Systematic Biology is Critical in Conservation Research

Interdisciplinary interactions are highly important in biological conservation research and systematic biology can provide a unique and critical contribution. New research shows that conservation biology is enhanced by the accurate identification and classification of organisms, while systematic studies can be motivated by conservation concerns.

To explore the synergism of systematic biology and other disciplines in conservation research, the March issue of *Systematic Biology* includes a six-paper special section “Biodiversity: The Interface Between Systematics and Conservation,” which was co-edited by Vicki Funk of the Smithsonian Institution in Washington, D.C., Ann Sakai of the University of California in Irvine, California, and Karen Richardson of University of Queensland, Australia.

These projects stem from a symposium held at the June 2000 joint annual meeting of the Society of Systematic Biologists (SSB), the Society for the Study of Evolution (SSE), the American Society of Naturalists (ASN), and the Association for Tropical Biology (ATB) at Indiana University, Bloomington, Indiana.

The findings in the special section include:

• Evolutionary processes and the distribution of genetic diversity are essential in the planning of conservation priority areas. A study of the wet tropics of Australia shows that genetic information on both divergence and long-term historical isolation should be considered in conservation planning to ensure the maintenance of evolutionary processes. This work is by Craig Moritz of the University of California in Berkeley, California.

• A potential threat exists in the hybridization of indigenous and nonnative species, which represents a serious mechanism of extinction. To prevent the further loss of native species, a predictive approach is presented in a study of North American freshwater species, providing a guide to prevent future hybridizations. This work is by William Perry of Illinois State University in Normal, Illinois, and David Lodge and Jeffrey Feder of Notre Dame University in Notre Dame, Indiana.

• Phylogeny, life history traits, and geographic patterns are useful in predicting endangerment in island and island-like ecosystems. A study of the Hawaiian flora shows that risk of endangerment is strongly associated in species with a limited geographic distribution, low population densities, hermaphroditic breeding systems, and bird pollination. The percentages of taxa at risk at the family level in the Hawaiian Islands and worldwide are also positively correlated. This work is by Ann Sakai, Warren Wagner of the Smithsonian Institution, and Loyal Mehrhoff of the National Park Service in Fort Collins, Colorado.

• Systematic data in the form of collection records are useful in mapping species richness and endemism and in selecting priority biodiversity sites. A study of plant and animal species from Guyana demonstrates that collection data combined with abiotic data can be used to select high-priority biodiversity sites based on the concept of irreplaceability, a measure of uniqueness. This work is by Vicki Funk and Karen Richardson.

• Designing conservation reserves should consider the ecological and evolutionary processes that generate current biodiversity. A study of South Africa’s Succulent Karoo shows that spatially explicit data on morphological variation within taxa provide essential information for conservation planning. This work is by Philip Desmet of the University of Cape Town in South Africa, Richard Cowling of the University of Port Elizabeth in South Africa, Allan Ellis of the University of California in Irvine, California, and Richard Pressey of New South Wales National Parks and Wildlife Service in Australia.

• Available biological data and knowledge can be more effectively used to alleviate problems of gaps in the spatial distribution of biodiversity. Three strategies to use data more effectively are: (1) apply predictive modeling
that integrates biological and environmental data; (2) incorporate knowledge of biological variation within and between mapped classes into measures of conservation priority; and (3) use regions that are rich in biological data as test-beds for evaluating the performance of surrogates. This work is by Simon Ferrier of New South Wales National Parks and Wildlife Service.

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**Current Literature**


Hesp, S.A., Potter, I.C., and Hall, N.G. 2002. Age and size composition, growth rate, reproductive biology, and habitats of the West Australian dhufish (Glaucosoma hebraicum) and their relevance to the management of this species. *Fishery Bull.* 100(2):214-227.


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