

Fossil flora from the Pleistocene lacustrine sediments at Ždrilo and Seline (Northern Dalmatia, Croatia)

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Plant macrofossils, mostly leaf impressions, were found in the Pleistocene lacustrine sediments at the seashore outcrops of the South Velebit Channel (locations Ždrilo and Seline), and for the first time a total of 79 specimens were collected during 2011-2012 research period (research still in progress) and 13 taxa were determined, belonging to 9 families (Adžić 2012). The plant macrofossils are apparently of Middle Pleistocene age or even older, according to 339.4 ± 61.4 years minimum age of the overlying glacial sediment at Ždrilo location (Marjanac, 2012). The sediments deposited in a proglacial lake, which occupied the southern part of present Velebit Channel, are associated to glaciers of the South Velebit Mt. at the onset of Mindel Glacial (Skarnelian Stage) (Marjanac, 2012).

The Seline lacustrine sediments are varved-like, but consist of predominantly massive silt to clayey-silt beds, otherwise vaguely laminated. Dropstones are common and more frequent than in Ždrilo sediments. Ostracods are found in sediments of both sections, while only at Seline section occur moulds of large gastropods and *Unio*-type mollusks. The sediment succession represents a proximal depositional zone of a proglacial paleo-lake (Adžić, 2012; Marjanac, 2012).

The Ždrilo Lacustrine sediments are typical varved glaciolacustrine sediments consisting of alternation of clay, silt-clay and clayey-silt laminae or thin beds (Adžić et al, 2012; Marjanac, 2012). Besides abundant plant fossils (Fig. 1), there are well preserved ostracod shells and poorly preserved juvenile mollusk shells. These varvites deposited in a more distal zone of a proglacial paleo-lake than Seline sediments. The plant remains predominantly occur as leaf impressions, commonly on bedding plains and locally within a massive clayey-silt beds.

The most abundant fossil plant is *Taxodium* leaf type (absent in the Seline section sediments). Only one fossil fruit was found in the Ždrilo section and it is interpreted as *Ulmus* sp. fruit. All the specimens are relatively small in size, ranging from 10-80 mm, with mean value 30,9 mm. The most common blade class is microphyll (LAWG, 1999). Following by the number of specimens are oak leaves (*Quercus* spp.) and zelkova (*Zelkova* cf. *carpinifolia*), found both at the Ždrilo and Seline sections. *Taxodium* is typical relict taxa today prevalent on the east coast of the Northern America. Recent areal of the genus *Zelkova* is restricted to Asia, Sicily and Crete (Søndergaard & Egli 2006). *Zelkova* disappeared gradually on the European continent (Foglieri et al 1986). Two fossil leaf impressions of *Liquidambar* cf. *europaea* were found at Ždrilo. Recent distribution of the genus *Liquidambar* comprises the area of the North America and East Asia (Komarnik, 2004). The *Quercus* spp. leaves were also relatively common in both sections represented by three different types of leaves, one ascribed to the *Quercus* cf. *trojana* leaf type. Other determined taxa are *Alnus* sp., *Pterocarya* sp., *Castanea* sp., *Fagus* sp., *Acer* cf. *rubrum*, *Buxus* sp., *Tilia* sp. The plant taphocoenosis found in lacustrine sediments represents mixed temperate forest vegetation, based on modern vegetation distribution pattern. The mixed temperate forest vegetation belt comprises large area and cannot be associated only with mild temperatures. Most of the determined taxa belong to genera that form different climax phytocoenosis today, which indicates that the vegetation was well developed and zoned.

Very recently, a number of new specimens were collected that will hopefully yield new data for more precise reconstruction of Pleistocene vegetation in this region.

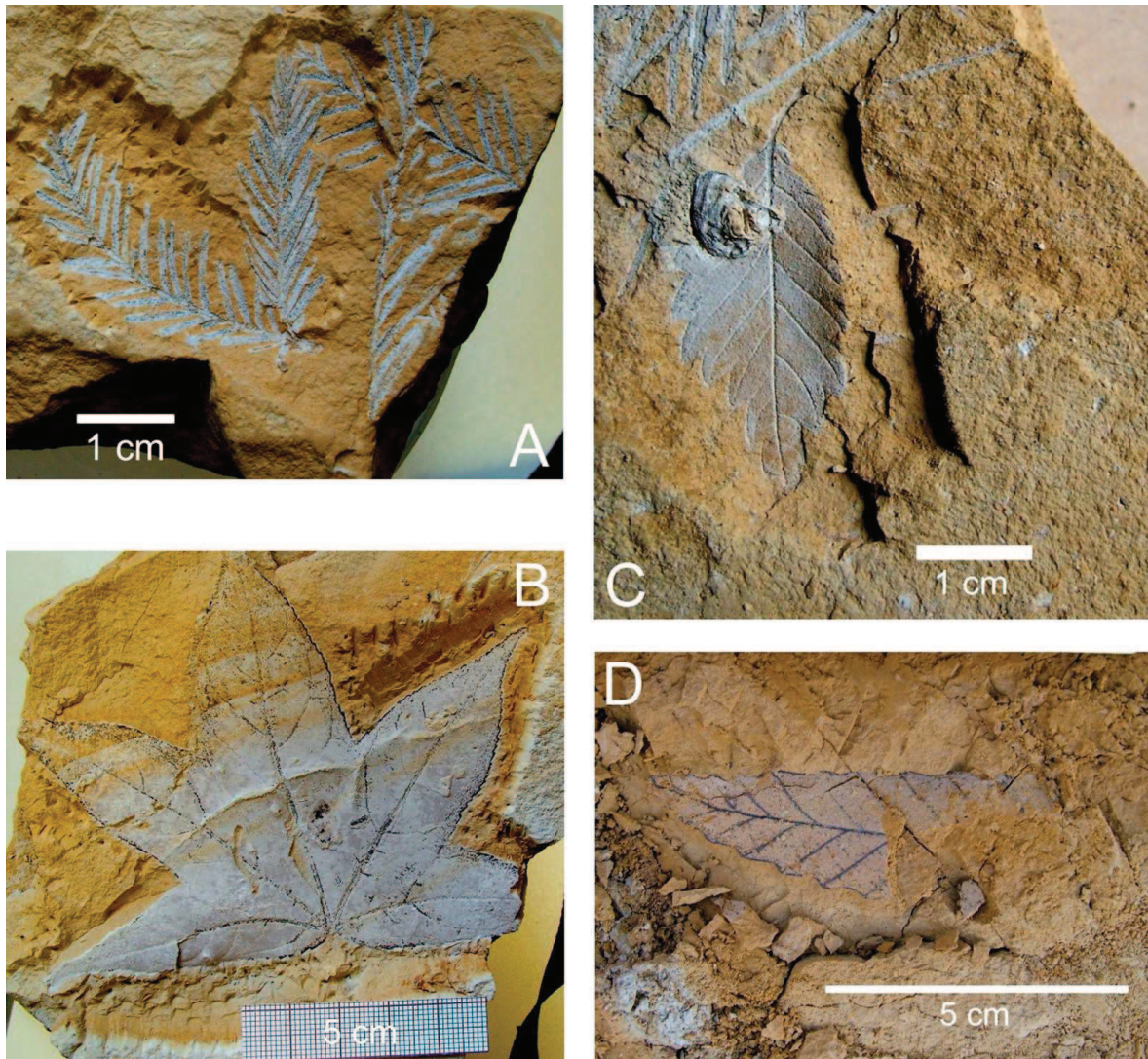


Figure 1. Plant macrofossils from Źdrilo varved sediments. A – *Taxodium* sp., B – *Liquidambar* cf. *europea*, C – *Zelkova* sp., D – *Quercus* cf. *Trojana*.

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