



ISAAC HARPAZ
1924-1987

Isaac Harpaz, Professor of Entomology and long-time Chairman of the Department of Entomology at the Faculty of Agriculture of the Hebrew University of Jerusalem, at Rehovot, passed away suddenly on May 7, 1987.

Born in Tel Aviv on December 5, 1924, Isaac was brought up in the town of Kefar Sava. Having graduated from the prestigious Herzliya High-School in Tel Aviv in 1941, he enrolled in the newly-established Institute for Agricultural Studies of the Hebrew University (now the Faculty of Agriculture), Rehovot, where he received his M.Sc. in 1947. That year he was appointed Assistant in Entomology, but his studies were interrupted by active military service during Israel's 1948-1949 War of Independence. In 1953 he received his Ph.D. in agricultural entomology from the Hebrew University. Both his M.Sc. thesis, on the bionomics of the spotted alfalfa aphid, *Therioaphis maculata*, and his Ph.D. thesis, on the ecology, phenology and taxonomy of graminicolous aphids, were supervised by the late Professor F.S. Bodenheimer. He was appointed Lecturer in Entomology at the Hebrew University, Rehovot, in 1955, and was promoted to Senior Lecturer in 1960, to Associate Professor in 1966, and to Professor of Entomology in 1971. He served as Chairman of the Department of Entomology almost continuously from 1966 on, as Associate Dean of the Faculty of Agriculture in 1973-1974, and as its Dean in 1974-1977. In 1982 he was appointed first incumbent of the Morris and Helen Mauerberger Chair in Agricultural Entomology at the Hebrew University.

The following list of more than 130 research and review publications, including two books and several chapters in major treatises, provides some insight into the amazing scope and depth of Isaac's scientific and cultural interests. He was an outstanding economic entomologist, virologist, systematist, ecologist, historian of science. A leading expert on pest biology, he published extensively on the insect and mite pests of various crop and forest plants, including cereals, alfalfa, tomato, olive, grape and pine, as well as on snails as plant pests. His book, "Plant Pests of Israel", which he co-authored in 1969 with the late Professor Z. Avidov, is still the definitive text on agricultural entomology in Israel.

A staunch proponent of IPM, Isaac Harpaz placed special emphasis on cultural and other non-chemical methods of pest control. To cite just one example, when the alfalfa seed chalcid, *Bruchophagus roddi*, became a serious pest in Israel, his ecological and phenological studies led him to devise a simple yet effective method of cultural control, by postponing seed production to evade the main period of the pest's attack. In 1966 he was appointed member of the FAO/UNEP International Panel of Experts on Integrated Pest Control, on which he served for 17 years. In 1974 he founded the Hebrew University Center for Integrated Pest Control Research, of which he was Chairman until the time of his death. The prestigious Rothschild Prize was awarded to him in 1986 in recognition of his outstanding contributions to IPM and plant protection.

A period of post-doctoral studies with Dr. Kenneth M. Smith at the Molteno Virus Research Unit of Cambridge University in 1955-1956 marked the beginning of Isaac's life-long interest in the interactions of insects and viruses. He was the first scientist in Israel to devote himself to both aspects of this important area - transmission of plant viruses by insects on the one hand, and virus diseases of insects on the other hand. He became an expert and a leader in both aspects, and the world-wide reputation he achieved was attested to by his membership in practically every international panel concerned with these subjects.

His careful and ingenious investigations of insect-borne virus diseases are best illustrated by his studies of maize rough dwarf virus (MRDV), a major disease of maize the causative agent of which he found to be transmitted by a planthopper, *Laodelphax striatella*. The title of his classic 1972 book, "Maize Rough Dwarf, a planthopper virus disease affecting maize, rice, small grain and grasses", illustrates the originality of Isaac's thinking. He argued that the virus is primarily a pathogen of sap-feeding planthoppers, whereas graminaceous plants serve only as intermediary hosts for its passage from one planthopper to another. Old-World cereals and grasses have "learnt to live" with the virus, but when American hybrid maize was introduced into the Old World, the virus flared up to epiphytotic proportions. Here, again, cultural methods provided the key to effective control. Isaac and his co-workers discovered that temperatures above 24°C prevented the propagation of the virus in its planthopper vector. Therefore, the mere delaying of maize planting dates until such time that the seedlings emerged from the soil when the mean air temperature exceeded 24°C, resulted in reduction of MRDV incidence to negligible proportions. Among his other projects, Isaac also led the research team that discovered that the devastating "tomato leaf curl" disease is caused by a virus transmitted by the tobacco whitefly, *Bemisia tabaci*.

As an insect pathologist, Isaac's attention was drawn to the enormous possibilities of controlling insect pests biologically, by causing pre-meditated viral infections. His studies of the Egyptian cotton worm, *Spodoptera littoralis*, indicated that the larvae of this important pest harbor latent baculoviruses, which changes in environmental conditions, especially in population density, may cause to burst out and start an epizootic. He also attempted to develop effective viral pesticides and control methods, by protecting the virus particles from damaging ultra-violet radiation and by designing bait formulations.

Far beyond the immediate scientific fields of agricultural entomology and virology, Isaac Harpaz was a man of broad cultural interests, including the history of entomology and the place of entomology in human culture. In 1973, for a volume on the history of entomology published by *Annual Reviews*, he wrote an excellent article on early entomology in the Middle East. Then, for the 1984 volume of the *Annual Review of Entomology*, he wrote a biography of his former teacher, F.S. Bodenheimer, that can serve as a model of historical writing at its best. The depth of his knowledge of Hebrew scriptures, of the history, geography and culture of Israel, was amazing, as was his phenomenal gift for languages. Fluent in Hebrew, English and Arabic, he could read and speak several others as well, and was always willing to help with a translation, with an appropriate term, with sound advice on any scientific or cultural matter, and always with patience and good spirits.

Isaac Harpaz was unquestionably one of Israel's most prominent entomologists on the international scene. His first sabbatical leave, in 1960/1961, was divided between the Department of Plant Pathology, University of Wisconsin, Madison, and the Department of Entomology, University of California, Riverside. In later years he was Visiting Professor of Entomology at the University of California, Berkeley (1969/1970), Visiting Senior Research Fellow at Jesus College, Oxford, and Visiting Professor at the Hope Department of Entomology, Oxford University (1977/1978), Consultant to the South African Department of Agriculture at the Plant Protection Research Institute, Pretoria (1979/1980), Consultant to the Interamerican Institute of Agricultural Sciences, Organization of American States, in Argentina (1982), and Visiting Professor of Entomology, University of Stellenbosch, South Africa (1984). His scholarly contributions to numerous congresses, symposia and seminars were always highly appreciated. He also served on the Editorial Boards of *Current Topics in Vector Research* and *Phytoparasitica*, the Israel Journal of Plant Protection Sciences.

A founding member of the Entomological Society of Israel, Isaac Harpaz was one of the main moving forces of that society. At the time of his death he served as its President. He was also active in numerous committees in Israel, including the Curricula Committee in Agriculture of the Ministry of Education and Culture, of which he was appointed Chairman in 1974, the Academic Committee of the Harry S. Truman Research Institute at the Hebrew University (1974), and the Council of the Wolf Foundation (1976).

Isaac was a gifted teacher, admired by his numerous students for his encyclopedic knowledge as well as for his wit and charm as a lecturer. Courses he taught at the Faculty of Agriculture, Rehovot, included General Entomology, An Introduction to Pest Management, Pests of Field, Vegetable and Flower Crops, Insect Pathology, and Vectors of Plant Pathogens. He also served as supervisor of many graduate students for the Master and Doctor degrees. Many of his former students now occupy leading positions in Israel.

Isaac is survived by his wife Yocheved (Joan) Harpaz (née Levy), his son Dr. Sheenan M. Harpaz, an aquaculture specialist, and two grandchildren.

With the passing of Isaac Harpaz we have lost an exemplary scholar, a leading researcher, a wise counsellor, an outstanding teacher, a talented administrator and a kind, modest, helpful friend. His students, colleagues and many friends will painfully miss him in the years to come.

DAVID ROSEN, ILAN SELA
Department of Entomology
The Hebrew University of Jerusalem
Faculty of Agriculture, Rehovot