

## New palynological data for the Miocene flora from NW Bulgaria – first results

### Нови палинологички данни за миоценската флора от СЗ България – първи резултати

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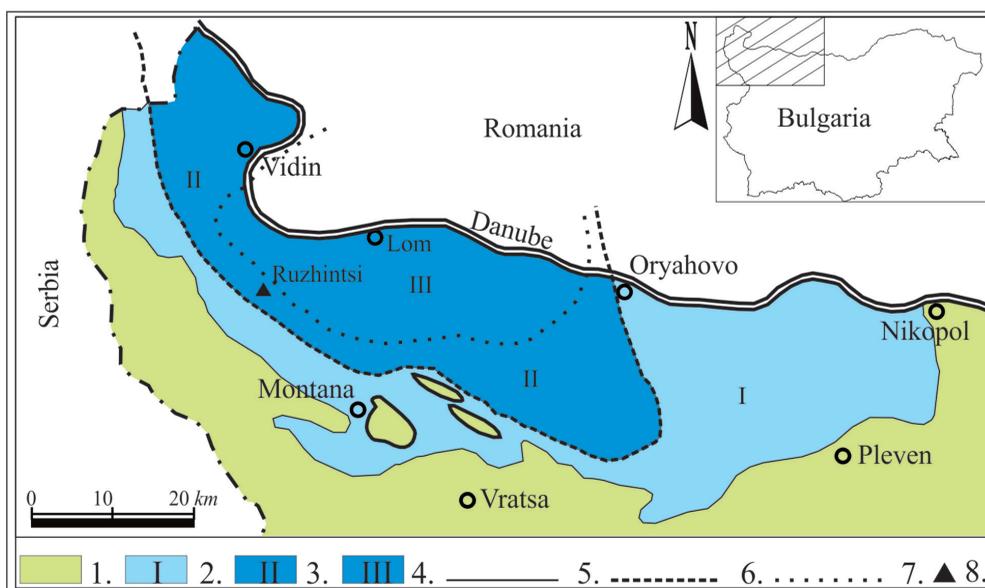
**Keywords:** Bulgaria, Volhynian, palynology, paleoflora.

#### Introduction

Recently, a new palynological study in the Neogene of the NW Bulgaria (southern part of the Forecarpathian Basin, Central Paratethys area) near the village of Ruzhintsi have been undertaken. The studied palynomorphs assemblages originate from brackish sediments, defined by fossil fauna as Middle Miocene in age (Kojumdgieva, Popov, 1989; Kojumdgieva et al., 1989). Till now the Middle Miocene sediments (Volhynian and Bessarabian) have been also studied

on the base of leaf imprints, seed, fruits and dispersed cuticles (for details see Palamarev, Petkova, 1987; Palamarev, Ivanov, 2001). Palynological data for this area are also available (Ivanov, 1997). Quantitative reconstructions for the Middle to Upper Miocene climate evolution in the Southern Forecarpathian Basin were provided by Ivanov et al. (2002).

The Forecarpathian Basin represents the eastern part of the Central Paratethys (Fig. 1) and is a key region to understand the Neogene evolution of the connection between the Central and Eastern Paratethys



**Fig. 1.** Sketch map of the structural/palaeogeographic areas in NW Bulgaria during the Neogene with the location of studied outcrop (after Kojumdgieva et al., 1989): 1, areas outside the Forecarpathian basin (land); 2, marginal stable area; 3, Miocene longitudinal depression; 4, Lom depression; 5, boundary of the basin; 6, boundary of the Miocene depression; 7, boundary of the Lom depression; 8, Ruzhintsi outcrop

area (Rögl, 1998). According to Palamarev (1989) it plays also a major role in the evolution and migration of Mediterranean sclerophyll vegetation.

## Results and discussion

The preliminary palynological data suggest a fossil flora that comprises of about 80 taxa of fossil spores and pollen. It is represented mainly by trees and shrubs, thus testifying the domination of forest-type vegetation over the Northwest Bulgaria during the Middle Miocene (Vollhynian). The content of herbaceous plants is negligible – single pollen grains of Asteroideae, Poaceae and Caryophyllaceae.

The most frequent pollen is that of Pinaceae, mainly *Pinus diploxylon* type, *Pinus haploxylon* type, *Cathaya* and *Tsuga*. From Magnoliophytes the better represented genera are *Carya* and *Fagus*. Pollen analysis shows that the dominant type of vegetation were mixed mesophytic forests. Important role in the structure of these forests had the group of trees of the genera associated mainly with the subtropical zone, e. g. *Engelhardia*, *Reevesia*, *Chloranthus*, *Corylopsis*, and *Symplocos*. Most of them are a rest of the paleotropical flora, dominant in Europe in the Paleogene (Ivanov et al., 2002). The group of the arctotertiary elements were presented both by the coniferous species (*Pinus*, *Picea*, *Tsuga*, *Abies*, *Keteleeria*, *Sequoia*) and angiosperm genera – *Betula*, *Carpinus*, *Corylus*, *Platanus*, *Eucommia*, *Quercus*, *Carya*, *Juglans*, *Tilia*, *Acer*, and others. Recent species of these genera occur mostly in the temperate and warm-temperate climatic zones of northern hemisphere.

The representatives of Taxodiaceae (*Taxodium*, cf. *Glyptostrobus*) *Alnus*, *Nyssa*, *Planera*, *Myrica*, as a main components of the swamp forests, are poorly presented. The plant paleocommunities of this type grow over coastal swamp territories along the southern margin of the basin, in close connection with swamp forests. Having in mind the percentage proportion of above mentioned taxa this type of vegetation was probably very limited in distribution in the area of Ruzhintsi.

The aquatic plants are poorly presented in pollen spectra. The water-edge and aquatic communities were composed of plants of genera *Typha* and *Potamogeton*, and in addition *Ruppia*, *Najas*, *Eulimnocarpus*, *Salvinia*, and others, found in the region as macrofossils by Palamarev and Petkova (1987).

The pollen analysis, carried out on Middle Miocene sediments from Northwestern Bulgaria, showed that the regional vegetation were probably of warm temperate or subtropical type. Ongoing more precise taxonomic and paleoclimatic analysis, as well as quantitative climate reconstruction will bring new data about vegetation evolution and climate dynamics.

*Acknowledgements:* This study is a contribution to the bilateral project SL01/10, Bulgaria – Slovakia.

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