

Parichat Chaisaeng 2007: Effect of Parasitoid *Anisopteromalus calandrae* (Howard)(Hymenoptera: Pteromalidae) Density on the Population of Maize Weevil, *Sitophilus zeamais* (Motschulsky)(Coleoptera: Curculionidae) in Milled Rice. Master of Science (Zoology), Major Field: Zoology, Department of Zoology. Thesis Advisor: Associate Professor Boongseua Vajarasathira, Ph.D. 56 pages.

Anisopteromalus calandrae (Howard) is a well known cosmopolitan parasitoid of various stored product insects including maize weevil, *Sitophilus zeamais* (Coleoptera: Curculionidae). This parasitoid could be used in the biological control of maize weevil. The optimal density of parasitoid *A. calandrae* was evaluated for the best control of maize weevil population. In the short term experiment, parasitoids were released at six (2, 4, 8, 12, 16 and 20 female parasitoids) densities into the box containing a pile of four cheesecloth bags filling with milled rice infested with 4th instar maize weevils. At 16 females per box, there was the highest percentage of parasitoid emergence, relatively low percentages of emerged weevil and parasitoid induced mortality (PIM). The highest superparasitism was observed at 20 female parasitoids per box.

The long term experiment was conducted to assess the effectiveness of different parasitoid density for the control of weevil population during six months storage. Ten unsexed adult maize weevils were introduced into each of 6 bottles, 1,000 ml, containing 500 g fresh milled rice. After 25 days, 6 densities of mated female *A. calandrae*, 0, 2, 4, 6, 8 and 10, were added into each container. Afterward, all emerged insects were randomly sampled and counted monthly till the end of experiment. The number of maize weevil increased with the decrease of parasitoid density. The percentage of parasitoid emergence increased with increasing parasitoid density. At 10 female parasitoids per bottle, the percentage of parasitoid emergence was lower than that of 8 female parasitoids density. At this density, the highest PIM was occurred. The decline in parasitoid emergence at higher parasitoid densities was probably due to superparasitism. When the number of available host is limited, *A. calandrae* attacks previously parasitized hosts leading to the decrease of parasitoid offspring and subsequently the failure in parasitoid establishment. The density of 10 female parasitoids per bottle was the most effective density for the control of maize weevil. At this density, the number of emerged weevil remained stable since at the end of three months after parasitoid introduction. To maximize the control of maize weevil population in the field, the optimum female parasitoid-host ratio, 10: 306 was recommended for release monthly as in the long term experiment. The parasitoid-host ratio, 16: 749 was advised to produce the highest parasitoid number as in the short term experiment.

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Thesis Advisor's signature

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