Uttar Pradesh J. Zool. 31(3) : 345-347, 2010 ISSN 0256-796X

EFFECTIVENESS OF SOME PLANT PRODUCT FOR THE CONTROL OF PULSE BEETLE *CALLOSOBRUCHUS CHINENSIS* ON STORED GREEN GRAM

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The effect of castor and karanji oil at .25, .50, .75 and 1.0% w/w concentration/ 100g of green gram against pulse beetle *C. chinensis* were studied. The study revealed encouraging results as the seeds of green gram could effectively be protected from the damage by mixing the seed at the rate of .25 to 1.0 ml/100g seed. The study suggested these oils to be pest effective, safer to predators, economically viable and socially acceptable especially by the farmers of the region.

Key words : Plant product, control, stored green gram, *Callosobruchus chinensis.*

INTRODUCTION

Synthetic insecticides though effect quick reduction in insect pest populations, these could be considered ideal ones due to reasons of safety to human beings, environment, resurgence of minor insect pests. Thus, their application should be judicious in the pest management programme. Natural plant products on the other hand, with better degree of selectivity toxicity to various fauna may form ideal substitutes for synthetic insecticides. Very little work on the storage of green gram (mung) seed using non-edible oils such as karanja and castor seed oils has been done so far in India in general and state of Bihar in particular. Therefore, the objective of the present study was to evaluate the possibility of using some non-edible oil such as karanja and castor seed oils as grain protectant against pulse beetle *C. chinensis* infesting green gram under normal storage condition.

MATERIALS AND METHODS

On proper identification, a healthy culture of *Callosobruchus chinensis* was maintained in the P.G. Deptt. of Zoology, A.N.S. College, Barh (Patna) in glass jars of 20 cm x 5 cm containing green gram at 30 ± 2^{0}C and 70 ± 5% RH, undamaged 100 g green gram free from bacterial, fungal and insect infestation were kept in glass jars and mixed with karanja and castor seed oil respectively, using four different concentrations *i.e.* 0.25, 0.50, 0.75 and 1.0% w/w along with an untreated control in three replications. Ten pairs of freshly emerged adult of *C. chinensis* were introduced in each jar with the top covered with muslin cloth and all the jars were kept at room temperature of 30 ± 2^{0}C and 70± 5% RH. Observations on percent damage and insect adult mortality were made periodically during summer, rainy and winter seasons and was subjected to different statistical calculations to find out the significance of factors statistically.

RESULTS AND DISCUSSION

During summer and winter seasons, the experimental observations had shown that the population growth of the pulse beetle *C. chinensis* reared on green gram after treat-

Table I : Effect of mixing Castor Oil with Seeds of Green Gram on the weight loss and mortality of *C. chinensis.*

Treatment (%) W/W	Seasons					
	Summer		Rainy		Winter	
	Loss in seed weight (g)	Morality %	Loss in seed weight (g)	Morality %	Loss in seed weight (g)	Morality %
0.0	10.90	25.00	10.78	18.50	9.65	24.05
0.25	7.30	26.05	7.15	20.05	6.05	25.05
0.50	5.80	29.65	5.55	23.60	5.45	29.05
0.75	5.00	34.15	4.95	27.05	4.85	35.05
1.00	4.35	38.90	4.30	29.15	4.05	40.20
CD at 1% of significance	0.755314651	1.405009548	0.412145354	0.804430961	0.354668863	0.193039131

Table II : Effect of mixing Karanji Oil with Seeds of Green Gram on the percentage weight loss and mortality due to infestation with *C. chinensis.*

Treatment (%) W/W	Seasons					
	Summer		Rainy		Winter	
	Loss in seed weight (g)	Morality %	Loss in seed weight (g)	Morality %	Loss in seed weight (g)	Morality %
0.90	10.70	25.50	10.40	21.90	9.25	24.15
0.25	7.20	26.95	7.00	22.65	5.98	25.50
0.50	5.70	30.25	5.55	26.90	5.15	29.15
0.785	4.90	32.85	4.75	30.75	4.65	35.40
1.0	4.20	39.65	4.50	32.05	3.80	40.70
CD at 1% of significance	0.649769521	4.309293357	0.513871994	1.065161526	0.698860283	0.721500199

ment was low and mortality high. In rainy season, the beetles had the tendency to multiply at higher rates and mortality was low and the results obtained were presented in Table I and II.

In the present set of experiment, after application of these oils of different doses, the result showed significant reduction in damage as well as in the insect population in treated grains. As far as various doses of different treatments were concerned the treatment containing 1.0 ml/ 100g of green gram manifested highest toxicity and treatment containing .25 ml/ 100g showed least damage. The most important point is to note that the mortality response was directly proportional to the increase in dose with the advancement of time. Heavy losses were observed in the weight of the pulses under studies as a result of insect attack. The results showed that the beetles only bored the grain keeping the shape intact. Although progressive insect infestation, the viability of the grain was observed to decrease proportionately. It therefore, appears possible that the grubs feed on the germs from inside. These studies indicate that if the infestation of the bruchid in this seed is detected and treatment given in the early stages the germination of the seeds may be expected to be as good as in the normal undamaged seed.

These results are in accordance with the results obtained by Chander & Ahmed (1986), Babu *et al* (1989) and Negi *et al* (1997). In addition to reduced oviposition higher adult and larval mortality have also been reported. The castor and karanja oils did not affect viability, palatability, cooking quality and physical appearance of seeds. We found that the oils didn't affect the germination of seeds.

The study has shown that these oils may be useful for storing green gram seeds to prevent it from devastation by *C. chinensis*. Results of the experiment indicated avoidance behaviours in *C. chinensis* towards treated with castor and karanja oils.
On the perusal of results, it may be concluded that :

- It is locally and cheaply available on a commercial basis
- Quality requirement is less
- It is not toxic to seeds
- It supports extra nutrients to seeds.

ACKNOWLEDGEMENT

The second author wishes to express gratitude to Dr. S.C. Singh, Chairman, Bihar State Pollution Control Board, Patna for constant encouragement and helpful guidance.

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