EFFECTIVITY OF ENTOMOPATHOGEN *Beauveria bassiana* (Bals) Vuill. WITH ADDITION OF INSECT GROWTH REGULATOR (IGR) TO CONTROL *Riptortus linearis* (HEMIPTERA: ALYDIDAE)

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ABSTRACT

This research aims to find out the effectiveness of entomophatogen *B. bassiana* with addition of IGR (Insect Growth Regulator) to control *R. linearis*. The experiment was conducted by using Completely Randomized Design and Randomize Complete Block Design, which each treatment was repeated 3 times. The treatment was a combination of IGR and 10% buprofezin with some concentrations (0.5 ml/l, 0.75 l/ml, 1 ml/l and 1.5 ml/l) an entomopatogen *B. bassiana*. The observed variable was the percentage of mortality and the mortality rate. The results showed that the application of *B. bassiana* with the addition of buprofezin unable to increase the effectiveness of B. bassiana in increasing the mortality of *R. linearis*. In this research indicated that mortality of *R. linearis* by entomophatogen *B. bassiana* with the addition of buprofezin not more effective than mortality caused by *B. bassiana*.

Keywords: *Riptortus linearis*, IGR, *Beauveria bassiana*.

INTRODUCTION

To reduce the use of the insecticide chemicals and need to be developed in biological agents (Rauf, 1994). entomopathogen fungus *Beauveria bassiana* (bals.) Vuill. Used in many have control pests of various types to various kinds of plant species. Effectiveness of *B. bassiana* on field has been inconsistent, which among other is caused by low bassiana stability isolate due to the environmental temperature, especially not support humidity, and the intensity of sunlight (Inglis, 1997). Therefore, the fungus *B. bassiana* can potentially be used as biological control agents in chocolate ladybugs.

A new approach to insect pest control is the use of substances that affect the growth and development of insects. This substance is classified as IGR (Insect Growth Regulator).

Various types of IGR is Buprofezin, Lufenuron, Bistfluron, Chlorfluazorun, Noyaluron etc. (Siddall, 1976). To be able to increase the effectiveness of *B. bassiana* on the research that will be done is adding the IGR with some concentration to entomopatogen fungus *B. bassiana* for control of Brown ladybugs.

MATERIAL AND METHODS

The treatment sporulation *B. bassiana* with addition of IGR used Completely Randomized Design. The treatment is done in a petri dish with media PDA and conducted to know the sporulation of *B. bassiana* with addition of buprofezin.

The treatment application of *B. bassiana* to *R. linearis* used Randomize

Complete Block Design. Application of *B. bassiana* did with some treatment of *B. bassiana* 10^{10}/ml, *B. bassiana* 10^{8}/ml, *B. bassiana* 10^{6}/ml, *B. bassiana* 10^{4}/ml dan control.

The treatment application of Buprofezin to *R. linearis* used Randomize Complete Block Design. IGR treatment with buprofezin 10 % with some concentration (0.5 ml/l, 0.75 ml/l, 1 ml/l dan 1.5 ml/l).

The treatment application of *B. bassiana* with addititon of Buprofezin to *R. linearis*. used Randomize Complete Block Design. Application of *B. bassiana* with addition of buprofezin done based the result of sporulation. Based on the sporulation, the highest development of spores is 10^{10} to be used as a treatment in the application.

Observed variable are mortality percentage, mortality time. if there found mortality in control (less than 20%) then mortality percentage must be corrected with the following formula :

$$P = \frac{x - y}{x} \times 100\%$$

P is corrected mortality percentage
X is percentage of life in control
Y is percentage of life in treatment

RESULTS AND DISCUSSION

Based on table 1 the high rate number of *B. bassiana* with addition of buprofezin 1.5 m/L was 30.51. On treatment of *B. bassiana* + buprofezin 0.75 ml/L (6.68) is no different with *B. bassiana* + buprofezin 0.5 ml/L (6.12) but showed differences with *B. bassiana* + buprofezin 1 ml/L (14.03).

Based on table 2 showed that concentration 10^{10} of Bb able to kill nymph of R. linearis 26.72% was not different with Concentration 10^{8} the mortality occurred 20%. Whereas, in the concentration of 10^{6} (16.67%) is no different with the concentration of 10^{4} (11.67) and 10^{8} (20%). On the treatment of the control indicates the percentage of mortality differences influence with other treatment.

Table 1. Average number of konidia *B. bassiana* with addition of buprofezin

B. bassiana (konidia density)	Buprofezin (Concentrate)	Average
10^{10}	0,5 ml/L	6,12 ab
10^{10}	0,75 ml/L	6,68 bc
10^{10}	1 ml/L	14,03d
10^{10}	1,5 ml/L	30,51e
Control	0	3.81 a

Table 2. The percentage rate mortality nymph of *R. linearis* after *B. bassiana* application

Concentrate	Mortality(%)
10^4	11,67 b
10^6	16,67 bc
10^8	20,00 cd
10^{10}	26,67 d
Control	0 a

Table 3. Percentage mortality *R. linearis* brown after Buprofezin application

Concentrate	Mortality (%)
0,5 ml/L	0 a
0,75 ml/L	1,66 a
1 ml/L	3,33 a
1,5 ml/L	3,33 a
Kontrol	0 a

Table 4. Rate of the percentage of mortality nymph of *R. linearis* after application *B. bassiana* by the addition of buprofezin

B. bassiana	Buprofezin (Concentrate)	Mortality (%)
10^4	1,5 ml/L	13,51 b
10^6	1,5 ml/L	22,02 bc
10^8	1,5 ml/L	29,04 c
10^{10}	1,5 ml/L	28,86 c
Control	Control	0 a

Based on table 3 application of buprofezin concentration 0.5 m/L, 0.75 m/L, 1 ml/L, and 1.5 m/L were not affect to the mortality of *R. linearis*. On the control treatment did not show differences influence mortality percentage with other treatment.

Based on table 4 the highest of mortality of R. linearis occurred 29.04% with 10^{10} concentration of *B. bassiana* with addition of buprofezin 1.5 m/L.

Table 5. Test of mortality percentage *R. linearis* in Buprofezin, *B. bassiana,* and *B. bassiana* + Buprofezin Treatments.

Treatment	Concentrate	Mortality (%)
Buprofezin	0,5 ml/L	0 a
	0,75 ml/L	1,66 a
	1 ml/L	3,33 a
	1,5 ml/L	3,33 a
B. bassiana	10^4	11,67 b
	10^6	16,67 bcd
	10^8	20,00 bcd
	10^{10}	26,67 cd
B. bassiana + Buprofezin	10^4 + 1,5 ml/L	13,51 bc
	10^6 + 1,5 ml/L	22,02 bcd
	10^8 + 1,5 ml/L	29,04 d
	10^{10} + 1,5 ml/L	28,86 d

Based on table 5 by treatment of buprofezin concentartion 1 m/L and 1.5 m/L the mortality of *R. linearis* occurred 3.33%, if the all level of concentration compared the fourth of these concentration was different. For treatment of *B. bassiana*, 10^4 were able to kill the concentration of nymphs 11.67%, when compared to the mortality rate on concentration of 10^6 (16.67%) and 10^8 (20%) there is no difference between these three treatments such as concentration of 10^4 when compared to the concentration of 10^{10} there may be differences of mortality. On treatment of *B. bassiana* + Buprofezin, 10^4 + 1.5 ml/L was able to turn off the nymphs of 13.51% if compared to the mortality at concentrations 10^6 + 1.5 ml/L (22.02%) there is no difference between the two treatments.

Treatment *B. bassiana* by the addition of buprofezin is not a reduction in conidia and pathogenicity *of B. bassiana* but with the addition of buprofezin is presumed not to increase the effectiveness of *B. bassiana*. The more konidia up in the bodies of insects more likely konidia to grow and develop to insects and then kill insects (Ferron, 1981). Monique *et al*., (2011) said that do not disturb buprofezin germination if used in the concentration of 1 mg/ml. This really shows you that between IGR and *M. anisopliae* did not happen and reduce patoghenisity poisonous fungus, in the research indicated that between IGR and fungi entomopathogen can mixed and is used in biological chemical, which is a combination to fight against the insect pests. The research result showed that *B. bassiana* more effective than buprofezin to nimfa *R. linearis* mortality. The higher concentration of *B. bassiana* is applied to *R.*

linearis, the higher mortality occurred.

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