

Bulletin

of the Entomological Society of America

Reprinted from
Bulletin of the Entomological Society of America
Volume 32, Number 1, Spring 1986

Consolidation of Effort Benefits All

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Dan Janzen has vividly drawn attention to perhaps the most serious problem facing plant and animal systematists ("Degradation of Tropical Forests: A Dialogue," *Bull. Entomol. Soc. Am.* 31[1]: 10-13): Mass extinction of a significant portion of the world's biota. Who can doubt that habitat destruction and traumatic alteration of natural systems have a far-reaching, negative impact on humanity in general and on the future of biological, agricultural, and medical research specifically. Unless we act quickly to survey and study the biota of these areas, the opportunity to do so will be lost forever.

Before proceeding, I would like to emphasize that if a viable solution to the problem is to be discovered and implemented, then the effort must be a community-wide endeavor with the Smithsonian Institution serving in an appropriate leadership role. The effort must be major, cooperative, and international in scope.

I choose not to address Dr. Janzen's suggestion of a merger of the entomology systematists in the Smithsonian Institution and the Agricultural Research Service (ARS) except to note that the reasons for the different missions of the two units are sound; a similar arrangement occurs in the United Kingdom with the British Museum and the Commonwealth Institute of Entomology. The basic point is that the two units *do* work together effectively and have done so for over 100 years.

Involvement of ARS

Dr. Janzen referred to ARS's involvement in the Smithsonian's entomology program. The laboratory to which he referred is the Systematic Entomology Laboratory, which comprises 28 research entomologists who study a broad spectrum of insect and mite groups. These scientists work closely with the 11 entomological systematists employed by the Smithsonian Institution and jointly develop and curate

the U.S. National Collection of Insects. From its beginning in 1881, the Systematic Entomology Laboratory and its predecessors employed 136 entomological systematists for a total of more than 2,100 scientist-years. This USDA activity has been, and continues to be, a major commitment to insect systematics, and broadly covers the major areas of research, identification and associated services, and collection development and management.

The research mission of the Systematic Entomology Laboratory is to develop classification systems of insect and mite taxa and systematic methodologies. Emphasis is placed on groups of agricultural importance, particularly those found in the United States and in the New World. Also, emphasis is placed on Old World groups of importance to biological control and pest exclusion. In a high percentage of groups that contain agricultural pests, ARS systematists have played major roles in the development of classifications that serve as hypotheses to be tested and refined as new taxa and new character systems are discovered. Although our emphasis is on long-term, comprehensive studies, we also serve an immediate problem-solving role and resolve problems of immediate concern to agriculture in the United States. Because of the enormity of the arthropod fauna and because of the restricted resources available, our goals are considerably more limited than we would like. Although the development of maximally useful classification systems requires analysis of taxa from all areas where they occur, we sometimes are forced to give priority attention to those taxa that occur in the United States or in America north of Mexico.

Examples of recent major accomplishments are: 1) The Coccinellidae of America north of Mexico (R. D. Gordon. *J. N.Y. Entomol. Soc.* 93: 1-912); 2) North American species of *Cuterebra*, the rabbit and rodent warble flies (C. W. Sabrosky.

Thomas Say Monogr. Ser., vol. 11); 3) Gelechiidae: Dichomeridinae, the moths of America north of Mexico (R. W. Hodges, in press).

Examples of more immediate problem-solving research are: 1) *Edovum puttleri*, n.g., n.s., an egg parasite of the Colorado potato beetle (E. E. Grissell. Proc. Entomol. Soc. Wash. 83: 790-796); 2) Physical changes in the genitalia of males of the screwworm, *Cochliomyia hominivorax* caused by mating (R. J. Gagné and R. V. Peterson. Ann. Entomol. Soc. Am. 75: 574-578); 3) Two new species of *Phylloxera* on pecan (M. B. Stoetzel. J. Ga. Entomol. Soc. 16: 127-144).

The biosystematic service responsibilities of the Systematic Entomology Laboratory are extensive and diverse, amounting to an average of 25% of our total effort. Not only are these services critically important to the many users throughout the Western Hemisphere, but they have an

important, positive impact on our research and curatorial functions. Need for research projects are identified as a result of our providing these services, and a large number of important specimens are retained for the improvement of the National Insect Collection.

The collection-oriented responsibilities of the laboratory are extensive. For more than 100 years (since the establishment of the collection by USDA) systematists at USDA and the Smithsonian Institution have worked closely and effectively together to develop the U.S. National Insect Collection. USDA's contributions have been major, including curation of the collection, addition of large amounts of material collected by staff members, purchase of private collections, and donations of material engendered by the assistance provided by USDA staff to other entomologists. The collection is an extremely important resource that must

continue to grow so that it can serve the multifaceted needs of the entomological community.

With implementation of at least some of Dr. Janzen's suggestions, the National Insect Collection would become an even more important repository of insect, mite, and other arthropod species that currently are components of New World ecosystems but soon will be extinct. The collection will serve as a permanent record of New World ecosystems and will allow for future research on the inhabitants of extirpated habitats.

Obviously, the Systematic Entomology Laboratory has a vested interest in any major changes required to accommodate Dr. Janzen's plea. Implementation of such a large undertaking without also affecting ARS's systematists would be difficult, if not impossible. Identification of the problem is a relatively easy task especially when it is excruciatingly obvious, but im-

plementation of solutions is far more difficult.

Coordination of Action

Two groups currently are drawing attention to and searching for mechanisms to support the critical need for biological surveys and intensive research programs on rapidly disappearing habitats of the New World. Dr. Janzen espouses the emergency status for such work in the Neotropics. For several years, Dr. Peter Raven (botanist, Missouri Botanic Garden) and others also have been urging for extensive research in the tropics. Dr. Michael Kosztarab (entomologist, Virginia Polytechnic Institute and State University) and others have made great strides in identifying needs for study of the biota of the United States through a national biological survey. E. O. Wilson (Harvard Univ.) recently has pointed to the "biological diversity crisis" and demonstrated the very critical need for a better understanding of biological diversity (BioScience 35: 700-706). A recent meeting of the Association of Systematics Collections in May 1985 and a second meeting to be organized by the American Institute of Biological Sciences in 1986 attest to the impetus being given to a U.S. national biological survey. A Canadian survey (for terrestrial arthropods) currently is underway and Mexico also is making progress toward starting a national survey.

It appears to us that a consolidation of survey effort makes good sense. Research results from parochial surveys likely will lack the comprehensive information essential for the development of fully useful classification systems and will be fraught with duplication of effort and unnecessary synonymy. Systematists are spread thinly enough without being expected to redo portions of their research for separate surveys of the United States, Mexico, Canada, and the Neotropics.

Consolidation of effort could benefit all! The need for a U.S. biological survey is evident because of rapid habitat destruction by urbanization and such environmental contamination as acid rain. However, the need for a survey seems far more critical in the rapidly disappearing forests of the South and Central American tropics considering that the demise of

these areas seems to be much more rapid than in similar areas in the United States. Planning for a United States survey appears to have considerable momentum, whereas survey of the Neotropics would require years of organization before implementation could take place. Therefore, we urge that the strength of the planning for a United States survey be merged with the strength of the absolutely critical need for a Neotropical survey. This coordination would alleviate potential conflicts among the surveys and would produce research results that are far more comprehensive and meaningful.

It is obvious that Smithsonian Institution entomologists, even in close association with the Systematic Entomology Laboratory, cannot assume this expansive task alone. However, as a permanent repository for specimens, the U.S. National Museum is an obvious choice. With new funds for expansion of the collection, new systematists, a corps of support scientists to make identifications, much needed technical support, a large sorting unit, expanded computer facilities, improved operating funds, etc., the Smithsonian Institution and the Systematic Entomology Laboratory jointly could successfully manage many of the functions envisioned by Dr. Janzen. However, entomologists at the National Museum could not deal with the problem alone. The Systematic Entomology Laboratory and Smithsonian Institution could undertake major portions of this expanded role, but the systematic community as a whole must provide support and expertise for such a massive undertaking first, to receive funding and second, to attain successful implementation. Community-wide effort is essential, with the Smithsonian Institution and the Systematic Entomology Laboratory providing leadership as appropriate.

Therefore, we support Dr. Janzen's essential thesis and strongly urge that positive action be taken before no action is possible.

Postscript

A point somewhat apart from this discussion but still of considerable importance to it is the need for further encouragement of tropical nations to make a

strong and diligent effort to preserve their natural habitats. We fear that the participants in this dialogue have taken a negative or defeatist attitude toward the future of habitat preservation (perhaps not entirely without cause). However, some progress has been made in recent years and there is hope for more in the future. We strongly urge those in a position to cause an effect to use every possible opportunity to encourage the establishment of national parks, nature reserves, etc. These preserves will assure that future biological research will include data from living organisms as well as from museum specimens. ■

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