

SHELL OUTER AND INNER STRUCTURES AND RISSOACEAN PHYLOGENY. II. SOME MORE DATA ON THE SHELL STRUCTURES IN *MARSTONIOPSIS SCHOLTZI* (A. SCHMIDT, 1856) (PROSOBRANCHIA: RISSOACEA: BYTHINELLIDAE)

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ABSTRACT: In the paper the author gives some more data on the shell SEM structures in *Marstoniopsis scholtzi* (A. Schmidt, 1856), not described by him earlier. He gives descriptions of the shell outer surface and sections perpendicular to the growth lines. Based on these data and the ones published in his monograph (Falniowski, 1990, this volume), the paper is to present some idea of what possible relationships of *Marstoniopsis* are.

KEY WORDS: shell outer surface, shell sections, growth lines, phylogenetic relationships

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In the paper the author gives some more data on the shell SEM structures in *Marstoniopsis scholtzi* (A. SCHMIDT, 1856), not described by him earlier. He gives descriptions of the shell outer surface and sections perpendicular to the growth lines. Based on these data and the ones published in his monograph (FALNIOWSKI 1990, this volume), the paper is to present some idea of what possible relationships of *Marstoniopsis* are.

1. Introduction

As I have already pointed out in my earlier papers (e.g. FALNIOWSKI 1989, 1990 this volume and FALNIOWSKI & SZAROWSKA in press), the phylogenetic relationships within the *Rissoacea* (= *Truncatelloidea*: PONDER 1988) are still far from being clear. Obviously, one of the reasons is the low number of the taxonomic characters available. Hence, shell SEM outer and inner structures seem therefore worth of attention as a possible source of new, useful characters.

The data on the shell SEM structures of *Marstoniopsis scholtzi* (A. SCHMIDT, 1856) (FALNIOWSKI 1990, this volume) are incomplete, since not enough material was available at the time of the study. *Marstoniopsis* is quite a rare species in Poland (FALNIOWSKI 1987). It is only recently that it has been possible to complete the description of those structures in the species. For technical reasons, it has not been possible to include the plates and descriptions within the monograph (FALNIOWSKI 1990, this volume) and, therefore, this addendum appears separately.

2. Description of the SEM shell structures

Protoconch outer surface

The protoconchs in all the studied specimens were more or less corroded, so no photographs are presented. The surface of the small, uncorroded patches was exactly the same as the one visible on the teleoconch surface described below, bearing characteristic, extremely fine pores approximately circular in shape and not arranged in a net.

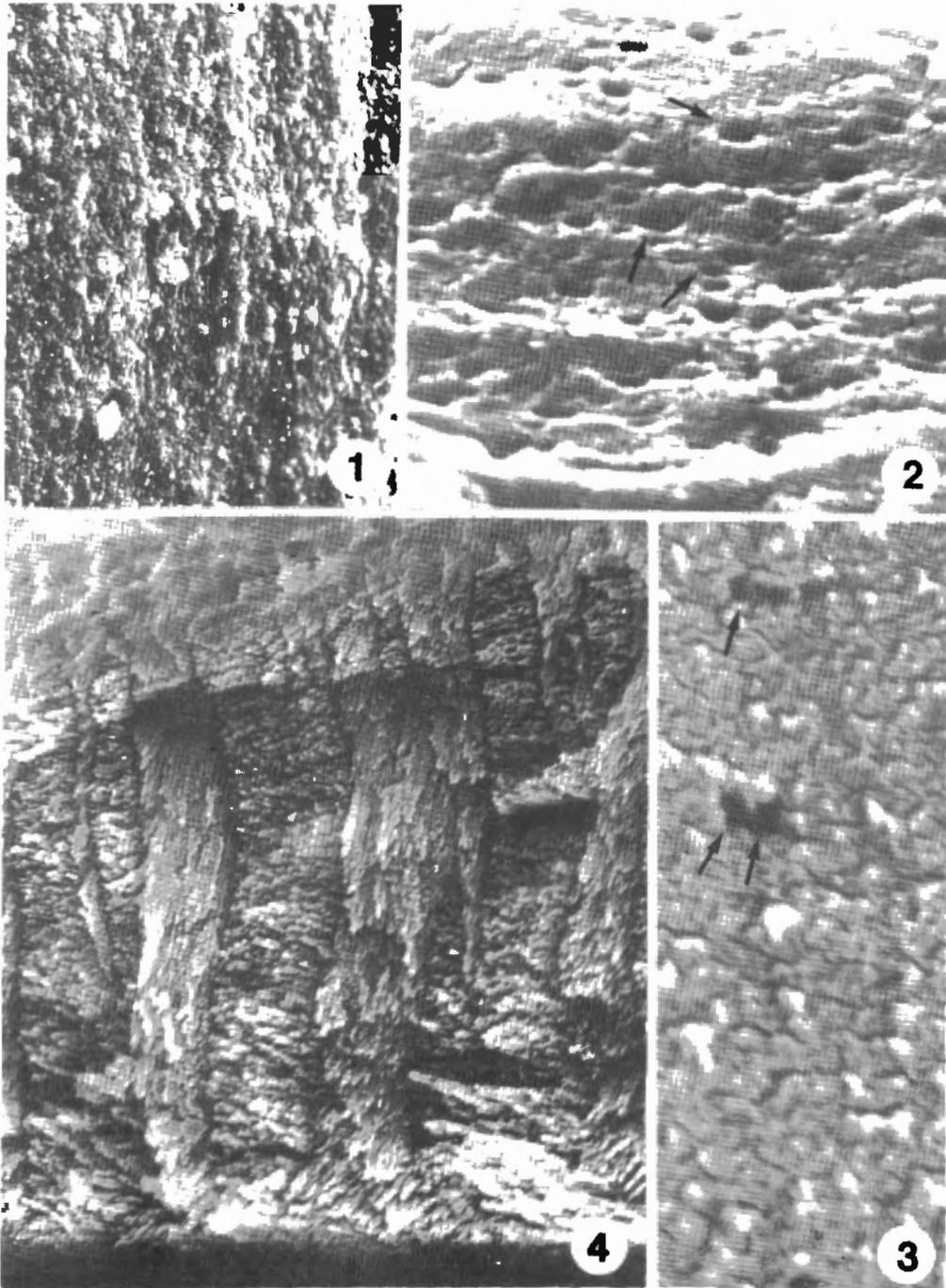
Teleoconch outer surface (Figs. 1 – 3)

Teleoconch outer surface is macroscopically smooth, only slightly marked growth lines being observable (Fig. 1). Under higher magnifications (Figs. 2 – 3) the surface is also smooth, like in *Bithynia*, *Bythinella*, *Hydrobia*, *Lithoglyphus*, *Potamopyrgus* and *Pseudamnicola* and unlike in *Bythiospeum*, *Dianella*, *Rissoa* and *Truncatella*. On the surface there are extremely fine pores (arrows in Figs. 2 – 3), approximately circular in shape and rather densely arranged, often in groups, but never forming a regular net characteristic of *Bithynia*, *Bythinella*, *Hydrobia* and *Potamopyrgus*. The pores in *Marstoniopsis* are also apparently smaller than the ones in the former genera. This kind of pores is unique among the rissoaceans studied so far, since similar pores I have found only in *Dianella* but in that genus they were accompanied by big and often fused pores never found in *Marstoniopsis*.

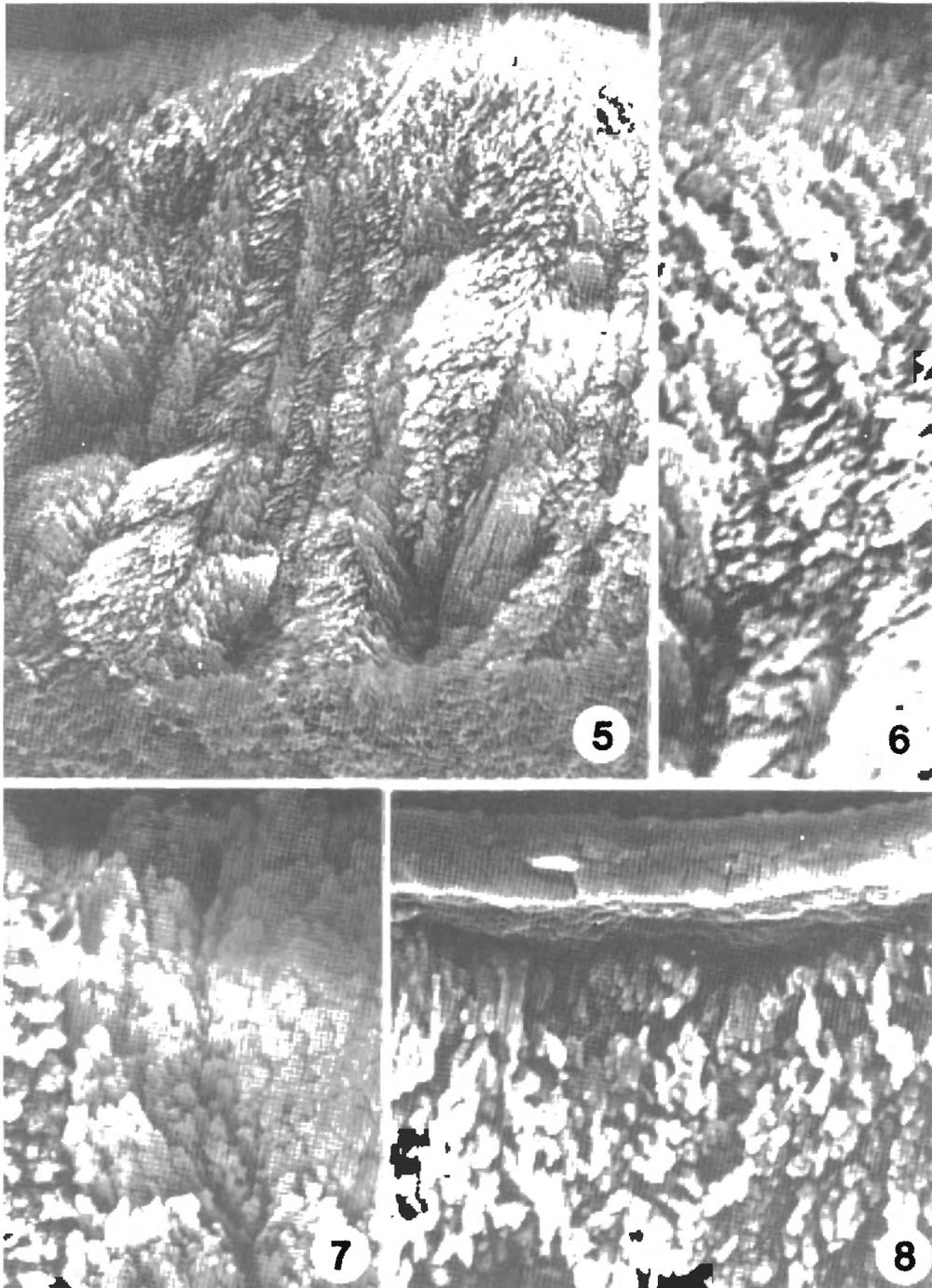
Teleoconch sections perpendicular to the growth lines (Figs. 4 – 8)

The main part of the sections perpendicular to the growth lines (Figs. 4 – 5) is filled with columns of the pallisade layer which are similarly organized in all the *Caenogastropoda* and, therefore, hardly useful in taxonomy. Between the pallisade layer and periostracum there is a thin layer (Figs. 5 – 8) showing a wide variety of its structure pattern. Even after deep etching (Figs. 4 – 5) it may look compact, with better or worse marked long trabeculae arranged approximately perpendicular to the shell surface (Fig. 5), or it may show a fine diagonal structure pattern or be grained in character (Figs. 6 – 8). Its variable structure is not of much help in relationships weighting. Within the layer, similarly as in *Bythinella* and *Hydrobia*, there are numerous, characteristic cavital spaces on deep-etched sections (Figs. 5 – 6 and 8).

The transition between the pallisade layer and the pallisade adjoining, innermost layer is rather smooth and gradual but it does not form the "transitional layer" that is characteristic of *Bithynia*. Similarly as in *Bythinella*, the innermost layer (Figs. 4 – 5) is grained-spongy (may be grained-compact). Characteristic, fine cavital spaces are present in the layer (Figs. 4 – 5); similar spaces occur also in *Bythinella* and *Potamopyrgus*.



Figs. 1 - 4 - Shell SEM outer and inner structures in *Marstoniopsis scholtzi*: 1 - 3 - teleoconch outer surface: 1 - body whorl, close to mouth (540 x); 2 - 3 - arrows indicate small pores (10,000 x); 2 - penultimate whorl, 3 - body whorl; 4 - shell section perpendicular to growth lines, periostracum on upper side (2,000 x)



Figs. 5 - 8 - shell sections perpendicular to growth lines in *Marstoniopsis scholzei*: 5 - whole section, periostracum on upper side (2,000 x); 6 - outermost fragment of 5 (5,400 x); 7 - outermost fragments of other sections (7 - 5,400 x, 8 - 6,600 x)

3. Relationships of *Marstoniopsis* in the light of the shell structure characters

The above results seem noteworthy. Although our knowledge of the shell structures in rissoaceans is still fragmentary, the above data, combined with ones on the shell sections parallel to the growth lines (FALNIOWSKI 1990, this volume), indicate some possible phylogenetic implications.

The shell structures of *Marstoniopsis* compared with those of several rissoaceans (hydrobioid and non-hydrobioid), indicate close relationships of the genera: *Bythinella*, *Hydrobia*, *Marstoniopsis*, *Potamopyrgus*. However, the pore-pattern of *Marstoniopsis* is unique, evidently differing from the uniform net-of-pores pattern that is characteristic of all the other genera listed above.

The common pattern of shell inner structure of the four above genera is actually astonishing. This indicates that the position of the *Littoridininae* GRAY, 1857 cannot be as distant from the *Hydrobiidae* s. stricto as suggested by numerous authors. Also the close resemblance of the structures of *Hydrobia* and *Bythinella* does not confirm the family rank of the *Bythinellidae* GERMAIN, 1931. It is hard to decide, in the light of the shell structures data, whether *Marstoniopsis* is most closely related with *Bythinella* or with *Hydrobia*: this also rejects the placement of *Marstoniopsis* within the *Bythinellidae*. Within the four genera considered, the shell inner structures of *Hydrobia* and *Marstoniopsis* seem primitive, while the ones of *Bythinella* and *Potamopyrgus* seem derived.

4. Acknowledgments

The SEM facilities were provided by the Scanning Microscopy Department of Jagiellonian University. The SEM photographs were done by Mrs. Jadwiga Faber, to whom I am deeply grateful. The work was supported by a grant from the Polish Ministry of Education funding the research project: "Variability, speciation and taxonomy of the Polish Prosobranchia".

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STRESZCZENIE

Wewnętrzne i zewnętrzne struktury muszli a filogeneza *Rissoacea*. II. Nowe dane o strukturach muszli *Marstoniopsis* *scholtzi* (A. SCHMIDT, 1856) (*Prosobranchia: Rissoacea:* *Bythinellidae*)

W pracy autor podaje nowe, wcześniej nie znane dane o strukturach muszli *Marstoniopsis scholtzi* (A. SCHMIDT, 1856), badanych w SEM. Zamieszcza opisy zewnętrznej powierzchni muszli i przetomów prostopadłych do linii przyrostów muszli. Na podstawie tych danych, a także pozostałych znanych dla tego gatunku (FALNIOWSKI 1990, ten tom), przedstawia wnioski o prawdopodobnych pokrewieństwach rodzaju *Marstoniopsis*.