



First records of *Dammarites albens* Presl in Sternberg (Pinopsida?) from the Cretaceous of Austria

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ABSTRACT. *Dammarites albens* Presl in Sternberg, gymnosperm fossil plant is described from the locality St. Wolfgang of the Cretaceous of Austria. It is preserved as leaf impression in Late Turonian marine sandstone from the Gosau Group. The leaf impressions of *Dammarites albens* are compared with the material described so far from the Cenomanian of the Czech Republic and Romania.

KEYWORDS. *Dammarites albens*, Gosau Group, Cretaceous

INTRODUCTION

First fossil plant from the Gosau Group of the Austrian Cretaceous was described by Unger (1850) as *Sabalites longirhachis* (Unger) Kvaček and Herman (2004a). Later Unger (1852, 1867) published more taxa from the Gosau Group, including some species from St. Wolfgang in Upper Austria (Plöching 1982a,b). Basic data on the geology and palaeontology of this region were given in a spectacular monograph by Reuss (1854). The Gosau flora was later briefly described by Krasser (1906) and Knobloch (1977). New interest in the flora was initiated by Heinz Kollmann and Johanna Eder-Kovar, who invited A. B. Herman and one of us (JK) to revise and describe a collection of fossil plants from the locality of Grünbach in Lower Austria housed in the Natural History Museum in Vienna. As a result several papers on Grünbach flora were published (Herman & Kvaček 2002a,b, 2007, 2010, Kvaček & Herman 2004a,b, 2005). In several last years the present authors in cooperation with colleagues from the Czech Geological Survey focused on other similar floras from the Gosau Group in the Salzkammergut region and published several preliminary reports on newly recovered or completely new fossil plant localities from this region (Hradecká et al. 2006, 2007, Kvaček et al. 2007, 2008).

One of the hitherto unknown fossil plants localities of the Lower Gosau Subgroup was a temporary road-tunnel excavation in St. Wolfgang in the years 1992/1993, where Mr. Wolf Mahernndl, a prominent private fossil collector from Bad Ischl, secured from the dump material a few slabs of fine-grained sandstone with plant remains. During the

construction of the nearby parking lot No. 3 in St. Wolfgang Stojaspal & Lobitzer (1976) collected a small fauna in grey sandy marls, which was identified by Summesberger & Kennedy (1996) as being of Late Turonian age (?Streiteck Formation). The fauna consists of *Barroisiceras haberfellneri* (Hauer), *Reesidites minimus* (Hayasaka & Fukada), Inoceramidae indet. and *Didymotis* sp. Plant remains were not found at this locality. Additional faunal elements from the mentioned dump material of the road-tunnel according to Summesberger & Kennedy (1996) belong to the same stratigraphic level. From the present point of view it is likely that the flora described below is of Late Turonian age. However, the plant bearing sandstone slabs have not yet been investigated for age diagnostic micro- or nannofossils.

The main aim of this paper is to describe from that locality fragments of leaves of *Dammarites albens* Presl in Sternberg so far unknown from the Cretaceous of Austria.

MATERIAL AND METHODS

There are seven specimens preserved in the collection of Mr. Maherndl. They are embedded in finegrained marine sandstone of the Gosau Group. Its stratigraphical position probably is Late Turonian. The material was photographed by Panasonic Lumix camera and studied under Olympus SZX 12 binocular microscope.

SYSTEMATICS

Dammarites Presl

Dammarites Presl in Sternberg 1838

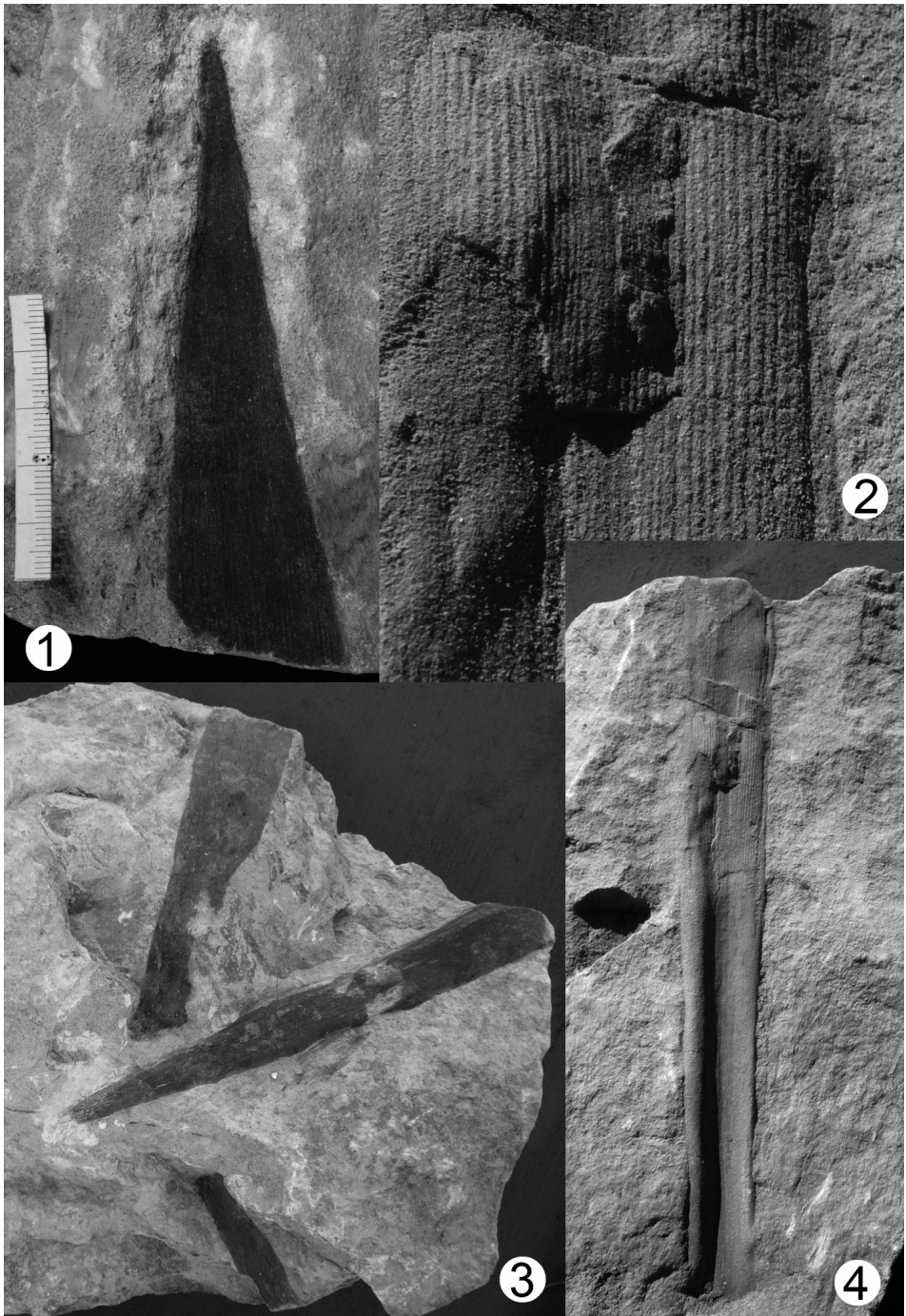
TYPE: *Dammarites albens* Presl in Sternberg 1838: 203, pl. 52, figs 11, 12.

REMARKS: Presl (in Sternberg 1838) described originally the holotype as an araucariaceous cone. Velenovský (1885) was the first who interpreted these fossil remains as a swollen stem covered with crowded woody leaf scars. Hlušík (1976) described compressed material showing connection between the foliage and the stem. He concluded that the genus is of gymnosperm affinity and that it does not represent a cone or any other coniferous fructification. Cone scales of quite different relationships, which were described under the name *Dammara borealis* Heer, were suggested by Seward (1919) to be also included into *Dammarites*. Seward & Conway (1935) changed this wrong interpretation and included *Dammara*-like cone scales (again incorrectly) into the genus *Sciadopityes* Göppert & Menge. Nevertheless, some authors (e.g. Bell 1957) followed Seward's interpretation and incorrectly used the name *Dammarites* for conifer cones or cone scales with superficial resemblance to *Dammara* (= *Aghatis*). We restrict here *Dammarites* Presl to stem-like fossils and their foliage.

Dammarites albens Presl in Sternberg

Dammarites albens Presl in Sternberg 1838: 203, pl. 52, figs. 11, 12.

DESCRIPTION. All seven Maherndl specimens are fragments preserved separately or in accumulations (Fig. 3). The leaf fragments are generally 3 cm broad. The largest fragment is 25 cm long. The leaf blades are coriaceous and oblong, nearly parallel-sided.



Figs. 1-4. *Dammarites albens* Presl in Sternberg. 1 – Apical part of leaf, $\times 0.8$; 2 – venation detail, $\times 2$; 3 – accumulation of leaf fragments, $\times 0.3$; 4 – basal part of leaf, $\times 0.3$.

Apical parts of the leaves are acute, but the very apex is rather oblong (Fig. 1). The acute apical part of the leaf is represented by a fragment 11 cm long and 5 cm broad. Basal parts of leaves are truncate and rather concave in cross-section. The best preserved specimen (25 cm long) is shown on Fig. 4. Well pronounced parallel venation shows a density of 12 veins per 1 cm (Fig. 2). All veins are of the same type, being about 1 mm broad.

DISCUSSION

Dammarites albens belongs to one of the most enigmatic plants of the European Cretaceous. It was described from the Nový Bydžov locality by Presl (in Sternberg 1838) as a female conifer cone. Velenovský (1885) was the first who has shown that cone scales of the “cone” are actually leaf bases. Based on this observation he interpreted it as a dwarf stem. In this way it was later discussed by Knobloch (1973). Later Hlušík (1976) identified its cuticle and using cuticle analysis he proved the connection of the stem and foliage earlier described as *Krannera mirabilis* Velenovský. This fact was clarified by Kvaček (1998).

The present material collected by Mr. Maherndl is a good example of the presence of *Dammarites* in the Austrian Cretaceous. Its occurrence is not surprising, however, particularly in light of finds of *Dammarites* from the Carpathian area (Givulescu 1981).

Leaves of similar type are known from European localities as *Pelourdea* and *Desmiophyllum*. They differ markedly from the leaves of the genus *Dammarophyllum* in having different shape, particularly sheathing base of *Dammarites* differ very much from the cuneate base of the *Dammarophyllum* leaves. Also the cuticle of *Dammarites* is different, showing Florin rings (cf. Kvaček 2003).

The question of the systematic relationships of *D. albens* has been discussed many times. Seward (1917) considered *Dammarites albens* (= *Pelourdea mirabilis*) as a conifer with affinities to *Cordaites*. Bayer (in Bayer & Petrbock 1919) suggested that *D. albens* is a cycad. On the other hand, Hlušík (1976) argued that cycads have different cuticle characters and suggested in accordance with Seward the coniferous affinity of the taxon. This opinion was supported by Barale (1992), who described leaves and microsporophylls of *Dammarites coriaceus* Barale from the Lower Cretaceous of Montsec, Spain. The plant remains of *D. coriaceus* bear pollen grains that are attributed to the family Araucariaceae (cf. Barale 1992: pl. 2, figs. 5, 6).

CONCLUSIONS

This paper reports about new finds of leaves of *Dammarites albens* from the Gosau Group of the Cretaceous of Austria. *Dammarites albens* is considered as a salt tolerant halophytic plant from the plant assemblage dominated by *Frenelopsis alata* (Uličný et al. 1997). It is known from several localities always associated with or embedded in marine sediments. Its long coriaceous leaves had very good preservation potential under marine conditions; therefore the leaves, described as *Krannera mirabilis*, are found usually in marine sandstones (Velenovský 1885, Bayer in Frič & Bayer 1901). Also the present leaf material is assigned to a plant originally growing in brackish conditions of a salt marsh.

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