



A comparison between Badenian macroflora in Slovakia and Bulgaria

Сравнение между баденските макрофлори на Словакия и България

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Introduction

Badenian macroflora in Slovakia is known from its southern part (Intracarpadian depression), western part (upper Nitra River valley), and locality close to the Devinska Nova Ves (Vienna Basin). The flora of southern Slovakia was studied by Nemejc (1961, 1967). The fossil flora of the Devinska Nova Ves was partly described by Berger (1951). The flora of the upper Nitra River valley close to the town of Nováky was partly revised by Kučerová (2010).

Middle Miocene aged macrofloras from Bulgaria are well known from the areas of the villages Gabra (Lower to Middle Badenian) located on the southern slopes of the Lozenska mountain and Satovcha (Middle Badenian) located in the Western Rhodopes. Both deposits represent continental facies that is considered a continental analogue of Badenian stage.

In this paper we have used a part of the data after Sitar (1978) concerning the Slovakian palaeoflora and these after Kučerová (2010). The data for Bulgarian Badenian flora are after Palamarev (1991) and Bozukov (1996a). Taxonomic composition of the floras based on leaf imprints of seed plants, ferns and allied plants, and cone imprints of gymnosperms data were used for a comparison between the two palaeofloras.

Results

There are 180 plant species in Bulgarian Badenian flora found such as leaf imprints or imprints of cones of gymnosperms. This is over three times more than the species found in Slovakia, whose number is 52. Thirty of them are common both to the Bulgarian and Slovakian palaeoflora. There are a total of 62 family representatives, 17 of which are found in both studied

palaeofloras. Four families are found only in Slovakian Badenian flora, and 32 only in Bulgarian one. The families Lauraceae, Fagaceae, Betulaceae, Fabaceae, and Sapindaceae dominate in both palaeofloras.

The rich macrofloristic information from Bulgaria shows that during the Badenian especially the species of the families Blechnaceae, Osmundaceae, Cupressaceae, Taxodiaceae, Lauraceae, Fagaceae, Salicaceae, Betulaceae, Sapindaceae and Theaceae played an important role. The association is dominated by the following individual elements: *Glyptostrobus europaeus*, *Sequoia abietina*, *Cryptomeria rhenana*, *Thuja savi-ana*, *Daphnogene* (various types), *Quercus* (various types), *Trigonobalanopsis rhamnoides*, *Betula*, *macrophylla*, *Gordonia stefanovii*, *Stewartia submonadel-pha*, *Populus* (various types) and *Acer* (various types). Less common are *Pinus* (various types), *Libocedrites salicornioides*, *Castanea sativa* foss., *Myrica ligni-tum*, *Ulmus carpinoides*, *Leucothoe protogaea*, and *Macclintockia basinervis*.

The Badenian flora in Slovakia doesn't differ in general from the Bulgarian one. An obvious influx of arctotertiary elements is recorded in both floras. Family Fagaceae (mainly genera *Quercus* and *Castanea*) plays a dominant role. Genera *Platanus*, *Parrotia*, *Ulmus*, *Zelkova*, *Juglans*, *Betula* and *Populus* are of similar status. Family Lauraceae is also well represented in quantitative terms, but in Slovakian Badenian flora mainly species of the genus *Daphnogene* are represented. The other genera of this family participated relatively weak in fossil vegetation.

In contrast to Bulgarian flora, small conifers are well represented in Slovakia while ferns are completely absent. Palm trees and plants growing in coastal areas are not registered in the Slovakian Badenian flora too (Sitar, 1978; Kučerová, 2010).

Conclusions

Based on taxonomical analysis and comparison of two palaeofloras, the following main conclusion could be outlined: 1) Bulgarian Badenian flora is significantly richer when compare to the Slovakian, including c. 3 times higher species diversity; 2) nearly 60% of the species found in Slovakian were spread in Bulgarian middle Miocene flora; 3) the dominant genera of angiosperms are the same in both floras; 4) in contrast to the Bulgarian flora in Slovakia the ferns, palms, hygrophytic angiosperms and endemic species are not presented; 5) gymnosperm plants are very poorly represented in the Slovakian flora when compare to the Bulgarian one; 6) representatives of the family Theaceae lack in Slovakian flora, while they dominate in some layers of phytocoenoses in Bulgaria; 7) most species with which Bulgarian Badenian flora differs from Slovakian are of limited distribution.

The presence of many palaeotropical elements of Bulgarian Badenian Flora evidence for preservation of ancient species in separate refuges on the territory of the Balkans peninsula while they are not preserved in Slovakia and Central Europe. *Macclintockia basinervis* is an example of this conclusion. It is of a systematic uncertain origin and was common in Central and Eastern Europe in the Paleogene (Knobloch, 1962, 1963; Stanislavskiy, 1956), but it still grew in the middle Miocene flora of Satovcha (SW Bulgaria) (Bozukov 1996b).

The existence of an active process of speciation is registered with the high percentage of endemic species in the Bulgarian flora – 3,4% (Palamarev, 1991). It is even higher in individual palaeofloras of Gabra and Satovcha respectively 3.6% and 4, 6% (Bozukov 1996a). Endemic species are not established in Slovakian Badenian flora. Being part of the Balkan Peninsula, the territory of Bulgaria appears as a key region to understand migration pathways and the processes of conservation and plant speciation. The more

specific character of the Bulgarian Badenian flora probably is a result of above mentioned processes that had taken place at favorable climate conditions.

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