

Studia breviora

Organic-walled microfossils of Wenlockian to Lower Devonian age from Ražča Formation and its equivalents from the Elešnica allochthon (Osogovo Mt.)

Low-grade (greenschist facies) metamorphic rocks in the Osogovo Mountain in the border area of the republics of Bulgaria and Macedonia have been subject of petrologic and lithostratigraphic studies during the last 60 years. Quartz-graphite schists interlayered with sericite-chlorite schists, quartzites, phyllites, calcareous schists and marmorized limestones from the Elešnica allochthon (Загорчев, Русева, 1982) have been recently introduced in the Bulgarian nomenclature as Ražča Formation of a supposed Riphean-Cambrian age (Вардев, 1989). The same age is supposed for similar rocks in the area of Sasa on the basis of the acritarchs *Protoleiosphaeridium* sp. and *Trachyoligotritetum minutum* found in an unknown locality (Ковачевик et al., 1981).

Rocks of the Ražča Formation and its equivalents have been sampled by N. Vardev (west of Kjustendil) and M. Aleksandrov, R. Stojanov and I. Zagorčev (Dolna Sasa). Several pilot samples have been processed following the standard palynological methods, and studied by I. Lakova. In one of the samples (No 242, light-grey phyllites, North of the village of Rasovo, Gjuševo area), a palynomorph association of acritarchs and miospores poor in species has been found. The miospores are dark-brown and hardly determinable, and correspond to a Thermal Alteration Index (TAI) of 3 to 4 according to the scale of Staplin (1969), with a moderate to intense degree of alteration of the organic matter. Nevertheless, a trilete mark is clearly visible in the miospores. This mark occurred for the first time not earlier than the Llandovery (Aeronian) according to Richardson, McGregor (1986), and the presence of an assemblage formed entirely by single trilete spores (without cryptospores) proves an age not earlier than the Wenlockian (Gray, 1985). The same sample contains the acritarchs:

- *Michrystidium inflatum* (Downie) Lister — occurring in the Silurian and partially in the Lower Devonian;
- *Lophosphaeridium papillatum* (Staplin) Martin — from Middle Ordovician to Upper Devonian;
- *Visbysphaera microspinosa* (Eisenack) — from Llandovery to Ludlow;
- *Leiosphaeridia* sp.

The ranges of the first three species coincide in the time interval from Ludlow to Lower Devonian.

One of the samples from Dolna Sasa (M18, dark-grey slate) contains organic-walled tubular microfossils. This is a monospecific cluster of the formal species *Laevitubulus laxis* Burgess & Edwards which has been found up to now in rocks of Wenlockian to Lochkovian age on the British Isles (Burgess, Edwards, 1991). It belongs to the brown algae of the group Nematophytales Lang.

The data cited show that the Ražča Formation and its equivalents on the territory of Macedonia should be referred to the Wenlockian — Lower Devonian, thus representing lateral equivalents of the Silurian graptolitic schists, the so-called "Kosovo Formation", and possibly, the Vrabča Formation, from the Penkjavci and Poletinci thrust sheets (Загорчев, 1984).

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References

- Burgess, N. D., Edwards, D. 1991. — *Botanical Journal of Linnean Society*, 106; 41-66.
Gray, J. 1985. — *Phil. Trans. R. Soc. Lond.*, B 309; 167-195.
Richardson, J. B., McGregor, D. C. 1986. — *Geol. Survey Canada Bull.*, 364; 1-79.
Staplin, F. L. 1969. — *Bull. Can. Petrol. Geol.*, 17, 1; 47-66.
Вардев, Н. 1989. — *Сп. Бълг. Геол. д-во*, 50, 1; 26-34.
Загорчев, И. 1984. — *Geologica Balc.*, 14, 4; 37-774.
Загорчев, И., Русева, М. 1982. — *Geologica Balc.*, 12, 3; 35-57.
Ковачевик, М., Петковик, П., Темкова, В. 1981. *Толкувач за листот Делчево. Основна геолошка карта 1:100 000 СФРЈ*; 55 p.

Iskra Lakova, Ivan Zagorčev
Geological Institute, Bulgarian Academy of Sciences,
1113 Sofia
Nikola Vardev
Committee of Geology and Mineral Resources, Sofia

Marin Aleksandrov
Lead-Zinc Mines "Sasa",
Makedonska Kamenica
Risto Stojanov
Rudarsko-Geoloski Fakultet, Stip