Caught in the act : Agents of evolutionary change
(version anglaise de "L'évolution en flagrant délit")

This active in-class learning module puts participants in the roles of evolutionary biologists investigating the relative contributions of genetic drift and selection. By recreating some thought-provoking current research (January, 2000) on Old World fruit flies recently introduced to the west coast of the Americas, students see that (micro) evolution *can* be observed in populations of higher organisms. They further their developing understanding of the agents of evolutionary change and experimental design by investigating whether the Old World latitudinal cline in size has become established in the Americas over the past twenty years.

Aided by a PowerPoint presentation (or overhead transparencies), the teacher introduces key points, stimulates class interactions and animates student groups wrestling with the issues and intricacies of the problem. Handouts facilitate group inquiry and class discussions. At one stage, student groups each measure coded photographic enlargements of fly wings. The data generated is best consolidated in a computer spreadsheet projected in front of the class. Consideration of the results leads to student-derived conclusions about evolutionary theory and experimental design.

This activity enables students to grapple with and master the rather abstruse mechanisms behind evolutionary change. Discussing their relative contributions to evolution makes these agents of modification more than a bare list of abstract terms on a textbook page. Having to formulate an argument to support a contention that this or that agent is more or less important encourages collaborative group behavior while reinforcing the concepts. This way, students develop the necessary familiarity and understanding to apply their knowledge of these agents of change to a real world case where the "experimental" results are in doubt until the end. They are also shown how their own measurements could contribute to deciding the outcome.

This activity also provides a great forum in which to think about experimental design. What first starts off as a simple question, "Does the Old World cline in size become reestablished in the Americas?" instantly becomes challenging. What do we mean by size differences? How can we be sure that the differences are due to latitude and not handling or temperature, for example? Are the size differences really genetically based? How do you tell? What do we actually measure in the first place? The answers to these and other questions that inevitably arise make for lively discussion.

For many of our students, evolution is either too abstract or too loaded a concept to examine closely. For those who prefer to ignore its abstraction, this activity provides a concrete example of evolution in action. For those whose upbringing or personal search has left them fearing or distrusting the word "evolution", the gently forced contemplation of this non-threatening, concrete example may open the way for further consideration of the concept of evolution.

This activity also shows that biologists today are discovering new and intriguing facts about evolution. Evolutionary theory did not stop with Darwin. In a world of microcircuits and microarrays, scientific interest in the intricacies of evolution remains strong.