INTRODUCTION TO THE SYMPOSIUM, THE MYTHS OF MANAGING RESISTANCE

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Resistance to pesticides in arthropod pests is a serious and increasingly perplexing problem in Florida, the USA, and the world. Resistance to pesticides already has created significant economic, ecological, and public health problems in agricultural, household and garden, and medical/veterinary pest management programs. Extensive research has been conducted on diverse aspects of pesticide resistance, and we have learned much during the past 40 years. However, to some degree, much of the discussion about 'resistance management' has been based on 'myths'. As an organizer of this symposium, one of my goals was to stress that managing resistance is a formidable task that will remain a perpetual pest management dilemma, because resistance is a fundamental survival response to stress by arthropods.

Five papers were presented in this symposium at the 1994 annual meeting of the Florida Entomological Society, but one manuscript regarding the response by industry to resistance could not be published in this series.

In the first paper, Gary Leibee and John Capinera assess the impact of resistance to pesticides in Florida and cite examples of resistance that limit pest management options.

Julie Scott describes what we currently know about the molecular genetics of arthropod resistance to pesticides. The number of genes identified, and the diversity of their effects on the physiology of arthropods, verify that resistance is a normal response to diverse environmental stresses. 'Pesticide resistance' is part of a general stress response with a long evolutionary history.

Leah Bauer describes what we know about resistance to various toxins of *Bacillus thuringiensis (B.t.)* strains. *B.t.* provides microbial control of an increasingly diverse group of arthropod species and is an increasingly important tool for integrated pest management programs. The deployment of transgenic crop plants containing *B.t.* toxin genes is likely to be an effective method for inducing resistance in agricultural pests. Despite the diversity of *B.t.* toxin genes isolated and cloned, cross resistances are common. Thus, *B.t.* toxin genes are limited resources.

Finally, I discuss a variety of resistance management methods and point out that we cannot really *avoid* resistance—we can only *delay* its onset. I argue that resistance management needs a paradigm shift that can best be accomplished if we recognize that pest management must be changed from a single-tactic strategy to a multi-tactic mode. Delaying resistance, whether to traditional pesticides or to transgenic plants with toxin genes, will require that we develop truly integrated pest management programs, incorporating all appropriate tactics, including host plant resistance, cultural controls, biological controls, genetic controls, and biorational controls. Pesticides should be reserved for situations in which they perform best—as tools to resolve an unexpected pest population outbreak. Effective, fully-integrated IPM programs will delay resistance because the number and rates of pesticide applications can be reduced.