

## Remembering Professor

### Tova Arzee

Tova Arzee was born in Kobryn, Poland and arrived to Israel as a young girl. Tova studied at the Hebrew University of Jerusalem, where she received her M.Sc. degree, and then continued her studies at UC-Berkeley as a graduate student, being supervised by Prof. Katherine Esau. After graduating, Tova continued working as a post-doctorate fellow with K. Esau broadening her plant anatomy knowledge. Her studies at UC-



Berkeley were focused on vascularization in the halophytic extremophile *Salicornia spp* (pickleweed), and development of foliar sclereids in olive as a net that maintains leaf structure under water shortage conditions.

She returned to Israel in 1953 to Tel Aviv University, which was founded in the early fifties. Tova participated in establishing the Department of Botany in a close contact with the already existing Botanical Garden.

During the first stage of her research at Tel Aviv University, she continued the vascularization study in succulent plants. She collaborated with Prof. A. Fahn from the Hebrew University of Jerusalem who kindly provided her with the microscopic equipment that was still missing in the young university. Their study was published in 1959 and throughout the years has become one of the fundamental guides to understanding vascularization in halophytic succulents.

Tova's scientific approaches were always broad, therefore upon shifting her research to morphogenetic aspects during the sixties, she always insisted on undertaking whole-plant research strategies, by trying to combine molecular, physiological and structural aspects.

While being responsible for the structural analyses, she collaborated with colleagues that complemented the studies with the required molecular, physiological or ecological aspects, yielding very interesting novel scientific findings. A large part of her studies was dedicated to differentiation of apical and lateral meristems. From her many studies on meristematic tissues, the following two examples reflect the combined structural and molecular approaches that were undertaken by Tova's group; A morphogenetic study that followed the shift from vegetative to reproductive stage of shoot apices in the short-day plant *Pharbitis nil* (Japanese morning glory), chosen as a model plant. This plant requires a single long night for starting the reproductive stage and initiating floral buds. This pioneering work showed the occurrence, localization and timing of very early changes in RNA synthesis and breakdown in certain cells of the shoot apex. These preliminary changes were followed by consecutive DNA synthesis and cell divisions, leading to gradual formation of the typical structure of reproductive apex.

Changes in meristematic activity in root apices were also examined. Using a radioactive precursor of DNA synthesis that enables characterization of cell lines derived from cells with labeled DNA, the need for polyamines for normal cell divisions and development of main and lateral root apices was shown.

Other studies included exploring activity of lateral meristems by using cellulose labeling, examining leaf and thorn developmental patterns, elucidating initial processes and corresponding polar cell divisions during germination of fern haploid gametophytes, and studying various aspects

of phytochrome and hormonal control of the greening process during seedling development.

Tova invested many efforts and devoted much of her time to teaching, both by construction of botanical courses supported by laboratory lessons, and by mentoring many students. She was an outstanding plant anatomist and did her best to transfer the knowledge to generations of students mostly at Tel Aviv University and for several years also at Bar-Ilan University. She was also a dedicated adviser to many graduate and M.Sc. students with whom she kept friendly relationships and constant contacts long after their graduation. Close to her retirement Tova felt that all the micro-technique methods used or developed by her group for analyzing tissues and cellular structures should be made available to the students while studying botany. Together with Marta Schwartz, her former graduate student, she wrote the “Plant Micro-techniques” book where the most useful procedures of embedding specimens, preparation of histology slides and differential staining of cellular or tissue components are described. This book has become a guiding tool for plant histological studies.

Prof. Tova Arzee will be remembered as one of the founders of plant sciences in Israel and well-known scientific leader in plant anatomy and morphogenesis.



Her nice personality and her care for students and colleagues are unforgettable.

**Yael Efrat and Aviah Zilberstein**