

Studies on the Varietal Incidence and Control of the  
Mango Nutweevil, *Sternochelus* (= *Cryptorrhynchus*)  
*mangiferae* Fabricius \*

by

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**Synopsis:** Three field trials and two laboratory trials were conducted for the control of the mango nutweevil in a randomised, replicated design. The combination of Malathion 0.1 per cent + Endrin 0.02 per cent spray, given thrice, commencing the first round 1½ months after flowering followed by two more monthly sprayings recorded the minimum infestation in the field trials. In the laboratory trials, Malathion 0.1 per cent + Endrin 0.02 per cent spray recorded the maximum mortality of both grubs and adults.

**Introduction:** Mango is the most popular fruit in the orient, particularly in India. Among the many insects which are known to occur on the mango plant, the commonly known 'Nutweevil' or 'Stone weevil' is the important one. The insect is a specific pest on mango. The grubs and adults feed on the endocarp of the fruit and hasten the maturity of the fruits resulting in the fruitfall from the trees. Recently, the import of Indian mangoes into U. S. A. has been withheld for the reason that the pest might be introduced into U. S. A. where the insect is not prevalent. This fact drew the attention of the Government and the Entomologists in India and studies were initiated on the different aspects of the pest. Investigations on the nutweevil's varietal incidence on mango and its chemical control were carried out for two years and the results are presented in this paper.

**Review of Literature:** The earliest work on the control of the mango nutweevil was in Hawaii by Van Dine (1906) who recommended the destruction of all the debris including the fallen fruits and refuse seeds by burning around the tree, as this process not only prevented the escape of the weevils from the infested material but also killed the hibernating adults in and around the trees. In India, Lefroy (1906) suggested painting or swabbing the bark with kerosene during the cold period before the flowering of mango starts as an effective method to check the pest. Ayyar (1940) also advocated proper disposal of debris and other infested materials like the fallen mango fruits and refuse seeds as prophylactic measures to keep away the nutweevil infestation in the ensuing season. However, no elaborate chemical methods were taken up until David and Sundara Babu (1962) reported the effectiveness of the insecticide, Lebaycid 0.1 per cent spray against the nutweevil.

**Materials and Methods:** In the years 1964 and 1965, observations were made on 34 varieties of mango at the Model Orchard cum Nursery, Thimmapuram and at the Fruit Research Station, Kanyakumari. A total number of 25 fruits was cut open and examined for each variety for the presence of the pest.

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*Field Trials:* Three insecticidal control trials against the pest were carried out; two trials during 1964-'65 on *Bangalora* variety and the third trial on *Neelum* variety during 1964. The treatments included were as follows.

*1964 trials on Neelum:* Sprays of Lebaycid 0.1 per cent, Dimecron 0.1 per cent, Malathion 0.1 per cent + DDT 0.1 per cent, Ekatin 0.1 per cent and Control (No treatment).

*1964 trial on Bangalora:* Sprays of Lebaycid 0.1 per cent, Dimecron 0.1 per cent, Malathion 0.1 per cent + Endrin 0.02 per cent, Sevin 0.1 per cent and Control (No treatment).

*1965 trial on Bangalora:* Sprays of Malathion 0.1 per cent + Endrin 0.02 per cent, Sevin 0.1 per cent, Rogor 0.1 per cent, Metacid combi at 20 cc/gallon and Control (No treatment).

The treatments were randomised and replicated four times with one tree for each replication and the sprayings were given thrice. The first round of spray was given one and half months after flowering, synchronising with the marble stage of the fruits at which time the nutweevil starts the oviposition. The second and third rounds of treatments followed at monthly intervals thereafter. Altogether three gallons of spray fluid was required per tree to spray on the foliage, branches, fruits, trunk and the soil around. At the time of fruit maturity, a total number of 100 fruits was harvested at random for each treatment at 25 fruits per replication and cut open to assess the nutweevil infested fruits. The data on infestation are furnished in Table I.

TABLE I

*Summary of results—1964 trial—Neelum and Bangalora*

S. No.	Treatments	Mean infestation per plot (Transformed).	
		<i>Neelum</i>	<i>Bangalora</i>
1.	Lebaycid	21.02	17.38
2.	Dimecron	29.92	26.88
3.	Malathion + DDT	19.07	—
4.	Malathion + Endrin	—	14.93
5.	Ekatin	27.20	—
6.	Carbaryl	—	23.98
7.	Control	34.98	32.50
S. E. of mean		1.19	1.34
C. D.		3.68	4.14

Conclusion:

$\overline{31} \underline{527}$

$\overline{41} \underline{627}$

*1965 trial on Bangalora*

S. No.	Treatments	Mean infestation per plot (Transformed)	S. E. of Mean	C. D.
1.	Malathion + Endrin	19.32		
2.	Carbaryl	31.88	0.933	2.87
3.	Rogor	31.88		
4.	Metacid combi	33.15		
5.	Control	39.80		

Conclusion:            1 2 3 4 5

*Laboratory trials:* During 1964-'65, four trials were also conducted in the laboratory to test the relative toxicity of the various insecticides tried in the field trials, two trials with grubs and two with adults. The trials were randomised and replicated four times. The treatments were the same as in the field trials *i.e.*, sprays of Lebaycid 0.1 per cent, Dimecron 0.1 per cent, Malathion 0.1 per cent + Endrin 0.02 per cent, Sevin 0.1 per cent and Control (without treatment) in 1964. In 1965 trials, Malathion 0.1 per cent + Endrin 0.02 per cent, Sevin 0.1 per cent, Rogor 0.1 per cent, Metacid combi at 20 cc/gallon and Control were included.

A total number of 80 grubs and 80 adults at the rate of 20 grubs and 20 adults per replication were kept in jars with mango leaves and fruits and insecticides were sprayed with an atomiser. Counts on the dead grubs and adults were taken 72 hours after treatment and mortality percentage statistically analysed. The results are furnished in Table II.

TABLE II

*Summary of Results—1964 trials on grubs and adults*

S. No.	Treatments	Mean percentage of mortality (transformed)	
		Grubs	Adults
1.	Lebaycid	68.45	70.50
2.	Dimecron	63.50	62.55
3.	Malathion + Endrin	73.68	77.10
4.	Carbaryl	61.70	65.30
5.	Control	0.65	—
S. E. of mean		3.78	0.88
C. D.		11.65	2.71

Conclusion:

3 1 2 4 5    3 1 4 2 5

## 1965 trials on grubs and adults

S. No.	Treatments	Mean percentage of mortality (Transformed)	
		Grubs	Adults
1.	Malathion + Endrin	86.77	86.77
2.	Carbaryl	70.50	64.55
3.	Rogor	66.25	56.02
4.	Metacid combi	60.02	48.62
5.	Control	3.22	6.45
S. E. of mean		2.11	1.965
C. D.		6.56	6.05

Conclusion:

1 2 3 4 5      3 1 4 2 5

**Results:** *Varietal incidence:* The data on the infestation collected from 34 varieties revealed that all the varieties were affected by the pest irrespective of the shape, size and taste. The maximum number of nine adults were noted in a single nut in the variety *Cherukkurasam*. In other varieties, the number of adult weevils ranged from one to seven. The percentage of infestation ranged from 30 to 100.

*Field Trials:* The infestation data gathered from the yield trials (Table 2) revealed that all the chemicals proved to be significantly effective in checking the pest compared to the control (no treatment).

In 1964, the trial on *Neelum* variety showed that the combination of Malathion 0.1 per cent + DDT 0.1 per cent spray recorded the minimum infestation of nutweevil followed by Lebaycid 0.1 per cent spray, though both these treatments were on par. In the trial on *Bangalora* variety, the combination of Malathion 0.1 per cent + Endrin 0.02 per cent spray recorded the minimum pest infestation followed by Lebaycid 0.1 per cent, though they were similar in efficacy. In 1965 trial also, on *Bangalora* variety, the combination of Malathion 0.1 per cent + Endrin 0.02 per cent spray proved to be significantly superior and recorded the minimum infestation.

*Laboratory trials:* In 1964 trials, the combination spray of Malathion 0.1 per cent + Endrin 0.02 per cent recorded maximum mortality of both grubs and adults. In 1965 trial also, the combination of Malathion 0.1 per cent + Endrin 0.02 per cent recorded the maximum mortality of both grubs and adults.

*Cost of treatment:* The cost of insecticides per round is as follows:—

Lebayoid 0.1 per cent spray	Price not known
Dimecron 0.1 per cent spray	Rs. 1.52
Malathion 0.1 per cent + DDT 0.1 per cent	Rs. 0.48

Ekatin 0.1 per cent spray	Rs. 1.07
Malathion 0.1 per cent + Endrin 0.02 per cent	Rs. 0.79
Sevin 0.1 per cent spray	Rs. 0.51
Rogor 0.1 per cent spray	Rs. 1.14
Metacid combi at 20 cc/gallon spray	Rs. 0.96

**Discussion and Conclusion:** From the three trials, two on *Bangalora* and one on *Neelum* variety conducted during 1964 and 1965, the combination spray of Malathion 0.1 per cent + Endrin 0.02 per cent recorded the minimum infestation of 14.93 per cent and 19.32 per cent respectively on *Bangalora* variety. On *Neelum* variety the combination spray of Malathion 0.1 per cent + DDT 0.1 per cent recorded the minimum infestation of 19.07 per cent. In the laboratory trials, the combination spray of Malathion 0.1 per cent + Endrin 0.02 per cent brought about the maximum mortality of grubs and adults. Considering the efficacy of the combination spray of Malathion 0.1 per cent + Endrin 0.02 per cent given thrice at monthly intervals commencing one and half months after flowering as well as its comparatively low cost, it can be advocated for economical control of the mango nutweevil.

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