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Status Of Synthetic Pesticides And Plantextractsagainst *Raphidopalpa Foveicollis*

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Abstract

Bioassay studies were carried out in the laboratory to determine the relative toxicity of Chloropyriphos.endosulphan, acetone and alcoholic leaf extracts of *Argemone mexicana*, *Parthenium hysterophorus*and *Nicotiana plumbigenifolia* against adult beetle of *Raphidopalpafoveicollis*. Based on the LC_{50} value ofinsecticides and taking the acetone leaf extract of*P.hysterophorus*as a unity, the relative toxicity of chloropyriphos, endosulphan, acetone and alcoholic leaf extract of *A. mexicana*, *P. hysterophorus* and *N. plumbigenifolia* was 7.40, 6.72, 1.23, 2.0, 1.0, 1.34, 0.98 and 1.09 respectively.

The synthetic pesticides chloropyriphosand endosulphanwere found to be most toxic as compared to plant products. However, *A. mexicana* were the were the most toxic among all the three plants used for the successful control of *R. foveicollis*.

Keywords: Synthetic pesticides, Plant extracts, Relative toxicity, *Raphidopalpafoveicollis*.

Introduction

Pesticides can prevent large crop losses and will thereforecontinue to play a role in agriculture. However, ill effects of synthetic pesticides have aroused interest in alternative methods of pest control. Pesticides of plant origin have become the focus of attention today owing to their easy biodegradable nature and safety to mammals, (Pandey and Khan, 2000; Dwivedi and Pareek, 2006; Kaur et. al., 2007; Osman, 2011 and Goulson, 2014).

Raphidopalpafoveicollis Lucas, commonly called as red pumpkin beetle feed on leaves, flower buds thereby causing severe harmespecially to young plants of cucurbitaceae family. keeping in view, the polyphagus nature of the insect, the present investigation was carried out to evaluate the relative susceptibility of *R. foveicollis*to some synthetic pesticides and plant extracts, so that effective control measures can be adopted.

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Material And Methods

The different concentrations of commercial formulation of synthetic pesticides i.e. endosulphan and chloropyriphos were prepared from their emulsifiable concentrates with tap water.

The leaves of *Argemone mexicana. Parthenium hysterophorus* and *Nicotiana plumbigenifolia* were dried in shade. The leaves were again dried in an oven at 45ºC for about 72 hours. After drying, the leaves were powdered in a blender and stored in glass jar. The leaves were also extracted with different solvents for which sequential extraction was followed with ethyl alcohol and acetone. Final residue was also dried and stored for use. For this a 50g sample of grind leaves was taken in a soxhlet to which ethyl alcohol was added until the leaf materials was dipped completely.

The solvent was added to the left over residue for extracting the remaining soluble material. This process was repeated 4 to 5 times in 24 hrs. The solvent was filtered through whatman. 2 filter paper placed in a funnel and extract was collected in a beaker. This extract was evaporated in a water bath at 40°C to know the amount of extract obtained from these plants. The residue after extraction was dried and extracted again with acetone as indicated above.

For experimentation the red pumpkin adult beetle were collected from the fields of cucumber in the month (July-October) and preconditioned in the laboratory at 27º±1ºC.Only the adult insect were placed in the petri dishes and directly sprayed with 1ml emulsion of each concentration of insecticides under potter's tower at 24cm mercury pressure the treated insects were then transferred to separate jarscontaining untreated host plant material as food and kept at 27º±1ºC.

Mortality counts were taken 24hr after treatment. Each experiment was replicated thrice and six to seven concentrations of each pesticidewere tested to obtain the log-concentration mortality curve. The data obtained was analysed statistically to calculate the median concentration value (LC_{50}) .The value of relative toxicity of different pesticides was calculated by taking the LC_{50} value of *P. hysterophorus* in acetone as unity.

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Result And Discussion

It is evident from the Table 1 that on the basis of LC_{50} valuethe descending order of toxicity of different synthetic pesticides and plant extracts to adult beetle of *R. foveicollis* are chloropyriphos> endosulphan>*A. mexicana* (alc) >*P. hysterophorus* (alc) >*A. mexicana* (ace) > *N.plumbigenifolia* (alc) >*P. hysterophorus* (ace) >*N. plumbigenifolia* (ace)

Out of 8 pesticides only 5 pesticides i.e.endosulphan, chloropyriphos, *A. mexicana* (alc, ace) and *P. hysterophorus* (alc) arefound to be more toxic than acetone extract of *P.hysterophorus* being 6.72, 7.40, 2.0,1.23 and 1.34 times respectively. However, extract of *N. plumbigenifolia* (alc and ace) were found to be 1.09 and 0.98 times less toxic.

Therefore, it may be inferred from the present investigation that synthetic pesticides (endosulphan and chlorophriphos) are most toxic than all three plant extracts to *R. foveicollis*. Also, alcoholic and acetone extract of *A. mexicana* is found to be most toxic against this pest, *P.hysterophorus*showed moderate toxicity while *N.plumbigeni*folia showed least toxicity to *R.foveicollis*.

Similarly Vekaria and Patel (2000) and Ahmed and Bhattacharya (1991) have studied the bio efficacy of botanicals and certain chemical insecticides against the mustard aphid and *Spilosomaobliqua*. According to them addition of various fractions of neem, *Parthenium* and *Bougainvillea* in the diet of *S.obliqua*showed variable biological activity. Also, they have reported that *Parthenium* revealed higher degree of growth inhibitory effect. Similarly, various other Scientists have studied the comparative efficacy of plant products and chemical insecticidesagainst various insect pests (Das *et al*., 2000, Dadmal*et al*., 2001; Singh *et al*., 2001)

Therefore, on the basis of above investigation and discussion it can be concluded that although synthetic Pesticides (chloropyriphos and endosulphan) are most toxic than plant extracts against *R. foveicolis*. But it can be suggested that plant extracts of *A.mexicana P.hysterophours* and *N.plumbigenifolia*can be used in place of highly toxic synthetic pesticides because of itssafety to beneficial insects, its lower cost & higher yield indicated their suitability for inclusion in integrated pest management.

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LC_{50}= Concentration calculated (ppm) to give 50 percent mortality
Relative toxicity = LC_{50} value of *P. hysterophorus* in acetone extract as unity.

Table-1: Relative toxicity of different insecticides and plant extract to*Raphidopalpafoveicollis*

S.No.	Treatment	Regression equation	LC_{50} (ppm)	Relative toxicity	Order of toxicity
1.	**Endosulphan**	Y=-144.166+75.998X	358.82	6.72	2
2.	**Chloropyriphos**	Y=-99.784+59.602X	325.89	7.40	1
3.	***Argemone mexicana***				
(a)	Acetone leaf extract	Y=- 115.856+50.377X	1960.16	1.23	5
(b)	Alcoholic leaf extract	Y=-86.427+44.284X	1204.29	2.00	3
4.	***Parthenuiumhysterophorus***				
(a)	Acetone leaf extract	Y=- 108.443+46.85X	2410.58	1.00	7
(b)	Alcoholic leaf extract	Y=-110.020+49.18X	1793.55	1.34	4
5.	***Nicotiana plumigenifolia***				
(a)	Acetone leaf extract	Y=- 110.0+47.180X	2462.65	0.98	8
(b)	Alcoholic leaf extract	Y=-113.709+48.933X	2215.89	1.09	6

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