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RESEARCH NOTE

Effect of different insecticides in the control of mango nut weevil (*Sternochaetus mangiferae* F.)

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Among the insecticides tested against nut weevil, carbaryl was effective in reducing the nut weevil infestation followed by endosulfan and malathion. Two applications of insecticides given at the time of flowering and marble size fruit stage were equally effective as in three sprays given at flowering marble size, fruit stage and advanced fruit development stage.

Key words : Mango, Nut weevil, Insecticides

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Mango (*Mangifera indica* L.) is considered as one of the most important fruits of India because of its largest area, highest production ,excellent flavour, delicious taste and juicy rich in carotenoids. In india, Andhra Pradesh ranks second both in respect of area (3.9 lakh hectares) and production (3.36 million tonnes) (Indian Horticulture Database,2013). More than 400 pests of different nature were recorded on mango (Tandon and Varghese,1985). The important pests that attack mango at field level are hoppers, nut weevil, mealy bug, fruit flies, stem borer, midges and bark eating caterpillars etc. Egg laying by the adult weevil causes fruit dropping at early stages. The grubs feed on the cotyledons and destroy. India produces about 60 per cent of the world mango production but is unable to reap its export potential; to the fullest due to the presence of mago nut weevil. The weevil comes in the way of mango export particularly to large and rich buyers like USA (Bagle and Prasad, 1984). Hence, two separate experiments were taken up to find out the efficacy of insecticides with reference to number of sprays and insecticidal combinations against mango nut weevil.

Two field experiments were conducted in the mango orchards of Narasingapuram during January 2010 to May 2010. The first experiment was conducted on the variety "Neellum" in a Randomized Block Design with 19 treatments.Each treatment was replicated thrice.

The insecticides were given single spray at the time of flowering, two sprays at the time of flowering and marble size fruit stage and three sprays at the time of flowering, marble size fruit stage and advance fruit development stage.

The second experiment was conducted on variety "Bangalora". The treatment were imposed in a Randomized Block Design. The trial consisted of eight treatments each replicated thrice. Each treatment consisted combination of three insecticides, Which were applied at the time of flowering, marble size fruit stage and advanced fruit development stage.

The required concentrations of the insecticides were prepared and 10 litres if the spray fluid was sprayed per tree with the help of high volume rocker sprayer. The untreated check was given 10 liltres of water spray. At harvest, 20 fruits per tree were examined for the nut weevil infestation by cutting the individual fruit and the percentage infestation was calculated.

The results indicated that the treatment carbaryl was more effective in all the three spray schedules with less fruit damage of 12 per cent. The next effective insecticides were endosulfan, malathion and cypermethrin which recorded 13.6,15.1 and 15.8 per cent fruit damage, respectively in all the three spray schedules. Similar results on the efficacy of carbaryl were reported by Chandramohan *et al.* (1981), Bagle and Prasad (1984) and Ramakrishna Babu (1999). Bhattacharya *et al.* (1966) reported that endosulfan (0.7%) and malathion (0.1%) significantly reduced fruit infestation by *S. frigidus*. Azadirachtin was comparatively less effective in reducing nut weevil infestation by recording 20.9 per cent fruit damage. Present studies are in conformity with the findings of Ramakrishna Babu (1999). Imidacloprid recorded the highest fruit damage of 18.9 per cent. Three sprays of insecticides given at the time of flowering, marble size fruit stage and advanced fruit development stage recorded least fruit damage (15%). However, it was statistically not significant with two sprays of insecticides given at the time of flowering and marble size fruit stage which recorded 15.5 per cent fruit damage. Single application of insecticides at flowering period recorded highest fruit damage of 30.1 per cent. This clearly indicates that application of insecticides at the time of advanced fruit development stage had no effect in reducing the fruit infestation by nut weevil. Among all the treatments, three sprays of carbaryl recorded least fruit damage of 6.3 per cent followed by two sprays of carbaryl with 6.6 per cent fruit damage, which were at par with each other.

The result of the second trial which included different insecticide schedules is presented in Table 2. The data revealed that carbaryl + endosulfan + acephate schedule recorded lowest fruit damage of 8.3 per cent and was significantly superior to the rest of the schedules. This might be due to the contact action of carbaryl and endosulfan, which were applied at the time of flowering and marble size fruit stage, respectively. The second best schedule was malathion + cypermethrin + endosulfan which recorded 10 per cent fruit damage. Battacharya *et al.* (1996) reported that endosulfan (0.07%) and malathion (0.1%) significantly reduced fruit infestation by *S.frigidis*. Acephate + profenophos + imidacloprid schedule

Table 1 : Efficacy of insecticides with reference to number of sprays on mango nut weevil (*Sternochaetus mangiferae* L.) in terms of fruit damage

Insecticides	Number of sprays			
	Single spray	Two sprays	Three sprays	Mean
Endosulfan (0.07%)	25.3^{h} (30.220)	8.0^{b} (16.410)	7.6^{b} (16.067)	13.6^{b} (20.899)
Malathion (0.05%)	27.0^{i} (31.307)	9.3^{c} (17.783)	9.0^{c} (17.440)	15.1^{c} (22.177)
Carbaryl (0.1%)	23.0^{g} (28.653)	6.6^{a} (14.953)	6.3^{a} (14.567)	12.0^{a} (19.391)
Cypermethrin (0.01%)	28.0^{j} (31.947)	10.0^{d} (18.420)	9.3^{d} (18.107)	15.8^{d} (22.824)
Azadiractin (0.05%)	32.0^{l} (34.447)	15.6^{f} (23.317)	15.2^{f} (22.780)	20.9^{f} (26.848)
Imidacloprid (0.005%)	30.6^{k} (33.623)	13.3^{e} (21.410)	12.8^{e} (21.017)	18.9^{e} (25.350)
Untreated check	44.6^{m} (41.937)	45.6^{m} (42.517)	45.0^{m} (42.130)	45.1^{g} (42.323)
Mean	30.1^{b} (33.162)	15.5^{a} (22.116)	15.0^{a} (21.785)	

	S.E.m	C.D.	F-test
insecticides (F1)	0.0944	0.267	**
number of sprays (F2)	0.1442	0.4078	**
insecticides (F1) X number of sprays (F1 x F2)	0.2497	0.7064	**

Mean of four observations
Figures in parentheses are angular transformed values.
Means followed by same letters are not statistically different.

Table 2 : Efficacy of insecticidal schedules against mango nut weevil (*Sternochaetus mangiferae* L.) in terms of fruit damage

Treatments	Insecticidal schedules	Fruit damage (%)
T_1	Cypermethrin (0.01%) + Imidacloprid (0.005%) + Carbaryl (0.1%)	12.0^{c} (20.257)
T_2	Endosulfan (0.07%) + Azadiractin (0.05%) + malathion (0.05%)	13.6^{d} (22.780)
T_3	Profenofos (0.01%) + Cypermethrin (0.01%) + Azadiractin (0.05%)	13.3^{d} (21.410)
T_4	Carbaryl (0.1%) + Endosulfan (0.07%) + Acephate (0.05%)	8.3^{a} (16.773)
T_5	Imidacloprid (0.005%) + Endosulfan (0.07%) + Cypermethrin (0.01%)	11.3^{c} (19.670)
T_6	Acephate (0.05%) + Profenofos (0.01%) + Imidacloprid (0.005%)	15.0^{e} (22.780)
T_7	Malathion (0.05%) + Cypermethrin (0.01 %) + Endosulfan (0.07%)	10.0^{b} (18.420)
T_8	Untreated check	48.0^{f}
S.E. m		0.271
C.D. (P=0.05)		0.821
F-test		**

Figures in parentheses are angular transformed values
Means followed by same letters are not statistically different.

recorded the highest fruit damage of 15 per cent. This might be due to the application of acephate at the time of flowering, which had no effect on the adult weevils in reducing egg laying.

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