



New taxa for the Blagoevgrad Graben palaeoflora (SW Bulgaria)

Нови таксони за палеофлората от Благоевградския грабен (ЮЗ България)

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Keywords: Blagoevgrad Graben, Upper Neogene sediments, fossil macroflora.

Introduction

During field investigations undertaken in 2016, a new fossil site that is situated inside the Blagoevgrad Graben near the town of Boboshevo and containing presumably Late Pontian–Early Dacian macroflora was found by M. Ivanov and determined by V. Bozukov. The fossils are found *in situ* 10 m below the surface inside the sediment outcrop considered as a part of the Pokrovnik Formation (Bakalov, 1978; Zagorchev, 1992; Ivanov, Bozukov, 2017). The site contains mainly arctotertiary species found in various habitats (Ivanov, Bozukov, 2017; Ivanov et al., 2018). Until now trees, bushes, lianas and semi-parasitic bushes that belongs to 28 taxa were registered (Ivanov, Bozukov, 2017; Ivanov et al., 2018).

New data about the fossil makroflora from Blagoevgrad Graben

As a result of the paleofloristic studies that were conducted the last 3 years inside the sediments of Pokrovnik Formation were registered 28 taxa. The majority of these taxa belong to the arctotertiary vegetation type. Their stratigraphic position has been correlated with the boundary between Miocene and Pliocene (5–6 Ma). Only few of the fossils mainly paleotropical species have a wider stratigraphic range. The majority of the taxa found so far are very similar with the contemporary vegetation types of Bulgaria and also these taxa are similar to the paleoflora that have been found in Sofia Basin (Stojanoff, Stefanoff, 1929; Stefanoff, Jordanoff 1934, 1935) and Gotse Delchev Basin (Kitanov, 1984). The age of the last two sedimentary basins

has been determined as Late Pontian–Early Dacian, because the same age can be determined of the Pokrovnik Formation.

The newly discovered 4 taxa (Fig. 1) also support this conclusion. Three of the new taxa represent a fossil equivalent of the contemporary species: *Fraxinus excelsior* L., *Populus alba* L., *Trapa natans* L.

Fraxinus excelsior foss. and *Trapa natans* foss. are presented in Garmen Paleoflora (Jordanov, Kitanov 1963; Kitanov, 1984). The fossil of *Populus alba* foss. has been found in Sofia Basin (Stojanoff, Stefanoff 1929). All three contemporary species *Fraxinus excelsior* L., *Populus alba* L., *Trapa natans* L. are well presented in nowadays flora on the territory of Bulgaria. The fourth new taxa is *Malus* aff. *orientalis* Uglitzk. This taxa is known in the Bulgarian paleoflora only from a carpological material (Palamarev, 1970). With the new leaf-print fossil its presence in the Bulgarian paleoflora has been reaffirmed. The carpological material that was determined by Palamarev (1970) was found in Nikolichevtsi Coal Basin (SW Bulgaria) which is situated around 100 km north of the Boboshevo fossil site. The age of Nikolichevtsi paleoflora has been determined as Meotian (Palamarev, 1970). The close geographic and stratigraphic relations between Nikolichevtsi paleoflora and the one that is subject of research in this article cannot exclude the presence of common taxa as *Malus* aff. *Orientalis* inside these sedimentary basins. The contemporary range of *Malus orientalis* includes the territories around Caucasus and Minor Asia. Because these areas are geographically close to the Balkans it is possible that the range of *Malus orientalis* had been broader at

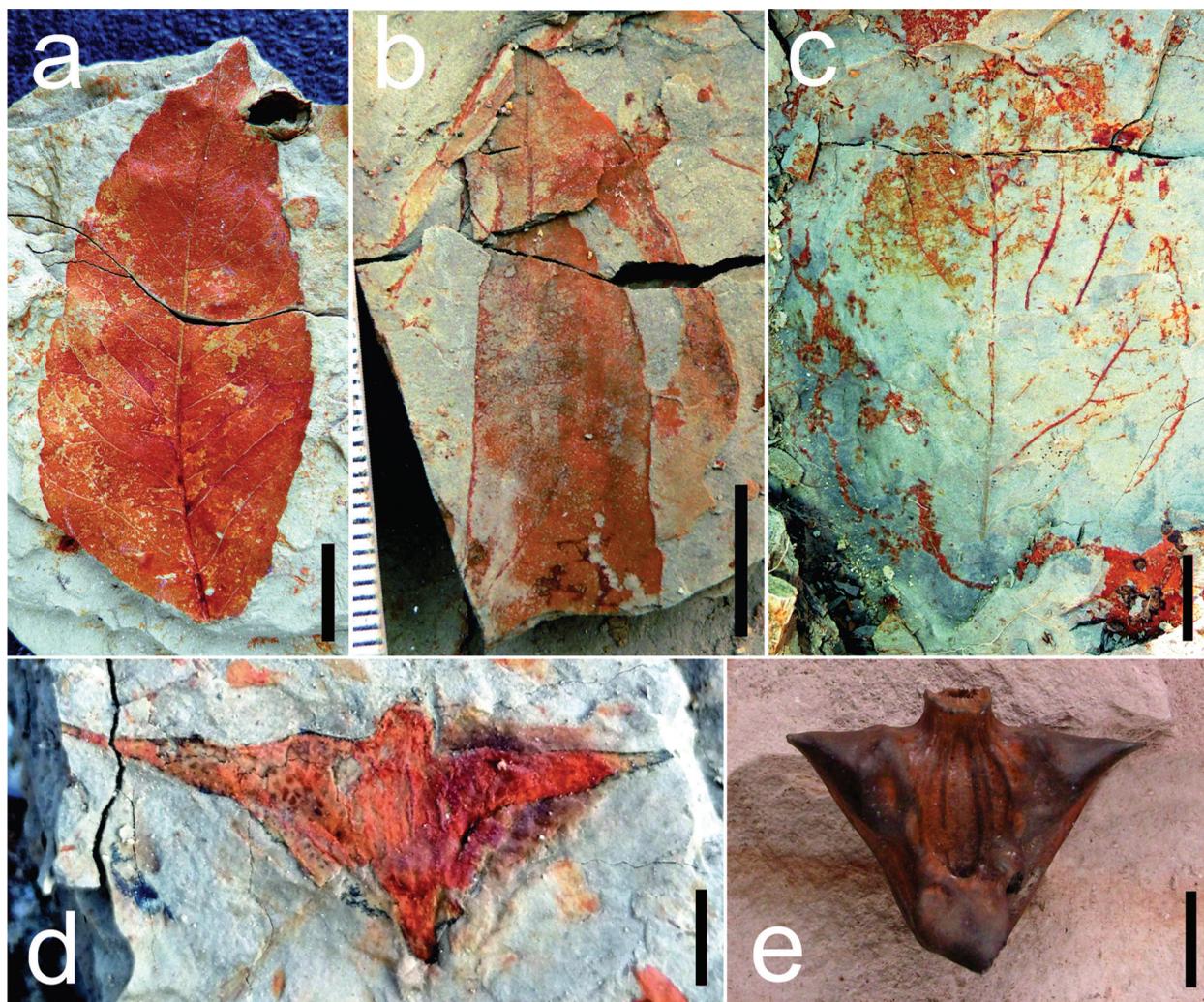


Fig. 1. Plant material: *a*, *Fraxinus excelsior* foss.; *b*, *Populus alba* foss.; *c*, *Malus* aff. *orientalis*; *d*, *Trapa natans* foss.; *e*, *Trapa natans*

the boundary between Miocene and Pliocene and the species was distributed on the Balkans as well.

With the new fossils the common taxa between the Boboshevo and Garmen paleoflora are 20 and the common taxa with Sofia Basin are 18. The coefficients of similarity between the paleoflora that is subject of interest in this research and the one in Garmen and Sofia Basins are 20.83 and 15.52. Because of that, a conclusion can be made that the Boboshevo paleoflora is closer to the one in Garmen than to the paleoflora found in Sofia Basin.

Conclusions

The new taxa found *in situ* inside the sediments of Pokrovnik Formation near the town of Boboshevo (Blagoevgrad Graben) support the proposed by Ivanov and Bozukov (2017) and Ivanov et al. (2018) Late Pontian–Early Dacian age of the Pokrovnik

Formation. Also these new fossils can be used as an additional evidences that support the thesis that Pokrovnik Formation is younger than the Dzerman Formation (Ivanov, Bozukov, 2017; Ivanov et al., 2018). This is opposite to the proposed age and stratigraphic relations between Pokrovnik and Dzerman Formations by Zagorchev (1992).

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