



New fossil taxa in the Neogene flora from the region of Garmen and Satovcha villages (SW Bulgaria)

Нови фосилни таксони в неогенската флора от района на селата Гърмен и Сатовча (ЮЗ България)

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Introduction

The Neogene flora from the localities near the villages of Garmen and Satovcha (Blagoevgrad district, SW Bulgaria) has been extensively studied by taxonomic, phytocenotic and environmental point of view. First evidence on the Garmen paleoflora was published by Jordanov and Kitanov (1950). Several papers appeared after that, and the final results and conclusions were given by Kitanov (1984a, b). The age of the paleoflora from this locality was determined as Late Pontian–Early Dacian, and 79 taxa were identified to species level. The first information about the Satovcha fossil flora was published by Stefanov and Ganchev (1951). The subsequent studies on this fossiliferous site have proved it to be the richest Bulgarian paleoflora locality, containing more than 100 fossil species. A complete analysis of species composition and other characteristics of this paleoflora, including its age assessment (Middle Miocene) were published by Bozukov (2001, 2002).

Material

During the expedition held in September 2014, a new fossil material of the studied fossil sites has been obtained. It consists mainly of leaf imprints, but imprints of inflorescences and cones were also found. The funds for this new study were provided by the Regional Historical Museum – Blagoevgrad. The new fossil material will enrich the existing paleobotanical collection of the museum.

Results

Twenty-six species from the area near Satovcha village and ten species from the sites near Garmen

village were identified, including 4 new species to the Satovcha paleoflora, and one new species to the Bulgarian fossil macroflora. The following lines give an account of that.

Eotrigonobalanus furcinervis (Rossm.) Walther & Kvaček (Family Fagaceae, location: Satovcha).

Note: despite being recorded by a single specimen, this finding is valuable. This species is very common in the Early Paleocene–Late Oligocene localities in Europe (Palamarev, Mai, 1998). In Bulgaria, it has been registered in 21 localities, spanning the Early Eocene to Late Oligocene. The new discovery extends the stratigraphic range of the species from the Late Oligocene to the Middle Miocene.

Salix cinerea L. foss. (Family Salicaceae, location: Satovcha).

Note: *Salix cinerea* has been found previously in Bulgaria in the Pliocene sediments near Kurilo, Sofia District (Stojanoff, Stefanoff, 1929). The well-preserved leaf structure of our fossil material allowed us to determine it as representative of a recent species. However, the age difference between the fossil and the recent examples requires caution in identification. Hence, we use the fossil form of the recent species.

Rubus aff. *phoenicolasius* Maxim. (Family Rosaceae, location: Garmen).

Note: 4 species of the genus *Rubus* are currently known in the Bulgarian Tertiary flora. Three of them were defined by carpoids, and the rest by leaf imprints. A lateral part of a compound leaf was found in the Garmen paleoflora. This leaflet is identical with that of the recent species *R. phoenicolasius*, which is widespread in China, Japan and Korea. It should be also noted that the same recent species was indicated as a modern analogue of the fossil species *R. laticostatus* Kirchh., which was identified by endocarps (Palamarev, 1970) in the Pontian sediments near

Baldevo village (closely located to Garmen village). *R. laticostatus* is known from Miocene and Pliocene deposits in Europe. The endocarp and leaf imprint are likely to be examples of the same fossil species. Our find appears to be an evidence of the connection between the Bulgarian Neogene flora and the recent flora of the East Asia.

Periploca graeca L. foss. (Family Asclepiadaceae, location: Satovcha).

Note: this species was found for the second time in Bulgaria. So far, it is known from 2 localities of Sarmatian flora in NW Bulgaria (Palamarev, Petkova, 1987). Our material increases the taxonomic composition of the lianas in Satovcha paleoflora. The latter have been known before by species of the genera *Ampelopsis*, *Bytneriophyllum*, and *Smylax*.

Typha angustifolia L. foss. (Family Typhaceae, location: Satovcha).

Note: it is a widespread species in the interval from the Middle Miocene to the Late Pliocene. It was found in Garmen area too (Kitanov, 1984), but the new finding enriched the composition of grass hygrophytes in Satovcha paleoflora. The latter also includes representatives of the genera *Cyperacites* and *Sparganium*.

Conclusions

Analyzing the new fossil material obtained, we can draw the following conclusions. Certainly, new further excavations will contribute with the discovery of more new taxa and specimens. The new findings increase our knowledge on the flora and the vegetation from different geological ages. The new data help us to go into deeper details on the relationship between Bulgarian Neogene and recent flora. They also confirmed the currently known facts. The Satovcha paleo-

flora appears to be unique, as being composed of great number of species. The coexistence of Paleogene relics and fossil forms of recent plants is another specific feature of Satovcha paleoflora which is confirmed too.

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