

Bombardier Beetle Systematics: Wendy Moore



Overview of Research Interests

My research interests include components of five broad biological disciplines – phylogenetic systematics, evolutionary biology, descriptive taxonomy, and chemical ecology. Recent advances in biotechnology provide opportunities to address evolutionary questions in innovative ways and thereby facilitate our understanding of the history of biodiversification.



Dissertation Research

My dissertation research centers on the carabid beetle subfamily Paussinae and includes components that span the spectrum of systematic work, including a classical taxonomic revision, molecular and morphological based phylogenetics, and studies of character correlation. I use molecular and genomic techniques to address the evolution of explosive defensive chemistry in two lineages of beetles, commonly known as bombardier beetles, and the evolution of myrmecophily (obligate associations with ants) within one of these lineages.

Evolution of Explosive Defensive Chemistry

Paussine beetles explosively discharge defensive benzoquinones at temperatures between 55°C and 100°C. This defensive strategy effectively deters both invertebrate and vertebrate predators and it is unique to the paussines and one other lineage of bombardier beetles, the subfamily Brachininae.



Did bombardier beetles evolve more than once? Using molecular sequence data and genomic techniques I am testing two competing hypotheses regarding the evolution of bombardier beetles. An understanding of bombardier beetle evolution will shed light on whether or not complex defensive glands and biochemical pathways have evolved more than once.

Revision of the Genus *Eohomopterus*



In collaboration with Dr. Peter Nagel (Basel, Switzerland) I am revising the Neotropical genus *Eohomopterus*. This project includes the description of five new species including two known only from Dominican amber.

Evolution of Paussine Beetles

I am inferring phylogenetic relationships within the subfamily Paussinae using DNA sequence data. Paussine species exhibit varying degrees of association with ants that has led to an astounding array of morphological diversity within this group. Many paussine species lay their eggs in their host ant nests, and the ants help raise the beetle larvae and pupae.



Despite the fact that adult paussines are ant brood predators, other behaviors indicate that some paussine species are not simply tolerated guests of the ant colonies, but may be valued by the ants. This project includes an investigation of the evolution of myrmecophily and the characters and behaviors associated with this lifestyle.



University of Arizona
Department of Entomology

