Isaak Wahl, 1915 to 2004

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Professor Wahl was born 20 September 1915 in Russia but grew up and received secondary education in Warsaw, Poland. In 1935, after his teachers predicted the course of events in Eastern Europe, he emigrated to Palestine for higher education. He earned his M.S. degree in 1940 and his Ph.D. in 1947 at the Hebrew University in Jerusalem while teaching at the Mikve Yisreal Agricultural School. He subsequently helped establish phytopathology in two

Israeli universities and taught many of its practitioners. Thus, Professor Wahl's career and the development of the science of phytopathology in Israel are congruent. In appreciation, Professor Wahl was made an Honorary Fellow of the Israeli Phytopathological Society in 1984.

Professor Wahl's work spanned diseases of most crops grown in Israel's intensive agriculture, but his greatest contributions came from his studying and making Israeli and world scientists cognizant of the central importance to science and world agriculture of Israel's indigenous ecosystem and of its flora, much of which is commonly considered "just weeds."

Many major world crops, including barley, oat, and wheat, have wild progenitor species that abound in their Fertile Crescent center of origin, of which tiny Israel is a part. The progenitors, their obligately parasitic pathogens, and the pathogen's main and alternate hosts all coevolved there, yet epidemics caused by these pathogens are rare. In contrast, the derivative species and cultivars of these respective crops grown in agroecosystems are renowned worldwide for severe epidemics. Comparative epidemiological, mycological, and genetic studies to increase understanding of these dramatically disparate experiences with the *same* basic host and pathogen germ plasm became the thrust of Professor Wahl's life work, which involved a *team* of gifted students and many collaborators (herein after, the team). This work was aided significantly by the applicability of a century of accumulated literature on diseases of cultivated crops and by Professor Wahl's fluency in over six languages, which enabled him to tap that treasure trove of earlier literature on the derivative species, their pathogens, and the pathogens' alternate hosts.

Applying the pathogenic race concept of Stakman (Wahl's post-doctorate mentor) and Flor's Law of gene-for-gene host-pathogen associations, the team found scores of new sources of disease resistance, which they characterized and made available freely to crop improvement teams worldwide, along with knowledge suggesting how to manage them in agroecosystems. They learned that the healthy indigenous ecosystem in Israel is due to the protection of indigenouness, to major-effect genes and/or minor-effect genes, but the former promise durability *only* in a diverse population. These facts and management suggestions were collated and published in ca. 200 research papers and synthesizing book chapters, and in 2003, his book *Genetic Resistance from Crop Progenitors and Other Wild Relatives* (G. Fischbeck,

J. A. Browning, and U. Brodny, eds. Herbert Utz Verlag, Munich, Germany). Emulating the protection of indigenouness has proven to be a successful strategy, e.g., in the United States, in Iowa's oat multiline program to control crown rust, in the Pacific Northwest to control wheat leaf and stripe rusts, and in the Southeast to control rust of pearl millet; in Europe to control barley powdery mildew with three-cultivar mixtures; in the Philippines and China to control rice blast; and in Colombia to control rust of coffee, a 20-year woody crop in a favorable environment.

In addition to an appreciation for these wild species and their natural ecosystem for disease management, the team vastly improved our understanding of parasite-host coevolution. They did more to learn, conserve, exploit, and make their potential value known to science and to humanity than anyone else, certainly since the great Russian geneticist N. I. Vavilov and the Israeli/American geneticist Aaron Aaronsohn. Their work has given science a more complete understanding of parasite-host coevolution; of how nature enabled its protection of indigenouness to protect plants from diseases; of the influence of environment; of long- and short-cycled (correlated) rust species and their significance; of rust nuclear cytology and its coevolutionary significance; of the nature and role of the alternative host to rust coevolution and its contribution to epidemiology and survival; and of the racial dynamics of cereal rusts in Israel and of the very broad host range of obligate parasites in the natural ecosystems versus the narrowly conceived *formae speciales* of the same fungi in agroecosystems.

Professor Wahl visualized, "sold", founded, and built Tel Aviv University's "Institute for Cereal Crops Improvement (Through the Utilization of Gene Pools of Their Wild Relatives," which was dedicated in 1982. Until his retirement, he was the institute's director; subsequently, still the team leader. Much of Professor Wahl's philosophy is institutionalized in the Institute and its Lieberman Germplasm Bank and H. C. Murphy Rust Research Laboratory, which are the only ones in the world dedicated exclusively to the preservation and study of germ plasm of wild species, both in situ and ex situ. Professor Wahl was instrumental in the establishment of the Minnesota-Israel Endowed Scientist Exchange Program. The productivity of Wahl's program was cited by the U.S. Congress in 1978 supporting the BARD (U.S.-Israel Binational Agricultural Research and Development) granting program.

Dr. Wahl won the Rothschild Prize in Agriculture in 1964. In 1978, he was the first Israeli scientist to receive the prestigious international Harvey Prize in Science and Technology. Prior to the Israel Prize, perhaps Professor Wahl's most notable honor was in 1985 when, for his team, he was presented "The Pruno Kraisky Award for Service to Humanity" in Vienna by the then-Prime Minister of Austria. He was named a Fellow of The American Phytopathological Society in 1986. His most notable honor was his being awarded the prestigious Israel Prize in the Life Sciences for his renowned work in plant pathology and mycology.

Professor Wahl passed away 8 January 2004 after a long illness. His beloved wife Ester preceded him in January 2002. He will be remembered as a scholar's scholar for the genius and execution of his holistic, visionary research program; for inspirational leadership that recruited students and funds to grow their program; and as a dear friend.