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LINKING SYSTEMATICS AND ECOLOGY TO PROMOTE CONSERVATION

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The 1994 Forest Canopy Conference at the Marie Selby Botanical Gardens was unique in two respects. First, it represented an opportunity for scientists who focus on aspects of forest canopies to come together to discuss new techniques, hypotheses and future directions. Second, it promoted important collaboration among professionals of different disciplines—educators, ecologists, systematists, conservationists, chemists, and sociologists, to name but a few of the scientists represented. The current challenges confronting research on forests, especially tropical rain forests with their enormous complexities, are daunting. It is increasingly important that scientists collaborate on their research activities and integrate results to insure the most accurate, rapid dissemination of their findings.

Of particular priority to studies of forest canopies are the disciplines of systematics and ecology. Forest canopies are renowned as world centers of biodiversity, with a wealth of insects, epiphytes, epiphylly, vines, birds, mammals and host plants interacting in this above-ground ecosystem (reviewed in Lowman and Nadkarni 1995). The species of these complex communities interact via photosynthesis, nutrient cycling, microclimate adaptation, phenology, herbivory, predation, pollination, and a host of other physical and biological mechanisms. The questions of what organisms live in forest canopies (an issue relating to systematics) and how they interact in this environment (a topic of ecology) are integral to our understanding and future management of this global component.

As an ecologist, I cannot fully understand the interactions of epiphytes, insects and host trees until I recognize the different species and classify the biodiversity that pertains to my ecological questions. Even further, I hope to understand which species may or may not be closely allied phylogenetically as a means of better understanding aspects of their leaf chemistry or their growth patterns. For this, I rely heavily on my colleagues in systematics for their expertise. This integration of systematics with my field observations enables me to pose hypotheses that are formed from a broader knowledge base and, therefore, are more meaningful in a scientific context (e.g. Selman and Lowman 1983).

Despite the obvious link between these two disciplines, there are all-too-few avenues of interaction available among scientists. Conferences, journals, and scientific books are often organized to attract members of a specialized discipline, and do not appeal to a broader audience. For this reason, collaboration among and integration of different disciplines of science are often difficult to achieve.

Systematics Agenda 2000 is one of the current programs aimed at prioritizing the classification of organisms on Earth and providing systematic information for all other disciplines of science. Similar initiatives are underway in education (e.g., the formation of conservation biology departments and courses in universities), in museums (e.g., interactive exhibits and classes that integrate taxonomy with ecology and conservation); and in research projects (e.g., Francis Hallé's *Radeau des Cimes* expeditions that integrate many disciplines of field biology in one site (Hallé & Pascal 1992)).

Scientists of all disciplines need to recognize the baseline importance of systematics and work together to insure that our taxonomic collections remain intact and adequately curated. A taxonomic collection has been referred to as a library of life (Cotterill 1995). If a library loses a book, it can usually be re-ordered. But if a museum loses a specialized collection of organisms, oftentimes they are priceless and irreplaceable. In his recent review, Cotterill (1995) laments the neglect of collections worldwide, and predicts that the consequences for environmental conservation are disastrous. He further reminds us that voucher specimens provide an important basis for studies in ecology, behavior, forensics, pollution studies, industry and agriculture (see also Krebs 1992). The recent advances in genetic techniques for classifying organisms (e.g., Murawski 1995) and in computer techniques for organizing taxonomic information (Edwards & Morse 1995) represent giant leaps in our abilities to classify biodiversity. We need to utilize these tools to address the compelling questions concerning biodiversity and conservation.

Systematists and ecologists need to work together to understand the interrelationships among the organisms that inhabit our planet (e.g. Gould

1989). The Marie Selby Botanical Gardens maintains large living and dried collections of epiphytes and related tropical plants that are used by taxonomists, ecologists and other scientists to pursue research on tropical biology. The integration of taxonomists and ecologists in this institution facilitates our ability to undertake projects that assist in conservation of forests and enhances our understanding of biological diversity.

Whether there are 10 million or 100 million species on our planet (see Wilson 1992), the task of classifying biodiversity is enormous and time-consuming. We need continued collaboration among taxonomists, ecologists, and other scientists in order for humankind to become good stewards of the ecosystems on Earth.

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