

Thitraporn Pundee 2009: Biological Study of Larval Parasitoid, *Asecodes hispinarum* Bouček (Hymenoptera: Eulophidae) and Pest Management Program for Major Insect Pests of Coconut in a Golf Course. Doctor of Philosophy (Entomology), Major Field: Entomology, Department of Entomology. Thesis Advisor: Associate Professor Surachate Jamornmarn, Ph.D. 136 pages.

Study on biology and mass rearing of larval parasitoid, *Asecodes hispinarum* Bouček were conducted under laboratory conditions (25±2°C and 70±10% RH) with natural lighting and temperature-controlled incubator at the Plant Protection Research and Development Office in Bangkok, during July 2006-December 2007. With four levels of temperature at 22, 25, 28 and 31°C were tested; the results showed that at 22°C the adult longevity of *A. hispinarum* was longest. Females lived longer than males; however, an increase of temperature leads to decrease longevity. Longevity of male and female parasitoids fed with honey at 22°C averaged 3.35±1.34 and 4.90±1.36 days, respectively. For study host specificity testing, it was found that the *A. hispinarum* could parasitize the larvae of *Plesioa reichei* Chapuis, but the quality of mummified larvae was lower than reared on *Brontispa longissima* Gestro. Females of *A. hispinarum* laid an average of 47.29 eggs during their lifetime, with range of 20-77 eggs.

Testing of *A. hispinarum* under laboratory conditions, optimal time for parasitization was at 24 hours. Optimum densities of female for parasitization on mass rearing of *A. hispinarum* were 40 and 60 females per box (14× 10× 6 cm³) per 20 on *B. longissima*. At 25°C showed the highest percentage of emergence of *A. hispinarum*, while at 31°C were critical for all development life cycle, parasitization and emergence. *A. hispinarum* had the longest mean developmental time (23.8 days) at 22°C and the shortest (16.5 day) at 28°C. *A. hispinarum* was able to parasitized at all larval instars of *B. longissima*; however, the 3rd and 4th instars larvae of *B. longissima* showed the best host stages for mass production. *A. hispinarum* reared on the larvae of *B. longissima* feeding on coconut, *Cocos nucifera* L. and typhus, *Typha angustifolia* L. leaves was not different on percentage of parasitization, percentage of emergence and percentage of female.

Implementation of Integrated Pest Management at Panya Indra golf course, Bangkok, during January 2007-March 2008 to major insect pests of coconut; the coconut hispine beetle, *B. longissima*, red palm weevil, *Rhynchophorus ferrugineus* Oliver and rhinoceros beetle, *Oryctes rhinoceros* L. Mummified larvae of *B. longissima* were released at average 246 mummies per month during January to December 2007 with total were 2,950 mummies. The first mummified larvae were established and found in five months after released. The mummified larvae were collected in June, August and November, and percentages of parasitization were calculated at 13.48%, 8.58% and 14.08%, respectively. Coconut trees at golf course showed clear signs of recovery with green shoots on November. Red palm weevil was applied by cultural control and pheromone traps. Adult of red palm weevil was counted in pheromone traps a month intervals, during April 2007 to March 2008. Twenty one of coconut trees destroyed by red palm weevil was cut during this study for reduce the source of food by rhinoceros beetle. Ten pheromone traps were set around the area of the golf course. Total of 26 red palm weevils were caught with male and female were 8 and 18 beetles, respectively. Damaged palms by the red palm weevil disappeared. Entomopathogenic fungus (*Metarhizium anisopliae*) and pheromone traps of rhinoceros beetle was applied. Duration of experiment of the rhinoceros beetle was carried out first and ends as same as red palm weevil. Maximum infected larvae by *M. anisopliae* in manure pits was found on June to November but the least was in March to April. *M. anisopliae* showed a significant negative relationship on high temperature and low humidity. Pheromone traps were set totally 16 traps. Total of 718 rhinoceros beetle adults were caught. The adults of male and female caught were 130 beetles and 588. It concluded that the coconut palms in the Panya Indra golf course were recovery from the damage of the coconut hispine beetle and the red palm weevil at the end of study. Whereas it was not cleared on the sign by the rhinoceros beetle since there were migrate of the rhinoceros beetle from outside of the golf course.

Student's signature

Thesis Advisor's signature

