

Drew Schwartz  
1919-2019

Drew Schwartz was a pioneer of biochemical and molecular genetics of maize. This body of work served as a foundation for related studies in other plant species. Having trained with Marcus Rhoades on maize cytogenetics, specifically an examination of the behavior of ring chromosomes, he turned to the study of maize isozymes when starch gel electrophoresis was developed in the 1950s. Early studies focused on esterases, which when subjected to electrophoresis, demonstrated their dimeric state when different variants were present in a hybrid. Tissue specific expression of alleles was demonstrated with esterase. The protein product of the *Shrunken1* gene was found in electrophoretic studies and a *Dissociation* transposable element insertion allele was revealed to lack the protein. The most extensive work from the Schwartz laboratory emerged from the definition of the two alcohol dehydrogenase genes. Allele polymorphisms were found for *Adh1* and induction of the enzymes under anaerobic conditions was demonstrated. A naturally occurring tandem duplication was described. EMS mutagenesis and screening by isozyme analysis yielded many *Adh* mutations that changed electrophoretic mobility and activity. Pollen selection against positive ADH grains was developed by exposure to allyl alcohol, which was used to select for null mutations carrying a version of the *Dissociation* transposon that was later cloned. The Schwartz laboratory also made contributions to an understanding of the Globulin1 embryo storage protein and malate dehydrogenase isozymes. In his later work, he studied the action of the *Activator* transposable element.

Schwartz was an enthusiastic attendee of the annual maize genetic conference and the Genetics Society of America (GSA) meeting. Schwartz had broad interests in genetics so he would engage in lively discussions on many topics at these meetings. He served a term as Treasurer of the GSA (1960-62) and as a member of the Annual Review of Genetics editorial board (1971-76).

Schwartz was a native of Philadelphia, Pennsylvania, where he was born on November 15, 1919. He attended Penn State College from which he received his B. S. degree in 1942. After service in the army from 1942 to 1946, graduate work followed at Columbia University from which his Ph. D. was awarded in 1950. After a year-long position at the University of Illinois, where Rhoades had moved from Columbia, as a Research Associate, he assumed the position of Senior Biologist at Oak Ridge National Laboratory. From 1962-64, he was a professor at Western Reserve University. When Marcus Rhoades became the chair of the Plant Sciences Department at Indiana University, he recruited Schwartz to the faculty in 1964. Schwartz became Professor Emeritus in 1990 but continued to work and think about science well into his 90's. During his tenure at IU he trained 18 graduate students and three postdoctoral fellows. Those trainees have in turn trained many and beyond such that Schwartz' academic descendants number into the hundreds. Many in the maize community can trace their lineage to Schwartz.

For the last ten years of his life, he moved to Jerusalem, Israel, to be near his surviving daughter, Rena. He passed away suddenly on August 10, 2019 at the age of 99, three months from becoming 100.

Those who studied with Schwartz remember the intensity of his interest in their data, and the ingenuity of his explanations. Leaving experiments unanalyzed but open in the lab overnight often resulted in a revelation the next morning: Schwartz was ready with a complete analysis and a new to-do list. Science was important in the Schwartz lab.

Speaking for those students of Schwartz and their descendants, and for all those who knew his imaginative and unique style of science, his out-sized influence on maize and plant genetics in general seems only natural.

--Jim Birchler and Mike Freeling (with assistance from Meir and Dina Fischer and Rena Schwartz)