

# *Ixostrobus grenlandicus* Harris from Hungarian Liassic with reference to revision of the genus *Ixostrobus* Raciborski from Poland

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**ABSTRACT.** One specimen of *Ixostrobus grenlandicus* Harris was found in the Hungarian locality near Komlo (the Mecsek Mountains, southern Hungary). The specimen was compared with *Ixostrobus siemiradzki* Raciborski from Poland (the Holy Cross Mountains) which is the type species of genus *Ixostrobus*.

Since the genus *Ixostrobus* was established and described in Polish only, the authors revised the genus and give the generic diagnosis in English.

**KEW WORDS:** Liassic, male cone, *Ixostrobus*, Ginkgoales

## INTRODUCTION

The first time a cone-like male organ similar to *Ixostrobus* was mentioned by Heer (1876) from Rhaetian-Liassic flora of Siberia under the name *Amentum masculum* and assigned to Czekanowskiales.

The genus *Ixostrobus* was established by Raciborski (1892) because of its uncertain affinity, for the specimens collected from Liassic grey shale in Gromadzice (Holy Cross Mountains, central Poland). First time this material was described under the name *Taxites siemiradzki* (Raciborski 1891), since the author interpreted it as the top of the coniferous branch. Next year some more specimens were collected from the same locality and their name was changed for *Ixostrobus* (Raciborski 1992, Andrews 1970, Wcisło-Luraniec 1992).

Since the diagnosis of the genus *Ixostrobus* was given in Polish, it was not attainable for the foreign palaeobotanists. As it was mentioned by Harris (1935) in his discussion of *Ixostrobus grenlandicus*, during his visit in Poland he compared his material with the illustrations of Raciborski's paper because the Polish description was useless for him and the

original material was not available for examination. On the base of the drawings Harris misinterpreted the arrangement of sporophylls on the axis. According to him, they were arranged in whorls, but in fact they grew spirally as it was stated in the diagnosis.

Harris (1935) established the new species *Ixostrobus grenlandicus* from *Thaumatopteris* zone of Lower Liassic of Greenland. Krassilov (1968) described the species *Ixostrobus ex gr. heeri* from flora of the Amur region, and later (Krassilov 1972) *Ixostrobus smidtianus* and *Ixostrobus heeri* with the interpretation of the taxonomical position of this genus. *Ixostrobus* was also described from Siberia and Transbaikalia (Prinada 1951).

*Ixostrobus whitbiensis* was described by Harris (1974) from the Middle Jurassic of Yorkshire. The *Ixostrobus* cf. *whitbiensis* is also known from two localities of Zhaitang Jurassic flora in China (Shuying Duan 1987).

Hill (1990) described the male cone morphologically similar to *Ixostrobus* as the new genus *Androstrombus balmei* belonging to Cycadales.

The systematic part of the present paper

contains an English translation of Polish original generic diagnosis of *Ixostrobus* and the specific diagnosis of *I. siemiradzki* proposed by Raciborski (1892) as well as the description of *I. grenlandicus* found recently in the Liassic deposits of Hungary.

## SYSTEMATICS

### Genus *Ixostrobus* Raciborski 1892

The generic diagnosis Raciborski based on the material stored in Institute of Geological Sciences, Polish Academy of Sciences, Senacka 1, 31-002 Kraków, Poland, numbered A - 25/13, A - 25/14, A - 25/15, A - 25/16, A - 25/18, A - 25/19, A - 26/56.

"The distal end of the slender branch, covered by crowded, spirally situated, linear leaves. Leaves outspreading, with simple vein. Near the top of each leaf single roundish capsule is observed on adaxial surface. The whole spike detaching from the axis." (Raciborski 1892, p. 12).

### *Ixostrobus siemiradzki* Raciborski 1892

Holotype. No. A-26/55, Fig. 1a

Paratype. No. A-25/14, Fig. 1c

Type locality. Gromadzice (Holy Cross Mountains)

Age. Rhaetian

Diagnosis. "Detaching spikes (male flowers?) 30-50 mm long, 10, 11, 12, 15 mm wide, cylindrical, with rounded top of spike. It consists of numerous, spirally arranged, linear leaves, outspreading from the axis. Axis 1.5 mm wide, covered by crowded leaves from each side. Leaves up to 8 mm, linear with simple vein, at their top lanceolately narrowed and bent upwards. On each leaf in bend is found a body on very slender stalk, up to 1.5 mm wide, rounded or elliptic, with flat base and unclear top". (Raciborski 1892, p. 15).

### *Ixostrobus grenlandicus* Harris 1935

1935 *Ixostrobus grenlandicus* Harris p. 147; Pl. 27, figs. 12, 13; Pl. 28 figs. 1-4, 7-10, 12, Text fig. 50G (type specimen Pl. 28, figs. 8, 10, 12).

Material. Two specimens (Hungarian Natural History Museum, No. BP 89.424.1, BP 98.1124.2) collected in Liassic deposits in the

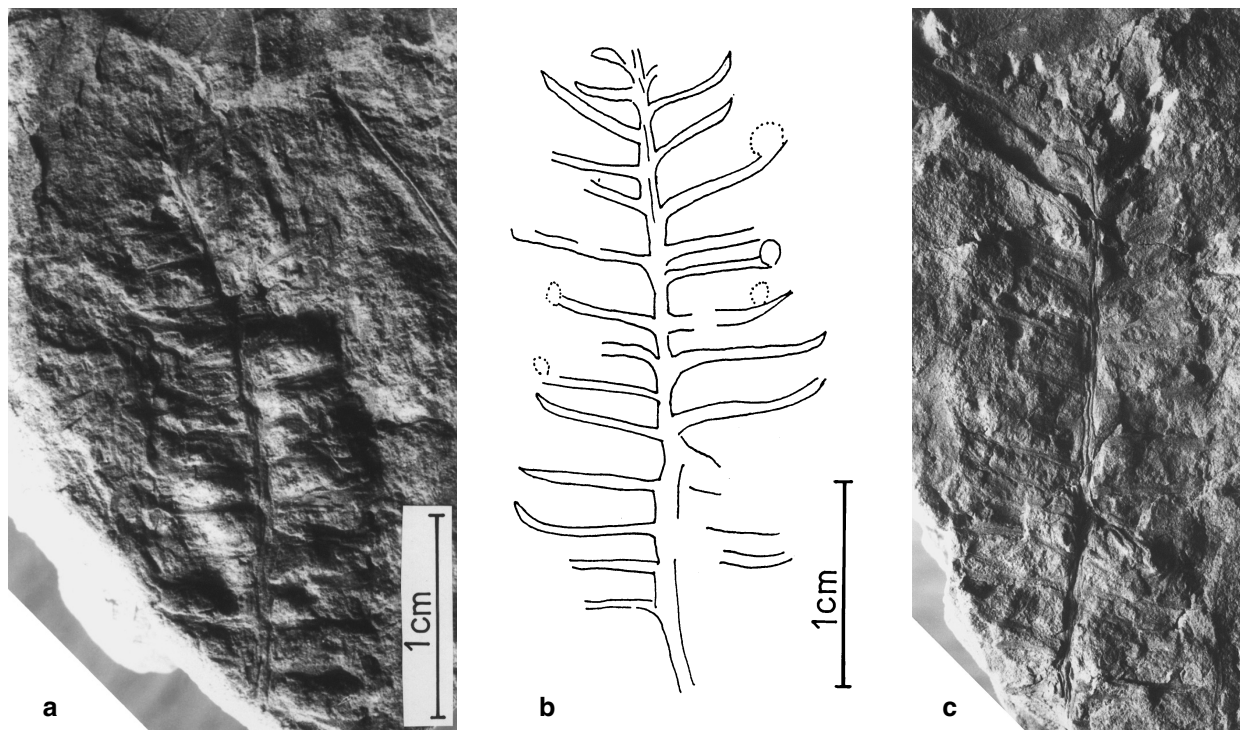


Fig. 1. *Ixostrobus siemiradzki* Raciborski from Poland (a - No. A-26/55, Holotype; b - reconstruction; c - No. A-25/14, Paratype)

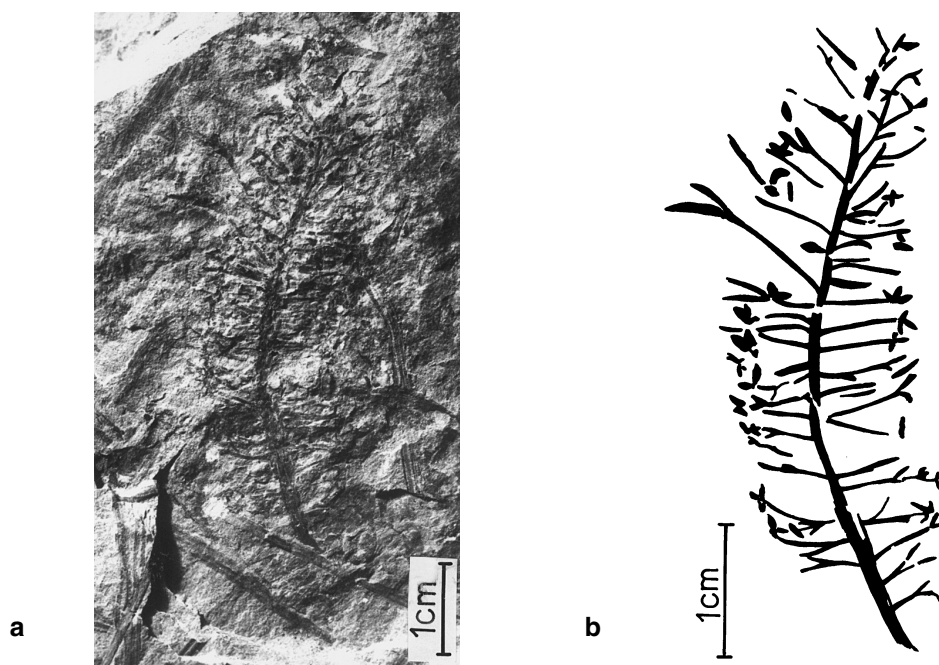


Fig. 2. *Ixostrobus grenlandicus* Harris from the Mecsek Mts. Hungary (a – No. BP 98.1124.2, b – BP 89.424.1)

region of Komló, the Mecsek Mountains, Southern Hungary. Both specimens represent large fragments of cones with the top and without the base, partly preserved as coalified compression, partly as imprint. The cuticle is very poorly preserved, not suitable for preparation.

**Description.** Two male cones, broken at the base. One of them is 43 mm long and 16 mm wide, the second one is 85 mm long and 20 mm wide in the middle. The axis is about 2 mm wide near the base and 1 mm wide towards the top. The sporophylls are slender, crowded, spirally situated on the axis, 5–7 mm long, 0.5 mm wide, finely striated along. They join the axis at right angle along the whole length of the fragment; the angle decreases towards the top of cone on the distance of the last 10 mm. Some of the sporophylls have slightly incurved end towards the top of the cone. The end of the sporophyll is beared by the sporangia, usually one sporangium is visible on each sporophyll. The sporangia are about 1,2 mm long and 0,8 mm wide, divided into two lobes with a deep incision (Fig. 2).

## DISCUSSION

Morphologically the Hungarian specimens most resemble the *Ixostrobus grenlandicus* as having the same slender structure. Other de-

tails possible to observe also agree with the description of this species.

Harris (1935) gave the emended diagnosis and discussed the genus in comparison with the illustrations published by Raciborski 1892 (he did not examine the original material) and compared his new species *I. grenlandicus* with the illustrations of the type species *I. siemiradzki*. In his opinion the structure of the *I. grenlandicus* “is very like *Ixostrobus siemiradzki*” and might be distinguished only by its “more slender sporophyll stalks and smaller sporangia”.

However, Harris (1935) interpreted the sporangia illustrated by Raciborski (1891, 1892) as laying on two sides of the axis and considered it as a difference between two species, while in Raciborski (op. cit.) described it as spirally arranged.

Harris (op. cit), in the discussion of his species considered also the possibility that both species: *I. siemiradzki* and *I. grenlandicus* might belong to the same taxon, because the only difference established on the grounds of the drawing was in the size. On the other hand the preservation of the material from Poland (only imprints) has not allowed the accurate investigation.

## POSSIBLE AFFINITY OF THE *IXOSTROBUS*

After the vast discussion Raciborski (1892) ascertained that *Ixostrobus* was probably a

male cone which might be connected with *Ginkgo* or *Baiera* (it was later corrected by Harris (1935) for *Czekanowskia* and *Podozamites*). Harris (1935) observed the *Ginkgoites hermelini* and *Podozamites* in the same localities with *Ixostrobus grenlandicus*, in one locality also *Czekanowskia*. Later Harris (1974) on the occasion of description of the new species *Ixostrobus whitbiensis* (from the Yorkshire) widely discussed the possible affinity of this genus comparing data from Siberia (Krassilov 1968, 1970), Japan (Oishi and Huzioka 1938), and Poland (Raciborski 1891, 1892). Harris (1974) took into consideration mainly such genera like *Ginkgo*, *Baiera*, *Czekanowskia*, *Podozamites* and *Desmiophyllum* and made a list of possible species which may belong to *Ixostrobus* (p. 130).

In Hungary are present almost all of these possible genera: numerous *Baiera* and *Ginkgo*, rare *Podozamites* and *Desmiophyllum* and very few *Czekanowskia*. Considering that only two specimens of *Ixostrobus* were found in the locality, we think that more probable is its affinity to rarely occurred genera than to genera which are found in great numbers.

#### CONCLUSION

1. In the present paper *Ixostrobus grenlandicus* Harris was described from the Hungarian locality in the Mecsek Mts.

2. The systematic parts contains translation of the original diagnosis of the genus *Ixostrobus* Raciborski as well as of its type species, *I. siemiradzki*.

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