

Foreword

Insects and plants interact with each other in a myriad ways. Many interactions involve mutual adaptations that enable the survival of the participants. Selection pressures are provided by plant defenses for counteradaptation by insects, which in turn select for modified defense in plants. Allelochemicals, which are secondary plant products, are known to have been evolved by plants as a response to attack by insects, and as the plants evolved, some of the associated insects also evolved with them. Exploitation of closely related plant families was made possible through changes in digestive processes, enzymes and other factors, leading to the evolution of specific differences among insects and resulting eventually in increased specialization within a group. We now have a better understanding of the role of sensory physiology of insects as one of the factors that determine susceptibility or resistance of plants to attack by insects. The association between insects and their host plants tends to be dynamic, involving mutual adaptations resulting in phytochemical diversity on the one hand and tolerance of insects to the chemical defenses of plants on the other. The host plant determines the survival, growth and multiplication rates of the concerned insects. The most important barrier to overcome is the behavioural one; the chemosensory mechanisms of insects respond differently to different chemicals, enabling the insects to locate and identify host plants, so that food discrimination is based on visual and olfactory stimuli. Thus insects encounter their host plants after processing the sensory information received from them and making appropriate movements that increase the probability of establishing and maintaining contact with the right food source. Each of the major steps in host plant selection is influenced by the chemical composition and the nutritional quality of the host plant as well as the nature of the secondary metabolites that play a major role in the attraction or repulsion of the insects. In order to successfully utilize its host plant, the insect must be versatile enough to complete the normal sequence of events; failure at any one step may confer an advantage to the host plant. The papers presented in this issue of the *Proceedings (Animal Sciences)* are based on a series of specialist lectures delivered at the DST National Workshop for young scientists held at the Entomology Research Institute from 22 July 1989 to 7 February 1990. The papers relate to resistance mechanisms of plants to insects, role of insects in wheat control, impact of natural products, and bioenergetics and biosystematics in relation to insect-plant interactions, to mention some of the more important topics.

The Workshop took into consideration all aspects relating to insect-plant interactions. This is a growing interdisciplinary field involving entomologists, botanists, biochemists and the plant breeders. Biological control also needs to be understood on the basis of the tritrophic relationship involving insect, host plant and parasite. The present decade as well as the next century will witness the increasing relevance of biotechnology in the study of insect-plant interactions, since future avenues of research will involve the identification and characterization of resistance genes, the development of probes to detect resistance genes and the transfer of resistance genes both within and between species.

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