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Efficacy of certain insecticides against *Choreodocus illustris* Walker (Orthoptera: Acrididae) under laboratory conditions

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Abstract

Published literature shows that the numbers of known insect species causing damage to crops are about 1,000 out of which 70 species are assumed to be responsible for maximum losses. It has been estimated that these crop losses in India are up to the tune of nearly Rs. 600 crores / year. Therefore, some methods should be evolved to combat these losses and those proving to be the effective control measures against insect pests to save the crops, in the field as well as under the storage condition, must be propagated. Keeping this view in mind, the present study was aimed to evaluate the effect of insecticidal action against *Choreodocus illustris* (adults). Insecticides such as Malathion, Cypermethrin, Endosulfan and Monocrotophos were selected in the present study and their predetermined concentrations of 0.005%, 0.025%, 0.05%, 0.1%, 0.25%, 0.5% and 1.0% (v/v) were applied on *C. illustris* in laboratory conditions. Maize leaves were dipped in these insecticides and then the insects were allowed to feed on them. Our results showed highest mortality (86%) of *C. illustris* (adults) at 1.0% concentration of Monocrotophos and this mortality profile declines with decreased concentration of the insecticide. No mortality of *C. illustris* (adults) was recorded due to the application of Malathion.

Keywords: Insecticidal efficacy; *Choreodocus illustris*; Cypermethrin; Malathion; Endosulfan; Monocrotophos.

Introduction

Uttar Pradesh is primarily an agricultural state and more than 75% of land area of this state is under agricultural practices. Maize is the major cultivated crop and host of *Choreodocus illustris* (Orthoptera: Acrididae), an important representative of Acrididean family Pyrrhocoridae. Both stages (nymphs and adults) of *C. illustris* feed on maize leaves. *Choreodocus illustris* is primarily polyphagous and feeds on leaves of rice, maize, millets, sugarcane, etc. Maize borer, *Choreodocus illustris*, is noticed wherever this crop is grown, but high damage is observed only in some localities. In order to improve the production of crop by managing the insect pest, work on the effects of insecticides like Malathion, Cypermethrin, Endosulfan and Monocrotophos on *C. illustris* is being carried out. However, reports on the use of certain other insecticides against *C. illustris* have already published (Mukerji et al. 1983; Even et al. 1984; Verma et al. 1998; Johnson et al. 1990; Tiwari, 2000; Jena, 2002). The present study demonstrates control methods of *C. illustris* in laboratory conditions using some known commercially available insecticides.

Materials and Methods

The insects *Choreodocus illustris* were collected from Naqvi Park, Aligarh Muslim University, Aligarh. The culture was maintained in the insectary under the controlled conditions of 35 °C and R.H. 65 ± 5%. The *Choreodocus illustris* were fed on maize leaves. Technical grade sample of Malathion 50% EC-MALATHION (Paramount Pesticides Ltd., Meerut), Cypermethrin 25% EC-MASTER (Pestimade, Ahmedabad, Gujarat), Endosulfan 35% EC-Parasulfan (Paramount Pesticides Ltd., Meerut), Monocrotophos 36% SL-SOLDIER (Pestimade, Ahmedabad, Gujarat) were obtained from the manufacturers. The chemical insecticides were prepared according to Pearson's square method. These insecticides were diluted to 0.2% stock solution using double distilled water and were further diluted according to the requirements.

The maize leaves were dipped in different concentrations (0.005%, 0.01%, 0.025%, 0.05%, 0.1%, 0.25%, 0.5% and 1.0%) of insecticides. The insects were allowed to feed on them and mortality was counted during feeding period in case of *C. illustris* (adults).

Results and Discussion

The observations made on comparative response of four insecticides namely Malathion,

Cypermethrin, Endosulfan and Monocrotophos on adult grasshopper, *Choroedocus illustris* (Acrididae), are summarized in Table-1.

It was observed that when the *C. illustris* adults were allowed to feed on the treated maize leaves with various concentrations of insecticides, the highest mortality 86% was noted at 1.0% concentration of Monocrotophos as reported previously by Jena et al. (2002) in grasshoppers. In the last two decades, researchers working on insecticides have obtained interesting results (Mathews, 1993; Jaglan et al., 1995). The mortality decreases with decrease in the concentration of insecticides, being lowest at 0.005% concentration. Least mortality response is noted against Malathion which is zero. Tiwari (2002) also reported the toxicity of chlorfluazuron against fifth instar hoppers of *Schistocerca gregaria*. It adversely affected the survival rate, and average mortality rate increased with rising concentrations of insecticides. Comprehensive studies are being carried out on systemic insecticides with the objective to control insects. Pesticides had contributed a lot to the welfare of man from last four decades. In order to accomplish the purpose, pesticides must be lethal to the pests. Many countries, therefore, have adopted a procedure to protect the public against harmful effects of these chemicals in food while at the same time recognizing legitimate need of their use in agriculture.

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Table-1: Effect of certain insecticides against *Choroedocus illustris* (Acrididae) adults.

Name of Insecticide	Percent mortality at various concentrations							
	0.005%	0.01%	0.025%	0.05%	0.1%	0.25%	0.5%	1.0%
Malathion	0.0 ±0.0	10.00 ±1.118	19.00 ±1.479	30.00 ±1.802	42.00 ±2.291	48.00 ±3.240	53.00 ±2.947	75.00 ±4.145
Cypermethrin	4.00 ±0.707	8.00 ±7.07	13.00 ±1.089	18.00 ±2.061	46.00 ±2.958	53.00 ±3.699	57.00 ±2.861	66.00 ±3.201
Endosulfan	4.00 ±0.707	8.00 ±1.414	12.00 ±1.870	26.00 ±3.354	37.00 ±4.380	59.00 ±4.602	75.00 ±4.085	82.00 ±3.278
Monocrotophos	13.00 ±1.089	21.00 ±1.479	25.00 ±1.479	44.00 ±1.870	52.00 ±1.870	55.00 ±2.487	79.00 ±3.631	86.00 ±3.354