



1995 Student Research Award Winner: Hannah Fraser

Research Proposal: Behavioral analyses of volatile sex pheromone components released by the male greater wax moth, *Galleria mellonella* (L.), and an evaluation of their use in trapping systems.

Background Information: The greater wax moth (GWM), *Galleria mellonella* (L.), is an economically important pest of the honey bee, *Apis mellifera* (L.). Larval stages of the moth feed on wax, pollen, and honey, causing heavy economic damage as they burrow through the comb. Although wax moth infestations in healthy, active colonies are effectively controlled by worker bees, extensive losses can occur in queenless colonies or in those weakened by exposure to pesticides or disease. The heaviest losses are typically incurred when beekeeping equipment containing comb and debris has been placed in storage; consequently, the GWM is commonly viewed as a stored products pest. Recent studies have been conducted on the use of pheromone traps in pest suppression programs. Pheromones, species-specific chemicals that influence the behavior of other members of the same species, have been used in biomonitoring of emergence patterns, assessing insect resistance, annihilative trapping and in communication disruption. The GWM has been identified as a suitable candidate for monitoring and control through the use of sex pheromones due to its unique biology and behavior. Research Objectives: Using documented information on the reproductive biology and behavior of male and female GWM and the recently identified aldehydes and primary alcohols of the volatile pheromone blend of GWM males; the objectives of this project are to: (1) Assess the behavioral function of the pheromone blend released by GWM males; (2) document the antennal morphology of male and female GWM; and (3) develop, in conjunction with Phero Tech Inc. (Delta, B.C.), a pheromone blend and trapping system suitable for monitoring and suppression in beekeeping equipment storage facilities and/or in apiaries. Study Description in Brief: The project involves the development of a pheromone blend attractive to female GWM. Preliminary work on the release rates of chemicals from lures will be conducted by Phero Tech Inc. A culture of GWM established and maintained at the Biological Control Laboratory, University of Guelph, will provide experimental units for the testing of synthetic pheromone formulations. Preliminary studies to evaluate trap design, blend effectiveness (relative to live tethered males and blanks), and optimal blend concentration are nearing completion. The roles of the individual chemicals in eliciting specific behavioral patterns will be established using arena bioassays (deletion studies). The most effective blend and pheromone delivery system will be applied to field trials conducted in infested storage facilities and apiaries of local beekeepers. Antennal morphology will be documented using scanning electron microscopy.