TROPICAL INSECT CHEMICAL ECOLOGY

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Contents

Summary

In this chapter we describe the current state of tropical insect chemical ecology in Latin America with the aim of stimulating the use of this important tool for future generations of technicians and professionals workers in insect pest management. Sex pheromones of tropical insects that have been identified to date are mainly used for detection and population monitoring. Another strategy termed mating disruption, has been used in the control of the tomato pinworm, *Keiferia lycopersicella*, and the Guatemalan potato moth, *Tecia solanivora*. Research into other semiochemicals such as kairomones in tropical insects revealed evidence of their presence in coleopterans. However, additional studies are necessary in order to confirm these laboratory results. In fruit flies, the isolation of potential attractants (kairomone) from *Spondias mombin* for *Anastrepha obliqua* was reported recently. The use of semiochemicals to control insect pests is advantageous in that it is safe for humans and the environment. The extensive use of these kinds of technologies could be very important in reducing the use of pesticides with the consequent reduction in the level of contamination caused by these products around the world.

1. Introduction

Chemical ecology is an interdisciplinary research area that studies the ecological interactions mediated by the chemical compounds that organisms produce. This discipline has its origin in the pioneer works of the German scientist Adolf Butenandt, who identified the sex pheromone of *Bombix mori* after the Second World War. However, general ideas of chemical ecology had already flourished some centuries ago (Hartman 2008). The chemical identification of sex pheromones belonging to the cabbage looper moth, *Trichoplusia ni* (Hübner), one of the major pests of agricultural crops (Shorey et al. 1967), opened the possibility of using pheromones to control insect pests. Chemical insecticides are routinely employed in order to control insect pests. The misuse of insecticides has led to resistance in some insects. Additional problems include the possible harmful effects on human health and the environment. Therefore alternatives such as semiochemicals are used for insect monitoring, mass trapping and mating disruption in a diversity of insects (Wyatt 1998).

The use of pheromones for pest control has made great progress in many countries. However, these advances have been made working with temperate climate pests, mainly in developed countries with a great tradition in research such as the United States of America, Canada, Europe, Japan, Queensland, and Korea. Traditionally, the chemical identification of pheromones of tropical insects is achieved by sending pupae from tropical countries to laboratories in developed countries in order to rear the insects for future pheromone studies (Kalinova et al. 2005). In other cases pupas have been sent from tropical countries to chemical ecology laboratories in developed countries to identify and synthesize pheromone candidates. The identified pheromones are then returned so that they can be tested in the field back in the tropics (Gries et al. 1998). One of the problems with this kind of cooperation is that the biological material does not arrive in good condition and sometimes it is difficult to obtain consistent results. This also results in a dependency relationship between sub developed countries and developed countries, a type of neocolonialism which belongs to the past. Thus, several chemical ecology laboratories have been established in Latin America and Africa as an alternative solution, implementing classic techniques of analysis, identification and synthesis of tropical insect semiochemicals. In tropical zones, there are many insect pests that cause greater damage to crops, in particular Lepidoptera herbivorous insects that are more abundant in tropical rather than temperate forest (Novotny et al. 2006). The chemical ecology of this order has been widely studied, and in the future it is anticipated that new pheromones will be identified from tropical insects. In this chapter, I reviewed some examples of chemical identification of semiochemicals from tropical insect found throughout Latin America.

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Biographical Sketch

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