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MOLECULAR PHYLOGENIES AND THEIR APPLICATION TO BIOLOGICAL CONTROL

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For the use of parasitoids or predators in biological control, molecular systematics has or will have impact on two important areas: 1) the identification of species or populations, and 2) the characterization of monophyletic lineages, whose members could share similar biological attributes. Chalcidoidea is likely the most important group of parasitic wasps for biological control programs; however, little progress is being made toward understanding the relationships of the included organisms using morphological techniques alone. Fundamental questions exist regarding the monophyly or relationship of most of the major assemblages such as the Aphelinidae, Eulophidae, Eupelmidae, Trichogrammatidae to name a few. Molecular techniques being used for the phylogenetic analysis of Chalcidoidea are reviewed, with an emphasis on understanding the monophyly and relationships of the Aphelinidae using nucleotide sequences of 18S, 28S D2 expansion and ITS2 regions of the rRNA transcript. Morphological features are compared with the resulting trees. Attributes of each of the genetic regions are discussed with regard to their application for the study of relationships within genera of Aphelinidae.

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RICE INSECTS AND PEST MANAGEMENT: IS TAXONOMY IMPORTANT?

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Rice (*Oryza sativa*) is by far the most important cereal crop grown in tropical countries. Over 800 insect species are known to damage rice while it is growing or in store. A considerable amount of information on rice pests, and their predators and parasitoids has been amassed. This has enabled increasingly sophisticated integrated management programmes to be developed, particularly as a result of reductions in agrochemical usage. To what extent have these advances in pest managment been due to taxonomic knowledge? Can successful management of pests be achieved without taxonomic studies? This idea is examined with rice insects providing examples for discussion.

01-022

LYGUS BUGS: THE INTERFACE BETWEEN ANALYTICAL SYSTEMATICS AND PEST MANAGEMENT

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Species of Lygus (Heteroptera: Miridae) cause economic losses to a wide range of crops in North America and Europe. As a consequence of its impact on agroecosystems, Lygus continues to be the subject of much basic and applied research. Yet, until recently, there has not been a reliable model of the relationships among the species, nor have there been reliable methods to routinely identify the species; this is largely due to generally subtle differences among and a great deal of variability within taxonomic characters. We report on a broad systematic analysis of Lygus, using morphological and molecular data and morphometric and phylogenetic methods, focusing on the points of confict and congruence observed between morphological and molecular approaches. Comprehensive systematic analyses are shown to provide a testable framework upon which life history strategies can be studied and biological control efforts and identification technologies can be developed. This approach has allowed for a focus on specific questions about the phylogenetic placement of the economically important species, their geographical distributions and potential host plant ranges; all are issues of importance in the selection of biological control agents, regulation against the introduction of new pest species and and the development of new crops.

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DISSEMINATING BIOSYSTEMATIC INFORMATION: YESTERDAY, TODAY AND TOMORROW.

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From Linnaeus to today, the content of BioSystematic Information has not changed much. Likewise, the demands of users: they want to know what it is, what it does, and when and where it does it. What has changed is the magnitude of information, from a few thousand to millions of data points, and the media on which to disseminate it, from the printed page to a full range of electronic formats, such as CD-ROM (Compact Disk-Read Only Memory) disks and WWW (World-Wide-Web) on the Internet. This explosion of information and multimedia, at a time when support for Systematics is declining but awarness of the importance of BioSystematic information for the sustainable use of Biodiversity is increasing users' demands, provides the challenge for the new century. How the systematists in Washington are meeting the challenge is illustrated and demonstrated with products, from on-line databases to expert identification systems.