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NOTE

OVICIDAL ACTIVITY OF SAN-155 AGAINST EGGS OF THE ALFALFA WEEVIL, *HYPERA POSTICA*[1]

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Abstract — An experimental systemic insecticide SAN-155 (5-dimethylamine-1, 2, 3-trithiane hydrogenoxalate) was tested for ovicidal activity against the eggs of the alfalfa weevil (*Hypera postica* Gyllenhal). A dose of 0.126 μg a.i./cm^2 or higher on 9 cm diameter filter paper containing insect eggs, prevented the eggs hatching and a dose of 6.280 μg a.i./cm^2 inhibited the development of the insect embryo.

INTRODUCTION

Direct application of insecticides on a plant may not affect the eggs of pest insects deposited within the host plant tissue, but the eggs would be accessible to the toxic compounds with systemic action. Groups of compounds most commonly used as ovicides are dinitrophenols and petroleum oils [5], and little attention has been given to the ovicidal compounds with plant systemic activity. The latter type of compounds could be used as selective insecticides in integrated control programs.

This report is concerned with laboratory tests conducted to determine the ovicidal activity of an experimental systemic insecticide SAN-155 (5-dimethylamino-1, 2, 3-trithiane hydrogenoxalate) against the 1-day old eggs of the alfalfa weevil (*Hypera postica* Gyllenhal).

MATERIALS AND METHODS

Uninfested alfalfa stems were obtained from the alfalfa field and all leaves except a few terminal ones were removed. Stems were held in paper cups, the lower part of a stem extending through a hole at the bottom of the cup into a test tube containing water. Female weevils were allowed to oviposit in the stems for a period of 2 hr. Eggs were obtained from the stems 24 hr later and 50 eggs were transferred into each of a series of sterilized petri dishes containing a double layer of 9 cm diameter Whatman No. 1 filter paper. SAN-155 was obtained as a soluble powder 90% w/w a.i. from Sandoz Ltd, and dissolved in distilled water to make a series of dilutions ranging between 0.0001 and 0.01% a.i. For treatment a 4-ml aliquot of a dilution was poured onto the eggs in the petri

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Table 1. Effect of various doses of SAN-155 on the hatching of the alfalfa weevil eggs

Dose μg a.i./cm² of filter paper	Avg no. of eggs hatched*	Adjusted % hatched†
Control (water)	45.00	100.00
0.063	46.00	100.00
0.126	27.90	62.00
0.188	7.67	17.00
0.314	1.33	2.96
0.628	0	0
1.884	0	0
6.280	0	0

* Fifty eggs treated/replicate.
† Abbott's formula was used to adjust for mortality of eggs not associated with ovicide.

dish, so that the treatment doses ranged between 0.063 and 6.280 μg a.i./cm^2 of the filter paper. Each treatment had three replicates and the control received 4 ml of distilled water only. Treated eggs were allowed to hatch at the room temperature (22–25°C).

RESULTS AND DISCUSSION

Data related to the percentage of eggs hatched are shown in Table 1. Abbott's formula [1] was employed to adjust for the mortality not associated with the ovicide. The untreated eggs hatched in a 7–9-day period. Those treated eggs which did not hatch within this period, did not hatch in an additional period of 7 days either and were considered dead.

A 0.628 μg a.i./cm^2 or higher dose completely inhibited the eggs from hatching; whereas a dose of 0.063 μg a.i./cm^2 was ineffective. With the intermediate doses, the egg mortality progressively increased as the concentration of the toxicant was increased. With a treatment of 1.884 μg a.i./cm^2 or a lower dose, the insect embryo did develop but eclosion was prevented. However, a 6.280 μg a.i./cm^2 dose inhibited egg maturation as well, and the treated eggs failed to turn darker. This type of activity involving arrest of embryonic development with higher concentrations of the toxicants has been reported for some other ovicidal compounds as well [3, 4].

These results are based on the direct application of the toxicant on the weevil eggs, and further studies are needed to evaluate the systemic ovicidal activity of this compound against the insect eggs deposited within the host plant tissue. The concentrations found in these tests to have ovicidal activity, are much lower than those recommended [2] for field sprays of this compound against agricultural pest insects and the chemical may prove to be valuable in insect egg control.

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