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Once more on the Moitessieriidae (Gastropoda Prosobranchia), with the description of Clameia brooki gen. et spec. nov.

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The prosobranch family Moitessieriidae is characterized by three anatomical characters; a conchological character that might be diagnostic is added with some doubt. *Clameia brooki* gen. et spec. nov. is described from Greece, which implies a considerable range extension for the family in a southeastern direction.

Key words: Gastropoda, Prosobranchia, Moitessieriidae, *Clameia*, taxonomy, Greece.

RE-DEFINING THE MOITESSIERIIDAE

Based on conchological characters only, Bourguignat (1863) introduced the Moitessieriidae as a new family for the genus *Moitessieria* Bourguignat, 1863. His view was generally abandoned after the decline of the 'Nouvelle École'. Over a century later on, Boeters (1972, 1973) re-established and re-defined this family, referring to anatomical features. Next to *Moitessieria* he included *Paladilhia* Bourguignat, 1865.

Radoman (1973a) proposed the Orientaliidae for both *Paladilhia* and, inter alia, *Phreatica* Velcovrh, 1970, *Paladilhiopsis* Pavlovic, 1913, *Iglica* A.J. Wagner, 1927, and *Belgrandiella* A.J. Wagner, 1927, overlooking Boeters' (1972, 1973) publications. Obviously, Giusti & Pezzoli (1980), dealing with taxa represented in Italy, concluded that the latter group of four genera should be classified with the Moitessieriidae. However, the Moitessieriidae sensu Boeters and the Orientaliidae cannot simply be synonymized.

In order to clarify the prevailing confusion, the Moitessieriidae are defined once more.

Moitessieriidae Bourguignat, 1863

Moitessieriidae Bourguignat, 1863: 432 [1].

Differentiating characters. — The Moitessieriidae differ from the Hydrobiidae, which are considered most closely related, by at least three anatomical character states. A conchological, fourth character state might also establish a separation of the two families.

(1) A gonopericardial duct is missing. This feature is already obvious for *Moitessieria* (see Boeters, 1972: 100; 1973: 64 [*M.* spec. from: Tarn, Albi, Puits de la Rue S. de

Rivière; Haute Garonne, Arbas, Goueil-di-Her]) and *Paladilhia* (see Boeters, 1972: 100; 1973: 65 "*pleurotoma*" [type species]) when opening the body, since the oviduct coming down the columella enters the uterus at a clear distance from the pericard.

In the Hydrobiidae the oviduct forms a loop, nearly touching the pericard. At this site, where the oviduct and the pericard come close together, the very short gonopericardial duct branches off. This has been reported for: *Hydrobia* s.s. (Krull, 1935: 436 "*ventrosa*"; Radoman, 1977: 208, fig. 3A [corresponding to 1983: 27, fig. 8A] "*stagnorum*"); *Hydrobia* (*Peringia*) (Krull, 1935: 436 "*ulvae*" [type species]); *Pseudamnicola* (s.s.) Radoman, 1983: 27, fig. 10 "*lucensis*" [type species]), *Horatia* (Radoman, 1966: 249, fig. 8; 1983: 48, fig. 20 "*klecakiana*" [type species]), *Belgrandia* (Radoman, 1973a: 30, fig. 1 [corresponding to 1983: 99, fig. 50] "*kusceri*" [type species]); *Bythiospeum* (Krull, 1935: 436 "*quenstedtii*"), *Marstoniopsis* (Krull, 1935: 436 "*steini*"; Radoman, 1976: 148, fig. 7 [corresponding to 1983: 175, fig. 107B] "*macedonica*"), *Bythinella* (Radoman, 1976: 138, fig. 4D "*viridis*" [type species]), *Potamopyrgus* (Krull, 1935: 436 "*jenkinsi*").

(2a) When leaving the crystalline style sac of the stomach, the intestine runs in the direction of the anus over a distance one to three times as long as this sac, before turning back in the direction of the stomach. At least for *Moitessieria* this has been both observed by the senior author and figured by Bernasconi (1984: 211, fig. 6d "*lineolata*").

In the Hydrobiidae, the intestine after leaving the stomach turns promptly back again, in the direction of the stomach. This has been reported for: *Hydrobia* s.s. (Radoman, 1977: 206, fig. 2A [corresponding to 1983: 25, fig. 6A] "*acuta*" [type species]), *Mercuria* (Giusti & Pezzoli, 1980: 5, fig. 2 "*zopissa*"), *Pseudamnicola* (s.s.) (Radoman, 1972: 198, fig. 4D "*conovula*"), *Belgrandia* (Radoman, 1973b: 234, fig. 7 "*vjetrenicae*"), *Belgrandiella* (Radoman, 1975: 49, fig. 10 "*umbilicata*"), *Bythinella* (Radoman, 1976: 137, fig. 3A "*schmidtii*").

(2b) Normally, neighbouring faecal pellets are aligned like sausages in a chain. In intestines densely filled with faecal pellets, the single pellets, however, can be arranged like in a bandoleer, which has neither been reported in the literature nor personally observed in the Hydrobiidae. This character state has been recorded in both *Moitessieria* (Boeters, personal observations; *M.* spec. from: Haute-Garonne, Arbas, Goueil-di-Her) and *Paladilhia* (Boeters, 1973: 65, fig. 5 "*pleurotoma*" [type species]).

(3) In the Moitessieriidae, the anus opens closely behind the mantle skirt, whereas the vagina opens about a half whorl behind it. These character states have been reported for both *Moitessieria* (Boeters, 1972: 100; 1973: 65, fig. 4. [*M.* spec.]) and *Paladilhia* (Boeters, 1972: 100; 1973: 65 "*pleurotoma*" [type species]).

In the Hydrobiidae, both the anus and the vagina open closely behind the mantle skirt. This has been reported for e.g. *Semisalsa* (Giusti & Pezzoli, 1980: 27, fig. 11B "*aponensis*"), *Mercuria* (Giusti & Pezzoli, 1980: 21, fig. 9C "*zopissa*"), *Pseudamnicola* (s.s.) (Giusti & Pezzoli, 1980: 21, fig. 9G "*lucensis*" [type species]), *Belgrandia* (Giusti & Pezzoli, 1980: 44, fig. 19I "*minuscola*"), *Belgrandiella* (Giusti & Pezzoli, 1980: 30, fig. 12F "*pupula*"), *Bythiospeum* (Giusti & Pezzoli, 1980: 34, fig. 14G "*cornucopia*"), *Marstoniopsis* (Giusti & Pezzoli, 1980: 56, fig. 24G "*insubrica*"), *Bythinella* (Giusti & Pezzoli, 1980: 56, fig. 24D "*schmidti*").

(4) In the Moitessieriidae spiral lines or an ornamentation that is spirally arranged on the shell can be observed, whereas in *Paladilhia* (at least on fresh shells) spiral lines can be seen (Boeters, 1972, 1988; Bourguignat, 1863). Schütt (1970: 308) mentioned

a spiral microsculpture for some SE. European representatives of "*Paladilhia* (*Paladilhiopsis*)". Because of a lack of anatomical data it is open to question, however, to which family or even genus (? *Bythiospeum*) these species really belong. In most species, the spiral sculpture, which may vary considerably in its detailed structure, has only insufficiently been studied with a light-microscope. Therefore, at present it remains uncertain whether a (certain type of) spiral microsculpture may serve to distinguish Hydrobiidae and Moitessieriidae. We only know that spiral lines are at least rare in the Hydrobiidae.

THE MOITESSIERIIDAE IN GREECE

Up to now, representatives of the Moitessieriidae have been reported from north-eastern Spain (Boeters, 1988), southern France (Boeters, 1972, 1973), northwestern Italy (Bodon, 1980) and Sardinia (Bodon & Giusti, 1989). To our surprise, we discovered an additional representative from Greece. This concerns both a new genus and a new species. The type specimens are kept in the Nationaal Natuurhistorisch Museum (Rijksmuseum van Natuurlijke Historie), Leiden, The Netherlands, abbreviated RMNH.

Clameia gen. nov.

Monotype: *Clameia brooki* spec. nov.

Description. — See that of the type species.

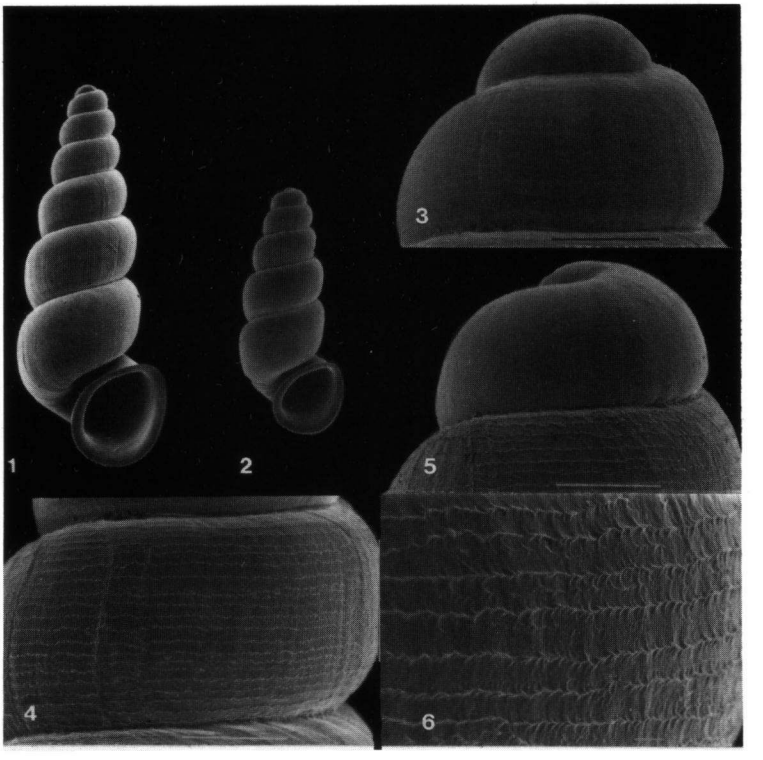
Differentiating features. — In contrast to *Paladilhia*, a pallial tentacle is missing. The shells of *Paladilhia* are similar in general shape, but have a lower number of whorls and a less conspicuously protruding aperture; the nature of the spiral sculpture might differ as well, but this has not yet been studied with a scanning electron microscope.

In both *Clameia* gen. nov. and *Moitessieria* the oviduct has two receptaculi. In *Moitessieria*, one of these is provided with an extremely short pedunculus, whereas in *Clameia* both pedunculi are long and about equal in length. In *Moitessieria* the shells are even more slender, with a higher number of whorls, that increase less quickly in size, and the entire teleoconch shell has a prominent spiral sculpture.

Clameia brooki spec. nov. (figs. 1-10)

Material. — Holotype (RMNH 56360) and paratypes (RMNH 56361/3 shells, A9277/3 animals in alcohol 70%), all from Greece, Évvoia (= Euboea), upstream of Mantoudi(on) (= Mandoúdhion), subsoil effluence of the Kirefs river, C. Bou leg., 26.viii.1971.

Shell (figs. 1-6, 8-10). — The shell is slender conical to slightly more spindle-shaped and provided with 5¼ to 7¼ colourless, very strongly inflated whorls; the body whorl is somewhat flattened laterally. Under a light microscope, a microsculpture of spiral lines is visible, most clearly so on the initial teleoconch whorls. A scanning electron microscope reveals a very faint spiral sculpture on the protoconch (fig. 3) and a much more prominent one on the adjoining, initial, teleoconch whorls, gradually becoming more obsolete towards the aperture. The spiral 'lines' are composed of irregularly arranged, short, twig-like, interconnected line segments (fig. 6). The protruding aper-



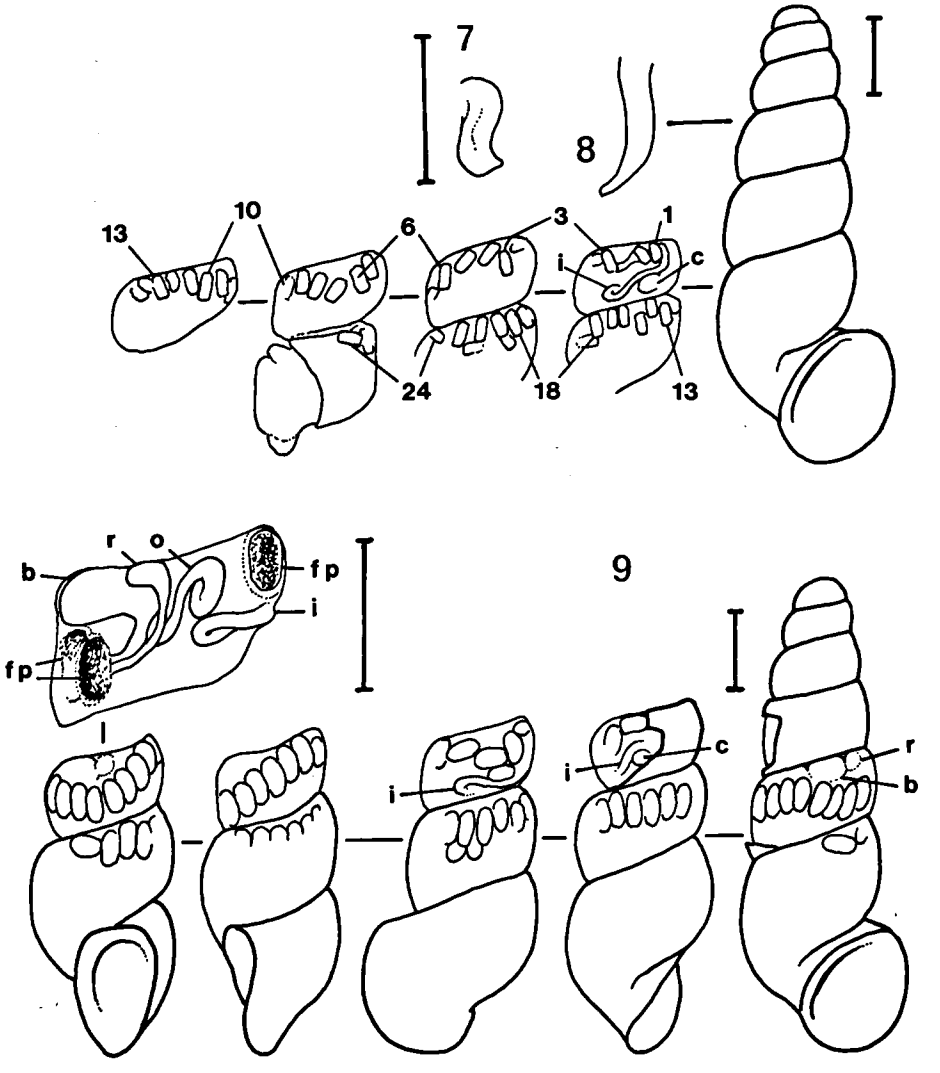
Figs. 1-6. *Clameia brooki* gen. et spec. nov., Greece, Evvoia, upstream Mantoudi in the subsoil effluence of the Kiref river; C. Bou leg. 26 viii 1971. 1, 3, 4, holotype (RMNH 56360); 1, shell, height 2.85 mm; 3, 4, apical part, interconnected details (140 x). 2, 5, 6, paratype (RMNH 56361), type locality; 2, shell, height 1.8 mm; 5, apex (140 x); 6, sculpture on the first quarter of the first teleoconch whorl (400 x). Photos by J.H.W. Krom, Leiden.

ture is obliquely ovoid. The apertural lip is broadly reflected to over 90° and thickened; it does not touch the penultimate whorl. In lateral view the apertural border is gently curved, S-like.

Shell height 1.6-1.9 mm; width 0.55-0.65 mm.

Differentiating shell features. — The shell can easily be distinguished from that of other Greek micro-prosobranchs. It somewhat resembles that of *Paladilhiopsis janinensis* Schütt, 1962, from NW. Greece, Ipiros, which differs in (1) size (the holotype measures 3.3 mm in height), (2) a comparatively broader apex, (3) an ascending last part of the body whorl, (4) a thinner and more narrowly reflected apertural lip, which is connected with the penultimate whorl at the parietal side.

Soft parts (figs. 7-10). — The body of the animal is colourless. Neither eyes nor a pallial tentacle have been observed. When leaving the stomach, the intestine first runs down in the direction of the aperture, turns back then to the stomach wall, slightly



Figs. 7-9. *Clameia brooki* gen. et spec. nov., paratypes, Greece, Evvoia, upstream Mantoudi in the subsoil effluence of the Kiref river; C. Bou leg. 26 viii 1971. 7, penis (scale-line 0.5 mm). 8, penis, shell and views of the lower teleoconch whorls with 24 faecal pellets (scale-line 0.5 mm). 9, shell (partially destroyed), views of the lower teleoconch whorls with 31 faecal pellets, and view of bursa and receptaculum (intestine partially removed) (scale-lines 0.5 mm). Abbreviations: b, bursa; c, crystalline sac; fp, faecal pellet; i, intestine; o, oviduct; r, receptaculum; v, vagina.

ascending, and finally turns again in the direction of the aperture, thus forming a Z-loop. In females a second loop of the intestine can be observed. It is situated about one body whorl behind the first loop and behind the uterus. Interestingly, the legs of this second loop do not lie on the wall of the shell like in *Bythiospeum*, but on the roof of the mantle cavity. Thus, seen through the wall of the shell, the legs of the loop lie behind each other. This arrangement reflects the fact that the uterus does not extend to the mantle skirt as in the Hydrobiidae. A corresponding second loop has been observed in *Paladilhia* (see Boeters, 1973: 65, fig. 5). In males a second loop seems to be missing. In two females 31 and 32 faecal pellets, respectively, have been counted, whereas two males showed only 18 and 23 pellets.

The penis is simple, finger-like, without appendages. The female tract has two receptaculi, viz. a bursa and, somewhat higher on the oviduct, a smaller receptaculum. The oviduct is slightly looped before entering the uterus, but lies isolated in the kidney without any gonopericardial duct branching off. The anus is situated close to the mantle skirt; the uterus terminates about 1/2 body whorl before the anus.

Distribution. — The species is only known from its type locality, in N. Évvoia, where it occurs subterraneously.

Derivatio nominis. — This new genus and its new species are dedicated to Dr. Claus Meier-Brook (Tübingen) organizer of the 10th International Malacological Congress, 1989.

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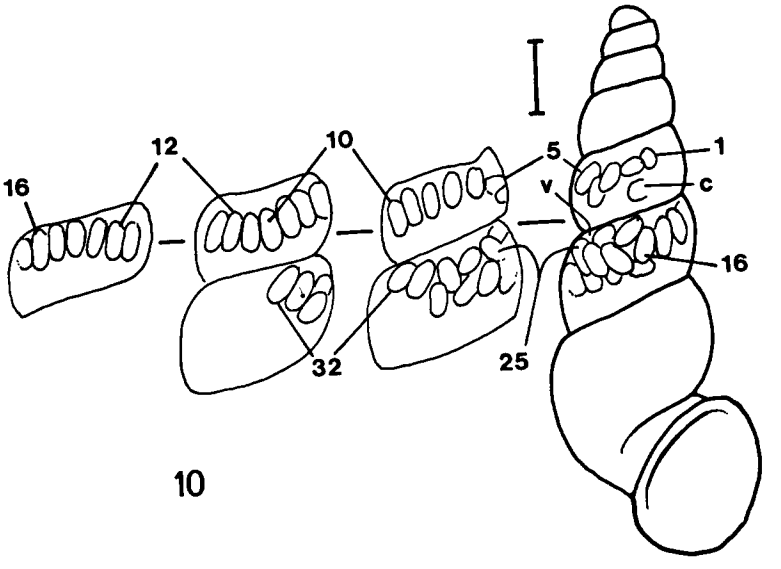

Fig. 10. *Clameia brooki* gen. et spec. nov., paratype, female shell with views of the lower teleoconch whorls with 32 faecal pellets (scale-line 0.5 mm). See also legends to figs. 7-9.

REFERENCES

BERNASCONI, R., 1984. Hydrobides de France: Moitessieria, Bythiospeum et Hauffenia des départements Gard, Ain, Isère (Gastéropodes Prosobranches). — Revue suisse Zool. 91: 203-215.

BODON, M., 1980. Segnalazione del genere Moitessieria Bourguignat in Italia. — Annali Mus. civ. Stor. nat. Giacomo Doria 5 (236): 1-5.

BODON, M., & F. GIUSTI, 1989. New data on the familiar status of Moitessieria and Paladilhia (Gastropoda: Prosobranchia). — Abstracts 10th Int. Malac. Congr., Tübingen 1989: 30.

BOETERS, H.D., 1972. Westeuropäische Moitessieriidae, 1. Spiralix n. subgen. (Prosobranchia). — Arch. Molluskenk. 102: 99-106.

——, 1973. Französische Rissoaceen-Aufsammlungen von C. Bou. — Annls Spéléol. 28: 63-67.

——, 1988. Westeuropäische Moitessieriidae, 2 und westeuropäische Hydrobiidae, 7. Moitessieriidae und Hydrobiidae in Spanien und Portugal (Gastropoda: Prosobranchia). — Arch. Molluskenk. 118: 181-261.

BOURGUIGNAT, J.R., 1863. Monographie du nouveau genre français Moitessieria. — Revue Mag. Zool. (2) 15: 432-445, pls. 20, 21. [Separatum: 19 pages & 2 plates].

GIUSTI, F., & E. PEZZOLI, 1980. Gasteropodi, 2 (Gastropoda: Prosobranchia: Hydrobioidea, Pyrguloidea). Guide per il riconoscimento delle specie animali delle acqua interne Italiana 8: 1-67. Verona.

KRULL, H., 1935. Anatomische Untersuchungen an einheimischen Prosobranchiern und Beiträge zur Phylogenie der Gastropoden. — Zool. Jb. (Anat.) 60: 399-464.

RADOMAN, P., 1966. Die Gattungen Pseudamnicola und Horatia. — Arch. Molluskenk. 95: 243-253.

——, 1972. Nochmals über die Gattung Pseudamnicola und schliesslich die Gattung Orientalia n. gen. — Arch. Molluskenk. 102: 195-200.

——, 1973a. New classification of fresh and brackish water Prosobranchia from the Balkans and Asia Minor. — Posebna Izd. Prirod. Mus. Beogr. 32: 1-30.

——, 1973b. Contribution à la connaissance des gastéropodes des eaux douces de Bosnie et d'Herzegovine. — Bull. Mus. Hist. nat. Marseille 33: 227-237.

——, 1975. Speciation in the genus Belgrandiella and in its related genera in the Balkans. — Glasn. prir. Muz. Beogr. (B) 30: 29-69.

——, 1976. Speciation within the family Bythinellidae on the Balkans and Asia Minor. — Z. zool. Syst. EvolForsch. 14: 130-152.

——, 1977. Hydrobiidae auf der Balkanhalbinsel und in Kleinasien. — Arch. Molluskenk. 107 (1976): 203-223.

——, 1983. Hydrobioidea a superfamily of Prosobranchia (Gastropoda), I. Sistematics. — Posebna Izd. srp. Akad. Nauka prirod. mat. 547 (57): 1-256.

SCHÜTT, H., 1962. Neue Süsswasser-Prosobranchier Griechenlands. — Arch. Molluskenk. 91: 157-166.

——, 1970. Neue Formen höhlenbewohnender Hydrobiiden des Balkans und ihre Beziehungen zu Paladilhiopsis Pavlovic 1913. — Arch. Molluskenk. 100: 305-317.