

Travel Scholarship Report

Review received ✓

International Society of Chemical Ecology (ISCE) 18th Annual Meeting, July 7-12th, 2001, Lake Tahoe, California.

The ISCE exists to promote the understanding of interactions between organisms and their environment that are mediated by naturally occurring chemicals. Research areas covered by this include the chemistry, biochemistry and function of natural products, their importance at all levels of ecological organization, their evolutionary origin and their practical application.

My particular interest in chemical ecology is in the application of sex pheromones to control *Helicoverpa armigera* in cotton and other crops. I aim to produce an attract and kill lure which contains a synthetic blend mimicking the sex pheromone the female moth produces to attract the male moth. This lure would then be laced with an insecticide, so that male moths contacting the lure are killed, preventing mating occurring, and subsequently reducing the number of fertile eggs laid on crops. My main reasons for wanting to get to the ISCE 2001 conference was to meet up with long-term researchers in the field of applied chemical ecology, communicate my research findings and aims with these researchers, and hopefully find some new directions which might benefit my own project.

A large proportion of the ISCE membership are involved in research into various aspects of sex pheromone communication in moths, and this was evident at the Lake Tahoe meeting, with at least eighteen of the oral presentations directly dealing with moth chemical communications, and with many other communications relevant to applied use of chemical attractants in pest monitoring and control. In general, the ISCE is orientated towards insects; this reflects a historic bias rather than the absence of chemical communication in other organisms.

Recent research presented at the conference, included the latest fluorescent visualization techniques which allows insights into how moths and other insects perceive their chemical environment by observing which parts of the insect neural system respond when various chemicals are presented to the insect. Biochemical research into the structure of odorant-binding proteins (OBPs) present on the moth antennae is showing how the specific reactions of insects to certain odors may be coded at all levels, from the antenna through to the central nervous system. This, and much of the other research presented at the conference would fall into the category of "pure" science, but the applications are already evident. By knowing the structure of OBPs it may be possible to produce novel chemicals that prevent these proteins from working, and thus prevent successful mating in the field. Similarly, by knowing how the female moth produces pheromone, it may be possible to "switch off" her pheromone production system, and prevent mating.

A number of papers presented at the conference were of interest to those working with pest management in cotton and other crops which are damaged by *Helicoverpa armigera*. A group from the Max-Planck-Institute for Chemical Ecology presented data on the terpenoid chemicals induced by herbivore attack on cotton. These chemicals are not produced when plants are damaged by simple mechanical disruption, but are induced by when caterpillars and other insects eat parts of the plant. These terpenoids are of significance to pest management as they act as attractants to parasitoids which use them as cues to find and attack the herbivores. An understanding of the biochemical mechanisms used to produce these terpenoids may lead to the breeding of cotton plants that are better at attracting parasitoids, or the production of sprays to attract parasitoids. More directly related to my own research was a paper detailing the derivation of a chemical attractive to the Codling moth (*Cydia pomonella*), a major pest of apples and other pome fruit. This chemical is attractive to both sexes of the moth, and the researchers from USDA and Trécé working on this project intend to develop an attract and kill lure similar to what I am devising for *H. armigera*.

The diversity of research presented at this conference is evident from my brief description of conference highlights. I came back with many new ideas for my own research and many new research contacts. I am extremely grateful for the CRDC's funding which enabled me to attend this conference.

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