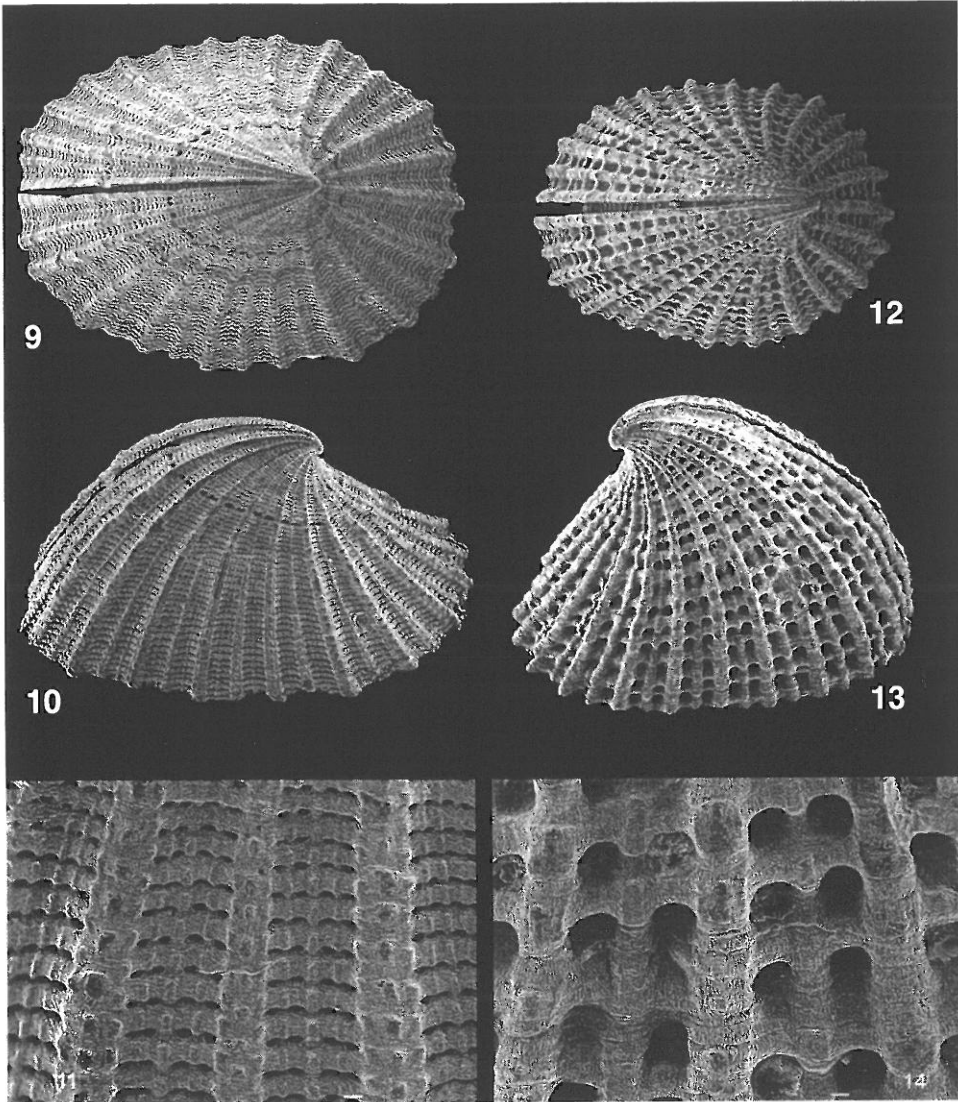
Selection of a lectotype. – After our study of all material available we are convinced that the concentric sculpture of close-set grooves, extending towards the aperture, is the generally typical sculpture. As the syntype figured by Crosse does not conform to this pattern, we selected another syntype as the lectotype of *Emarginula paivana* (Crosse, 1867) (fig. 8).

Material (in the National Museum of Natural History, Leiden, the Netherlands, unless stated otherwise). – Côtes de Madère (type locality): lectotype and 5 paralectotypes (shells) in the Muséum National d'Histoire Naturelle, Paris, France. Madeira and Selvagens Archipelago [CANCAP-I (1976), III (1978) and IV (1980) expeditions (for details, see Van der Land, 1987)]: Sta. 1.K14, SE coast of Madeira, W of Caniçal, 32°44'N 16°44'W, littoral of rocky shore (1 shell); 1.K16, SE coast of Madeira, Ponta de São Lourenço, W of Prainha, 32°44'N 16°44'W, rocky shore with tide pools (6 shells); 1.020, W of Deserta Grande, 32°31'N 16°32'W, at 144 m, Van Veen grab (1 shell); 1.040, SE of Madeira, 32°44'N 16°44'W, at 56 m, Van Veen grab (1 shell); 1.D68, SE coast of Madeira, Porto da Abra, 32°45'N 16°41'W, at 0-12 m, by scuba diving (1 shell); 1.D82, S coast of Madeira, near Ponta da Oliveira, 32°39'N 16°49'W, at 0-20 m, by scuba diving (2 shells); 1.084, S of Madeira, 32°38'N 16°51'W, at 86 m, Van Veen grab (1 shell); 1.D117, S coast of Madeira, W of Funchal harbour, 32°38'N 16°56'W, at 0-20 m, scuba diving (1 shell); 3.D04, W coast of Deserta Grande, 32°31'N 16°31'W, at down to 15 m, scuba diving (2 live specimens); 3.K01, SE coast of Madeira, Caniçal, 32°44'N 16°44'W, rocky littoral, pools, shallow sublittoral, shore-collecting (5 live specimens); 3.K02, S coast of Madeira, Funchal, 32°38'N 16°56'W, polluted rocky littoral, tidepools, crevices (32 live specimens); 3.K10, W coast of Deserta Grande, 32°31'N 16°31'W, exposed rocky littoral, shore-collecting (7 live specimens); 4.D16, Porto Santo, E coast of Baixo, 33°00'N 16°23'W, rocky coast, at 5-20 m, scuba diving (8 live specimens); 4.D16, Porto Santo, E coast of Baixo, 33°00'N 16°23'W, rocky coast, at 5-20 m, scuba diving (5 live specimens); 4.D17, Porto Santo, SE coast of Baixo, 33°00'N 16°23'W, exposed rocky coast, at 5-20 m, scuba diving (3 live specimens); 4.K17, Selvagens archipelago, S coast of Selvagem Pequena, 30°02'N 16°01'W, rocky shore, rock flat, tide pools, shallow bay, shore-collecting, at 0-3 m (1 live specimen); 4.K26, Porto Santo, SW coast of Baixo, 33°00'N 16°23'W, rocky coast, tide pools, shallow bay, shore-collecting, at 0-3 m (15 live specimens).

Along the south coast of Madeira (18 shells, fam. De Klein leg. et don.), AD28134, AD28308, in collection J.J. van Aartsen.

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Figs 9-11. SEM figures of *Emarginula paivana* and *Emarginula fissura*. Figs 9-11. *E. paivana* (3.0 x 6.1 x 4.9 mm), No. 11017: Porto Santo, southeast coast of Baixo, exposed and rocky, collected between 5 and 20 m depth; 9. Apical, 10. Lateral, 11. Detail, scale bar = 0.01 mm. Figs 12-14. *E. fissura* (5.9 x 8.4 x 6.0 mm), Norway, Nordheimsfjord, near Hambaara, viii.1965, live collected; 12. Apical, 13. Lateral, 14. Detail, scale bar = 0.01 mm.

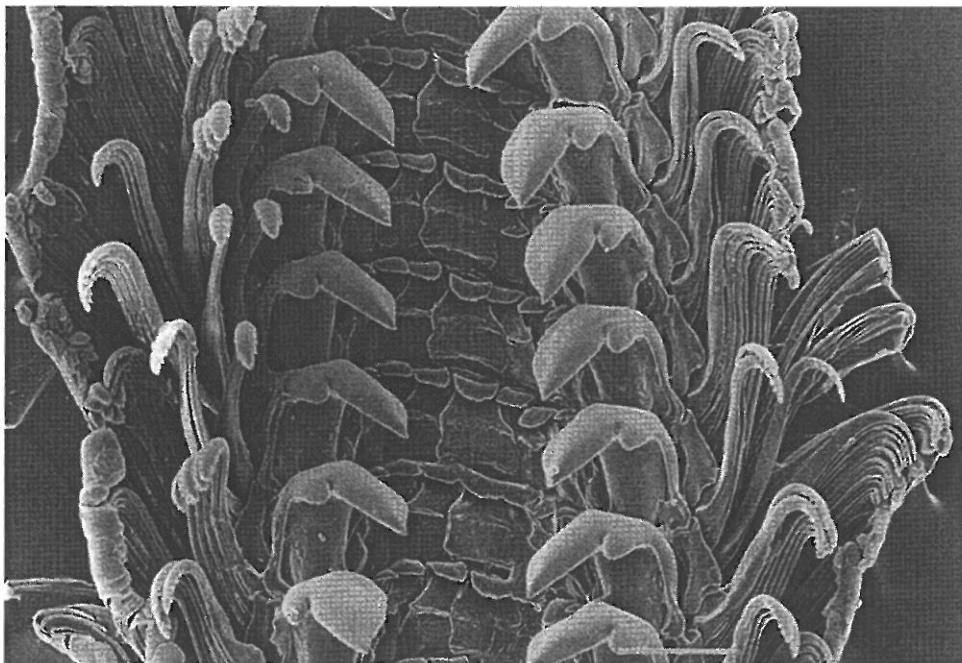


Fig. 15. SEM figure of the radula of *Emarginula paivana*. Specimen of fig.1, (6.2 x 12.5 x 8.8 mm) collected in a moderately exposed rocky littoral; Sta. 3.K10: west coast of Deserta Grande. The radula consists of a central teeth, 3+1+1 laterals and c. 15 marginals. The laterals differ remarkably: the first three having more or less the size and shape of the central, the 4th with a cusp which is about 5 times bigger and a 5th, without cusp, probably just functional for the hinge-like flexibility of the radula. Compared with the figures of Piani (1984: figs 111 and 115) we can see that this radula is much more like the one in *Emarginula punctulum* which also shows the big 4th lateral teeth, whereas this lacks in *E. fissura*.

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