Robert M. Hanau, 1947 to 2000

Lisa J. Vaillancourt and Charles P. Woloshuk

Robert (Bob) M. Hanau, plant pathologist at Purdue University, died on 15 March 2000. Dr. Hanau was born 12 November 1947 in Dallas, Texas. He attended Temple University, Philadelphia, PA, where he received a B.A. in biology (1976) and a Ph.D. in bacteriology (1981). His dissertation research was on nitrogen assimilation in *Klebsiella pneumoniae*. Dr. Hanau came to the Department of Biological Sciences at Purdue University in 1981, as a postdoctoral associate with J. E. Brenchley working on the molecular

biology of glutamine synthetase in *Salmonella typhimurium*. In 1982, as a National Institute of Health postdoctoral fellow with A. O. Jackson in the Department of Botany and Plant Pathology at Purdue, Dr. Hanau studied the molecular biology of plant viruses. It was at this time that he became interested in plant pathology.

In 1984, Dr. Hanau was hired as an assistant professor in the Department of Botany and Plant Pathology at Purdue University. One of Dr. Hanau's greatest strengths was his farsightedness that enabled him to quickly recognize the potential of the latest experimental approaches. When Dr. Hanau began his work in the mid-1980s, the application of molecular techniques to fungal plant pathogens was in its infancy. He undertook the task of developing *Colletotrichum graminicola* (*Glomerella graminicola*) into a model system for studying molecular components of fungal pathogenicity, including reproduction, host recognition, and variability. Dr. Hanau was among the first to apply molecular methods to a phytopathogenic fungus, and his laboratory published the first successful transformation of *C. graminicola* in 1988. In his laboratory, techniques were developed to produce and manipulate the *Glomerella* spp. stage in vitro, making *C. graminicola* one of the only *Colletotrichum* fungi that can be easily subjected to classical genetic analysis, and assuring its position as the acknowledged genetic model for this important genus. Dr. Hanau focused his attention on sexual and asexual reproduction in *C. graminicola*, understanding that the ability to reproduce was essential for the success of any plant pathogen. Most of his molecular studies were directed at the genes involved in the development of two types of asexual propagules, and he cloned several relevant genes by subtraction hybridization and complementation of mutants. One of the genes identified by subtraction hybridization encoded super-

oxide dismutase (SOD). This was significant because many believe that a major line of plant resistance is through production of superoxides and oxygen-free radicals. It follows, that without SOD, fungi would not be able to protect themselves from the oxidative burst of the host. The SOD gene of *C. graminicola* was disrupted, and the disruptants were reduced in pathogenicity.

Dr. Hanau was once again ahead of his time in his appreciation for the value of whole genome approaches for studies of fungal pathogenicity. Early in his career at Purdue, he developed a strong interest in understanding the structure of the entire *Colletotrichum* spp. genome, and he was among the first to apply molecular karyotyping for genome characterization of phytopathogenic fungi. He was also among the first to see variable minichromosomes in pathogenic fungi, a phenomenon that greatly intrigued him. These chromosomes formed the topic of one of his students' Ph.D. theses, in which it was reported that the minichromosomes were produced during meiosis, apparently due to chromosomal translocations, and that they were transcriptionally active.

Dr. Hanau believed that small genetic differences between closely related *Colletotrichum* spp. from corn and sorghum could provide the key to their host specificity, and he spent a great deal of time characterizing and comparing the genomes of these two species. His findings confirmed that the two are genetically very closely related, with very similar genomic content, and his work to characterize the genome size and complexity of *C. graminicola* via C_0t analysis, genomic reconstruction, and molecular karyotype analysis has put it in an excellent position to be subjected now to modern genomic analysis.

In his short career, Dr. Hanau published 24 journal articles, although much of his later work unfortunately remains unpublished, except in his students' theses. His studies have brought *C. graminicola* to the forefront as one of the few fungal systems that can be genetically manipulated to understand fundamental problems of plant pathology.

Dr. Hanau taught several courses at Purdue, including Plants and Civilization, Plant Pathology, and Molecular Basis of Host-Parasite Interactions. He mentored six graduate students, three of whom are now university professors, and two postdocs.

Surviving Dr. Hanau are his three children, Evan, Matthew, and Caroline; his father Gordon Hanau of Plantation, FL; two brothers, David of Pittsburgh and John of St. Louis; and four sisters, Diana Hanau-Strain of Chicago, Kate Gaines of Pleasant Hill, CA, Joan Walsh of St. Louis, and Jean Hanau of Fort Lauderdale, FL.