

## Trametes eocenicus, a new fossil polypore from the Bohemian Eocene

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*Trametes eocenicus* Knobloch et Kotl. (Polyporaceae) from Radvanov, the Staré Sedlo Formation (Lower Tertiary, Upper Eocene) in W Bohemia (Czech Republic) is described. This fossil lignicolous polypore grew most probably in a subtropical forest formed of broad-leaved evergreen angiospermous plants.

Key words: *Trametes eocenicus*, fossil polypore, Upper Eocene, Bohemia, Czech Republic.

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Je popsán druh *Trametes eocenicus* Knobloch et Kotl. (Polyporaceae) ze starosedelského souvrství (starší terciér, svrchní eocén) z Radvanova v z. Čechách. Tento fosilní choroš rostl s největší pravděpodobností v subtropickém vždyzeleném lese tvořeném širokolistými krytosemennými rostlinami.

### INTRODUCTION

Proofs of fossil fungi are of various kinds. Primarily are the results of the destructive activity of fungi on wood (see e. g. Hartig 1878, 1894), then fossil spores, of which it is mostly unknown as to which genera and species of recent fungi belong (see e. g. Elsik et al. 1990, Ethridge Glaas et al. 1987), and, finally, impressions of carpophores or, also, their remains. Only with fossil fungi with perennial or, at least, hard leathery carpophores from the Tertiary, and especially the Quaternary, it is possible to state more exactly to which genera or even species they belong (see e. g. Gennard, Hackley 1989, Hübsch 1974, Killermann 1938, Kreisel 1957, 1977, Skirgiello 1961, Straus 1952 a,b), and only in such cases where the context of carpophore, spores or other microstructures have been preserved. Modern mycological methods for recent fungi cannot work in fact without the microscopical study of carpophores, and is much more difficult with fossil fungi.

In most fossil fungi of the Tertiary age, carpophores are usually not preserved and, therefore, it is impossible to identify them to any recent fungal genera with certainty, as we have at our disposal solely their impressions in the rock. For this reason, it is best to accommodate them in special genera with the modified names of those recent fungal genera, which they resemble. In our case, the impression closely

resembles some species of the genus *Trametes* Fr. (sensu lato) and so the fossil genus at our disposal is *Trametites* Straus, and under which we describe our fossil polypore as a new species.

#### DESCRIPTION OF THE NEW SPECIES

*Trametites eocenicus* Knobloch et Kotlaba, spec. nov.

Carpophores bracket-like, imbricate, with a rather thin, semiorbicular pilei 6.5 x 7.5 cm, rounded margins; upper surface of the pilei slightly zoned and remarkably radiately fibrous to faintly sulcate. Pores or other macro-, as well as micro-, features, are not known.

Holotype from Radvanov is preserved in the Paleontological Department of the National Museum, Prague, no. G 6508 (see fig. 1, 2), 1986, leg. E. Knobloch.

Type locality: Radvanov near Sokolov, W Bohemia (Czech Republic), light yellow, soft sandstone of the Staré Sedlo Formation, Upper Eocene, Lower Tertiary.



Fig. 1 *Trametites eocenicus* Knobloch et Kotl. - upper view of the pileus surface.

Photo by H. Vršťalová



Fig. 2 *Trametites eocenicus* Knobloch et Kotl. - semilateral view.

Photo by H. Vršťalová

#### DISCUSSION

We are only able to describe relatively few macromorphological features for this new fossil polypore as we have at our disposal only an impression in the sandstone. For this reason, we do not know if this fungus had pores (round, elongated, labyrinthic, small or large etc.) on the lower part of the pileus, or if the hymenophore was even lamellate (as it is e. g. in the species of the genus *Lenzites* Fr.). The most similar to our impression from Radvanov are some species of the recent genus *Trametes* Fr. in the broad sense (but other genera cannot be completely excluded).

The generic name *Trametites* was initially published by A. Meschinelli in Saccardo's *Sylloge fungorum* 10: 97, 1892 (*Sylloge fungorum fossilium*). There is, however, no generic description and so the name *Trametites* Meschinelli (as it is sometimes cited) was not validly published from the nomenclatural point of view – it is, therefore, a so-called “nomen nudum” (moreover Fr. is given as the author of the genus *Trametites* although Fries only described the recent genus of polypores, and, in addition, as *Trametes* and not *Trametites*). Nomenclaturally, the fossil genus *Trametites* was validly published only in 1950 by A. Straus (see Zijlstra in Farr et al. 1986), when he described the fossil polypore *Trametites undulatus* (with a so-called “descriptio generico-specifica”).

*Trametites eocenicus* is the first and only known fossil Tertiary polypore found in the Czech Republic. Other fungal finds from the Staré Sedlo Formation belong mostly to rusts (Uredinales) which parasitized leaves of angiosperms and are well preserved as impressions in fine Tertiary sandstone.

It is clear that pore-fungi, having perennial carpophores of woody or hard leathery consistency, were rather suitable for preservation in sediments – more often in the Quaternary than in Tertiary sediments; however, pore-fungi having annual, soft fleshy carpophores could not be preserved and would therefore disappear, most probably during several weeks, or at least months, after their development.

Hübsch (1974) described from the Older Quaternary, at Ehringsdorf in E Germany, a new fossil polypore *Trametes ehringsdorfensis* Hübsch and another find, which he assigned to cf. *Trametes confragosa* var. *tricolor* (Bull.: Fr.) Pilát. The last named fungus is considered in recent mycology by some mycologists to be an independent species, *Dedaleopsis tricolor* (Bull.: Fr.) Bond. et Sing.; it is characterized by the dark colours of the zonated pileus and the lamellate hymenophore. All finds from Ehringsdorf had very distinct lamellae on the lower part of the pilei. Kreisel (1977) considered all these fossils as belonging to the recent species *Lenzites warnieri* Dur. et Mont. The impressions of fossil polypores from travertine – Ehringsdorf near Weimar in Germany and, also, from Öcseny in Hungary (see Kreisel 1977, Taf. 57, fig. a, Taf. 58, fig. a) – have really well preserved lamellate hymenophores.

#### GEOLOGICAL SETTING

Southwest of the village Radvanov, near the town Sokolov (formerly Falknov, Falkenau), a profile in the Staré Sedlo beds was open for a short time in July 1986. The Staré Sedlo Formation was developed in a very typical development known from the locality “Na pískách” close to Radvanov (for details see Knobloch 1963). Plant impressions were present in the soft yellow sandstones, although the leaves were mostly fragmentary and thus not well preserved. Besides sandstones, white

Kaolin clays and coarse-grained conglomerates with rounded pebbles (quartz), also occur in these sites.



Fig. 3 Map of the part of Central Europe showing the location of Radvanov in W. Bohemia, the type locality of *Trametes eocenicus*.

#### THE FOSSIL FLORA OF THE STARÉ SEDLO FORMATION

The fossil flora of the Staré Sedlo Formation is known since the time of Rossmässler (1840); a summary of the further investigations and some principal information about the fossil flora is given by Knobloch (1963, 1990a). The flora of the Staré Sedlo Formation is dominated by two evergreen angiospermous elements, i. e. *Eotrigonobalanus furcinervis* (Rossm.) Walter et Kvaček (Fagaceae) and *Daphnogene cinnamomea* (Rossm.) Knobloch (Lauraceae). The physiognomy of the vegetation corresponds to the broad-leaved evergreen subtropical forests characterized by those species having thick, coriaceous leaves with an entire margin (the systematic position of many of them is unknown). These types of leaves, taken together with the exactly identified species, indicate therefore a most probable a subtropical, perhaps rather wet climate.

Ferns are very rare in these sediments and gymnosperms are represented by pines (several species are known only by needles and cones) and by representatives of the family Taxodiaceae (cf. *Taxodium*, *Glyptostrobus*, *Sequoia*).

The angiosperm leaves mostly belong to the family Fagaceae, Lauraceae and Myrtaceae. The genus *Mastixia*, *Sterculia*, palms and other important fossils are also present. Some leaves of deciduous trees or shrubs with rather ancient

features are represented by species of the genus *Populus* – *P. leucophylla* (Rossm.) Knobloch et Kvaček and *Platanus* – *P. frazinifolia* (Johnson et Gilmore) Walther. Angiospermous plants with a long history, known as *Steinhauera subglobosa* Presl (Altingiaceae), as well as the extinct *Majanthemophyllum basinerve* (Rossm.) Knobloch and *M. petiolatum* Weber, are also present.

The question, as to which of these trees and shrubs was probably the host of *Trametites eocenicus* – and if this polypore was a parasite or a saprophytic – cannot, of course, be answered.

The sediments of the Staré Sedlo Formation are the oldest in the Tertiary of Bohemia. By comparison and reference to the investigational results of the Paleogene sediments in the former German Democratic Republic performed during the last 30 years, the Staré Sedlo Formation has been thought – since 1963 – to be the Upper Eocene (see Knobloch 1963). This suggestion is reinforced by the recent investigations of Mai, Walther (1985). The Upper Eocene is a time space in the older Tertiary of 35 – 38 million years B. C.

#### NOTES TO THE OCCURRENCE OF FOSSIL FUNGI

Among fossil fungi similar types as *Trametites eocenicus* are very rare. More often are found plant tissues partly destroyed by the mycelium of some fungus, and, most often, parasitic rust fungi on plant leaves, e. g. *Aecidium rhamni-tertiaria* Engelhardt, a rust which occurred on the leaves of *Trigonobalanopsis rhamnoides* (Rossm.) Kvaček et Walther.

Other evidence of fossil fungi are fungal spores and pyrenomycete perithecia, and on which special literature exists. Especially striking are the perithecia known as *Rosellinites areolatus* (Fres. et Meyer) Kirchw. (which are known also from the Bohemian Tertiary) and the perithecia of *Trematosphaerites lignitum* (Heer) Meschinelli.

A taxonomic survey of fossil fungi can be found in Němejc (1959) and of the tertiary fungi in Brabenec (1909). Whereas the older works primarily treated species which parasitized leaves of angiosperms, recently published papers also mention perithecia, which are obtained by diluting samples in water (see e. g. Bůžek, Holý 1964, Gregor 1980). Some perithecia-like structures are known from the Cretaceous (see Knobloch 1971) as well as the Tertiary as *Cenococcum geophilum* Fr. (see e. g. Gregor 1980). The remains of fossil microfungi were also described from the brown-coal deposits of the Tertiary near Turów in W Poland by Skirgiello (1961). Ascomycetes were represented by *Rosellinites congregatus* (Beck) Meschinelli, *Trematosphaerites lignitum* (Heer) Meschinelli and *Meliola*?, whereas the family Polyporaceae is represented by some rather nice material which was identified as *Fomes* cf. *fomentarius* (L. : Fr.) Kickx. Except for *Meliola*?, the other

species are present also in some other brown coal areas (see Bůžek, Holý 1964, Skirgiello 1961).

Paleobotanists usually study higher, i. e. vascular, fossil plants and they devote less attention to the lower, i. e. non-vascular, plants, or they overlook them. One exception was the German paleobotanist and mycologist Adolf Straus who devoted himself to describing lower plants from Willershausen (Straus 1952a,b, 1956, 1992). He accumulated many fossil fungi which parasitized plant leaves and for which he provided new names. In fossil plants, as well as in fossil fungi, however, he overestimated the close relationship between the recent and fossil organisms, and this is also clear from the often designation of species by recent names (see Knobloch 1990b).

A special chapter on fossil fungi preserved in amber, of which 18 species belonging to 12 genera, are so far known to exist, are given by Czezcott (1961).

#### A c k n o w l e d g m e n t s

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