

## POLISH BOTANY IN 1944—1974

During the Second World War most of the Polish botanical laboratories were destroyed, many prominent scientists were killed, and teaching in botany was practically non-existing.

Beginning with 1944, the reconstruction of laboratories and starting teaching at botanical departments of universities were the first tasks of the after-war period. The next great efforts of the Polish Government and of Polish botanists were directed towards transformation of the Polish Botany into a modern and many sided discipline.

The after-war period of botanical activity in Poland was firstly a period of extensive floristic activity. Due to works of many field botanists the stand of the knowledge of Polish Flora approved considerably. Many previously practically unexplored territories belong at present to the best explored ones (e. g. Lubelszczyzna — East Poland). Most of the published papers dealt with vascular plants. However, a very characteristic trend in post war Polish botany was that the floristic investigations on spore plants (especially on bryophytes, lichens and fungi) were notably intensified. The floristic activity formed a firm basis for the development of plant taxonomy, mainly because of the reconstruction of severely damaged herbaria. It allowed also to published many series of exsiccata (e. g. *Planta Polonica Exsiccata*, *Plantae Silaesiae Exsiccatae* — both containing vascular plants only, besides that *Bryotheca Polonica*, *Hepaticotheca Polonica* and *Charotheca Polonica*). The intensive exchange gave the opportunity to get herbarium material from abroad.

Strictly taxonomical investigations were carried out on vascular plants mainly. The corollary of that activity is the closing of the great work on Polish plants "*Flora Polska*" started by professor M. Raciborski (first volume was published in 1919; two years after Raciborski's death). As an addition to this work composed of 14 volumes, an Atlas (*Iconographia*) of all Polish plants was being published. As far 26 parts have been edited. Besides the vascular plants, also the spore plants were being investigated taxonomically: Polish Moss Flora (complete in two volumes), Polish Liverwort Flora (the first of two volumes has been published), Polish Lichens Flora (4 volumes were published so far), Polish Mycoflora (6 volumes published so far). That work will take still a long time to be completed. Because of a great demand for plant determinators, several "small floras" have been published. A special position takes large flora of water plants (*„Flora Słodkowodna Polski"*) containing keys for determination of all water plants that can be expected growing in Poland (not only those that have been found as yet). 12 volumes out of 18 planned were published so far.

Many original taxonomic works of monographical character on various taxa have been carried out. Taxonomic monographs of genera *Colutea*, *Alchemilla*, *Melampyrum*, *Eleocharis*, *Drepanocladus*, *Boletus*, *Russula* and others were published. New taxonomical methods were used (besides classical ones). E. g. the large genus *Geum* was monographed with experimental taxonomic methods by W. Gajewski, moreover genera *Alisma*, *Trollius* and also spore plants genera *Pleuroclada* and *Riccardia* (Central European species) and many critical taxa as e. g. *Plagiochila asplenioides* s. l., *Riccia ciliifera* s. l. and others. Several Polish botanists were invited to work in international projects e. g., Flora Europaea, Flora Iranica.

Two new original taxonomic methods were worked out: the method of Janina Szaferowa (curves of shape and variability) and dendrite method (i. e. minimum spanning tree method) of the late professor J. Perkal and his group. The first method was used for describing the variability of Central European *Betula* species, of Scotch Pine and several other plants (mainly trees). The dendrite method was adapted for plant taxonomical purposes by T. Kowal and his collaborators who used it for taxonomical studies of fruits and seeds of many plant taxa (mainly of the family *Caryophyllaceae*). Both methods are undoubtedly of multivariate character and should be considered as forerunners of the true multivariate technics, which as more and more computer programmes become available, will also be used in botanical research in Poland.

Comparatively few botanists used the chemotaxonomical methods; among others, chemotaxonomical studies were carried out on the genus *Cytisus* (based on alkaloid contents), other members of the family *Papilionaceae*, species of the genus *Prunus*.

Phytogeography has in Poland a long and good tradition. This discipline depends on floristics even more than taxonomy. The revival of Polish floristics formed a basis for many phytogeographical works. First of all it was possible to start publication of two atlases of plant distribution in Poland. One of them deals with vascular plants (Atlas of distribution of trees and shrubs in Poland), the second one is devoted to spore plants (Atlas of Spore Plants Distribution in Poland). They both contain maps of the Polish part of the area of singular species in comparison with their general (European and world) distribution. Both publications are progressing rather quickly: there were published 16 parts (with 80 maps) of the first and 10 parts (with 100 maps) of the second one. The quick development of the Polish phytogeography allowed publication of a synthetic work, "Polish Vegetation" (Szata Roślinna Polski) in two volumes. (English edition published in 1966).

The main object of the Polish phytogeography is the distribution of plants and plant communities in Polish territory as well and, also, its changes caused by steadily growing impact of various human activities. The activity of man exterminates many stenotope and rare plant species and communities but at the same time it creates possibilities for range extensions of some and invasion of other plant species. Polish phytogeographers worked actively on these problems in the post war times. Several local monographs of flora and vegetation of comparatively undisturbed regions have been published (e. g. Gorce and Bieszczady Mts. for the mountain regions, and Island of Wolin and Białowieża Primeval Forest in the Polish Lowlands).

Also the processes of sinantropisation of Polish flora and vegetation were in focus. The often drastic changes in distribution of several species in disturbed areas (in towns and heavily industrialised counties) were registered and many general problems connected with those phenomena were discussed.

Polish plant geographers worked also outside Poland. Several of them investigated various exotic floras (e. g. in West Africa, Viet-Nam, Tien-schan Mountains). Thus the basis for work in worldwide phytogeographical problems was made. It should also be mentioned, that some Polish phytogeographers were invited to assist in various international projects as e. g. Atlas of Plant Distribution in Europe (which is being published in Finland), Atlas of the Distribution of European Fungi etc.

In connection with phytogeographic work described above, the very extensive phytocenological activity should be mentioned here. Polish phytocenology started in the twentieth but was then rather restricted geographically to the Carpathian chain (especially the Tatry Mts.). After the war it developed very much. The phytocenological investigations were performed practically in the whole Polish territory, on both the comparatively natural vegetation and the synantropic one. This activity was very often connected with phytosociological mapping of investigated territories. Because of a necessity to base the planning of land use in Poland on a possibly broad basis, Polish phytocenologists undertook a very important and time consuming project of mapping the potential vegetation (i. e. the vegetation which would be established after cessation of any human activity which, although being an abstract notion, can be used for determining the value of habitats for human purposes) of the whole territory of Poland. Besides that many Polish phytocenologists were concerned with various general problems such as e. g. the theory of plant succession and the structure of plant communities. In recent years, in connection with the FAO Biological Programm, many projects on ecology of biocenoses were started. Especially, the investigation of the role played by Fungi (mycorrhiza fungi included) in biocenoses aroused much interest not only in Poland.

Investigations over the recent vegetation stimulated work on fossil plants, especially those of periods preceding the Ice Age, of Interglacial Periods and during the retirement of the Ice Sheet. The result of these investigations is a rather complete picture of vegetation changes in the Polish territory which may be used for explaining many peculiarities of recent plant distribution. Also the older floras, having no direct connection with the recent ones, were studied. In this respect, especially the research done on carbon floras (having important impact on stratigraphy of that period) and those of the Mesozoic (particularly *Bennettitinae*) should be mentioned. Many paleobotanists worked also on plant remains found in the rest of ancient man dwelling sites.

The reconstruction of botanical disciplines connected with laboratory work was much more difficult. But in spite of that the progress in this field was also evident.

Investigations in plant anatomy (including embryology) and plant cytology were carried out mainly at the universities. Various aspects of plant structure were studied. One of the most interesting studies was done on the structure of plant meristems. It permitted to explain the mechanism of differentiation of xylem elements which

has not only theoretical but also practical significance. With the aid of electron microscopy the ultrastructure of plant cells and their organelles (especially chloroplasts) was studied, also the biochemical cytology developed in some institutes.

Special position in Polish botany occupy the karyological investigations done by Maria Skalińska and her school. They investigated the chromosome number and morphology in many Polish plants (especially in those of the Tatry Mts.), in many instances in connection with experimental crossing and embryology. The amount of work done in this respect (published in numerous papers) allows synthetic elaboration of many problems (e. g. karyological characteristics of the flora of Tatry Mts.).

Apart of descriptive embryology which was carried out by many scientists, the introduction of novel experimental methods is worth stressing. The method of *in vitro* pollination was used for overcoming the sterility barriers as well as *in vitro* culture of anthers leading to production of haploid plants.

The rapid development of the country and a great need for goods production demanded great scientific effort. Botany was, of course, no exception in this respect. Especially plant physiology had a great role to play, mainly in the development of agriculture. No wonder that this discipline showed a significant progress after the war, in spite of the fact that the reconstruction of plant physiology was a most difficult task.

There are at present over 150 scientists working in plant physiology in Poland. The research is carried out in practically all branches of plant physiology but with most efforts concentrated on two groups of problems: 1 — photosynthesis and mineral nutrition, 2 — regulators of growth and development. In the investigation of photosynthesis, the Polish botanists collaborated within the International Biological Programme and within the Council for Mutual Economic Aid. The problems investigated were first of all the theoretical aspects of the energetics of photosynthesis, the development of photosynthetic apparatus, mechanism of chloroplast movement, photosynthetic production by cultivated plants, various plant communities and ecosystems. In the field of mineral nutrition, studies on the role of humus compounds in the uptake of mineral salts should be mentioned. The growth regulators were studied from the point of view of their role in various stages of plant development and in various developmental processes, and of the mechanism of their action. The possibilities of their practical application were also investigated (e. g. prevention of wheat lodging, increasing of frost resistance).

Polish botanists work mainly in universities and agricultural colleges and in the institutes of the Polish Academy of Sciences. Most of them are members of the Polish Botanical Society founded in 1922. The botanical papers are published in many Polish and foreign journals. The most important Polish botanical journals are: "Acta Societatis Botanicorum Poloniae", where papers from all botanical disciplines are published (mainly experimental ones), "Monographiae Botanicae" destined for more voluminous papers of monographical character and "Fragmenta Floristica and Geobotanica" for plant floristics, taxonomy and geobotanical work.