

## AN APPRECIATION OF PROFESSOR MACIEJ ZENKTELER, ARCHITECT OF PLANT *IN VITRO* CULTURE AND EXPERIMENTAL EMBRYOLOGY IN POLAND

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*Effugiunt structos nomen honosque rogos*



**Fig. 1.** Portrait of Maciej Zenkteler in toga and biretta (from the Zenkteler family archive).

Professor dr. hab. Maciej Zenkteler died last summer (August 6, 2017 in Poznań) at the age of 86. He was a member of the Editorial Board of *Acta Biologica Cracoviensia Series Botanica* from 1998 to the end of his life. As scientific adviser to the editorial staff and also as an excellent reviewer of papers on plant cell tissue, organ culture and experimental embryology, he gave us the benefit of his vast experience. To raise the profile of the journal, he contributed important original articles on interspecific crossing.

In the months that have passed since the death of Professor Zenkteler, I have often recalled impressions of our long acquaintance, his scientific work, his life, his family, and his successes in science. I knew Maciej Zenkteler for more than thirty years: first in his roles as a renowned botanist and as the initiator of plant tissue culture in Poland, later as a member of the editorial board of *Acta Biologica Cracoveinsia series Botanica* during my tenure as its Editor-in-Chief (1996–2015), and through many years as a friend.

He was an outstanding scientist, a man of noble character, a wonderful academic teacher, and a tender husband and father. He impressed us with his fairness, cheerful temper, subtle thought, sensitivity, kindness, diligence, honesty, modesty, personal charm, and love of nature.

Professor Zenkteler's scientific career was tied to Adam Mickiewicz University in Poznań, where he

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graduated with a master's degree (1957), earned his PhD (1962), achieved tenure (1969) and was made a Professor of Life Sciences (1989). For twenty-five years he headed the Department of General Botany in the Faculty of Biology (1978–2002). He was Vice Director of the Institute of Experimental Biology (1981–1984), President of the Poznań Branch of the Polish Botanical Society (1992–2001), and a member of numerous commissions of Polish Scientific Research Institutions, and Scientific Councils of the Polish Academy of Sciences.

His scientific work was devoted to experimental botany (plant cell, tissue and organ culture *in vitro*) and embryology. He began his research by focusing on a variety of processes: differentiation and redifferentiation during *de novo* plant organogenesis; anther culture to induce androgenic development of haploid embryos; and pistil and ovule culture for gynogenetic formation of haploid embryos. In later years he investigated *in vitro* pollination of angiosperm ovules in interspecific and intergeneric crosses in order to break isolation barriers, and also created a highly efficient protocol for hybrid embryo culture. He developed a number of useful *in vitro* techniques, now widely applied. His research proved very important not only to

plant embryologists but also to plant breeders for practical application.

Professor Zenkteler gained valuable experience in foreign laboratories: at the University of Wisconsin-Madison (USA) in the laboratory of Professor D.C. Cooper and Professor H.M. Hildebrandt (1960–1961), at Delhi University in the Department of Botany under the supervision of Professor P. Maheshwari (1964–1965), at the Max Planck Institute in Tübingen in the laboratory of Professor G. Mehlers (1978), at the Max Planck Institute in Cologne-Vogelsang in the laboratory of Professor J. Straub, at the University of Melbourne in the laboratory of Professor G.L. Davis (1985) and at Freie Universität Berlin in the laboratory of Professor O. Schieder (1992, 1993). Having gained such a wealth of knowledge and experience abroad, he supported the newly opened *in vitro* laboratories at Polish universities and institutes. One of them was the *in vitro* culture laboratory of the Jagiellonian University's Department of Plant Cytology and Embryology (that laboratory was initiated by Professor Janina Małecka, continued by Professor Lesław Przywara and by me, and is currently supervised by Dr. hab. Marzena Popielarska-Konieczny).

Professor Zenkteler was active to the very end. He cooperated with the De Roose company (Ghent, Belgium) on crossing between Araceae species (*Anthurium andreanum* × *Spatiphyllum wallisii*) to obtain new races, with the Floris company (Netherlands) to produce blue-flowering hybrids between *Gerbera* and *Aster amellus*, and with the Rijk Zwaan seed company (Netherlands) to induce gynogenic haploid embryos in intergeneric crossing experiments (lettuce × chicory, lettuce × sunflower, tomato × cucumber).

Professor Zenkteler's main interests included distant pollination via *in vitro* pollination of ovules attached to the placenta in intergeneric crosses of economically important plants such as Brassicaceae in order to introduce important traits, and experiments in which pistils of *Salix* were pollinated with different *Populus* species in order to produce bioenergetic hybrid plants with higher biomass than *Salix*. His dream was to break the strong barriers to crossing between angiosperms and gymnosperms. To do this, he pollinated ovules of *Melandrium album* with pollen of *Pinus wallichiana* in an *in vitro* model. The experiment ended in the formation of two-celled haploid embryos, indicating parthenogenetic division of *Melandrium* egg cells without the involvement of the male genome of *Pinus*.

Professor Zenkteler was the author of more than a hundred publications, including academic books or chapters, ten chapters in foreign monographs, and papers in prominent foreign and Polish journals.



**Fig. 2.** Portrait of Maciej Zenkteler (from the Zenkteler family archive).



**Fig. 3.** Maciej Zenkteler's family. Top, Elżbieta and Maciej, wedding picture. Below, daughter Barbara with husband Michał (at left), son Maciej with wife Małgorzata (at right); grandchildren (last row): Barbara's sons Wojciech and Tomasz (at left); Maciej's children Julia, Mia and Adam (at right) (from the Zenkteler family archive).

The last paper, entitled "Development of haploid embryos and plants of *Lactuca sativa* induced by distant pollination with *Helianthus annuus* and *H. tuberosus*", was published in *Euphytica* in 2016 (vol. 208, pp. 439–451).

Professor Zenkteler was a mentor of graduate students and junior faculty alike, teaching multiple courses in botany, leading workshops and practical *in vitro* lab courses for students and researchers from Polish and foreign academic centers, supervising numerous master's theses (more than 120) and doctoral dissertations (9), reviewing doctoral theses (44) and habilitation applications

(23), and preparing applications for the title of professor (14).

From 2002 he was Professor Emeritus in the Department of General Biology at Adam Mickiewicz University but remained hard at work in the laboratory, doing experiments, writing papers and attending conferences.

In 2012, Adam Mickiewicz University celebrated the renewal of Professor Zenkteler's doctorate – fifty years after he earned it.

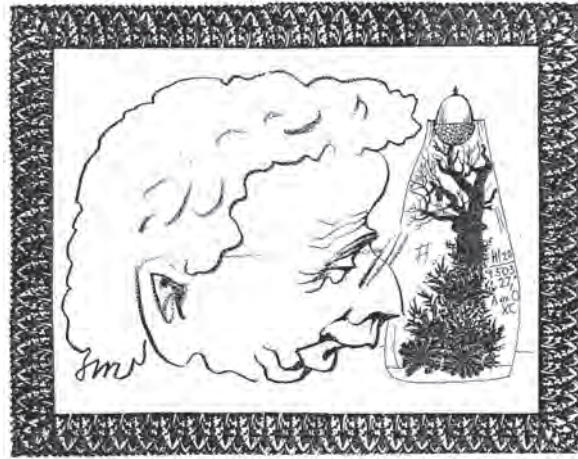
He received a number of prestigious awards for his achievements, including the Gold Cross of Merit (1977), the Knight's Cross of the Order of



**Fig. 4.** Planting the Professor Maciej Zenkteler Memorial Tree (hornbeam, *Carpinus betulus*), at the Morasko campus of Adam Mickiewicz University in Poznań on October 3, 2017. Pictured are Elżbieta Zenkteler and members of the Council of the Faculty of Biology and the Department of General Botany of Adam Mickiewicz University at the ceremony (from the Zenkteler family archive).



**Fig. 5.** Maciej Zenkteler with students and staff members in the greenhouse of the Rijk Zwaan seed company in the Netherlands during artificial pollination of lettuce  $\times$  chicory (**A**) and lettuce  $\times$  sunflower (**B**) (from the Zenkteler family archive).



**Fig. 6.** Caricature of Maciej Zenkteler by Stanisław Mrowiński (from the Zenkteler family archive).



**Fig. 7.** Professor Zenkteler surrounded by various species of plants that he used for research. The inscription reads: *He was stable ... only they changed* (epigram of Jan Szaudynger). Montage given to Professor Zenkteler by Professors Anna Mikula and Jan Rybczyński of the Polish Academy of Sciences Botanical Garden Center for Biological Diversity Conservation in Powsin during the fiftieth-year doctoral renewal ceremony at Adam Mickiewicz University on March 19, 2012 (from the Zenkteler family archive).



**Fig. 8.** Celebration of the renewal of Professor Zenkteler's doctorate fifty years later, at Adam Mickiewicz University on March 19, 2012 (from the Zenkteler family archive).



**Fig. 9.** Maciej Zenkteler and Professor Ewa Łojkowska at the XIII Conference on Biotechnology and *In Vitro* Culture, Rogów, Poland, 2012 (from the Zenkteler family archive).



**Fig. 10.** Maciej Zenkteler during summer vacation (from the Zenkteler family archive).

Polonia Restituta (1979), the Medal of the National Education Commission (1989), the Władysław Szafer Medal (2007), University Rector's awards for scientific and educational activities, and the Award of the Minister of National Education for his life's work. But for this modest man the most important reward was the friendship and kindness of the people who surrounded him. "Friends are like silent angels who raise us when our wings no longer can fly". Such the angel was his wife Elżbieta, who cared for him to the end.

His devotion to science – and his wonderful personality – won him the admiration of all who knew him. We sorely miss him.

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On October 3, 2017, a hornbeam tree was planted at the Morasko Campus of Adam Mickiewicz University in memory of Professor Maciej Zenktelel. The hornbeam tree symbolizes resistance, endurance and strength of character.

*Carminibus vives semper, Maciej, tuis*

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