

Throughout the resulting book the authors emphasize how little we actually know of the chain of related functional processes even in relatively simple cases such as the attracting of the male moth to the female. Summarized, the status of this research is as follows: (i) We know many pheromones chemically but know little about the histology and histochemistry of the glands that produce them; further analytical effort is necessary in view of the evidence that many pheromones have several components. (ii) The study of the production, composition, and reception of host substances (attractants, repellents, antifeedants) is still in its beginning. (iii) Pheromone-emitting behavior and odor distribution are not well understood. (iv) Identification of receptor organs and progress in the understanding of sensory transduction have been possible only in some cases. (v) Investigation of central nervous integration has just begun, and little is known about the mechanisms of command and motor control. (vi) Orientational processes are multisensory functions and are little understood.

The book concentrates on signals that are perceived by olfactory organs. After a treatment of the sensory mechanisms, the majority of the chapters deal with the behavioral responses and the nature of host products, pheromones, allomones, and kairomones. The final 100 pages explain the "status and prospects for behavior-modifying chemicals in pest management."

Pheromones, and in particular sexual attractants, are not simple magic means that will enable us elegantly and selectively to eliminate unwanted species and abandon insecticides. But in spite of some disillusionment, there is great potential in the concept of interception of chemical communication in pests at critical phases. To date, pheromones are valued for the detection of expected pest species and for estimation of their population density and have been successfully used to confuse orientation in some cases. Efforts at mass trapping, which was originally thought to be possible, were not successful.

While symposium volumes are often redundant and therefore a special type of pollution, I am glad to see this one in print. Most of the papers are good or even excellent. There is some overlap among the papers, and there are some regrettable gaps (for example, termites are not dealt with). Most unfortunate is that the references following the chapters are not in alphabetical order and that there is no author index. Refinding a given citation out of a total of 1500 in the 24 chap-

ters thus becomes a major task, and that difficulty limits the usefulness of the book.

This is not a book for the beginner (who should rather read H. H. Shorey's 170-page *Animal Communication by Pheromones*, Academic Press, 1976) and will be read from cover to cover only by reviewers, but it is very useful for the researcher, teacher, and pest-control planner.

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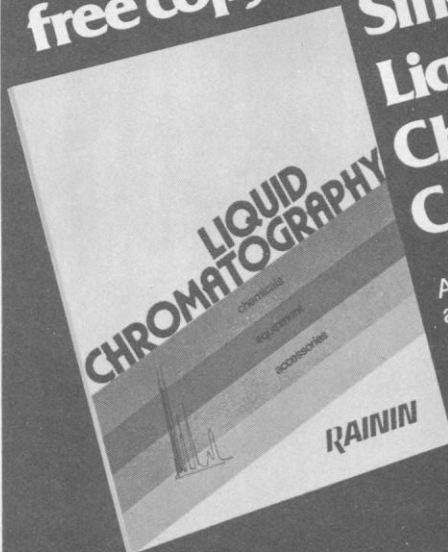


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