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Efficacy of Certain Insecticides on the Population of Chilli Bug, *Elasmomia granulipes* Ww. (Hemiptera - Coreidae) in Manipur

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ABSTRACT

Elasmomia granulipes Ww. has been found to be a serious pest on chillis - *Capsicum annum* L and *C. frutescens* L in Manipur. Efficacy of seven insecticides against it, the application of Dimethoate (0.04) and Endosulfan (0.07) on the crop plant during 2011 and 2012 revealed more effective in minimizing the population of the insect pest. Further, it has been observed that the insecticides do not affect the bio-control agents. As a result of the treatment with these insecticides, the highest yield of crop had been recorded from the treated plot with Dimethoate (0.04) and Endosulfan (0.07) whereas Neem oil fresh and phosalone (0.04%) affected insect population at minimum resulting less yield of crops.

Keywords: Insecticides, Sprays, Yield, Insect Pest, Chilli.

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1. Introduction

Elasmomia granulipes Ww is a gregarious and sap sucking bug. It is very destructive to the plant by both of its stages viz., Nymphal and adult. It has been recorded for the first time as a serious pest of chilli plantations in Manipur as per recorded data. Its severe infestation on the plantation results in stunted growth of the plants and less yield of the crop. From the relevant literatures reveal that there were no record of even its occurrence on chilli and no information on its biology or its control except Kumar, (1998)^[9] who has recorded it for the first time from this area and has studied the biology of the insect pest, *Elasmomia granulipes* in Manipur. And a few workers like Sandhu ^[7] on cereal *Jassid*, Benerjee ^[1] on *Amrasca devastans* and *Cestius phycitis*, Borle ^[2] on *Aphis gossypii* G and Karthikeyan ^[3] on *Pseudococcus gilbertensis* (Beardly) and *Parlatoria orientalis* Rao have done works on chemical control measures. Shachi Bushan V ^[11] studied the efficacy of insecticide Fenpyroximate for the control of mite on Chilli. Therefore, an effort has been made to evaluate the efficacy of some insecticides against this bug in order to enhance the crop production.

2. Materials and Methods

The experiments were taken in the research field of N. Birahari College, Khundrakpam, Manipur and Nambol L.Sanoi College, Nambol, Manipur during 2011 and 2012. The experiments were conducted as randomized block designs with five replications each. The number of selected plot was 5 and size of each plot was (6.8 x 10.2) sq. ft. The selected seven insecticides namely Endosulfan 35 EC, Monocrotophos 36 SL, Malathion 50 EC, Dimethoate 30 EC, Phosalone 35 EC, Cypermethrin 25 EC and Neem oil fresh were used. There were two time sprays per year. Each spray had been done on 2,5,7 and 10 days interval to the experimented plots. Before applying the insecticide on the crop plantation during first week of March of each year, a preliminary survey on the infestation had been done. On the quantum of infestation, the first spray had been applied. After 15 days, the Second spray was followed. Field applications were made using knapsack sprayer having a hollow cone nozzle before flowering and fruiting time. The pre – treatment count of *Elasmomia granulipes* population was taken on 5 plants each from each plots before spraying and post treatment counts were recorded on 2, 5, 7 and 10 days ^[3]. Five plants were selected per treatment randomly. The number of adults and nymphs of bugs were counted before treatment and post treatment. The data obtained from the experiments were statistically analyzed.

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3. Result and Discussion

In the present study seven insecticides viz., Endosulfan 35 EC, Monocrotophos 36 SL, Malathion 50 EC, Dimethoate 30 EC, Phosalone 35 EC, Cypermethrin 25 EC and Neem oil fresh have been applied against the chili bug, *Elasmomia granulipes* in order to reduce the pest population. The year-wise spray norms and observations have been made as follows.

3.1 First spray 2011

2, 5, 7 and 10 days after insecticidal treatments, It had been observed that Endosulfan (0.07) reduced the population of the insect pest at 0.31% and Dimethoate (0.04) at 0.33% bugs population per 5 plant respectively whereas Neem oil affected 0.95% of the pest population and Phosalone (0.04) affected 0.92%. From the affected status shown in the table -1 during the first spray, Endosulfan (0.07) and Dimethoate (0.04) were the most effective insecticides for the reducing of the insect population whereas least effective insecticides on the pest population have been identified as Neem oil and Phosalone (0.04) (Table-1, Chart).

3.2 Second spray 2011

After 15 days of first spray, the second spray had been done. 2, 5, 7 and 10 days after insecticidal treatments, Dimethoate (0.04) affected the insect population at 0.40%; Cypermethrin (0.01) reduced the population at 0.42% whereas Neem oil affected the pest population at 1.05% and Monocrotophos (0.05) reduced the insect population at 0.71%. From the above experimental observation indicated that the maximum lost to the insect population has been done by the insecticide-Dimethoate (0.04) and Neem oil fresh has done minimum lost to the pest population (Table-1).

When the means of two spray under treatment were pooled, it was concluded that the best insecticides in reducing the population of chilli bug was Dimethoate (0.04%) which reduced the insect population at maximum 0.37% and next, Endosulfan (0.07%) reduced the pest population at 0.43%. Whereas Neem oil (3.5%) affected the population at 1.00% and Phosalone (0.04%) affected at 0.81%. From the above mean from the two sprays indicated that the maximum damage to the pest population has been done by Dimethoate (0.04%) and the least effective insecticide was Neem oil in suppressing of *E. granulipes* population shown in Table -1 & 3 and Chart.

Table 1: Relative efficacy of different insecticides against Chilli bug, *Elasmomia granulipes* Ww. Infesting Chili during 2011

Name of the selected Insecticides	Concentration (%)	FIRST SPRAY					SECOND SPRAY					Pooled up mean of the two spray
		Mean bug population per 5 plants					Mean bug population per 5 plants					
		2 DAT	5 DAT	7 DAT	10 DAT	Mean	2 DAT	5 DAT	7 DAT	10 DAT	Mean	
Endosulfan	0.07	0.15 (0.80)	0.32 (0.90)	0.77 (1.11)	0.60 (1.04)	0.31 (0.96)	0.08 (0.76)	0.20 (0.80)	1.53 (1.02)	0.35 (1.35)	0.54 (0.98)	0.43 (0.98)
Monocrotophos	0.05	0.45 (0.97)	0.48 (0.99)	0.70 (1.08)	1.28 (1.33)	0.73 (1.09)	0.28 (0.82)	0.32 (0.90)	1.18 (1.29)	1.05 (1.24)	0.71 (1.06)	0.72 (1.08)
Malathion	0.05	0.23 (0.85)	0.52 (1.00)	1.25 (1.32)	1.38 (1.36)	0.85 (1.13)	0.22 (0.84)	0.65 (0.95)	0.47 (0.98)	1.32 (1.34)	0.67 (1.03)	0.76 (1.08)
Dimethoate	0.04	0.15 (0.81)	0.15 (0.80)	0.15 (0.83)	0.83 (1.17)	0.33 (0.90)	0.08 (0.74)	0.08 (0.76)	0.48 (0.99)	0.95 (1.20)	0.40 (0.92)	0.37 (0.92)
Phosalone	0.04	0.40 (0.95)	0.73 (1.11)	0.93 (1.19)	1.62 (1.44)	0.92 (1.17)	0.15 (0.80)	0.38 (0.93)	1.10 (1.26)	1.12 (1.25)	0.69 (1.06)	0.81 (1.12)
Cypermethrin	0.01	0.20 (0.79)	0.23 (0.85)	0.82 (1.15)	1.20 (1.29)	0.61 (1.02)	0.10 (0.77)	0.18 (0.78)	0.65 (1.07)	0.73 (1.10)	0.42 (0.93)	0.52 (0.98)
Neem oil	3.50	0.35 (0.91)	0.72 (0.30)	1.15 (1.27)	1.57 (1.42)	0.95 (0.98)	0.18 (0.83)	0.63 (0.94)	1.23 (1.11)	2.15 (1.31)	1.05 (1.05)	1.00 (1.01)
Control (water)	0.00	0.68 (1.08)	0.88 (1.17)	1.72 (1.48)	2.18 (1.60)	1.37 (1.33)	0.67 (1.08)	1.15 (1.28)	1.20 (1.28)	1.87 (1.49)	1.22 (1.28)	1.30 (1.31)
C.D. at 5%		0.09	0.15	0.30	NS	0.21	0.18	0.24	NS	NS	0.15	0.15

Figures in parenthesis are transformed values of $\sqrt{x+0.5}$ DAT - Days after treatment; NS – Non- significant.

3.3 First spray 2012

2, 5, 7 and 10 days after insecticidal treatments, Dimethoate (0.04%) affected the insect population by reducing 0.28% and Cypermethrin (0.01%) affected the pest population at 0.44%; per 5 as compared to the untreated control. While the Neem oil (3.5%) affected the insect population 0.81% and Phosalone(0.04) affected 0.78% of the pest population. From the above datas show that the most effective insecticides were Dimethoate (0.04%) & Cypermethrin (0.01%) whereas the least effective has been observed in Neem oil (3.5%) & Phosalone (0.04) application. (Table -2).

3.4 Second spray 2012

2, 5, 7 and 10 days after insecticidal treatments. The most

effective insecticides are Dimethoate (0.04%) damaging 0.32% to the population of the insect pest. While Malathion (0.05%) reduced 0.34% of the pest population. Monocrotophos (0.05) reduced 0.57% and Neem oil Fresh affected 0.54% to the insect pest population. The mean of the second spray were calculated and have been observed that the most effective insecticides were Dimethoate (0.04%) and Malathion (0.05%) and Monocrotophos(0.05) and Neem oil Fresh were the least effective insecticides as compared to the untreated control (Table -2).

When the pooled means of the two annual spray schedules were statistically analyzed, a characteristic significance has been observed among the treatments. Dimethoate (0.04%) was the most effective insecticide damaging the insect population

at 0.30% which was coincided with Pai and Dhuri 1991^[5] and Cypermethrin (0.01%) was the second most effective chemical because it reduced the population at 0.41%. While least effectiveness has been observed in the Neem oil (3.5)

application reducing the population at 0.68% and Monocrotophos (0.05) was the second least effective insecticide affecting 0.57 % (Table- 2 & 3 and Chart).

Table 2: Relative efficacy of different insecticides against Chili bug, *Elasmomia granulipes* ww. Infesting Chili during 2012.

Name of the selected Insecticides	Concentration (%)	FIRST SPRAY					SECOND SPRAY					Pooled up mean of the two spray
		Mean bug population per 5 plants					Mean bug population per 5 plants					
		2 DAT	5 DAT	7 DAT	10 DAT	Mean	2 DAT	5 DAT	7 DAT	10 DAT	Mean	
Endosulfan	0.07	0.30 (0.83)	0.28 (0.88)	0.75 (1.11)	0.53 (0.90)	0.47 (0.93)	0.22 (0.84)	0.13 (0.79)	0.47 (0.98)	0.88 (1.02)	0.43 (0.91)	0.45 (0.92)
Monocrotophos	0.05	0.35 (0.85)	0.52 (1.01)	0.58 (1.02)	0.80 (1.14)	0.56 (1.01)	0.30 (0.89)	0.33 (0.91)	0.78 (0.98)	0.85 (1.15)	0.57 (0.98)	0.57 (1.00)
Malathion	0.05	0.35 (0.85)	0.40 (0.95)	0.75 (0.85)	0.79 (1.11)	0.57 (0.94)	0.10 (0.73)	0.42 (0.95)	0.37 (0.92)	0.47 (0.97)	0.34 (0.89)	0.46 (0.92)
Dimethoate	0.04	0.13 (0.79)	0.30 (0.83)	0.20 (0.83)	0.50 (1.00)	0.28 (0.86)	0.25 (0.81)	0.22 (0.84)	0.33 (0.91)	0.48 (0.99)	0.32 (0.89)	0.30 (0.88)
Phosalone	0.04	0.45 (0.97)	0.53 (1.00)	0.83 (1.15)	1.30 (1.33)	0.78 (1.11)	0.25 (0.81)	0.15 (0.81)	0.72 (1.10)	0.82 (1.14)	0.49 (0.97)	0.63 (1.04)
Cypermethrin	0.01	0.23 (0.81)	0.20 (0.83)	0.45 (0.88)	0.88 (1.17)	0.44 (0.92)	0.22 (0.84)	0.40 (0.87)	0.45 (0.97)	0.40 (0.95)	0.37 (0.91)	0.41 (0.92)
Neem oil	3.50	0.58 (1.04)	0.62 (1.05)	0.77 (1.09)	1.28 (1.32)	0.81 (1.13)	0.22 (0.84)	0.42 (0.95)	0.82 (1.13)	0.68 (1.08)	0.54 (1.00)	0.68 (1.06)
Control (water)	0.00	0.92 (1.16)	1.07 (1.24)	1.38 (1.36)	1.75 (1.45)	1.28 (1.30)	0.62 (1.05)	1.05 (1.21)	0.75 (1.10)	1.18 (1.27)	0.90 (1.16)	1.09 (1.23)
C.D. at 5%		NS	NS	0.24	NS	0.12	NS	NS	NS	NS	0.15	0.06

Figures in parenthesis are transformed values of $\sqrt{x + 0.5}$ Abbreviation: DAT - Days after treatment; NS - Non significant.

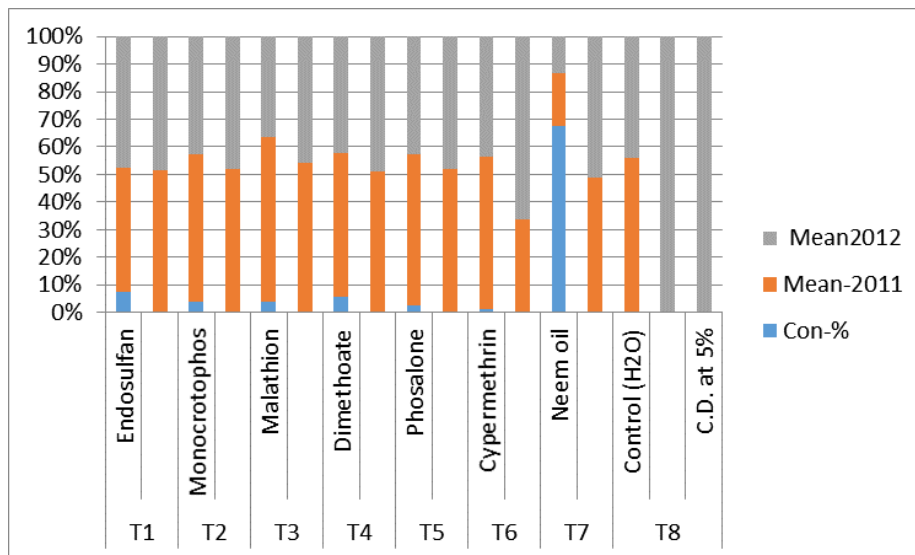


Chart: Showing Relative efficacy of different insecticides against *Elasmomia granulipes*Ww

These observations have been supported by many workers on different plant bugs in different areas like Cereal jassid Sandhu^[7]; cotton jassid, *Amarasca bigutulla bigutulla* in Akola^[2] and Subbaratnam^[10]. The insecticides like Quinalphos and Carbofuran were found effective against the gram leaf hopper, *Amarasca devastans* and Quinalphos and Monocrotophos also the brown leaf hopper in West Bengal and New Delhi^[1, 4]. Kumar and Agarwal (1990)^[4] were the most persistent insecticides against this Jassid and it remained effective for a period of 6 weeks. Similarly Pai and Dhuri^[5] found

Dimethoate is most effective against cowpea Jassid, Karthikeyan^[3] detected Monocrotophos and Phosphamidon against Neem tree mealy bugs, *Pseudicoccus gilbertensis* in Tamil Nadu whereas, Lambdacyhalothrin, Dichlorovos and Profenophos were found to be highly toxic against the Pigeon pea mealy bug, *Coccidohystrix insolitus* in Tamil Nadu. Kumar *et al.* (2013) also detected Acetamiprid to be superior to conventional insecticides in controlling cotton Jassid, *Amarasca bigutulla bigutulla* in Manipur. Since *E. granulipes* is newly recorded insect pest of chilli from this area, not much

information are on recorded neither on its biology nor its control.

Table 3: Relative efficacy of different insecticides against *Elasmomia granulipes*Ww.

	Treatment	Concentration (%)	Mean bug population/5 plants	
			2011	2012
T ₁	Endosulfan	0.07	0.43	0.45
			0.98	0.92
T ₂	Monocrotophos	0.05	0.72	0.57
			1.08	1.00
T ₃	Malathion	0.05	0.76	0.46
			1.08	0.92
T ₄	Dimethoate	0.04	0.37	0.30
			0.92	0.88
T ₅	Phosalone	0.04	0.81	0.63
			1.12	1.04
T ₆	Cypermethrin	0.01	0.52	0.41
			0.98	1.92
T ₇	Neem oil	3.50	1.00	0.68
			1.01	1.06
T ₈	Control (H ₂ O)	0.00	1.30	1.03
			1.31	1.23
	C.D. at 5%		0.15	0.06

Figures in parenthesis are transformed values of $\sqrt{x + 0.5}$

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