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Algae in the Sarmatian deposits from the Machów outcrop and from the boreholes Jamnica M-83 and S-119 (Carpathian Foredeep)

Algal cysts of *Halicoryne morelleti* (Pokorny) (order Dasycladales) were found in the Lower Sarmatian deposits studied in the Machów outcrop and from the boreholes near Jamnica. They are accompanied mainly by foraminifera of the miliolidae group. The cysts are most common within the clayey part of the Krakowiec Clays but in sandier sediments their amount rapidly decreases to zero lack in the youngest part of the Sarmatian sequence. Such varied content of algal cysts of *Halicoryne morelleti* (Pokorny) and variable taxonomic composition of foraminifera assemblages resulted from changes in the sedimentary environment.

Microfaunal studies of materials from the Miocene deposits from the Machów outcrop and from the boreholes near Jamnica (northern Carpathian Foredeep area) indicated that sometimes large concentrations of algal cysts of the order Dasycladales occur together with foraminifera assemblages. The specimens of these algae were noticed by J. Małecki (1970, 1974) at the Niskowa and Gliwice Stare sites, where eight gametangia of the species *Chalmasia morelleti* (Pokorny) were described, defined by V. Pokorny (1948) from the Sarmatian sediments in the central part of the Vienna Basin. O. Miletic-Spajic (1961) considered *Chalmasia morelleti* (Pokorny) to be the same as the species *Acicularia morelleti*. G. Valet, G. Segonzac (1969) considered te genera *Chalmasia* and *Halicoryne* synonymous based on comparison of the fossil species *Chalmasia morelleti* (Pokorny) with the recent species *Halicoryne spicata* (Kützing). Lastly, I. I. Bucur *et al.* (1993) have noticed *Halicoryne morelleti* (Pokorny) in the Lower Sarmatian deposits of Rumania.

The above mentioned scientists have observed the co-occurrence of both isolated and grape-shape aggregates of cysts of *Halicoryne morelleti* (Pokorny). In studied material from Machów and Jamnica, the author found only the both isolated cysts (Pl. I, Figs. 1, 2). They were present in the Lower Sarmatian during the development and differentiation of the

miliolidae. These cysts are rare in the first faunal assemblages of the *Cycloforina karreri ovata* Zone, but they are more common in the upper part of it. They are most frequent in the *Varidentella sarmatica* Zone, which was dominated by pelitic sedimentation (the Krakowiec Clays). The number of cysts rapidly decreased with the beginning of sandier deposition and the replacement of miliolidae by foraminifers of the elphididae and nonionidae groups. In all studied profiles the algae occur with the same frequency within the same horizons, and it seems that their abundance in the *Varidentella sarmatica* Zone could be useful for correlation.

Variable algal content as well as variable taxonomic composition of foraminifera assemblages of studied faunal associations probably resulted from environmental changes (i.e. temperature, salinity) in the sedimentary basin.

Dasycladales are marine algae which live in mainly shallow (5–30 m deep), tropical and subtropical waters with normal or increased salinity and low turbulence typical for coastal lagoons (J. L. Wray, 1977). Recent *Halicoryne* are known from the Western Pacific, Japan and New Caledonia. *Halicoryne spicata* (Kützing) occurs southward from the equator, particularly south of lat. 10°S, and *Halicoryne wrightii* (Harvey) is frequently found north of lat. 10°N (G. Valet, G. Segonzac, 1969).

Family **Acetabulariaceae**
Genus *Halicoryne* Harvey, 1859
Halicoryne morelleti (Pokorny, 1948) Valet et Segonzac, 1969
(Pl. I, Figs. 1–4)

1948 *Chalmasia morelleti*; V. Pokorny: p. 13–51, Pl. 1, Figs. 1–8; Pl. 2.
1961 *Acicularia morelleti* (Pokorny); O. Miletic-Spajic: p. 182, Pl. 1, Figs. 6, 7.
1969 *Halicoryne morelleti* (Pokorny); nov. comb. G. Valet, G. Segonzac: p. 124–126, Pl. 3, Fig. 3.
1970 *Chalmasia morelleti* (Pokorny); J. Małecki: p. 170, Pl. 3, Figs. 6, 6a, b.
1974 *Chalmasia morelleti* (Pokorny); J. Małecki: p. 599-600, Pl. 1, Fig. 4a–c.
1987 *Halicoryne morelleti* (Pokorny); P. Génot: p. 120, Pl. 3, Fig. 17.
1993 *Halicoryne morelleti* (Pokorny); I. I. Bucur *et al.*: p. 81–90, Pl. 1, Fig. 7; Pl. 2, Figs. 8, 9, 10; Pl. 3, Figs. 1–7; Pl. 4, Figs. 1–6.

D e s c r i p t i o n . The cysts are spherical, sometimes ellipsoidal in shape (diameter between 0.2–0.4 mm), with the aperture on the peak (Pl. I, Fig. 1). The walls of the aperture (Pl. I, Figs. 3, 4) are oriented so that its diameter decreases toward the cyst's center. V. Pokorny (1948) assumed this as the characteristic feature of the discussed species. Visible in the apt section is the internal structure of the wall (Pl. I, Figs. 3, 4), composed of aragonite crystals oriented perpendicularly to the internal wall surface (Pl. I, Fig. 4). The single cysts have no contact traces, which could indicate that they were separated in life by organic matter or that they were suspended (totally surrounded by) within it.

Occurrence. Poland (Niskowa, Gliwice Stare, Machów, Jamnica S-119, Jamnica M-83); Czech (Vienna Basin), Rumania (Borod Basin), Serbia, Hungary (Ecseg area).

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GLONY Z UTWORÓW SARMACKICH Z ODSŁONIĘCIA W MACHOWIE ORAZ OTWORÓW JAMNICA M-83 I S-119

Streszczenie

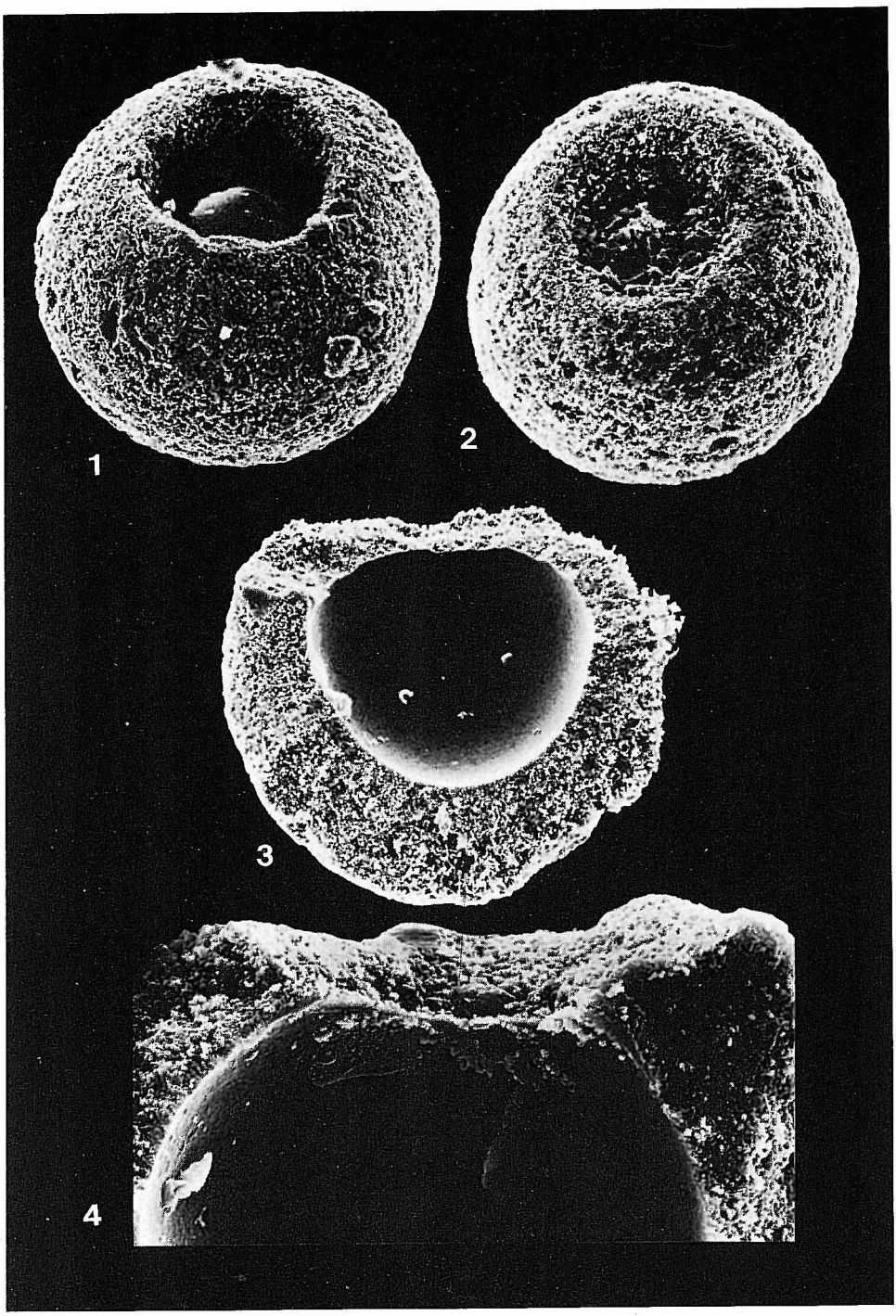
W osadach sarmatu pochodzących z odsłonięcia w Machowie i z otworów wiertniczych Jamnica S-119 i M-93 stwierdzono cysty glonów *Helicoryne morelleti* (Pokorny) należących do rzędu Dasycladales. Towarzyszą im głównie otwornice reprezentujące grupę miliolidów. Najwyższa frekwencja cyst obserwowana jest w ilastej części warstw krakowieckich, w części bardziej piaszczystej zaś liczba cyst gwałtownie zmniejsza się aż do całkowitego ich zaniku w najmłodszej części sarmatu. Zróżnicowany udział cyst glonów *Halicoryne morelleti* (Pokorny) i zmienny skład taksonomiczny zespołów otwornicowych wywołany był zapewne przez zmiany środowiska, zachodzące w tym czasie w zbiorniku sedymentacyjnym.

PLATE I

Figs. 1–4. *Halicoryne morelleti* (Pokorny)

Single cyst, general view: 1 — MUZ PIG 9001/93/Ds, Machów outcrop, Lower Sarmatian, x 978, 2 — MUZ PIG 9002/93/Ds, borehole Jamnica M-83, Lower Sarmatian, x 1146; 3 — internal view of the cyst, MUZ PIG 9003/93/Ds, Machów outcrop, Lower Sarmatian, x 1200; 4 — section of cyst, MUZ PIG 9004/93/Ds, Machów outcrop, Lower Sarmatian, x 2400

Widok ogólny: 1 — odsłonięcie Machów, sarmat dolny, pow. 978 x, 2 — otwór wiertniczy Jamnica M-83, sarmat dolny, pow. 1146 x; 3 — widok wnętrza cysty, odsłonięcie Machów, sarmat dolny, pow. 1200 x; 4 — przekrój przez cystę, odsłonięcie Machów, sarmat dolny, pow. 2400 x



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