Integrated control of *Ephestia cautella* (Walker) in a confectionary factory

Savoldelli, S.*, Süss, L.
DiPSA (Dipartimento di Protezione dei Sistemi agroalimentare e urbano e Valorizzazione delle Biodiversità), Università degli Studi di Milano, via G. Celoria 2, 20133 Milan, Italy. Email: sara.savoldelli@unimi.it

* Corresponding author
# Presenting author

DOI: 10.5073/jka.2010.425.227

Abstract

In a confectionary factory, integrated pest-management techniques were used for 12 months. *Ephestia cautella* is the major pest in this industry. Its presence was monitored using pheromone traps and water traps. The most critical areas were identified and water traps were better at identifying these areas than pheromone traps. Intensive cleaning and structural improvements were carried out when necessary. Water traps have been used as a mass trapping system because they catch both males and females. Catches in water traps showed a decrease in population density after 8-9 months. In a confined area, a mating disruption system was applied to interfere with moth mating. Most females caught with water traps were mated, although in the area where mating disruption was applied, the percentage of unmated females was higher compared with areas where mating disruption was not used.

Keywords: Integrated pest management, Mating disruption, Water trap, Almond moth, Pheromone.

1. Introduction

In a confectionary factory in Italy, which produces a wide variety of chocolate-based products, the almond moth, *Ephestia cautella* (Walker) (Lepidoptera: Pyralidae) is the major pest. It is managed by regularly scheduled fogging with synergized pyrethrins. Fogging affects only exposed insect stages but *E. cautella* growth and development occurs within refuges where the insecticide may not penetrate.

2. Materials and methods

Alternative methods were tested to manage the almond moth because of the difficulties in managing infestations in two well-isolated factory departments (Süss and Savoldelli, 2009). Water traps for mass trapping were placed in both departments. In the department where the moth density was less, a mating disruption system was tested. In the other department, maintenance and cleaning interventions were carried out at different times. No chemical treatments were made during the entire test duration.

Tests were performed in two production areas for 12 months. Area A was about 6500 m^3 while area B was about 8,000 m^3. Both had concrete floors, plastered walls and ceilings. The inside environmental temperature averaged 25°C in winter and 35°C in the summer; the relative humidity (r.h.) was between 28% and 37%. A pheromone trap system was established to monitor *E. cautella*, using 25 Storgard® II traps (Trécé, Inc. Adair, OK, USA) baited with a pheromone lure in area A and 26 traps in area B. Dispensers were changed every two months. In these two areas, a mass trapping system was applied, using water traps (13 in area A and 16 in area B) each consisting of a plastic box (50 cm x 40 cm x 15 cm), filled with about 8 cm of water. The water traps were placed on the floor along the walls. At the end of January, 10 m of "rubber string" dispenser, baited with 50 mg/m of Z9, E12 - tetradeca dienyl acetate (TDA), were placed in area A to study the interference of this pyralid sex pheromone compound with the mating behaviour of *E. cautella*. On the basis of data given by the producer, the release of pheromone was calculated as 200-220 µg/m (airborne concentration: 0.3-0.4 µg/m^3) for 2 months. The "rubber string" was cut up in pieces of about 50 cm, hung horizontally among the machines or near the walls, at a height of about 2 m. The "rubber string" was replaced about every 8 wk. Pheromone trap data were collected weekly, and water trap data about every 10 d. All insects trapped with water traps were taken to the laboratory, identified and sexed.

3. Results and discussion

The results of this study confirm the attractiveness of water traps to both males and females of *E. cautella*. Water traps captured more males for each trap compared to pheromone traps, placed in the same environment (Figs. 1 and 2). There was a large difference in the number of captures for each trap at the beginning of the tests, when the initial level of moths was higher. Monthly data of water trap captures in area A show a peak of moths about every three months: February, May and August. From August to December, water-trap captures decreased and there were no other peaks. The analysis of the females captured with water traps highlights a larger percentage of unmated females in area A compared to area B.

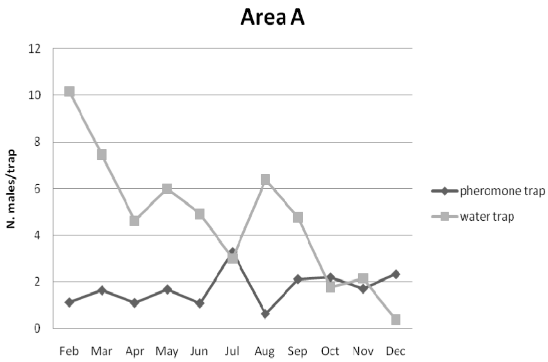

Figure 1 Monthly mean trap catch of *E. cautella* males in pheromone traps and water traps, in area A.

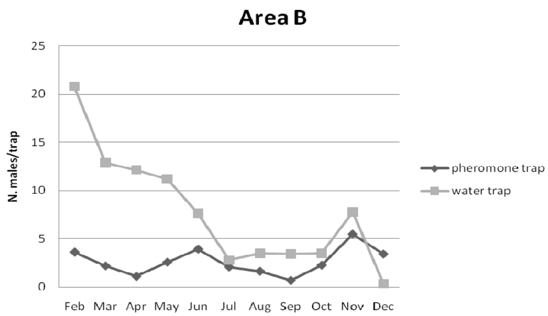

Figure 2 Monthly mean trap catch of *E. cautella* males in pheromone traps and water traps, in area B.

In area B, the initial presence of *E. cautella* was higher. Visual inspections and trap capture data showed an infestation focus in an unused piece of machinery located in the area. After the removal of the machine in May, captures decreased significantly. In August, fittings were cleaned and this intervention eliminated some infestation foci, as confirmed by the low number of water trap captures until October. In November, the milling plant in the area B was stopped for maintenance and cleaning. Captures increased, probably because the plant was opened and partly disassembled. Moths present in cracks and crevices that are usually isolated and difficult to reach may have been attracted to the pheromone and water traps.

4. Conclusion

The control of *E. cautella* can be managed using IPM techniques that combine pheromone traps for monitoring, water traps for mass trapping, pheromones for mating disruption, and, of course, good sanitation is also very important.

References

Süss L., Savoldelli S., 2009. Mass trapping and mating disruption to control *Cadra cautella* (Walker) in a confectionary factory. Proceeding of the Working Group "Integrated Protection of Stored Products", International Organisation for Biological and Integrated Control of Noxious animals and Plants/West Palaearctic Region Section, 29 June- 2 July, 2009, Molise, Campobasso, Italy. (In press).