

### Evolutionary genetics of *Drosophila* in South America: Alive and well.

A synopsis of the 2° Simpósio de Ecologia, Genética e Evolução de *Drosophila* held at the Instituto de Biociências, Letras e Ciências Exatas (IBILCE)-UNESP, Câmpus de São José do Rio Preto, São Paulo, Brasil, November 23 – 24, 2001. <http://www.cenacon.com.br/eventos/drosophila>. This conference report was provided by William J. Etges, University of Arkansas.

For evolutionary biologists who have traditionally used *Drosophila* species in their research, interest in South American fly species has typically been restricted to the vast number of species inhabiting the neotropics. Intensively studied groups such as *D. willistoni* and the *D. paulistorum* species complex have played important roles in the history of population genetics, particularly in studies of inversion polymorphisms and incipient speciation. Recent research in cytogenetics, ecology, and biogeography of *D. repleta* group species in Brasil and Argentina, as well as Columbia and Venezuela, has helped to resolve the evolutionary history of this large species group. Research presented by an international group of *Drosophila* workers at the 2° Simpósio de Ecologia, Genética e Evolução de *Drosophila* in São José do Rio Preto encompassed a diverse number of approaches to classical as well as current problems in *Drosophila* evolutionary genetics.

Twelve symposium speakers presented their research during this two day symposium ending with an informal interaction with the 40 or so poster presenters. J. G. Sevenster (Univ. Leiden) summarized his group's community analyses of Neotropical, fruit-breeding *Drosophila* by showing the importance of spatial and temporal heterogeneity in resource abundance to species richness. Among communities, they conclude that species coexistence has been facilitated by a tradeoff between larval development time (some species are better competitors within fruits) and adult body size (other species are better at dispersing and finding new resources). Analyses of sampling techniques and Amazonian *Drosophila* guild structure were discussed by M. Martins (Univ. Federal do Para, Belém). An insightful history of one of the most interesting "natural" experiments in evolution, *i.e.*, the recent colonization of Chile by *D. subobscura* from Europe, was presented by M. Budnik (Univ. Chile, Santiago). Although thought to be a poor competitor, *D. subobscura* has displaced endemic species as it has in North America.

Quantitative genetic analysis of wing size and shape in *D. mediopunctata*, presented by L. B. Klaczko (UNICAMP, Campinas), emphasized the role of chromosomal inversions and temperature on wing phenotypic variation. A fascinating morphological analysis of aedeagus shape and size in this species was also discussed, with the conclusion that sexual selection may be operating on this species-specific reproductive structure. B. C. Bitner-Mathé (Univ. Federal, Rio de Janeiro) also discussed the quantitative genetics of morphological variation in wing size and shape and the search for QTLs employing recombinant inbred lines from crosses between *D. simulans* and *D. sechellia* in collaboration with A. G. Clark (Penn State Univ). Comprehensive karyotypic analyses of *D. willistoni* aimed at tracing its rich inversion history as well as the possible involvement of transposable elements in chromosome breakage and gonadal dysgenesis was presented by V. L. S. Valente (Univ. Federal, Rio Grande do Sul). Genetic research in studies of recombination rates in *D. ananassae*, hypermutable strains of *D. willistoni*, and surveys of the *Drosophila* fauna of Uruguay were presented by B. Goñi (Univ. de la República, Montevideo).

Reanalysis of the phylogeny of the *D. repleta* group using molecular and chromosomal characters was presented as a framework for understanding the role of host plant use in the diversification of species. Character mapping of the types of host cacti used has allowed W. J. Etges

(Univ. Arkansas, USA) and colleagues to infer that use of *Opuntia* species is the ancestral condition with switching to columnar cacti occurring independently in different species clusters. Molecular evolution of the P element family of transposons was revealed for the *willistoni* and *saltans* groups by C. M. A. Carareto (UNESP, São José do Rio Preto). Regulation of expression/repression of P element activity in these groups is currently being studied and is thought to be similar to systems in *D. melanogaster*. F. M. Sene (Univ. São Paulo, Ribeirão Preto) presented an eloquent summary of the advantages/disadvantages of the technique-driven discoveries in the last few decades of population genetics research. His group's long-term interest in the processes of diversification and speciation in the *D. serido* complex of the *repleta* group has produced a model system for understanding the interplay between recently diverged species, gene flow, and biogeography. The importance of isolation, allochrony, and the cohesion concept of speciation were discussed by F. C. do Val (Museum of Zoology, Univ. São Paulo). The capstone speaker for the symposium, J. David (CNRS, France), provided further justification for understanding the genetic basis of thermal plasticity and tolerance in ectotherms such as *Drosophila*. Only through integrative study of genetics, behavior, physiology, and ecology can we understand the evolution of complex phenotypes such as those underlying physiological adaptation – a welcome message in these days of global climate change from one of the world's authorities of temperature tolerance in *Drosophila*.

The meeting was expertly organized by H. E. M. Bicudo, known for her many contributions to the cytogenetic and systematic study of the *D. saltans* group, L. M. Ravazzi, and M. K. H. Kobayashi, and a team of extremely adroit and helpful students (all of UNESP, São José do Rio Preto). The next meeting is scheduled for 2003 at the Univ. Federal, Rio Grande do Sul to be organized by V. L. S. Valente. It will be a serious challenge to organize a more productive and smoothly run scientific meeting with such a broad spectrum of contributors.