FOREWORD

The multidimensional concept of species has come to occupy a predominant place in the study of life sciences and the increasing problems confronted in biocontrol programmes, as well as the impact of biotypes or siblings in insect vector species, not to mention the frequency of occurrence of intraspecific diversity in several pest species, have led to the involvement of ecobehavioural, physiological, cytogenetic and biochemical approaches towards a better assessment of the concerned species. The increasing consciousness regarding the need for such an integrated approach to biosystematic studies has never been more acute than it is today. Biosystematics has emerged as an interdisciplinary area of research in life sciences, with considerable impact on applied biology, in particular in the fields of agriculture, forestry, medical and veterinary fields. Such an orientation appears essential in view of the species concept occupying a central place in contemporary biological thought. Being the most important level of integration in the organic world, consistent efforts have been and are being made to redefine and reassess the true nature of the species which are today recognized as distinct ecological, behavioural and genetic units. Besides accurate species determination, a knowledge of population biology of species will enable a better understanding not only of the generic and species complexes, but also of the intraspecific categories.

An assessment of the consequences of individual variation for differential reproductive success in natural population of insects has become obligatory for a better understanding of species. The recognition of the dynamic, plurimodal configuration of species, as against the static, unimodal concept has often been emphasized for a better appreciation of the dimensions of species. Phenotypes resulting through successive interactions of the individuals of a genotype with the environment, involve the entire range, the whole repertoire of various pathways of development that may occur in the carrier of a given genotype in all environments — favourable or unfavourable, natural or artificial. This is not known for most species. Intraspecific diversity enables the combination of resources scattered in time and space to provide a composite niche for a species. The importance of systematic entomology therefore solidly rests on the necessity to understand how ecosystems function and in particular situations what organisms are involved in specific biological processes. For this understanding the species has to be properly identified. It is needless to emphasise that there is an increasing tendency for the occurrence of biotypes in species reacting differently under different situations and this has posed serious problems in applied entomology.

Another aspect of polymorphism relates to the niche width variation hypothesis which interprets that higher frequency of polymorphism is in the central part of the range of a species in view of the greater necessity of niches occupied by central populations, so that greater number of inversion types occur in this area — an aspect deserving close scrutiny. The correlation of electrophoretically detectable enzyme polymorphism and morphological variation also contributes towards a better understanding of the dimensions of species.

The above mentioned dimensions of species are illustrated with examples from diverse groups of insects, presented at the Workshop on Biosystematics of Insects, held at the Entomology Research Institute, Loyola College, Madras during 27-30 April 1987 and sponsored by the Department of Science and Technology, New Delhi.

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