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Evaluation of Effective Dose of Monocrotophos Against *Nephantis serinopa* Meyrick by Trunk Injection Technique and It's Comparison to Foliar Spray*

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ABSTRACT

An experiment to evaluate effective dose of monocrotophos against *Nephantis serinopa* Meyrick, incorporated by trunk injection technique and foliar spray was carried out on the farm of N. M. College of Agriculture, Navsari, during 1980-81 and 1981-82. West coast tall, a commonly grown variety of coconut in South Gujarat was used for the experiment. The results revealed that the monocrotophos when applied through trunk injection technique at 10 ml (3.6 g.a.i.) and 20 ml (7.2 g.a.i.) per palm of 8 years age, was found to be effective upto 60 and 90 days respectively fo t e control of the pest in comparison to foliar spray.

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INTRODUCTION

The coconut (*Cocus nucifera* L.) is the most useful palm of tropical region, because every part of tree is exploited commercially. This important palm is reported to be infested by more than 100 insect pests (Nirula, 1955) in various countries. Hutson (1920) reported some important pests like *Nephantis serinopa* Meyr., *Rhynchophorus ferrugineus* F., *Oryctus rhinoceros* L., *Herculia nigrivitta.*, *Erechthias pachygramma* Meyr., *Erechthias lampadacma* Meyr. etc. to be attacking the coconut palms. The first mentioned insect *N. serinopa* is one of the most serious pests of coconut.

The insecticides viz. Paris green, DDT, Toxaphane, Lead arsenate, Malathion and dieldrin were commonly used to control *N.serinopa* before 1970. Over the periods, DDT and dieldrin (Sathiamma and Kurian, 1972) monocrotophos (Anjaria *et. al.*, 1975), DDT and BHC (Rangaswami, 1977 and Thampan, 1981), BHC and Trichlorphon (Butani, 1979), diflubenzuron (Sundarmoorthy, 1980) were recommended as foliar spray for the control of this pest. However since coconut tree is very tall it is combersome to spray the above said insecticides from the ground. To overcome this, trunk injection technique was introduced and it was reported to be effective for the control of various coconut pests viz., stick insect, *Graeffea crouanii* Le. Guilloy in western samoa (Stelzer, 1970), caterpillar *Brassolis. sophorae* L. and moth borer *Castnia deadalus* cramer in Gayana (Rai, 1973), bag worm, Metisa plana WLK. (Wood *et al.*, 1974) and leat moth *Artona cataxantha* Hamps (Ooi *et al.*, 1975). In India Nadarajan and Channa Basavanna (1978), Pillai (1979), Mithyantha *et al.*, (1980) and Nadarajan *et al.*, (1980) have reported that trunk injection of monocrotophos was the most effective for the

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control of *N. serinopa*. In Gujarat Anonymous (1981) have reported monocrotophos @ 9-18 ml. per palm according to the age of coconut plam to be effective against *N. serinopa* Meyr.

The present paper deals with the evaluation of effective dose of monocrotophos applied by trunk injection Technique for effective control of *N. serinopa* Meyr. and it's comparison is made with the foliar application.

MATERIALS AND METHODS

An experiment on control of black headed caterpillar *N. serinopa* of coconut by truck injection technique in comparison to foliar spray was carried out at the Horticulture farm, N. M. College of Agriculture, Navsari during the year 1980-81 and 1981-82. West coast tall, a commonly grown variety in South-Gujarat was used for the experiment. Monocrotophos (Nuvacron 36% w/w) @ 5, 10 and 20 ml. per palm, was used for the trunk injection, while monocrotophos 0.05% was used for foliar spraying.

Experimental Field Layout and Treatments

Eight years old 25 coconut palm were selected for the first year trial (1980-81) as well as second year trial (1981-82). The experiment was laidout in complete randomized design with different treatment given below :

Sr. No.	Treatments	No. of palms/ Replicate
1.	Monocrotophos 36% w/w @ 5 ml (1.8 g.a.i.) per palm by Trunk Inection technique (T.I.T.)	5
2.	Monocrotophos 36% w/w @ 10 ml (3.6 g.a.i.) per palm by T.I.T.	5
3.	Monocrotophos 36% w/w @ 20 ml (7.2 g.a.i.) per palm by T.I.T.	5
4.	Monocrotophos 36% w/w @ 0.05% by foliar spraying.	5
5.	Control (Untreated)	5

Spraying Technique

For injecting the insecticides in the trunk of coconut, a carpenter's auger (Gilmet) with outer diameter of 2 cm. was utilized. The auger was inserted into the stem at a height of 100 cm above ground level at 45 degree angle by rotating it in a clock wise direction to a sufficient depth to hold the amount of the insecticides applied. The measured quantity of insecticides was poured into the hole by using 'Leaf funnel" to direct the liquid into the hole. After introducing the insecticide, the mouth of the hole was smeared with the solution of copper oxychloride (10 grams blue copper 50% added in 100 ml. of water) to prevent the fungal infection. The hole was closed with the cotton plug and then it was plastered with wax so as to prevent the pozing thereafter.

Method of evaluating the treatment

So as to evaluate the effect of different dose of insecticides on *N. serinopa* applied through different techniques tried in the experiment, the measurement of length of galleries made by the larvae ws taken at 15 days interval in both the year. Randomly three leaves per tree and ten leaflets per leaf were selected and tagged. Further, one gallery per each leaflet (tagged) was observed for its increase in length at 15 days interval. The two end of the galley were marked with the stapler pin such a way that any increase in the length at 15 days interval can be traced out easily and clearly. It was observed that pinning with stapler pin had on adverse effect on leaf structure and its normal growth and further no drying of leaflets was observed because of this procedure of pinning.

RESULTS AND DISCUSSION

The data of the trial undertaken during 1980-81 are presented in table 1. The data revealed that the difference in mean length of galleries before the application of different treatment was non-significant indicating the uniformity of the infestation. On 15th and 30th day after application of different treatment the mean length of gallery in the

TABLE 1

Mean length of gallery mined by *N. serinopa* Meyr. before and after application of monocrotophos (1980-81).

Sr. No.	*Details of treatment of monocrotophos 36% w/w*	*Mean length of gallery (cm.)*					
		Before treatment	*Days after treatment*				
			15	*30*	*60*	*90*	*105*
1.	5 ml/palm by T.I.T.*	14.70	17.93b	19.21b	19.21b	19.21b	19.92
2.	10 ml/palm by T.I.T.	15.66	15.68 ab	15.71 ab	15.71ab	18.15b	19.32
3.	20 ml/palm by T.I.T.	13.31	13.31a	13.61a	13.61a	13.89a	17.68
4.	0.05% by foliar spray	14.07	14.20a	14.54a	19.44c	19.44b	19.66
5.	Control (untreated)	15.11	17.43b	19.21b	20.63c	20.81b	21.00
	S. Em ±		1.025	1.283	1.45	1.42	
	C. D. at 5%	N.S.	3.01	3.77	4.26	4.17	NS
	C.V. %		14.59	17.64	18.72	17.50	

* Trunk Injection Technique.

treatment of 20 ml monocrotophos per palm by T.I.T. have remained lowest (13.31 cm. and 13.61 cm respectively) and was at par with the treatment of 0.05% monocrotophos foliar spray (14.20 cm and 14.54 cm respectively) and 10 ml monocrotophos per palm by T.I.T. (15.68 cm and 15.71 cm respectively). On 60th day the treatment of 20 ml monocrotophos per palm by T.I.T. had maintained its superiority by keeping the least mean length (13.61 cm) of gallery and was at par with 10 ml. monocrotophos per palm by T.I.T. (15.71 cm.) The treatments monocrotophos 10 ml. per palm by T.I.T. 5 ml. monocrotophos per palm by T.I.T. and control were inferior to the other treatments and at par on 15th and 30th day after injection. On 60th day the treatments 5 ml. monocrotophos per palm by T.I.T., 0.05% monocrotophos foliar spray and control were inferior to the other treatments and were at par with each other. On 90th day after stem injection, the treatment of monocrotophos 20 ml. per palm by T.I.T. had still maintained its, superority by keeping least mean length (13.89 cm) of gallery, while all the other treatments were at par and inferior. On 105th day after stem injection the difference among the mean length of gallery in different treatments was non-significant, suggesting the loss of effectiveness of monocrotophos 20 ml. per palm applied by T.I.T.

The data of the trial undertaken during 1981-82 are presented in table-2. The data revealed that the difference in mean length of gallery before the application of different treatment was non-significant indicating the uniformity of the infestation. On 15th day after application of different treatment, the mean length of gallery in the treatment of 20 ml monocrotophos per palm by T.I.T. was lowest (11.57 cm) and at par with the treatments of 10 ml. monocrotophos per palm by T.I.T., 0.05% monocrotophos foliar spray and control. The mean length of gallery in the treatment of 5 ml. monocrotophos per palm by T.I.T. was highest (17.20 cm) and at par with control suggesting its failure in checking the increase in infestation. On 30th day, the treatment of 20

TABLE 2

Mean length of gallery mined by *N. serinopa* Meyr. before and after application of monocrotophos (1981-82).

Sr. No.	Details of treatment of monocrotophos 36% w/w	Mean length of gallery (cm.) Before treatment	Days after treatment 15	30	60	90	105
1.	5 ml/palm by T.I.T.*	13.12	17.20b	20.22cd	21.68c	31.07b	32.57
2.	10 ml/palm by T.I.T.	11.73	11.73a	12.71a	15.61b	26.97b	28.56
3.	20 ml/palm by T.I.T.	11.57	11.57a	11.57a	11.57a	21.34a	28.27
4.	0.05% by foliar spray	11.03	12.87ab	15.05ab	21.22c	26.93b	28.37
5.	Control (Untreated)	10.86	14.94ab	17.68bc	24.63c	30.70b	32.18
	S. Em ±		1.16	1.33	1.33	1.62	
	C. D. at 5%	N.S.	3.42	3.92	3.91	4.77	NS
	C.V. %		18.69	19.21	15.64	13.19	

* Trunk Injection Technique.

ml. monocrotophos per palm by T.I.T. was again superior and at par with the treatments of 10 ml. monocrotophos per palm by T.I.T. and 0.05% monocrotophos by foliar spray. On 60th day the treatment of 20 ml. monocrotophos per palm by T.I.T. was agian found superior, and the treatment of 10 ml. monocrotophos per palm by T.I.T. was remained second. All the other treatments including control were at par and inferior. On 90th day, 20 ml. monocrotophos per palm by T.I.T. was only the superior treatment as the mean length of gallery was lowest (21.34 cm) in it, while all other treatments were iinferior and at par among themselves and with control. On 105th day after trunk injection, the difference among the mean length of gallery in different treatment was non-significant suggesting the loss of effectiveness of monocrotophos 20 ml. per palm applied by T.I.T.

Nadarajan *et al.*, (1980) have screened several insecticides for the control of black headed caterpillar, N. serinopa and Red palm mite Raoiella indica Hirst. In coconut palm through the trunk injection technique. They found 3.5 g.a.i. (i.e. 9 ml of 40 EC) monocrotophos per palm by T.I.T. to be effective upto 90 days in younger palm (five years old) and 7 g.a.i. (i.e. 17.5 ml of 40 EC) monocrotophos was effective 60 days in 9 to 10 years old palms. Similarly, Anonymous (1981) have observed 70% and 100% larval mortality from third and sixth day respectively after trunk injection with 9 to 18 ml. monocrotophos per palm.

On the basis of overall results of two years trial, it can be concluded that monocrotophos 20 ml. per palm by T.I.T. was the best treatment as it can check the infestation upto 90 days.

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