

FOSSIL SALIX POLARIS WAHLBG. IN THE NETHERLANDS

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I. INTRODUCTION

From several places in the Netherlands fossil specimens of dwarf willows have been recorded, both from deposits of the last Glacial (Weichselian: FLORSCHÜTZ, 1930, 1936; VAN DER VLERK and FLORSCHÜTZ, 1950, 1953) and of the penultimate Glacial (Saalian: ZAGWIJN and DE JONG, 1960). As stated by FLORSCHÜTZ the arctic-montane species of *Salix* recorded with certainty are the following: *S. herbacea*, *S. reticulata*, *S. retusa*. The presence of *S. polaris*, however, had not yet been recorded with certainty (VAN DER VLERK and FLORSCHÜTZ, 1950). In the present paper some specimens of this species will be described, which have been found lately near Hengelo, in a bed from the Weichselian Pleniglacial. This bed, consisting of about three metres of loam has been exposed among others in the pit of Rientjes, about 2 km due north of the town of Hengelo (Province of Overijssel). In this pit at the base of this bed, occurred in places a layer rich in plant debris, among which numerous leaves of arctic-montane species. The following species could be recorded: *Salix herbacea* L. (64 leaves), *Salix reticulata* L. (60 leaves), *Salix polaris* Wahlbg. (3, perhaps 5 leaves), *Dryas octopetala* L. (4 leaves), *Betula nana* L. (2 leaves).

A radiocarbon dating of this material yielded the following result: $37\ 170 \pm 840$ y. BP; GRN-1763.

2. DESCRIPTION OF FOSSIL LEAVES OF SALIX POLARIS

Fossil leaves of *Salix polaris* can be distinguished from those of *Salix herbacea*, which they closely resemble in appearance, by the lack of any dentation of the leaf-margins. In *S. herbacea* often dentation is much reduced, though single dents always remain; moreover the nervature indicates their presence, as the tertiary nervules running into the dentations can be found. On the other hand in *S. polaris* such nervules are recurved before reaching the leaf-margin. Very often the leaves of the latter species are distinctly cordiform.

Three leaves found in our material can be recorded with certainty as *Salix polaris* (Figs. 1-3).

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Specimen III 68-M142-5/168 *Salix polaris* (leaf). Pit Rientjes Hengelo (Netherlands). Weichselian. Length 5.9 mm; breadth 5.6 mm. Distinctly heart shaped, leaf-margin smooth, tertiary nerves recurved before reaching the leaf-margin.

Specimen III 70-M142-5/170 *Salix polaris* (leaf). Pit Rientjes Hengelo (Netherlands). Weichselian. Length 7.1 mm; breadth 6.5 mm. Slightly cordiform. Though the leaf-margin is damaged in one place, it does not seem to bear any dentules. Nervation as in the preceding specimen.

Specimen III 72-M142-5/72 *Salix polaris* (leaf). Pit Rientjes Hengelo (Netherlands). Weichselian. Length (stalk excl.) 7.1 mm; breadth 6.5 mm. Shape: rounded oviform. Leaf-margin smooth, nervature as in the preceding specimens.

Two other specimens (III 49-M142-5/149 and III 52-M142-5/152) though closely resembling the leaves of *Salix polaris*, show a damaged leaf-margin, making it impossible to decide whether a dentation is absent or not, and for this reason they cannot be distinguished with certainty from *Salix herbacea*. (Figs. 4 and 5).

The specimens described are kept in the collections of the Palaeobotanical Laboratory of the Geological Survey at Haarlem, Netherlands, under the numbers quoted.

3. DISCUSSION

Salix polaris Wahlbg. is an arctic, chiefly procumbent dwarf shrub which has been recorded from some fossil-bearing sites of Pleistocene age in Europe (TRALAU, 1961). Species of adequate distributional character, now completely absent from the flora of Central Europe, are *Diapensia lapponica* and *Ranunculus hyperboreus*. The oldest occurrence of *S. polaris* is known from Tarzyniechy in Poland (TRALAU, 1962), the deposits of which are referred to the Mindel-Glacial (Cracovian), Mindel-Riss Interglacial, and Riss Glacial (ŚRODOŃ, 1954, 1960). The other Pre-Weichselian occurrences (e.g. those of Great-Britain and Germany) are of unknown age. The finds from the Late Glacial phase of the Last Glaciation show this species to have been widespread over extensive areas of N. Europe, where it became extinct during the following Post Glacial reforestation period. In the Netherlands on the other hand the species is found during the preceding phase of severest cold of the Last Glaciation and it seems to have died out here at a somewhat earlier junction, namely at the beginning of the Late Glacial, together with many other arctic-montane species.

According to the theory of glacial survival *S. polaris* belongs to the part of the Scandinavian flora which survived at least the Last Glaciation in unglaciated islands along the Norwegian coast. The geographical isolation of this species in Scandinavia is striking, the nearest recent occurrences being known from Spitsbergen and the Uralian Mountains.



Fig. 1. *Salix polaris* Wahlbg. (leaf), specimen III 68-M142-5/168.



Fig. 2. *Salix polaris* Wahlbg. (leaf), specimen III 70-M142-5/170.

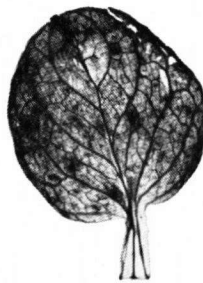


Fig. 3. *Salix polaris* Wahlbg. (leaf), specimen III 72-M142-5/72.



Fig. 4. *Salix (polaris?)* (leaf), specimen III 49-M142-5/149.

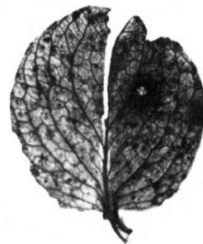


Fig. 5. *Salix (polaris?)* (leaf), specimen III 52-M142-5/152.

All specimens from Pit Rientjes, Hengelo, Netherlands. Age Weichselian Pleniglacial. Magnification 4 ×.

REFERENCES

- FLORSCHÜTZ, F. 1930. Proc. Kon. Ak. Wet. **38**: 137.
———, 1936. Proc. Sixth Intern. Bot. Congress Amsterdam, **1**: 205–208.
ŠRODON, A. 1954. Inst. Geol. Biul. **5**: 69.
———, 1960. Roczn. Pol'sk Tow. Geol. **29**: 299.
TRALAU, H. 1961. Bot. Notiser **114**, fasc. 2: 213.
———, 1962. Manuscript — Stockholm 1962.
VAN DER VLERK, I. M. and F. FLORSCHÜTZ. 1950. Nederland in het IJstijdvak,
p. 229.
———, 1953. Verh. Kon. Ak. Wet., 1e reeks, Deel **20**, 2: 1–58.
ZAGWIJN, W. H. 1961. Mem. Geol. Found. Neth., Nieuwe Serie **14**: 15–45.
——— and J. DE JONG. 1960. Geol. en Mijnb. **39**: 51.