Bangladesh J. Sugarcane, 3 : 1-4

Toxicity of nuvacron 40 SCW and carbicron 50 SCW on adults of white grubs (*Brahmina sp.*)

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ABSTRACT

An experiment was conducted in the laboratory to study toxicity of Nuvacron 40 SCW and Carbicron 50 SCW on adults of white grub (*Brahmina sp.*). Mango leaves sprayed with these insecticides at concentration 0.1% and 0.05% were fed to adult beetles for 24 hours and the time needed for total mortality was recorded. All the treatments killed 90% beetles within 3 days and more than 95% mortality was obtained within 6 days, whereas mortality of the untreated beetles was only 58.75% after 15 days.

INTRODUCTION

Several species of white grubs belonging to family Melolonthidae have been identified as serious pests of sugarcane in different sugarcane growing countries including Bangladesh. (Anon, 1979 ; Anon, 1980). The adults of *Brahmina* sp. emerge in late February to April at dusk from the soil and take shelter on big trees like mango, black-berry, guava, jack-fruit and other wild plants in the vicinity of the cane fields. They feed on the leaves and young fruits and mate there. (Personal communication with Dr. M. A. Hamid Miah and Dr. M. H. Khan, SRI, 1981). They cause severe crop loss in the northern part of Bangladesh. They are also gradually spreading over the southern region (personal observation). The time and method of pesticide application are influenced by several factors, such as the life cycle and behaviour of the species, its seasonal occurence, the potential phytotoxicity and the mode of cultivation (Wilson, 1969a).

Soil insecticides of the Chlorinated hydrocarbon group like BHC (Benzene hexachloride), Aldrin, Dieldrin, Heptachlor etc. have been found effective against white grubs (Bull and Cullen, 1981 ; Martorell and Gaud, 1967). Due to their extended persistance and toxic effect on beneficial insects as well as phytotoxicity these are receiving reduced attention for use in the fields. BHC is already banned in Bangladesh. BHC (18% dust) is less effective than Oftanol 10 G (Srivastava *et. al.*, 1981). All the above mentioned chemicals are usually applied in soil for killing larvae.

A preventive method of controlling larvae by killing adults was thought to be a supplementary approach. Therefore, an experiment was set up with systemic organophosphorus insecticides to study the effect of pesticide in the adult beetles following feeding of treated (toxic)leaves.

MATERIALS AND METHODS

The experiment was conducted during March-April, 1981 in the laboratory. Two organophosphorus systemic insecticides namely, Nuvacron 40 SCW (Monocrotophos : 0, 0-dimethyl-0-(2-methylcarbamoyl-1-methylvinyl)-phosphate) and Carbicron 50 SCW (Dicrotophos : 0, 0-dimethyl-0-(2-dimethylcarbamoyl-1-methyl-vinyl)-phosphate) both at 2 different rates of 0.1% and 0.05% spray, were administered on young mango leaves following RCB with four replications. Twenty white grub adults (beetles) of the *Brahmina* sp. were released in each of the 20 plastic pots (19.5 cm. high x 19.5 cm. dia) containing about 3 cm. thick sand. The insecticide treated branches were first inserted in small plastic bottles containing water to keep them fresh and were placed in the grooves of sand inside the plastic pots. Each of them, containing treated leaves and beetles, was kept covered with nylon net to prevent the beetles from escaping during their flight activity at night. The following day these treated leaves were replaced by a set of fresh, untreated leaves and the process was continued everyday till all the beetles in a particular treatment died. Data on mortality were recorded everyday and the results were statistically analysed.

RESULTS AND DISCUSSION

Cumulative mortality is represented in figure 1. Percent mortality among the treated ones just after consumption of insecticides on the first night was remarkably

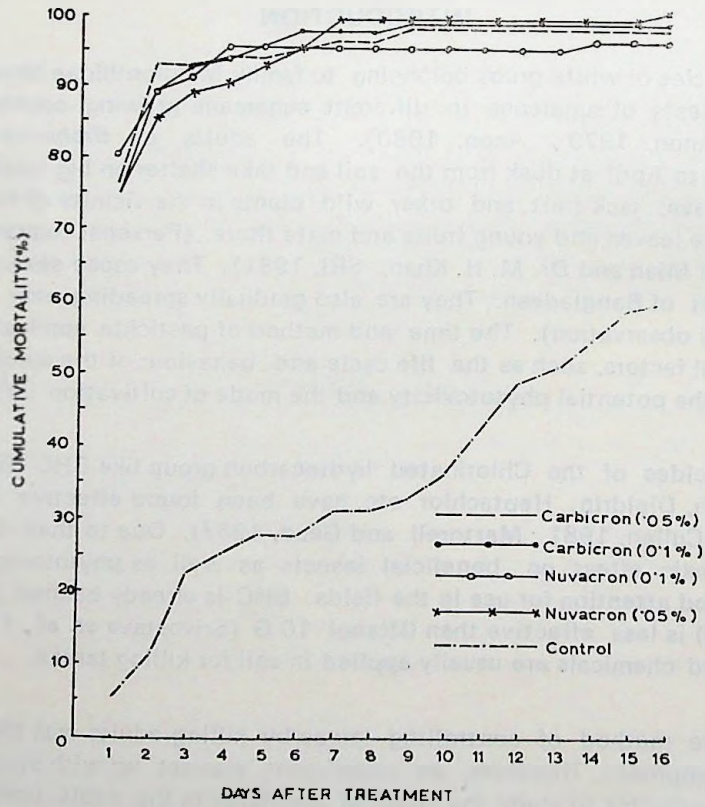

Figure 1. Cumulative mortality % at different concentration of nuvacron and carbicron.

high compared to the control. Around 90% mortality was observed within 3 days (72 hours) and 95% mortality was observed in the treated beetles within 4 to 6 days after treatment compared to 27.5% mortality in control. Cent percent mortility was observed among Nuvacron (0.05%) treated beetles within 15 days after treatment. Mortality on other treated beetles was below 100% but above 95% whereas that in the untreated group was only 58.75%. The mortality study was continued upto the 16th day after insecticide application when only one beetle survived in Carbicron 0.1%, two in Carbicorn 0.05%, three in Nuvacron 0.1% and thirty two in the control. These results agree with those obtained on *L. consanguinea* with DDT, Aldrin, Dieldrin (Kalra and Kulshreshtha, 1961) where the toxicity remained in the adult beetles for less than one week.

The statistical analysis showed that all the insecticide treatments were significantly different from the control. But no significant difference within insecticide doses was observed (Table 1). The results also show that a few beetles survived after 15 days following their confinement with the treated leaves. It seems probable that these beetles did not eat the treated leaves which was exposed to feeding for 24 hours only, otherwise they would have died within a week.

Table 1 : Comparative efficacy of different treatments on beetle mortality after 16 days of feeding.

Treatments	Control	Nuvacron 0.1%	Nuvacron 0.05%	Carbicron 0.05%	Carbicron 0.01%
Mortality	57.50 b*	96.25 a	97.50 a	97.50 a	98.75 a

* Figures accompanied by the same letter are not significantly different at 5% level of probability.

Application of insecticide to the soil between rows of cane when the beetles emerge and working them into soil gave good control (Fewkes and Greathead, 1978) these results indicated that the adult beetles might be killed by spraying feeding trees as quoted by Wilson (1969b) from Saplala (1959) and thus oviposition in the sugarcane field may be prevented to a great extent. Further works are needed to determine the toxicity persistence time of these chemicals in treated tree, which will, in the long run, help decide the interval of spraying.

Therefore, it is assumed that integration of adult killing by spraying on feeding trees with application of insecticides in the soil could give better control than either of the two.

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