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TOXICITY OF SYNTHETIC INSECTICIDES ON THIRD INSTAR LARVAE OF Chrysoperla nipponensis (NEUROPTERA : CHRYSOPIDAE)

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BY

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A project report submitted to Faculty of Agriculture, Universiti Putra Malaysia, in fulfillment of the requirement of PRT 4999 (Final Year Project) for the award of the degree of Bachelor of Agricultural Science.

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ENDORSEMENT

This project report entitled "Toxicity of synthetic insecticides on third instar larvae of *Chrysoperla nipponensis*" is prepared by Nadiah binti Jaliludin and submitted to Faculty of Agriculture in fulfillment of the requirement of PRT 4999 (Final Year Project) for the award of the degree of Bachelor of Agricultural Science.

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ABSTRACT

Green lacewing *Chrysoperla niponensis* is well known as insect predator of pests in the field crop and widely used as biological control agent. Usually an adult feeds on nectar, pollen and sugar excretions. The larvae are considered as active worker and having huge appetite to feed on aphids, red spider mites, thrips, mealybugs and whiteflies. The intensive use of insecticides to control the pest could reduce the number of biological control agents through residual contact with insecticides. Therefore, the purpose of this study was to evaluate toxicity of cypermethrin and spinosad and to identify the most toxic insecticide against the larvae of *C. nipponensis*. The insecticides that had been used are cypermethrin and spinosad. The experiment was conducted by using leaf-dip bioassay method. The mortality was recorded after 24, 48, 72, 96 and 120 hours and the results were subjected to probit analysis and ANOVA with means separation by Tukey. The most toxic insecticide against third instar larvae was obtained from cypermethrin with LC_{50} 30.28 ppm while the less toxic was examined from spinosad with LC_{50} 182.23 ppm.

ABSTRAK

‘Green lacewing’ atau nama sainstifik ialah *Chrysoperla niponensis* terkenal sebagai serangga pemangsa bagi perosak tanaman makanan dan digunakan secara meluas sebagai agen kawalan biologi. Biasanya serangga dewasa memakan madu, debunga dan kumuhan gula dari bunga tumbuhan. Manakala larva tersebut dikenali sebagai serangga yang aktif dan mempunyai selera makan yang banyak untuk memakan aphids, hama labah-labah merah, thrips, koya dan lalat putih. Serangga ini boleh didapati di kawasan pertanian seperti di ladang sayur-sayuran. Walau bagaimanapun, penggunaan racun serangga secara intensif boleh mengurangkan bilangan agen kawalan biologi melalui sisa racun serangga yang terdapat di tanaman. Oleh itu, tujuan eksperimen ini adalah untuk menilai ketoksikan beberapa racun serangga sintetik serta mengenal pasti racun serangga yang paling toksik terhadap *C. nipponensis*. Racun serangga yang telah digunakan adalah cypermethrin dan spinosad. Racun ini sering digunakan dalam penanaman sayur-sayuran. Eksperimen ini dijalankan dengan menggunakan kaedah bioassay. Kematian telah direkodkan untuk setiap 24, 48, 72, 96 dan 120 jam dan keputusan yang di perolehi di analisis dengan menggunakan Probit dan ANOVA serta cara perbandingan dengan Tukey. Racun serangga yang paling toksik terhadap larva instar ketiga adalah daripada cypermethrin dengan LC_{50} 30.280 ppm manakala racun yang kurang toksik adalah daripada spinosad dengan LC_{50} 182.23 ppm.

1.0 INTRODUCTION

1.1 Background of study

Green lacewing *Chrysoperla nipponensis* is well known as predatory of pest in the field crop and widely used as biological control of pests. This predator has complete metamorphosis from the formation of eggs, larvae, pupae and adults. Usually adults feed on nectar, pollen and sugar excretion of insects. The larvae are considered as active worker and have huge appetite to feed on aphids, red spider mites, thrips, mealybug and whitefly (Garrett, 2005).

According to Salim (2016), biological control is related to the use of natural enemies in the field to reduce the number of insect pest and at the same time, it helps to increase crop yield through lowering the damaged crop. There are several examples of biological control agents such as parasitic wasps, lady beetle and green lacewing. They are useful in killing and consuming insect pests during their development.

1.2 Problem statement

Instead of biological control method, most farmers use chemical control because of its effectiveness to kill the insect pest in the field. The overuse of insecticides can cause elimination of beneficial insects in the natural environment. After that, biological control agents are difficult to survive when conventional insecticides are applied to control the pest. Thus, the toxicity of conventional insecticides should be evaluated.

1.3 Objective

The objectives of this study were consequently as below :

1. To evaluate toxicity effects of several synthetics insecticides on third instar larvae *Chrysoperla nipponensis*.
2. To identify the most toxic insecticides on *C. nipponensis*

1.4 Significant of study

This study was to focus on the use on synthetic insecticides such as cypermethrin and spinosad that currently being commonly used to control insect pest population in vegetable production in Malaysia. Apart from that, the experiment would will assist the farmer to choose the insecticides with no detrimental effect toward the green lacewing.

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