There was no correlation between ear length and grain yield and this may be explained by the fact that ear length or the number of seeds produced per ear is not only affected by nutrition but also by other factors such as plant and environmental factors.

Of the eight hybrids studied, the hybride (Q51xQ52), a two-earred hybrid was recommended as a potential candidate for further foliar fertilization studies and subsequent cultivation.

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CHEMICAL CONTROL OF POINTED GOURD VINE BORER, *(Apomecyna Saltator)* FABR.

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Several insecticides were tested against the pointed gourd vine borer, *Apomecyna Saltator* Fabr., a serious pest of pointed gourd. Isofenphos sprayed @ 0.5 kg a.i./ha killed 100% grubs feeding in the vines. Soil treatment with granular phorate, carbofuran, quinalphos or disulfoton or aldrin dust applied @ 1 kg a. i./ha during january killed 75 % grubs habitating in the roots left for ratoon crop. Maximum net profit of Rs 2.267 /ha was obtained when the crop was sprayed With quinalphos 0.5/kg a.i./ha at 280 days after planting (DAP) However, the benefit cost ratio was higher with phosphamidon treatment.

The pointed gourd (*Trichosanthes dioica* Roxb) is an important vegetable crop grown extensively in the Hirakud Command Area of Sambalpur, Orissa. The crop is propagated clonally through roots and is of three years duration. One of the major constraints of low production is the damage caused by the vine boring beetle (*Apomecyna saltator* Fabr.) in the peak reproductive phase of the crop. The grubs and adults are carried to the new plantation through

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the roots (seed materials) and start infesting the vines with the onset of monsoon rains. By mid-September almost all plants are infested by this beetle. The grubs emerging from the nodal joints devoured the vines and often kill them resulting in heavy loss in yield. No information is available on chemical control of this pest. A study was, therefore, made to find out effective chemical control against the beetle.

MATERIALS AND METHODS

Laboratory spraying :

Vine borer infested nodes containing fourth instar grubs were examined and collected from the unsprayed crop during October, 1979. The nodal joints were separated from the main vines keeping 1 cm either end. Each petridish containing 20 infested nodes (each node having a 4th instar grub) was sprayed with specified insecticide in the Potter's tower under 24 Cm/Hg pressure The treated petridishes were dried under a ceiling fan for 15 minutes and then transferred to clean jars, the open end of which were tied with muslin cloth and rubber band. Each petridish constituted a treatment and was repliceted 4 times. Grub mortality was recorded 72 hours after spraying by dissecting each node.

Field spraying :

Local variety of pointed gourd roots were planted on 5th December, 1978 at one per pit of 30 cm dia, spaced at 1 m X 0.50 m and fertilized with 100: 50. 50 : kg of N, P_2O_5 and K_2O per hectare. There were 14 treatments (Table 1), each replicated 4 times in randomised block design with net plot of 30 sq. m. Field spraying was done with a hand compression sprayer at 2 l/plot at 280 days after planting (DAP) when the infestation was sufficiently high. The mortality of the 4th instar grubs were recorded 72 hours after insecticital treatment. For this 20 vines were selected randomly from each sub-plot and only the mortality of the 4th instar grubs was determined by dissecting and examining the infested nodal joints of each of the vines. The moribound insects were also considered as dead.

Soil treatment:

After completion of the first and second crop, the dead vines were removed during second fortnight of December, 1979 and 1980. The left over roots of the first and second ratoon crop were treated with granular/dust formulations of insecticides during January, 1980 and 1981. Both granules and dusts were applied in the soil and incorporated in the vicinity of the roots. The crop was irrigated oneday after insecticidal treatment. As the leftover roots were on the ridges and were treated with insecticides, care was taken to apply irrigation in such a way that it will moisten the base of the plant without washing away the insecticides. The mortality count of the grubs (irrespective of the stages, was taken on the 7th day following treatment Observations were recorded from 50 infested roots of each treatment.

RESULTS AND DISCUSSION

Laboratory treatment :

It is evident from the results (Table 1) that insecticidal treatment, in general, significantly decreased the grub mortality compared to untreated check. Among the insecticides Isofenphos was

the most effective and it killed 100% of the grubs infesting the vines. The second best insecticide was endosulfan followed by Phosphamidon, Chlorpyriphos, Quinalphos and Fenvaleate (Table 1). On the other hand Malathion and Carbaryl even with a dose of 1 kg a. i /ha could kill 57% of the grubs.

Field spraying :

Isofenphos even under field spraying killed 100% grubs infesting the vines within 3 days and it remained significantly superior to other insecticides tested. The efficacy of other insecticedes remained similar as in the Laboratory test.

The vine borer infestation in the crop started following the onset of monsoon and peak damage coincided with the maximum fruiting stage. It is therefore, necessary to select out such insecticide (s) which will be most effective to the pest and should have least residual toxicity. Malathion and Carbaryl the most commonly recommeded insecticides for vegetable crops, were not very effective aganist the beetle. Isofenphos was distinctly superior to all other insecticides both in the field and laboratory conditions. However, its residual toxicity on fruits needs further investigation. Endosulfan appear to be the second best insecticide aganist the beetle.

Soil treatment :

Application of granular/dust formulation of insecticides to the soil significantly reduced the grub population habitating the roots as compared to untreated control Granular phorate, Carbofuran, Quinalphos and Disulphotan or Aldrin dust applied @ 1.00 kg a.i/ha killed 75 — 9. % grubs inhabiting the stubble roots (Table 2). Malathion was the least effective dust in controlling this pest. Older grubs were killed earlier than the younger instars because of the fact that the feeding injury was more which in turn facilitated better penetration of the insecticide into the roots. On the contrary the first and second instar grubs were well concealed in the left over portion of the stem above ground level.

In the available literature no work has been reported on the chemical control of this pest. However, *Apomecyna* species infesting pointed gourd has been reported by Pollard (1954), Saha and Vora (1974) and Samalo and parida (1983).

Benefit cost ratio :

Sparying the pointed gourd crop with insecticides at the peak reproductive phase controlled the vine borer infestation and increased the yield. The net benefit through plant protection ranged between Rs 225 and 2267/ha in different treatments. Maximum marginal benefit of Rs 2,267/ha was obtained in the Quinalphos treatment. Further Quinalphos spraying attributed towards better vine growth and increased fruit yield However the benefit cost ratio was maximum (Table 3) in phosphamidon treatment as compared to all others.

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Table 1. Vine borer mortality

Insecticides	Dose (kg a i./ha)	Grub mortality (%)* Lobcratory sprayin 1979	Field spraying 1980
Isofenphos	0.4	100.0(90.0)	100 0(90.0)
Endosulfan	1.0	91.7(73.4)	81.5(65.0)
Phosphamides	0.5	89.0(70.6)	83.0(65 7)
Chlorpyriphos	0.5	90 3(71.9)	81 2(64.4)
Quinalphos	0.5	87 8(69 7)	75.8(60 6)
Fenvalerate	0 2	82.5(65.3)	76.9(62 0)
Dichlerves	0.5	72.2(58 3)	68.2(55.8)
Demeton	0.5	67.7(56.3)	53.7(47.2)
Monocrotophos	0 5	64.4(53 4)	58 4(49.8)
Fenitrethion	0.5	62 0(52 2)	56.4(48.7)
Dimetheate	0.5	60 5(51.2)	54,9(47.8)
Carbaryl	1.0	56,4(48.9)	5 .6(45.9)
Malathion	1.0	40 7(39.4)	35 3(36 5)
Untreated check	—	4.1(11.6)	4 0(11.6)
L. S. D.		14.4	6.8

*Mean of four replications
Figures in parenthesis represent transformed values

Table 2. Soil treatment with insecticides for vine borer control

Insecticides	Dose (Kg a. i./ha)	Grub mortality in roots (%) 1980	1981
Phorate 10G	1 0	89.0 (71.1)	91.1 (75 8)
Carbofuran 3G	1.0	87.9 (69 7)	84.0 (67.5)
Quinalphos 5 G	1.0	90.8 (72.4)	77.4 (61.8)
Disulphoton 5 G	1.0	87.6 (69 4)	75.4 (60 3)
Aldrin 5D	1.0	90.6 (72.2)	81.2 (64.6)
B. H. C. 10D	1.0	77.8 (62.0)	67.5 (55:7)
Fenitrothion 2D	0.5	66 5 (54,4)	NT
Quinalphos 5D	1.0	62.5 (52:2)	NT
Malathion 5D	1.0	64.2 (53.3)	56.2 (48.6)
Untreated check	—	0.0	3.3 (4.8)
L. S. D. 0.05		6.7	10.9

* Mean of four replications 7 days after insecticidal treat ment
G = Granule and D = Dust
NT = Not tested
Figures in parenthesis represent transformed values

Table 3. Net profit and benefit cost ratio with insecticidal application to pointed gourd

Insecticidal treatment	Fruit yield (Kg/ha)*	Cost yield (Rs/ha)	Cost of Pl.pret (Rs/ha)**	Benefits through pf Prot (Rs/ha)	Benefit:cost ratio
Isofenphos	7527	7527	155	1462	9.43 : 1
Endosulfan	8084	8084	162	2019	12.46 : 1
Phosphamidon	7936	7936	120	1871	15.59 : 1
Chlorpyriphos	7450	7450	265	1385	6.23 : 1
Quinalphos	8332	8332	233	2267	9.73 : 1
Fenvalerate	7872	7872	330	1807	5.47 : 1
Dichlorves	6898	6899	104	833	8.01 : 1
Demeton	6775	6775	181	710	3.92 : 1
Monocrotophos	7643	7643	241	1578	6.55 : 1
Fenitrothion	6529	6529	150	764	5.09 : 1
Dimetheate	7298	7298	125	1233	9.86 : 1
Carbaryl	6525	6525	130	460	3.54 : 1
Malathion	6290	6290	116	225	1.94 : 1

* Mean of 3 replications Pointed gourd yield was Calculated @ Rs. 1.00/kg.

** Cost of insecticides and labour chargs calculated at the prevailing rate at the time of experimentation.

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