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SYMPOSIUM ON INSECTICIDE RESISTANCE IN INSECTS

Introduction

The development of resistance to insecticides in insects is a problem that has long plagued entomologists and pesticide chemists. It is commonplace for resistance to new types of toxicants to occur in the field within a few years of initial use and, sometimes, to be present when the chemical is first used.

At the present time, best estimates are that at least 250 species of insects of both agricultural and medical importance are resistant to one or more types of insecticide. Some insect pests have evolved to the point where they are virtually immune to all chemical control measures. These insects pose major threats to programs as diverse as malaria control and cotton production.

The ever-increasing strictures on the introduction of new pesticides have reduced the flow of insecticides which might block resistance. These restrictions make it imperative that we gain a better understanding of the mechanisms by which insects become resistant to presently used insecticides and, further, what we may be able to do about the problem.

Dr. Ernest Hodgson and coworkers presented a comprehensive paper dealing with the role of quantitative and qualitative changes in insect microsomal cytochrome P-450 as they relate to resistance. Drs. N. Motoyama and W. C. Dauterman presented a similar review on nonmicrosomal resistance mechanisms. The genetics of resistance to organophosphate insecticides in the housefly was discussed by Dr. R. M. Sawicki in a paper which imparted strong emphasis to the role of interaction of different genetic factors. Dr. L. C. Terriere described the induction of insecticide metabolism in insects by pesticides and related chemicals and discussed the relationship of this phenomenon to resistance. The occurrence and genetics of resistance to juvenile hormone analogs in houseflies were reported on by Drs. S. B. Vinson and F. W. Plapp who speculated that resistance to these chemicals probably occurs as cross-tolerance in insect strains selected with other types of toxicants.

Three other presentations were made at the symposium but were not submitted for publication in the proceedings. These include a review of the biochemistry of DDT resistance with particular reference to the role of microsomal hydroxylation by Dr. M. Agosin. His outstanding work in this area for the last decade was summarized here. A paper dealing with insecticide resistance in lepidopterous insects, the major agricultural insects where resistance is a problem, was made by Dr. R. I. Krieger and a discussion of the possible role of δ-aminolevulinic acid synthetase in insecticide resistance was given by F. W. Plapp.

It is our hope that bringing together these papers will help to clarify some of the complexities encountered in working with resistance. Hopefully the information will contribute to finding better ways of dealing with the phenomenon.

Special thanks are due to Drs. J. J. Menn and A. S. Perry for chairing the sessions of the symposium and for leading the discussions that developed.

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