

## **Elisabeth Tschermak-Woess — on the occasion of her 70th birthday**

D. SCHWEIZER

This issue of Plant Systematics and Evolution is dedicated to emer. o. Univ.-Prof. Dr ELISABETH TSCHERMAK-WOESS who has celebrated her 70th birthday on January 28th, 1987. Presenting a series of original articles, colleagues, collaborators, and former students wish to express their gratitude and appreciation for her distinguished contributions to cytology, phycobiology, and lichenology.



In order to highlight at least some of the manifold scientific achievements of Prof. E. TSCHERMAK-WOESS and of her activities as a university teacher, the editors have decided to present their personal accounts in two parts, evaluating both her contributions to cytology (this article) and to lichenology (by J. POELT). Also, a list of publications is included.

About one third of the publications of ELISABETH TSCHERMAK-WOESS concern cytological problems of which the two main efforts are population cytogenetic studies on indigenous species of the *Allium paniculatum* alliance, and the phenomenon of endomitosis and endopolyploidy in flowering plants. The former studies were initiated by an observation of Prof. LOTHAR GEITLER, who discovered chromosomal polymorphisms in a natural *Allium carinatum* population in Lunz am See (Lower Austria). Part of this work was then carried out in the after-war-time under difficult circumstances at the Biologische Station Lunz. In these days, a long-lasting scientific and emotional connection of E. TSCHERMAK-WOESS arose with this pre-alpine research station and the surrounding country.

In her population cytogenetic studies, E. TSCHERMAK-WOESS was able to demonstrate a surprising extent of structural heterozygosity in natural *Allium* populations. The then suspected relationship between chromosomal polymorphism and heterochromatin is now confirmed following the advent of chromosome banding techniques. The lines of the research established in these hard days after the war and carried out with a minimum of experimental equipment in Lunz and at the Institute of Botany of the University of Vienna are still followed up by former students of E. TSCHERMAK-WOESS and by colleagues. To mention two of them, Doz. Dr J. GREILHUBER and Dr J. LOIDL in their theses and subsequent work analysed the heterochromatin composition and variation in indigenous plants. They also continued the work of their Ph.D.-supervisor on the meiotic process and on accessory chromosomes.

In 1953 E. TSCHERMAK-WOESS has published her first work dealing with the phenomenon of endomitotic polyploidy in plants. The process of nuclear growth, often paralleling cellular differentiation in plants, had been known for long, and certain cases were documented by embryological studies, e.g. those by Prof. K. SCHNARF from Vienna. However, these cases were rather considered as karyological curiosities, and their mode of evolution and significance in development was not understood. TSCHERMAK-WOESS and her students, in a series of interesting publications, carefully described these phenomena, provided convincing interpretations, and thus related their observations to what was already known from animals. Directly connected with her school and her name is the discovery of "giant" (polytene) chromosomes in plants. Such chromosomes were believed to occur in animals only, particularly in some dipteran flies. In 1956, polyteny in antipodal cells of the embryosac of *Papaver* and of *Aconitum* was discovered by GERTRUDE HASITSCHKA and ELISABETH TSCHERMAK-WOESS respectively, and one year later by the senior scientist, the most spectacular giant chromosomes so far known in the plant kingdom, namely those of the chalazal endosperm-haustorium of *Rhinanthus*. Modern plant molecular biology has taken up these observations and now approaches these nuclear differentiation processes with new methods. Interest in the phenomenon of endomitosis in plants, first established by the Viennese karyological school of L. GEITLER and E. TSCHERMAK-WOESS, has since spread to other laboratories, e.g. to that of Prof. F. D'AMATO (Pisa), of Prof. W. NAGL (Kaiserslautern), a former student of Prof. GEITLER, and of Dr P. W. BARLOW (Bristol).

As a result of her intensive occupation with the endomitotic process, E. TSCHERMAK-WOESS has published a series of review articles, text-book chapters, and the standard work in this field "Strukturtypen der Ruhekerne von Pflanzen und Tieren"

(1963). From 1964–1972 TSCHERMAK-WOESS (partly in cooperation with L. GEITLER) was in charge of the annual reviews on “Morphologie und Entwicklungsgeschichte der Zelle/Karyologie“ in the series “Progress in Botany“

The studies of ELISABETH TSCHERMAK-WOESS and her students all have in common that they are based on a very careful interpretative microscopical examination documented by fine drawings and the necessary photographic evidence. This was accompanied by quantitative approaches such as nuclear volumetry and cytometry together with mathematical analyses. E. TSCHERMAK-WOESS was the first to introduce the method of Feulgen-DNA cytophotometry in Austria (1959).

During recent years E. TSCHERMAK-WOESS has returned to investigations of the systematics and reproductive biology of lower plants (see the following article of J. POELT), however, without giving up her strong interest in karyomorphology and cytogenetics. Her karyological work remains a basis and stimulation for the present cytogenetical research carried out here in Vienna and elsewhere. Her fine character and outstanding work is both example and incentive for colleagues and students. Colleagues and friends like to wish emer. o. Univ.-Prof. Dr ELISABETH TSCHERMAK-WOESS much satisfaction, enjoyment, and success in her present and future scientific activities.