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PALAEOCONCHOCELIS STARMACHII GEN.N., SP.N., AN ENDOLITHIC RHODOPHYTE (BANGIACEAE) FROM THE SILURIAN OF POLAND

Campbell S., Kaźmierczak J., Golubić S.: *Palaeoconchocelis starmachii* gen. n., sp. n., an endolithic rhodophyte (Bangiaceae) from the Silurian of Poland. Acta Paleont. Polonica, 24, 3, 403—408, October, 1979.

Palaeoconchocelis starmachii gen. n., sp. n. an endolithic microalga (Bangiaceae, Rhodophyta) is formally described. It is preserved both as a body fossil (the organism) and a trace fossil (the borings) in crinoid columnal fragments within carbonate rocks of Silurian (Ludlovian) age. The rocks were obtained from a core (the 544.9 meter depth) at Widowo near Bielsk Podlaski, Poland.

K e y w o r d s: Bangiophyceae, Rhodophyta, taxonomy, U. Silurian, Ludlovian.

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INTRODUCTION

The occurrence of organically preserved Silurian endolithic microalge has been reported from a core at Widowo, near Bielsk Podlaski in eastern Poland. Many boreholes remain intact and some harbor cellular remains of the excavating organisms. The body fossils have been studied in this section (*in situ*) and by extrication from the rock with ditute acid, and documented using light and transmission electron microscopy (Kaźmierczak and Golubić 1976). The trace fossils (boreholes) are visualized in three dimensions by casting them in polymerizing resin and evaluating the cast with scanning electron microscopy. The fortuitous preservation of both trace and body fossil allows evaluation of the extent to which the borehole morphology conforms to the morphology of the organism. It also permits comparison between fossil and Recent endoliths and their borings. This comparative approach allowed interpretation and

identification of one prevalent paleotaxon as the conchocelis stage of a bangiacean rhodophyte (Campbell 1979). This paleotaxon is formally described in the present paper.

The material is housed in the Institute of Paleobiology, Polish Academy of Sciences, abbreviated as ZPAL.

SYSTEMATIC PALEONTOLOGY

Phylum **Rhodophyta**
Class **Bangiophyceae**
Subclass **Bangiophycideae**
Order **Bangiales**
Family **Bangiaceae**

Genus *Palaeoconchocelis* gen. n.

Type species: Palaeoconchocelis starmachii gen. n., sp. n.

Derivation of name: from *palaeo* = old; *conchocelis*, after the modern genus described by Batters (1892) which was shown by Drew (1949) to be a phase in the life history of the Bangiaceae.

Diagnosis: The thallus is endolithic within a calcareous substrate (crinoid columnals). The boreholes conform closely to the organism. The thallus is composed of: (1) large uniseriate filaments consisting of isodiametric or slightly elongate cells, 7—30 μm wide and 60—40 μm long, which branch repeatedly and form small plantlets. Branching is in all directions, and is lateral or subdichotomous, (2) fine, rarely branched filaments, 3—5 μm in diameter are attached to large filaments. The fine filaments penetrate the substrate for hundreds of microns (as revealed by borehole casts). Branching is rare, mostly near chain-like series of swellings (ca. 8 μm wide) along these fine filaments. Cells of the large filaments often contain one or two plump or shrivelled internal bodies. Both cells and internal bodies often contain a single dense, granular inclusion. A lentil-shaped structure occurs at the center of some cell cross-walls.

Discussion. — The identification of the genus *Palaeoconchocelis* as a bangiacean rhodophyte is based on the following interpretation: large uniseriate filaments are conchosporangial branches containing 1—2 conchospores within their cells; inclusions in cells and conchospores are remnants of pyrenoids or of chloroplasts collapsed about pyrenoids; lentil-shaped structures at the cross walls are pit-connections characteristic of rhodophytes; fine filaments are vegetative filaments of the endolithic conchocelis phase; swellings along fine filaments are bulbous swellings, reputed to be reproductive structures responsible for a short circuit of the life history of the Bangiaceae within the conchocelis phase (see Campbell 1979). No evidence of the macroscopic epilithic phase of the life history was found in the calcareous rock.

Palaeoconchocelis starmachii gen. n., sp. n.
(pl. 21: A—E)

Holotype. — Plate 21 illustrates representative specimens of the body fossil and resin casts of their borings. Type slide ZPAL Al.IV/5A, Institute of Paleobiology, Polish Academy of Sciences, Warszawa, Poland contains the type specimen at co-

ordinates 6.6×100.1. Reference coordinates 2.0×9.8 are marked with a cross.

Type horizon and locality. — Lower Ludlovian, from a core depth of 544.9 m and 524—525 meters of the Widowo drilling at Bielsk Podlaski, eastern Poland.

Derivation of name. — In honor of the Polish phycologist Professor Karol Starmach who studied microbial fossils of the Ordovician of Poland (Starmach 1963).

Diagnosis. — As for the genus. Vegetative filaments are 3—5 μm wide, 25—40 μm long; bulbous swellings are 7—9 μm wide; conchosporangial cells are 7—30 μm wide (mean ± standard deviation = 13.1±3.4 μm, n = 636), and 6—40 μm long (17.2±5.1 μm, n = 636); spores within cells of the conchosporangial branches measure 5—10 μm (8.61±2.2, n = 14) in diameter; inclusions are 2—3.5 μm (2.44±0.5 μm, n = 8) in diameter.

Discussion. — The interpretation of the fossil and identification of the structures has been carried out by Campbell (1979) on the basis of a fossil to Recent comparison with the conchocelis stage of the modern bangiacean rhodophyte *Porphyra nereocystis* Anderson.

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PALAEOCONCHOCELIS STARMACHII GEN. N., SP. N. — ENDOLITYCZNY KRASNOROST (BANGIACEAE) Z SYLURU POLSKI

Streszczenie

Przedstawiony jest formalny opis endolitycznych krasnorostów sylurskich oznaczonych jako *Palaeoconchocelis starmachii* gen. n., sp. n. i klasyfikujących się jednoznacznie w obrębie dzisiejszej rodziny Bangiaceae. Opisane glony pochodzą z górnosylurskich wapieni wiercenia Widowo IG 1 koło Bielska Podlaskiego (poziom 544.9 m). Część glonów zachowana jest unikalnie w postaci mało zmienionych plech organicznych, część zaś jako pozostałe po plechach wydrążenia.

EXPLANATION OF THE PLATE 21

Plate 21

Palaeoconchocelis starmachii gen. n., sp. n.
Lower Ludlovian, Widowo drilling

A and *B* are light micrographs using transmitted light and Nomarksy interference contrast. *C*, *D* and *E* are scanning electron micrographs. Scales: *A* = 100 μm, *B*—*D* = 10 μm.

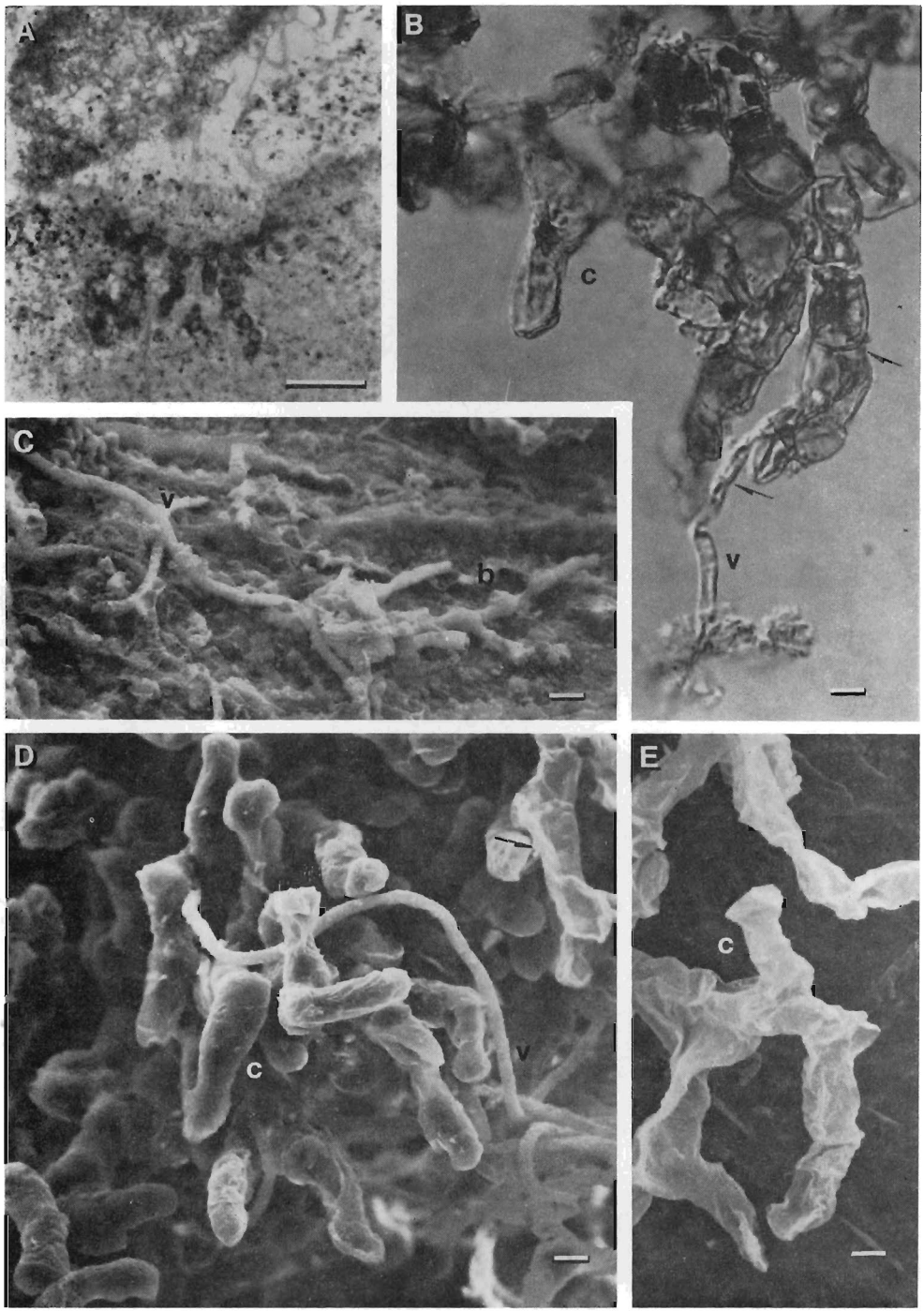
A. Thin section through calcarenite with bored crinoid ossicle. Endolithic filaments radiate from the surface of the fragment inward.

B. Detail of a conchosporangial branch (*c*) attached to a vegetative filament (*v*). Crosswalls are indicated by arrows. The carbonate matrix was dissolved.

C. Resin cast of vegetative filaments (*v*) with chain-like bulbous swellings (*b*).

D. Resin-cast borings, *v* = vegetative filaments, *c* = conchosporangial branch. Note that the rounded forms are resin casts which replicate the borings and that the body fossil is visible (arrow) where resin infiltration was prevented by an obstruction of the borehole.

E. Shrivelled, air-dried body fossil (conchosporangial branches) after removal of the carbonate matrix by dilute HCl.


A
B
c
v
C
v
b
D
c
v
E
c