Sigillaria Lycopods from the Early Permian Angaraland

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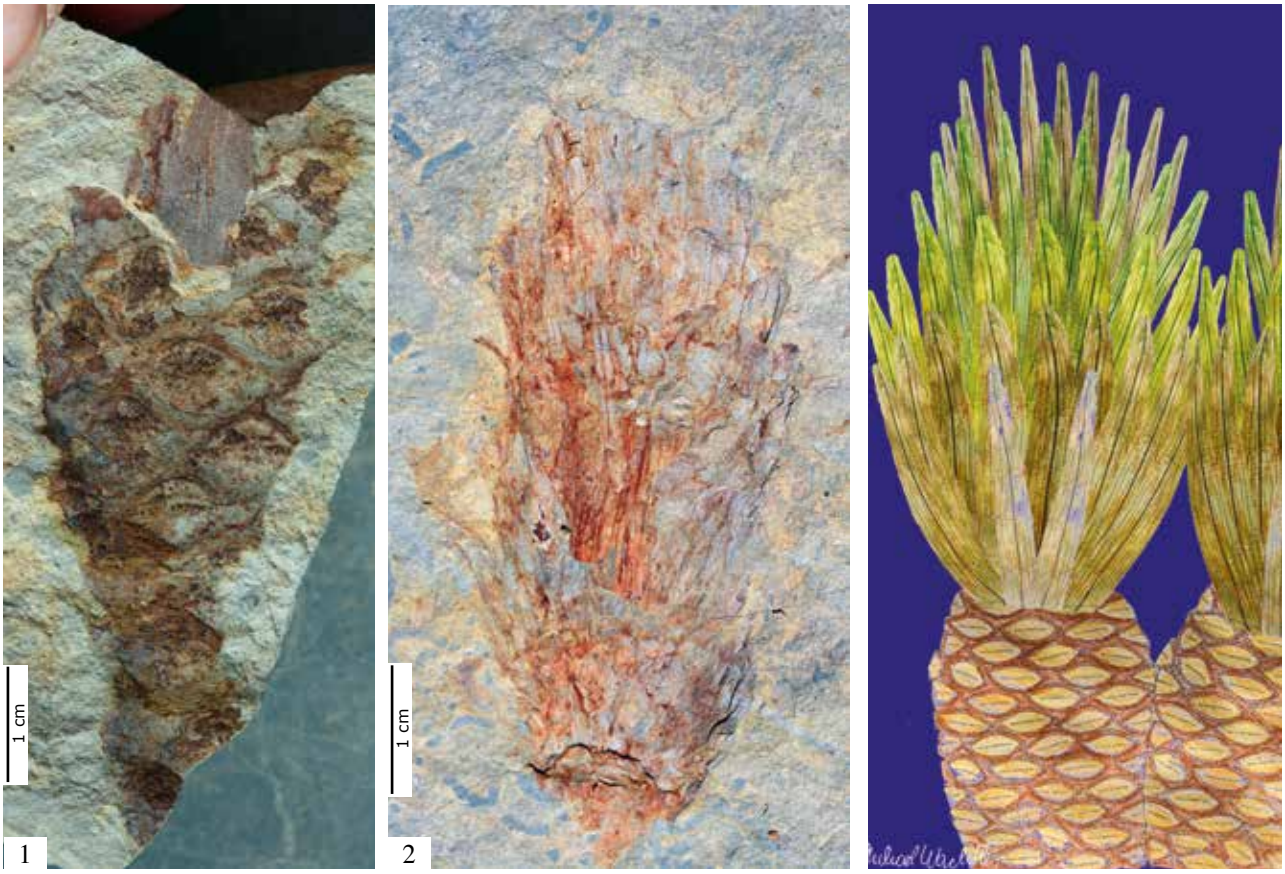
The Sigillariaceae – one of the most dominating lycopods in the Paleozoic – were characterised by stems with elliptic leaf cushions and abscission points situated just over the centre of the leaf scar. This was because the slender and elongated leaves were shed during the growing stage. A new Early Permian (Artinskian) Sigillariaceae from the Ural region, belonging to the former isolated Angara continent – *Sigillangaria klyuchikii* nov. gen. n. sp. – will be described. The smooth scars evidence several abscission points as opposed to those known from the Euramerican continent with only two. The fertile organs unfortunately were not found in direct connection, but typical lycopod fructifications recovered in the vicinity hold probably microsporangiate and also macrosporophylls coated densely by slender sterile leaves.

Online: May 2020
Keywords: Fossil lycopods, *Sigillaria*, Fore Urals, Permian, Angara



***Sigillangaria klyuchiki*, Sigillaria-lycopod from the Early Permian Fore-Urals**

Part of a stem with abscission scars typical for Sigillariaceae (designed holotype Klyuchiki 01); 2. Strobilo probably belonging to the same plant (Klyuchiki 2); 3. Reconstruction of the known parts (Klyuchiki, Krasnoufimsk)

Introduction

Carboniferous and Early Permian *Sigillaria* were characteristic tree-like plants reaching, in best cases, a height of up to 30 m, normally about 20 m, with a tall, single or apically only once-forked stem. The elongated leaves were attached directly to the stem but shed easily so that characteristic leaf scars, often in vertical rows, covered the stems for almost the whole trunk. Early Permian *Sigillaria brardii*, known for their longitudinal and spiral rows of leaf cushions was a common flora element from many fossil sites on the northern hemisphere continent Euramerica. The leaves of *Sigillaria brardii* may bear one strong midvein and more subtle veins. Now in Early Permian (Artinskian) layers of the Fore-Urals, another *Sigillaria* species was found, which probably had only a low-growing character.

Systematic Paleontology

Class Lycophyta
Subdivision Lycophytina Kenrick & Crane, 1997
Order Sigillariaceae

Genus *Sigillangaria* nov. gen. n. sp. WACHTLER & PERNER 2020

Etymology

They are named after their affinities to the lycopod *Sigillaria* and the Angara located in the Permian period in the area that now comprises the Urals and Siberia.

Diagnosis

The stems are covered with smooth elliptic leaf cushions with a prominent outer rim; several abscission points of the leaves collocate in the centre of the leaf scars.

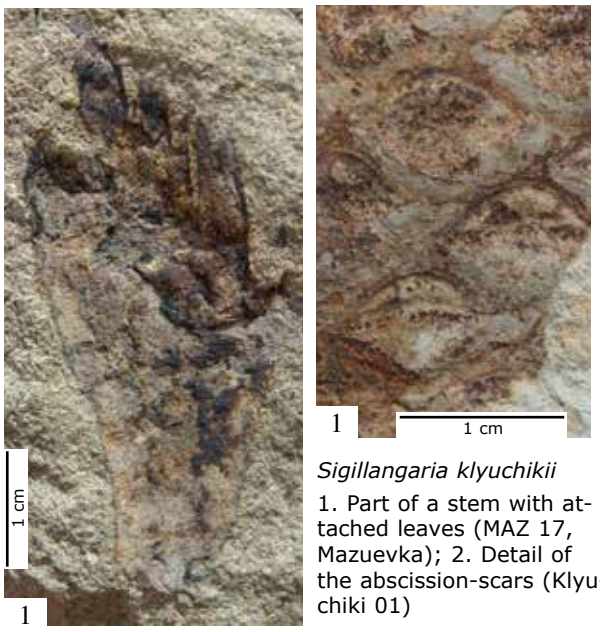
Sigillangaria klyuchikii n. sp. WACHTLER & PERNER 2020

Holotype

Klyuchiki 1 Coll. Wachtler, Dolomythos Museum, Innichen

Etymology

It is named after the location Klyuchiki near Krasnoufimsk (Красноуфимск) Oblast Swerdlowsk (Russia) where the plant was found.



Sigillangaria klyuchikii
1. Part of a stem with attached leaves (MAZ 17, Mazuevka); 2. Detail of the abscission-scars (Klyuchiki 01)

Description

Stems: The preserved stem of the holotype Klyuchiki 01 is 60 mm long, the elliptic leaf cushions are from 10–12 mm wide and five mm broad. In the middle, they evidence about ten leaf scars from the subtle veins connecting leaf and stem. A similar feature is seen in MAZ 17 from Mazuevka, but here some leaves are attached.
Leaves and fertile organs: The leaves are long, thin, grass-like attached directly to the stem growing in a spiral along the trunk. Klyuchiki 02 – thought to belong to *Sigillangaria klyuchikii* – holds about 70 mm long smooth leaves equipped with a longitudinal prominent mid-vein and other parallel side-veins running the full length of the foliage. The supposed micro and megasporophylls are hidden by the covering leaves.

Remarks and ecology

Early Permian *Sigillangaria klyuchikii* is rare and was found especially in the lacustrine areas of Klyuchiki together with *Goniatites* and brachiopods. This suggests that the lycopod was best adapted to brackish sea water, filling the niche of today's mangrove swamps. It represents a dwarfish *Sigillaria* genus like *Sigillcampeia* in the European Triassic.

References

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The Origin and Evolution of Angiosperms
Early Permian Flowering Plants

Edited by
Michael Wachtler and Thomas Perner

Published by Dolomythos Museum, 39038 Innichen, South Tyrol, Italy
First edition May, 2020 ISBN 978-88-944100-4-4
info@dolomythos.com

Hardcover Euro 98
Pages 240