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POSTGLACIAL HISTORY OF THE COMMON SPRUCE (*PICEA EXCELSA* (LAM.)
LK.) IN THE LOW BESKIDS SEPARATING THE EAST FROM THE WEST CAR-
PATHIANS

O postglacialnej historii świerka pospolitego w Beskidzie Niskim

ABSTRACT. The successive stages of the mapping of the range of the common spruce in Poland and the role of the results of palaeobotanic studies carried out in this range are recalled. Information about the fossil sites of this tree, clashing with the conception of the so-called Mid-Carpathian disjunction in the spruce distribution constitutes the essential part of the paper.

INTRODUCTION

After more than twenty years I resume the consideration of the still controversial problem concerning the boundaries of the occurrence of the common spruce and the breaks in its range, in literature referred to as the Middle-Polish and Mid-Carpathian disjunctions (Środoń 1967). I remind that I regarded the distinction of these breaks as insufficiently documented and suggested that we should return to the boundaries of the continuous distribution of spruce in the territory of Poland, marked by Raciborski in 1912 and later presented by Szafer in Romer's (1917) „Atlas Polski” and in the „Flora Polski” (1919) and accepted by Jedliński and Paczoski (cf. Środoń l.c.). On the two above-mentioned maps Szafer plotted the insular spruce stands in Volhynia and Polesie.

In 1921 Szafer veered round and admitted Pax's (1918) view on the existence of the Middle-Polish disjunction in the range of the lowland spruce to be correct. Works by and close acquaintance with J. Rivoli (cf. Szafer 1973, pp. 135-137), the author of the publication „O geograficznym rozszedzeniu świerka” (On the geographical distribution of the spruce) (1884), concerning also „regions free from spruce”, were probably not insignificant as regards his arrival at that decision. Later, basing himself on palaeobotanical data, Szafer (1931, 1935) established three independent routes of postglacial spruce migration to our country, namely, two routes reaching the boundaries of the Low Beskids in the Carpathians

from opposite directions and the third one leading from the north-east. As a result, he fixed the picture of the distribution of the spruce with two disjunctions on the frequently published maps of forest tree ranges in Poland and not only in it, for a long time (cf. Schmidt-Vogt 1987).

The suggestion that we should return to Raciborski's conception met partly with approval, qualified by the rejection of the Middle-Polish disjunction, in the „Atlas rozmieszczenia drzew i krzewów w Polsce” (Atlas of the distribution of trees and shrubs in Poland) by Boratyńska et al. (1980) and in the university text-book „Botanika leśna” (Forest botany) by Tomanek (1987). Special attention should be paid to the information given by Ralska-Jasiewiczowa (1983), who on the basis of her studies carried out by the isopol method came to the conviction that 5000 years ago the ranges of the East- and the West-Carpathian spruce were connected along the northern foothills of the Low Beskids. This information has its complement in the isopol picture of the postglacial history of the spruce over a section of the southern slopes of the Low Beskids in Czechoslovakia (Rybničkova & Rybniček 1988).

Among other publications, attention is also drawn to the utterance on the spruce in the Low Beskids in a work by Staszkievicz (1976), in which, belittling the significance of information given in my paper of 1967, the author acknowledges the Mid-Carpathian disjunction to be „an effective genetic barrier between the East and the West-Carpathian spruce (p. 41)”. It is a pity only that the author of that theory forgot to quote the proportion of spruce pollen in two profiles and the macroscopic remains of this tree from the site at Besko on the Wisłoka — given in my work. This is a pity because its proportions from Cergowa Góra near Dukla (11.6, 10.0, 13.1 and 9.6%) and from Besko (5.8 and 12.2 %) are sufficiently high to evidence the presence of the spruce *in situ*. Staszkievicz (l.c.) provides also information, borrowed from Holubcik's (1969) paper, about the occurrence of the East-Carpathian spruce (var. *acuminata*) in the eastern part of the Slovakian side of the Tatras. Mezera (1939, pp. 49 and 52) did that much earlier, signalling a maximum proportion of this variety, namely, 39%. This high proportion seems to suggest convincingly that the Low Beskids did not divide the ranges of two varieties of the common spruce, i.e. var. *acuminata* and var. *abies*, neighbouring in the Carpathians, but that they may have been an area of their interpenetration.

FOSSIL VESTIGES OF THE SPRUCE IN THE LOW BESKIDS

To begin with, an observation valuable as a specific document from before more than a hundred years:

„It is a surprising phenomenon that the spruce again becomes a great rarity in the Beskides, which surround the Tatra group. On the Carpathian sandstones, from Babia Góra to Sanok, we encounter almost pure stands of fir and beech, sometimes even pine, but not those of spruce. It is only at the foot of our Polish Alps that, having crossed Nowy Targ Podhale, we again meet with this tree species in the Tatra valleys”. (Rivoli 1884, p. 6). This discontinuity in the occurrence of the spruce in the Polish Carpathians, known better to us at present, was able — as it was to turn out in course of time — to lead to the finding of the fact that the Low Beskids, the lowest and narrowest range, about 75 km long, in the Carpathians, were by nature devoid of this tree.

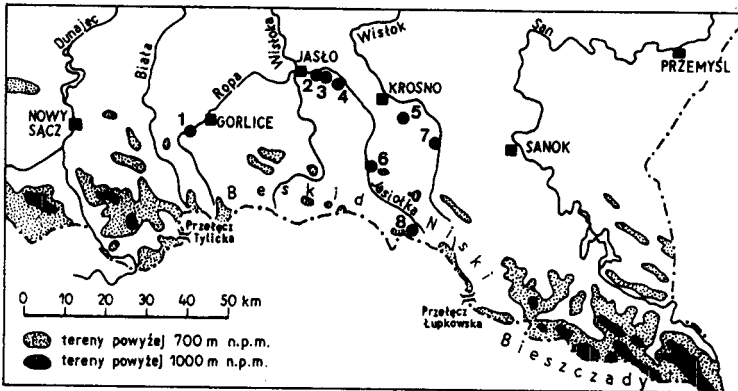


Fig. 1. The distribution of the sites of deposits comprising fossil remains of the common spruce (*Picea excelsa* (Lam.) Lk.) in the area of the Low Beskids and Doły Jasielsko-Sanockie, adjacent to them in the North: 1 — Symbark (Gil et al. 1974), 2 — Roztoki (Szafer & Jaroń 1935), 3 — Roztoki (Harmata 1987), 4 — Tarnowiec (Harmata 1987), 5 — Kępa (Gerlach et al. 1972), 6 — Cergowa Góra (Więckowski & Szczepanek 1963), 7 — Besko (Koperowa 1970), 8 — Jasiel (Szczepanek 1987)

The Mid-Carpathian disjunction in the Low Beskids was distinguished by Wierdak (1927), who also defined its position on a map. No later than the next year this disjunction was plotted on a map of the whole range of the spruce in Poland by S. Kulczyński and Sz. Wierdak, included in Szymkiewicz's (1928) academic text-book of botany. All the later maps showing the distribution of trees in Poland up to the most recent ones present the Mid-Carpathian disjunction. I called its existence in question, providing palaeobotanical arguments, which however proved unsatisfactory, as I have related above.

Palaeobotanical papers by Harmata (1987) and Szczepanek (1987), excellently contributing to the problem under discussion, have recently come out in print. In the Low Beskids now we know as many as eight sites of Late Glacial and Holocene floras, containing microscopic (pollen grains) and in some cases also macroscopic (needles and seeds) remains of the spruce (cf. Figs 1 and 2). The substance of these figures is univocal in their significance and does not demand many additional comments. The excellently documented diagram of the profile from Tarnowiec near Jasło (Harmata 1.c.) comprises the fullest picture of the postglacial history of the spruce in the Low Beskids. The spruce appeared early, as early as the Late Glacial, when together with the birch, pine and larch it occupied the shores of lakes and peatbogs, whose deposits are known from many fossil sites in the area of Doły Jasielsko-Sanockie (Szafer & Jaroń 1935, Klimaszewski 1948, Gerlach et al. 1972, Alexandrowicz 1987, Wójcik 1987). Macrofossils of the above-mentioned trees occur in the profile from Tarnowiec, where they are found with abundant remains of various aquatic and marsh plants and mosses.

* I owe heartfelt thanks to Mr. Jerzy Mamak, who elaborated both these figures.

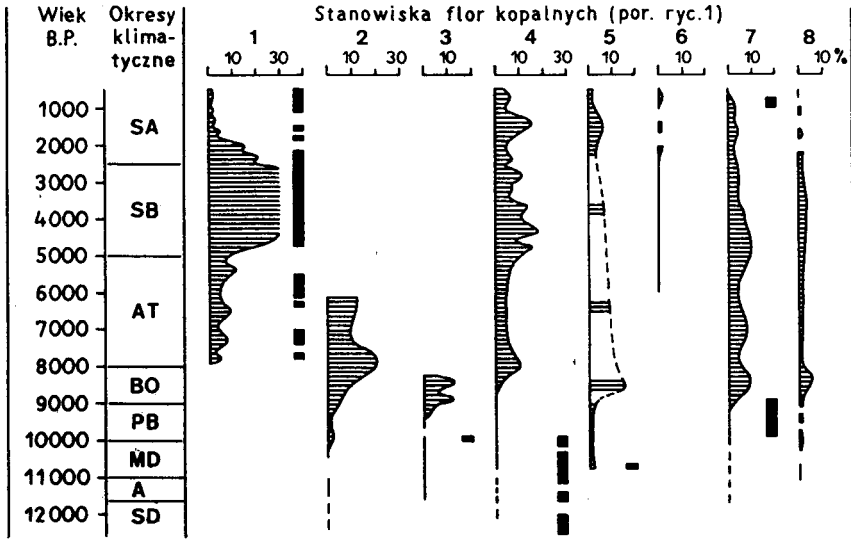


Fig. 2. The proportion of pollen grains and macroscopic remains (seeds and needles --- black blocks) of the spruce in the profiles, arranged in the same order as given in Fig. 1

The above-mentioned palaeobotanical publications inform that the progressing climatic changes and the formation of mixed mountain forest communities against the background of these changes worsened the situation of the spruce in the Low Beskids. At the same time these works indicate that it subsisted in wet habitats named, the number of which increased considerably with time owing to the formation of peat on the Holocene bottom terraces and dividing ridges (Zuchiewicz 1987). The spruce may also have occupied rock-weathering and earth slides. This is suggested by its ecological requirements as well as by specimens encountered sporadically in the composition of woods which now, too, surround some landslides, e.g. at Szymbark (Gil et al. 1974.).

The place-names derived from the word „smerek” used by the local population to call the spruce is not insignificant in so far as the question of fossil traces of the presence of this tree in the Low Beskids is concerned. One of them is the sixteenth-century Smerekowiec (south of Gorlice, 454 m a.s.l.), called Smereczyn before, another one the no longer existing village of Smereczne (513 m a.s.l.) in the region of the Dukla Pass (Krygowski 1967). Such topographical names as Smrok, Smroki (meadow, field) or Ruskie Smreki (wood) (Lubaś 1963), certainly younger than the names of villages, are also known from this area.

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