

Studia breviora

Additional palynological data on the age of the Razhcha Formation, Osogovo Mts, West Bulgaria

The age of the low-grade metamorphic rocks of the Razhcha Formation (various types of schists and quartzites) have been questionable for long time. Primarily it was supposed to be Precambrian based on scarce acritarch findings on the territory of the Republic Macedonia. The palynological assemblage reported by Lakova et al. (1995) from the sample 242 at the locality Rasovo, Gueshevo area, West Bulgaria, determined the age of the Razhcha Formation within the time interval from Wenlockian to Early Devonian. The age determination was proposed mainly on the occurrence of relatively longer-ranging acritarch species.

A recently undertaken study on the trilete miospores from the same assemblage of sample 242 has enabled a further age specification. The palynological preparations contain the species *Emphanisporites zavallatus* Richardson, Streel, Hassan & Steemans, 1982, a coarsely sculptured *Emphanisporites*, which is a very characteristic biostratigraphic marker. The time span of this miospore species is restricted at the end of Lochkovian. It is an index-species of the latest Lochkovian *Breconisporites breconensis* – *Emphanisporites zavallatus* Assemblage Miospore Zone introduced by Richardson & McGregor (1986) and recognized in Belgium, south Wales, Poland (Turnau, Jakubowska, 1989) and the subsurface of the Moesian Platform in Romania. Undeterminable zonate miospores are also present. It is to be mentioned that in the sporomorph evolution the incoming of zona (prominent equatorial cingulum) occurred not earlier than the beginning of Lochkovian (Richardson, 1996).

Along with the acritarchs and trilete miospores, single specimens of tubular structures of *Porcatitubulus annulatus* Burges & Edwards, 1991 occur, its stratigraphic range being from Wenlock to Middle Devonian. These are organic-walled microfossils (tubular structures with annular internal thickenings) which are most probably related to the early stages of land plant evolution during the Silurian and Early Devonian. Rich associations of tubular structures, including *P. annulatus*, were documented so far in the Anglo-Welsh Basin (Burgess, Edwards, 1991), Scotland (Wellman, 1995), Pennsylvania, USA (Strother, Traverse, 1979), Virginia, USA (Pratt et al., 1978), as well as in a number of boreholes from the subsurface of the southern part of Moesian Platform, Bulgaria (unpublished data by the author).

This occurrence of the miospore species *E. zavallatus* indicates that the age of the Razhcha Formation in the locality Rasovo is Late Lochkovian. The presence of representatives of the open sea microplankton (acritarchs) in the palynological preparations of sample 242, although co-occurring with miospores and tubular structures, shows that the Razhcha Formation was deposited in marine environment with some supply of terrestrial plant debris from the neighbouring land.

These results are obtained under the Project NZ-603 "Stratigraphic and tectonic correlations of Southwestern Bulgaria and the adjacent areas (Eastern Serbia, Macedonia and Northern Greece)" of the Bulgarian Scientific Fund.

References

- Burgess, N.D., Edwards, D. 1991. — *Botanical Journal of the Linnean Society*, 106, 41-66.
- Lakova, I., Zagorcev, I., Vardev, N., Aleksandrov, M., Stojanov, R. 1995. — *Geologica Balcanica*, 25, 1; p. 20.
- Richardson, J.B. 1996. — In: Jansonius, J. & McGregor, D.C. (ed.), *Palynology: principles and application*; AASP Foundation, Vol. 2; 555-574.
- Pratt, L.M., Phillips, T.L., Dennison, J.M. 1978. — *Rev. Palaeobot. Palynology*, 25; 121-149.
- Richardson, J.B., McGregor, D.C. 1986. — *Geological Survey of Canada, Bulletin* 364; 1-79.
- Richardson, J.B., Streel, M., Hassan, A., Steemans, Ph. 1982. — *Ann. Soc. Geol. Belg.*, 105, 135-143.
- Strother, P.K., Traverse, A. 1979. — *Palynology*, 3; 1-21.
- Turnau, E., Jakubowska, L. 1989. — *Ann. Soc. Geol. Pol.*, 51, 391-416.
- Wellman, C. 1995. — *Rev. Palaeobot. Palynology*, 84, 3/4; 255-279.
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