BIOLOGICAL CONTROL OF CERTAIN GREENHOUSE PESTS

By

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B.Sc. Agric. Sci. (Plant Protection), Fac. Agric., Banha Univ., 2009
M.Sc. (Economic Entomology), Fac. Agric., Cairo Univ., 2015

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APPROVAL SHEET

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SUPERVISION SHEET

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Title of Thesis: Biological control of certain greenhouse pests
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Dr. Amal Ibrahim Afifi.
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Department: Economic Entomology and Pesticides **Branch:** Economic Entomology
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ABSTRACT

This study was conducted to outcome with practical successful strategies using biological control programs for major greenhouse pests, especially on sweet pepper and tomato crops, by developing and reducing the cost of natural enemies rearing in order to cut down on biological control cost. Improving mass rearing of the alternative host *E. kuehniella* through added nutrients to larval rearing and reducing costs by using *E. kuehniella* wastes to produce animal feed. Three alternative hosts *E. kuehniella*, *S. cerealella* and *C. cephalonica* were tested for rearing of *Trichogramma* Parasitoids. *E. kuehniella* is the best for rearing. The effect of cold storage on *T. euprocitidis* was studied by storage on host eggs *E. kuehniella* and on *T. euprocitidis* pupa. The results show that the parasitized eggs of *T. euproctidis* could be stored at 8°C. Four types of frozen eggs (*E. kuehniella*, *S. cerealella*, *C. cephalonica* and *S. littoralis*) were tested as a factitious host for mass rearing of *Orius albidipennis* and *O. laevigatus*. Obtained results revealed that the lowest overall mortality rates to adulthood were recorded for nymphs that fed on *E. kuehniella* eggs. Also five types of plants (Bean pods, Lettuce vein, *Geranium* leaves, Onion leaves and Potato vein) were tested as an egg laying substrate for *O. albidipennis* and *O. laevigatus*. Bean pods recorded the highest number of laid eggs (145.83 and 149.89) for *O. albidipennis* and *O. laevigatus*, respectively. Four media were evaluated as a substrate to avoid cannibalism in larval rearing of *Ch. carnea*. Using *E. kuehniella* cadavers resulted the highest number of produced adults (1646 adults).Three ovipositional substrate types and 3 colors were tested for adult rearing. Three categories of pesticides (insecticides, acaricides and fungicides) were tested on *M. caliginosus* and *O. albidipennis*. Monitoring pest during the plantation season in a commercial greenhouse located at Berkash. Three insect pests recorded in tomato plantations: *T. absoluta*, the whitefly (*B. tabaci*), and aphids (*A. gossypii*, and *M. persicae*). The red spider mite *T. urticae*, *T. tabaci* and *B. tabaci* were the most dominant pests on sweet pepper plantations. Three control strategies were carried out using: *A. swirskii* at a rate of 2/m², *M. caliginosus* (at a rate of 1/m²) and *O. albidipennis* at a rate of 1/2 adults/m², while the fourth untreated (control). The obtained results showed that *T. urticae* was controlled successfully using *A. swirskii* (2mites/leaf) and *O. albidipennis* (2.8mites/leaf). Comparison between biological and chemical control of certain sweet pepper pests in greenhouses were conducted. The results show that *O. albidipennis*, *M. caliginosus*, *Ch. carnea* and *T. euproctidis* proved to be efficient in controlling sweet pepper pests in greenhouses. Also comparison between biological and chemical control of certain tomato pests in greenhouses was carried out. The first one, for the biological control using: *M. caliginosus* at a rate of 1/2 nymph/m^2, *Ch. carnea* at a rate of 1/4 larvae/m^2 and *T. euproctidis* at a rate of 25 parasitoid/m^2; the second one was treated with the usual chemical control on the farm while the third remained untreated (control). The best results were obtained when applied biocontrol agents. The effect of different microclimatic parameters on the dispersal of the two *Trichogramma* species which were used to control *T. absoluta* on tomato in greenhouses.

Keywords: Improvement of mass rearing; *T. euproctidis*; *Ch. carnea; M. caliginosus*; *O. albidipennis*; Biological control; greenhouse pests; aphids; Thrips; whitefly*;* The red spider mite; *T. absoluta* ; Sweet pepper; Tomato.

DEDICATION

With deepest love, I would like to dedicate this work to my late father who gave me encouragement, cooperation and a river of continuous help. Thanks for what you gave me.

I also dedicate this work to my mother for her patience, guidance, support and caring attitude, as well as to my brothers and my grand family for all the hearty support they offered me during this period of my post graduate studies.

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