

# THE LOWER JURASSIC FLORA FROM ODROWAŻ (NORTHERN MARGIN OF THE HOLY CROSS MTS)

by

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In 1891 and 1892 M. Raciborski and in 1928 A. Makarewiczówna described the Lower Jurassic flora of several outcrops in the north-eastern margin of the Holy Cross Mts.

I am working on the flora of the new outcrop from Odrowąż farther to the west. The plants, well preserved compressions, occur in a bed of grey shale. Certain plants were macerated in nitric acid and gave good cuticle preparations which were investigated under the light microscope, occasionally in the scanning electron microscope. With some plants, however, maceration does not give good results.

The list of plants found so far contains: *Sphenophyta*: *Neocalamites* sp. 1; *Neocalamites* sp. 2; *Pteridophyta*: *Phlebopteris angustiloba* (Presl) Hirmer et Hoerhammer and about 4 species of as yet undetermined ferns; *Pteridospermo-phyta*: *Pachypteris* sp.; *Bennettiales*: *Otozamites* sp., *Pterophyllum* sp.; *Coniferophyta*: *Himmerella* cfr. *muensteri* (described by M. Reymanówna), *Podozamites* sp. 1, *Podozamites* sp. 2; *Incertae sedis*: Indetermined axes (probably *Lycophyta*), *Stachyopitys prestlii* Schenk.

So far I have described in detail parts of two plants, 1) axes covered with scales and 2) an interesting fructification. The axes resemble those of Lycophytes but their affinity is uncertain. The fructification is determined as *Stachyopitys prestlii* Schenk. It is a 42 mm long fragment of a main axis with helically arranged short lateral appendages ending with one cupule (3).

I imagine that the plants from Odrowąż formed two plant communities judging by the size of plant fragments. The first plant community is represented by undamaged larger plant fragments which indicates that they grew near the place of deposition. I think it was a conifer forest dominated by trees of *Himmerella muensteri* and grew on a marshy habitat covered by *Neocalamites*. The rare *Bennettiales* and *Pteridospermo-phytes* probably occurred in drier places.

The second plant community is represented by small fragments of fern leaves which indicates their long distance transport by water. I suppose that the fern community grew upstream in a river valley.

The presence of the fern *Phlebopteris angustiloba* (*Matoniaceae*) which family grows today in the tropical and subtropical climatic zone suggests a tropical or subtropical climate for this Jurassic flora. *Phlebopteris angustiloba* indicates also a Lower Liassic age of the Odrowąż flora.

These preliminary results were presented in the form of a poster during the XIV International Botanical Congress (1) and at the outcrop Odrowąż during the 24-th Congress excursion in Poland (2). At present I am continuing work on this flora which is the subject of my doctoral thesis.

## References

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In 1887 and 1892 M. Reichenow described the Lower Liassic flora of the Holy Cross Mts. in the north-eastern margin of the new outcrop from Odrzwet further to the west. The plants, well preserved and compressed in a bed of grey shale. Certain plants were investigated under the light microscope, occasionally in scanning electron microscope. With some plants, however, maceration does not give good results.

The list of plants found so far contains: *Stachyopitys* sp. 1, *Neoculmitis* sp. 2, *Freycinetia* sp. 3, *Freycinetia* sp. 4, *Freycinetia* sp. 5, *Freycinetia* sp. 6, *Freycinetia* sp. 7, *Freycinetia* sp. 8, *Freycinetia* sp. 9, *Freycinetia* sp. 10, *Freycinetia* sp. 11, *Freycinetia* sp. 12, *Freycinetia* sp. 13, *Freycinetia* sp. 14, *Freycinetia* sp. 15, *Freycinetia* sp. 16, *Freycinetia* sp. 17, *Freycinetia* sp. 18, *Freycinetia* sp. 19, *Freycinetia* sp. 20, *Freycinetia* sp. 21, *Freycinetia* sp. 22, *Freycinetia* sp. 23, *Freycinetia* sp. 24, *Freycinetia* sp. 25, *Freycinetia* sp. 26, *Freycinetia* sp. 27, *Freycinetia* sp. 28, *Freycinetia* sp. 29, *Freycinetia* sp. 30, *Freycinetia* sp. 31, *Freycinetia* sp. 32, *Freycinetia* sp. 33, *Freycinetia* sp. 34, *Freycinetia* sp. 35, *Freycinetia* sp. 36, *Freycinetia* sp. 37, *Freycinetia* sp. 38, *Freycinetia* sp. 39, *Freycinetia* sp. 40, *Freycinetia* sp. 41, *Freycinetia* sp. 42, *Freycinetia* sp. 43, *Freycinetia* sp. 44, *Freycinetia* sp. 45, *Freycinetia* sp. 46, *Freycinetia* sp. 47, *Freycinetia* sp. 48, *Freycinetia* sp. 49, *Freycinetia* sp. 50, *Freycinetia* sp. 51, *Freycinetia* sp. 52, *Freycinetia* sp. 53, *Freycinetia* sp. 54, *Freycinetia* sp. 55, *Freycinetia* sp. 56, *Freycinetia* sp. 57, *Freycinetia* sp. 58, *Freycinetia* sp. 59, *Freycinetia* sp. 60, *Freycinetia* sp. 61, *Freycinetia* sp. 62, *Freycinetia* sp. 63, *Freycinetia* sp. 64, *Freycinetia* sp. 65, *Freycinetia* sp. 66, *Freycinetia* sp. 67, *Freycinetia* sp. 68, *Freycinetia* sp. 69, *Freycinetia* sp. 70, *Freycinetia* sp. 71, *Freycinetia* sp. 72, *Freycinetia* sp. 73, *Freycinetia* sp. 74, *Freycinetia* sp. 75, *Freycinetia* sp. 76, *Freycinetia* sp. 77, *Freycinetia* sp. 78, *Freycinetia* sp. 79, *Freycinetia* sp. 80, *Freycinetia* sp. 81, *Freycinetia* sp. 82, *Freycinetia* sp. 83, *Freycinetia* sp. 84, *Freycinetia* sp. 85, *Freycinetia* sp. 86, *Freycinetia* sp. 87, *Freycinetia* sp. 88, *Freycinetia* sp. 89, *Freycinetia* sp. 90, *Freycinetia* sp. 91, *Freycinetia* sp. 92, *Freycinetia* sp. 93, *Freycinetia* sp. 94, *Freycinetia* sp. 95, *Freycinetia* sp. 96, *Freycinetia* sp. 97, *Freycinetia* sp. 98, *Freycinetia* sp. 99, *Freycinetia* sp. 100.

So far I have described in detail parts of two plants, 1) axes covered with scales and 2) an interesting fructification. The axes resemble those of *Lycopodium* but their affinity is uncertain. The fructification is determined as *Stachyopitys* *Freycinetii* Schenk. It is a 42 mm long fragment of a main axis with helically arranged short lateral appendages ending with one cupule (3).

I imagine that the plants from Odrzwet formed two plant communities judging by the size of plant fragments. The first plant community is represented by undamaged larger plant fragments which indicates that they grew near the line of deposition. I think it was a conifer forest dominated by trees of *Wittmannia* *Freycinetii* and *Freycinetia* *Freycinetii*. The site - *Freycinetii* and *Freycinetia* *Freycinetii* - was probably occupied in their places.

The second plant community is represented by small fragments of fern leaves which indicates their long distance transport by water. I suppose that the fern community grew upstream in a river valley.

The presence of the fern *Freycinetia* *Freycinetii* (*Freycinetia*) which hardly grows today in the tropical and subtropical climatic zone suggests a tropical or subtropical climate for the Liassic forest.

*Freycinetia* *Freycinetii* indicates also a Lower Liassic age of the Odrzwet forest. These preliminary results were presented in the form of a poster during the XIV International Botanical Congress (1) and at the outcrop Odrzwet during the 34-th Congress excursion in Poland (2). At present I am continuing work on this flora which is the subject of my doctoral thesis.

References

1. Wcisło-Luraniec, E. 1987. Plants of the Lower Liassic Conifer forest from Odrzwet in Poland and their fructifications. Part II *Freycinetia* and remaining *Freycinetia*. Abstracts of the Ge-