

This Week's Citation Classic

Ayala F J, Powell J R, Tracey M L, Mourao C A & Perez-Salas S. Enzyme variability in the *Drosophila willistoni* group. IV. Gene variation in natural populations of *Drosophila willistoni*. *Genetics* 70:113-39, 1972. [Dept. Genetics, Univ. California, Davis, CA]

Allelic variation at 28 gene loci coding for enzymes is described for 70 natural populations of *Drosophila willistoni*. There is a great deal of variation —on the average, 58% of the loci are polymorphic and an individual fly is heterozygous at 18.4% of the loci. Although significant differences occur between populations, the configuration of allelic frequencies is remarkably similar throughout the several million square miles covered by the distribution of the species. [The SCI® indicates that this paper has been cited over 125 times since 1972.]

Francisco J. Ayala
Department of Genetics
University of California
Davis, CA 95616

March 8, 1979

"The application, in 1966, of the techniques of gel electrophoresis to population genetics made it possible to obtain quantitative answers to questions of fundamental importance, such as how much genetic variation exists in natural populations and how much genetic differentiation occurs during the speciation process. This paper is part of a series of more than a dozen articles that investigate these questions in unusually favorable materials. E.T. Dobzhansky and many collaborators (including myself) had in past years shown that the *D. willistoni* group consists of several closely related species and contains populations at various stages of speciation.¹ In 1967, I became a member of the Rockefeller University faculty and established there a laboratory for electrophoretic studies. I decided to use the *D. willistoni* group of species for investigating, by means

of electrophoresis, (1) the amount and the pattern of variation throughout species of very broad geographic distribution, (2) the amount of genetic change associated with the main stages of the speciation process.

"This paper reports for *D. willistoni*, the most widely distributed species of the group, our results concerning the first question. The interesting results are that all sorts of populations, separated in many cases by thousands of miles and living in different ecological situations, showed approximately the same amounts of genetic variation; and that the same alleles and in rather similar frequencies exist everywhere. These results raise a number of problems—for example, the genetic variants do not seem to respond (or do so only in very limited fashion) to environmental differences, although environmental factors were previously thought to be the main determinants of the genetic constitution of populations.

"*Drosophila* stocks available in our laboratory were used in the study, but genetic changes may take place in the laboratory. It was, therefore, essential to collect wild flies and, indeed, most of the results concern wild flies. Collecting *D. willistoni* flies is, however, a pleasant task since the species lives in the forest of the American tropics. Several collecting trips to the Amazon basin and other regions of the American tropics were done. A graduate student and three postdoctorals participated in the collecting trips and in the laboratory research. Although the research was done at Rockefeller University, the final paper was written early in the summer of 1971 after I had moved to the University of California at Davis."

1. Spassky B, Richmond R C, Perez-Salas S, Pavlovsky O, Mourao C A, Hunter A S, Hoenigsberg H, Dobzhansky Th & Ayala F J. Geography of the sibling species related to *Drosophila willistoni*. and their semispecies of the *Drosophila paulistorum* complex, *Evolution* 25:129-43. 1971.