

## Zahir Eyal, 1936 to 1999

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Zahir Eyal, professor, Department of Plant Sciences, and director, Institute for Cereal Crops Improvement, Tel Aviv University, passed away in his home in Hod-Hasharon, Israel, on 30 July 1999 of melanoma. He was born 5 October 1936 in Haifa, Israel.

Zahir was introduced to Israel's indigenous flora, modern agriculture, and breeding wheat for disease resistance at Mivve-Israel Agricultural High School, Jaffa. After classes, he worked on the cooperative re-

search programs of phytopathologist I. Wahl and cereal breeder J. Ephrat, from whom he acquired his love of wheat. Upon graduation in 1954, his mandatory service followed in the Israeli Defense Forces as a paratrooper. Zahir then joined a kibbutz in the Negev, resumed his work on field crops, and deepened his intimate contact with Israel's indigenous flora and fauna as a naturalist-guide for the Society for the Protection of Nature in Israel.

Zahir earned his B.S. degree (1963) with honors in plant pathology and agronomy at Oklahoma State University, Stillwater, and only 6 years after first landing in New York, his Ph.D. degree (1966) in plant pathology and biochemistry at Rutgers University, New Brunswick, NJ, where he also met his wife Yona. His education continued as a postdoctoral fellow on the integrated small grains improvement project of Professors Ralph Caldwell and Fred Patterson at Purdue University, West Lafayette, IN, which emphasized breeding for "general resistance" and tolerance to foliar pathogens of small grains. This experience honed him for his future leadership career of seeking to understand and overcome foliar pathogens of small grains. Later, in Israel and internationally, Dr. Eyal would emulate their team approach to research and working with students. In 1967, Dr. Eyal joined the faculty of the Department of Botany (now Plant Sciences), Tel Aviv University, as a lecturer and was promoted through the ranks to professor in 1984.

Dr. Eyal's return to Israel coincided with the arrival of the International Maize and Wheat Improvement Center's (CIMMYT) new daylength-insensitive, semidwarf wheats and their *Septoria tritici* blotch (STB) epidemic. Remembering R. Caldwell's prediction that when the wheat rusts were controlled *Septoria* spp. would succeed them as wheat's major pathogens, Dr. Eyal chose to tackle *S. tritici* on Israel's cultivated wheat and its indigenous tetraploid progenitor, wild emmer, *Triticum dicoccoides*. He initiated a comprehensive, multifaceted research program on chemical (for temporary farmer relief) and biological control of STB, epidemiology, pathogenic specialization, physiological and biochemical aspects of host-pathogen interaction, and, later, molecular genetics. Much of this proved to be pioneering. From the outset, Dr. Eyal stressed breeding for resistance and tolerance and included a unique outreach component to help breeders utilize his results—an offer few refused.

Professor Eyal's program had a major impact on breeding for STB resistance worldwide. His book on *Septoria* diseases of wheat, with colleagues at Montana State University and CIMMYT, was published in English and Spanish and achieved wide distribution and acclaim. Additionally, with CIMMYT and the Research Institute for Plant Protection (IPO-DLO), Professor Eyal organized and led inter-

national regional workshops for scientists in East Africa, South America, the Mediterranean Basin, and Mexico. He and colleagues also conducted five International *Septoria* Workshops that attracted *Septoria* workers from several disciplines. Dr. Eyal's pioneering research on this major wheat disease and his concomitant outreach earned him the title "Dr. Septoria" by many appreciative wheat scientists.

Professor Eyal believed strongly in the approach of incorporating multiple resistance qualities into wheat either by traditional breeding or by overcoming genetic barriers and introgressing alien genes into the wheat nuclear genome. Based on newly developed molecular strategies and together with colleagues at home and at the Max-Planck Institute in Cologne, Germany, three different wheat genetic transformation methods have been employed by his group for introducing alien genes into diverse bread wheat cultivars. A molecular approach has also been undertaken in studying the *S. tritici*-wheat interaction. *S. tritici* isolates varying in their specific interaction with wheat cultivars were used as recipients for introducing plasmid DNA vectors carrying a fungal selectable marker in an attempt to knock out fungal genes involved in virulence of specific interaction with wheat.

In his many capacities, Professor Eyal and his Institute staff have continued an intensive research program on the rich indigenous Middle Eastern ecosystem begun by Aaron Aaronsohn and I. Wahl 10 and 6 decades ago, respectively. Interactions between and among wild relatives of cultivated small grains, their coevolved obligate parasites, and alternate hosts have been characterized, aiming at the potential integration of wild germ plasm into programs breeding for durable resistance.

Dr. Eyal also taught undergraduate and graduate courses in plant pathology and plant physiology. He guided over 30 master and doctoral students. He has published over 50 papers in refereed journals, many with them as coauthors; 22 other papers; five books or book chapters; and has obtained two patents. In 1984 to 1986 and 1992 to 1994, Professor Eyal chaired Tel Aviv University's Botany Department. He was a member or chair of numerous university, national, and international committees. Dr. Eyal had sabbatical leaves at Montana State University, Bozeman (1975–1976 and 1982–1983), CIMMYT (1982–1983 and 1990), and IPO-DLO, Wageningen, the Netherlands (1991). Dr. Eyal was president of the Israeli Phytopathological Society (1979–1982), was elected a Fellow of The American Phytopathological Society (1995), and since 1998, he was vice president of the Mediterranean Phytopathological Union.

At the time of his death, Professor Eyal was adding a second floor to the Institute for molecular genetics and biotechnology studies of cereals and planned to pursue his vision of a center for regional scientific cooperation as peace is being established. He envisaged a center for promoting international cooperation in the betterment of life through improved small grains, capitalizing on the untapped regional reservoirs of native, utilizable germ plasm.

Dr. Eyal was a leader in science, research, and practical agriculture. His endless energy, optimism, and far-reaching vision inspired his and others' careers. Unfortunately, he died prematurely—before the Institute's second floor could be completed, peace could be established, or his vision for a Middle Eastern Center of Academic Excellence and Cooperation could be launched, much less established. He is survived by his wife Yona, son Ephraim, daughter Tal, granddaughter Yael Zohar, mother Bella, brothers Yigal and Avraham, and a host of colleagues and admirers of Dr. Septoria around the wheat-producing world.