

Book Review

THE PANNONIAN FLORA OF THE CHIUZBAIA FOSSILIFEROUS SITE / FLORA PANNONIANĂ A SITULUI FOSILIFER CHIUZBAIA

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Contents: 1. Introduction; 2. Geological setting; 3. Flora of the Chiuzbaia site; 4. Flora and vegetation of the Pannonian Basin; 5. Neogene vegetation assemblages in Central Europe; 6. Modern biogeographical affinities of the taxa from the Chiuzbaia site; 7. Systematic descriptions; Conclusions; References; Annexes; Plates.

The book published by geologist Gheorghe Macovei from Baia Mare concerning the fossiliferous locality of Chiuzbaia (Maramureș County) represents a contribution elaborated at the time of the author's professional maturity, completing a professional career that sums up several decades of experience in the fields of geology and palaeontology. The special value of this work resides in the concept of a comparative approach both with the Pannonian Basin flora and with other floras of similar age from Transylvania.

Chiuzbaia is a locality that became famous worldwide in Palaeobotany thanks to the impressive number of articles that the late palaeobotanist Prof. dr. Răzvan Givulescu published in volumes of various specialized journals, completed by several book chapters (most of which are included in the bibliography of the book herein presented). However, as the author points out, a substantial time – exceeding three decades – has already passed since the latest synthesis on the Chiuzbaia flora was published, and thus an update was due. In the meantime, emphasizes the author, the fossil plant-bearing outcrops have been largely covered by rock debris, and last but not least, they have been unprofessionally poached by second-hand "collectors".

The palaeobotanical research on the Chiuzbaia site has a long history, starting two centuries ago with the contributions of the geologists Károly Hofmann and Móricz Staub. Subsequently, the locality was nearly ignored from palaeobotanical viewpoint until the end of the 1950s, after which Givulescu's contributions begin.

The first part of the book is therefore devoted to aspects such as the location of the locality, a very brief history of the research, and the geological framework. The latter chapter recounts the successive attempts to establish the geological age of the site, highlighting the failure of the micropaleontological method based on the study of ostracods, and provides important new

information concerning this subject based on radiometric dating.

Indeed, the existence of recent radiometric K-Ar ages derived from igneous rocks of the Chiuzbaia Depression provides the possibility to assess the absolute age of the fossil plant site. These include the following datapoints: 10.9±0.5 Ma. - andesites of Chiuzbaia (Chiuzbaia stream), southern area of the depression; 9.9±0.5 Ma. - amphibolite andesites of the Firiza Andesitic Complex at the mouth of Jidoaia valley, immediately above the diatomite; and 9.1±0.4 Ma. - pyroxene andesites of the Igniș-Mara Andesitic Complex, above the Firiza Complex; as well as ages of some magmatic intrusions cross-cutting the Pannonian sedimentary pile of the depression: 10.5±0.8 Ma. - Chiuzbaia stream body (Herja area); 10.9±0.7 Ma. - Vârful Poca body; and 10.0±0.3 Ma. - Măgurii stream body (north-eastern part of the depression). From these radiometric data reported in the book, the age of the fossil flora site at Chiuzbaia can be estimated to between 10.1 and 10.9 Ma, that is, Middle Pannonian according to the regional stratigraphy.

What makes the deposits yielding foliar imprints and other organic remains at this locality unique is the presence of diatomaceous rocks, as the fine-grained nature of the original sediments have allowed/promoted exceptional fossilization for the fossil plants. The systematic assignments of these rock-building microorganisms are presented briefly in the geology chapter.

The paper lists and describes 114 taxa of fossil plants, 30 of which are newly reported from this fossiliferous locality. Furthermore, this research has yielded several hitherto unknown details for many of the identified taxa.

Comparative studies with floras originating from landmark localities in the Transylvanian area (such as Băița, Cornișel, Delureni, Valea Crișului, Borsec) were carried out, establishing the altitudinal zonation of the Chiuzbaia palaeoflora, with aquatic, wetland, marsh, riparian, and mesophytic mixed forest vegetations identified, the latter being a characteristic of the extra-basinal flora. The mapping of taxonomic affinities indicates the dominance of Eurasian elements (ca. two thirds of the assemblage) versus those of North American origin (one third).

Problems related to Eurasian relict taxa, the presence of endemic Arcto-Tertiary floristic elements, aspects of palaeoclimatic interpretations, and comparisons with present-day climatic aspects are raised and discussed. The composition of the zonal vegetation is analyzed by the IPR (*Integrated Plant Record*) method, which revealed the presence of a mixed mesophytic forest with the following zonal plant associations: coniferous, broad-leaved deciduous, broad-leaved evergreen, sclerophyllous components, legumes, and zonal grasses. The identified assemblages indicate similarities with Recent plant associations in Yakushima (Japan) and M'Emei (China).

The Pannonian palaeorelief of the Chiuzbaia area can no longer be deciphered morphologically, being destroyed by subsequent eruptive events in the area, on the one hand, and by Quaternary erosion, on the other. However, based on his palaeobotanical data, the author suggests that the sedimentary area was characterized by lowlands, medium-altitude zones and, at some distance, highlands.

The most substantial share of personal contributions is found in the extensive segment of the book devoted to systematic descriptions that for each taxon specify the available sample (number of specimens), followed by description of the leaf impressions, discussions, and identification of possible modern analogs. The descriptions are supplemented with illustrations represented by (color as well as black and white) photographs and drawings, adding references to the different plates.

A brief concluding chapter that highlights the essential contributions of this research concludes the text of this publication.

The extensive (11 pages) list of bibliographical titles emphasizes the author's vast documentation.

The book I review therefore addresses a very interesting topic related to the Upper Miocene fossil flora, starting from the case study of the fossiliferous Chiuzbaia locality. It is a book that should not be missing from the library of any palaeobotanist, or from the shelves of any university library or research institute. It provides an excellent update and synthesis of the palaeobotanical data known from this important locality. And, most importantly, it comes in the context of a visible slowdown of palaeobotanical investigations in our country: the old generation of palaeobotanists has left the scene, and the currently active one is visibly far behind the previous one in terms of published outputs. Indeed, the scientific novelties brought by this book are the proof for the potential of investigating the fossil plants of our country, a research direction that should be encouraged.

I warmly recommend the book of Gheorghe Macovei to geologists, palaeontologists, biologists and geographers interested in the evolution of the country's geological past, which must be considered within the global ensemble of knowledge by giving it its due place.

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