

Evaluation of Effective Dose of Monocrotophos for the Control of Mango Hopper *Amritodus atkinsoni* Lethierry (Cicadellidae: Homoptera) by Injection Method and Its Comparison with Foliar Application

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ABSTRACT

Three doses viz., 0.15, 0.25 and 0.30 ml a.i. of monocrotophos (Nuvacron 40 EC)/cm girth as stem injection and recommended dose viz., 0.04% monocrotophos by foliar application were applied after flowering on alfanso variety of mango tree and their effectiveness were compared. Monocrotophos 0.25 and 0.30 ml a.i./cm girth as stem injection and monocrotophos 0.04% as foliar application decreased the population of mango hopper significantly after one week of treatment and were also remained effective upto one month. One month after application, the effectiveness of monocrotophos 0.04% by foliar application was reduced. The lower dose (0.15 ml a.i./cm girth) of Monocrotophos was effective only after third week of injection. Monocrotophos 0.25 ml a.i./cm girth was the most effective lowest dose which had controlled the hopper population for more than five weeks.

(Received on 17th Octo. 1981)

INTRODUCTION

Mango hopper *Amritodus atkinsoni* Lethierry is the most destructive pest of all the varieties of mango in South Gujarat. Its population starts increasing with the beginning of the flowering season in the month of January and continues up to June. The adult population buildup is seen from February-March onwards. Both adults and nymphs suck the cell sap of the tender shoot, leaves and inflorescences. The act of oviposition into the veins of tender leaves result into deformation of such leaves. Severe infestation leads into severe shading of flowers and even young fruits. The hoppers also excrete

honeydew which encourages the development of shooty mould leading to black coating on leaves which ultimately interferes the photosynthetic activity of the tree.

For the control of the mango hoppers, monocrotophos EC. @ 0.03% to 0.05% as foliar application on mango have been found very effective by various workers, viz., Shah *et al.*, (1979) Prasad *et al.*, (1979); Prasad and Bagle (1979); Siddiqui and Mahur (1979); Patel (1979); Hyder and Laxminarayan (1979 a and b); Tandon (1979); Tandon and Lal (1979) and Singh and Mistra (1979). Similarly it has also been applied through stem injection and found effective for the control of various pest of coconut (Rai,

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1973; Stelzer, 1970) and mango (Sandhu *et al.*, 1979). The bioassay work to assess the residue of six insecticides including monocrotophos injected in the mango trees at the level of 0.1, 0.2, and 0.3 ml a.i./cm. girth of the trees, it has been found to be safer as there was absence of any residue in the market size fruits (Jayaram and Thontadarya, 1978).

Thus literature revealed that monocrotophos is very effective both as foliar spray and stem injection for the control of mango hoppers. However, the effective dose of monocrotophos by stem injection method have not been evolved for the control of mango hoppers in Gujarat and its comparison is not made with foliar application of recommended dose i.e. monocrotophos @ 0.04%. The present paper deals with studies conducted on the efficacy of different doses of monocrotophos EC. (Nuvacron 40 EC.) by stem injection method and is being compared with the efficacy of foliar application of monocrotophos applied @ 0.04%.

MATERIALS AND METHODS

The field trial was laid out during February-March 1981, in an orchard of alfanso variety of mango at Agricultural Experiment Station, Gujarat Agricultural University, Paria, Dist. Valsad (Gujarat State) in randomized block design with five treatment replicated four times (Table 1). Monocrotophos (Nuvacron 40 EC) was applied @ 0.15, 0.25, and 0.30 ml a.i./cm. girth of the main trunk of the mango trees by injection method (I.M.) after flowering. About 3 to 4 cm. round hole (about one to two feet above the ground level) was drilled at an angle of 45° in the trunk of tree with the help of an Auger (Gilmet) for

injecting the insecticidal liquid. The depth of the hole was kept depending upon the thickness of the main stem and the quantity of insecticide to be injected in the trunk. The frass from the hole was removed by inserting and pulling out the gilmet again and again. Measured quantities of different doses of monocrotophos were filled into the hole with the help of "leaf-funnel" to direct the flow of the insecticide into the hole. Later the holes were smeared with solution of copper oxychloride (10 grams) and Bavistin (5 grams) added in 100 ml water. The hole was then plugged with wet soil lump.

Foliar application (FA) was done by spraying monocrotophos (Nuvacron 40 EC) @ 0.04 % with the help of bamboo lance with triple action nozzle attached to the hydrolic energy foot sprayer.

The population count of nymph of pretreatment as well as at week interval after treatment was made from eight inflorescences per tree. One tree was treated as one replication and four trees were allotted to each treatment. The analysis of data on pretreatment population was done using $\sqrt{n}$ transformation while the data on post treatment population were subjected to statistical analysis using $\sqrt{n+1}$ transformation. Simultaneously to evaluate the treatments, the analysis of percentage reduction was undertaken after angular transformation.

RESULTS AND DISCUSSION

The data of the trial presented Table 1 indicate that there was significant difference in the post treatment population after a week in different treatments. Maximum per cent reduction was found in treatment No. 2 and 3 of I.M. The order of toxicity was

TABLE I

Efficacy of monocrotophos (Nuvacron 40 EC) against mango hopper *Annilodius alkinsoni* Lethierry.

Sr. No.	Concentration of monocrotophos	Pre-treatment population	Post treatment population and percentage reduction of mango hopper									
			1st week		2nd week		3rd week		4th week		5th week	
			hopper	Percentage reduction	hopper	Percentage reduction	hopper	Percentage reduction	hopper	Percentage reduction	hopper	Percentage reduction
1.	0.15 ml. a.i./cm. girth by injection method	7.33 (53.73)	5.58 (30.14)	39.08 (39.76)	6.16 (36.82)	31.10 (26.68)	5.50 (29.25)	34.79 (32.55)	1.83 (3.35)	73.04 (91.47)	2.20 (3.84)	72.72 (91.18)
2.	0.25 ml. a.i./cm. girth by injection method	6.37 (40.58)	1.10 (0.21)	79.94 (96.95)	1.98 (2.92)	68.86 (86.97)	2.58 (5.56)	61.51 (77.24)	1.64 (1.69)	74.96 (93.27)	1.94 (2.76)	71.66 (90.10)
3.	0.30 ml. a.i./cm. girth by injection method	7.64 (58.37)	1.00 (0.00)	79.86 (100.00)	1.37 (0.88)	80.40 (97.22)	1.50 (1.25)	78.24 (95.85)	1.00 (0.00)	79.86 (100.00)	1.10 (0.21)	80.64 (97.36)
4.	0.04% a.i. by foliar application	8.78 (77.09)	1.00 (0.00)	79.86 (100.0)	1.00 (0.00)	79.86 (100.0)	2.60 (5.76)	72.50 (90.96)	1.00 (0.00)	79.86 (100.0)	3.31 (9.96)	66.46 (84.05)
5.	Control (untreated)	6.04 (36.48)	8.81 (76.62)	10.14 (0.00)	10.67 (112.85)	10.14 (0.00)	14.51 (209.54)	10.14 (0.00)	6.97 (47.58)	21.30 (13.20)	4.42 (21.28)	43.86 (48.02)
S.E.m. (±)			0.81	5.16	1.19	7.15	1.72	9.77	0.89	5.96	0.83	7.81
C.D. (P = 0.05)			N.S.	2.58	3.67	21.96	5.30	30.02	2.75	18.31	N.S.	N.S.

Figures in parenthesis are retransformed values.

monocrotophos 0.3 ml a.i./cm girth by IM = monocrotophos 0.25 ml a.i./cm girth by I.M. = monocrotophos 0.04% by F.A. > monocrotophos 0.15 ml a.i./cm girth by I.M. All the treatments were significantly superior over the control. On second and third week after treatment almost similar trend was found. On fourth week after treatment, all the treatment except the control were at par indicating the late effectiveness of lowest dose of monocrotophos (0.15 ml a.i./cm girth) by I.M. On fifth week after treatment the population in foliar application was found to be increased indicating the loss of effectiveness by F.A. Similar increase in nymph population of mango hopper was also observed in the treatment of monocrotophos 0.15 ml a.i./cm girth by I.M. In control, a trend of continuous rise in population was observed up to 3rd week and later on it was found declining because of drying of inflorescence due to previous infestation. Thus, it can be concluded that monocrotophos 0.25 ml a.i./cm girth given by I.M. was the effective lowest dose for reducing the population considerably after a week and remained effective for more than five week. Monocrotophos 0.04% applied by FA remained effective up to 4th week; thereafter its efficacy was decreased.

It is worth to indicate one of the important observation made during the study that in one of the replication of I.M. where the trunk of the tree bifurcated into two trunks from the bottom and the injection was given at the base of bifurcation point, the insecticide did not translocate properly and reach to leaves and inflorescence in one of the trunk bifurcation resulting no decrease of population on the inflores-

cence of that trunk. Thus in such condition it is suggested to inject each half of the total insecticide into two holes made separately in two bifurcated trunks. In spite of equal efficacy of monocrotophos against mango hopper up to four week for FA and five week for IM, the IM can be considered effective method for the control of mango hopper in mango orchards having very tall and old trees where it is difficult to spray the insecticide by FA.

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