Kanokporn Phaowongsa 2010: Insecticidal and Antifeedant Effects of Whole Bean Flour and Protein Enriched Bean Flour against *Sitophilus zeamais* (Motschulsky) (Coleoptera: Curculionidae): Master of Science (Biology), Major Field: Biology, Department of Zoology. Thesis Advisor: Associate Professor Boongeua Vajarasathira, Ph. D. 111 pages.

The insecticidal effects of whole bean flour on corn weevils (*Sitophilus zeamais*) were studied. The corn weevils were kept in the bean flour-mixed rice at various concentrations for one and two weeks. After one week, only the navy bean flour affected the insect mortality. After two weeks, red kidney bean flour, navy bean flour, and mung bean flour all were responsible for the death of the corn weevils at 1%, 10%, and 20% concentrations. However, when the protein extracted from three beans were mixed with rice at various concentrations for one and two weeks, no effect on the death of the corn weevils was observed. When the parent generation of the insects was kept in rice mixed with the three bean flours for one week, different concentrations of red kidney bean and navy bean flours had no effect on the number of progenies. After 2-4 weeks, the increased concentrations of the two flours had more prominent effect on the progeny number. As for the mung bean flour, only the number of progenies born in the fourth week was affected. The results of the second week were similar to those of the first week, except for the mung bean flour that decreased the number of corn weevil progenies born within 1-4 weeks. Thus, it can be inferred that the enriched proteins extracted from the three beans have no statistically significant effect on the birth of the insect's progeny. On the other hand, experiments on the corn weevil's consumption of the rice mixed with the three bean flours and protein enriched bean flours from mung bean and navy bean reveals that the insects ate less with a statistical significance. Red kidney bean enriched flour, in contrast, had no effect on the insect's consumption. A result from enzyme specificity test of the α amylase extracted from the adult corn weevils reveals that the optimum condition for the enzyme is at pH 6 and at 60^{o}C. Moreover, the enzyme inhibitors from all of the three beans were found to inhibit the corn weevil's α amylases. The inhibitor extracted from the mung bean has the best efficiency, followed by those from navy bean and red kidney bean, respectively. Additionally, the inhibition efficiency of the three bean enzyme inhibitors can be enhanced by increasing the concentration. These inhibitors may play an important role in inhibition of insect feeding and thus leading to reduction of fecundity and mortality.

_____ _____ ___ / ___ / ___

Student's signature Thesis Advisor's signature