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Dissipation and Persistence of Certain Insecticides on/in Cowpea Pods (Var. C. 152)

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A field trial was conducted to find out the rate of dissipation of foliar. insecticides and the terminal residues of soil applied insecticides in cowpea variety C. 152. The half life values for different insecticides viz., endosulfan, chlorpyriphos, monocrotophos, carbaryl, dimethoate, methomidophos. phosalone. methyl parathion, and quinalphos were 2.0. 1.98, 1.48, 2.34, 2.8, 1.41, 1.46. 0.81 and 2.27 days respectively. The terminal residues of carbofuran was 0.2 ppm and that of phorate 0.3 ppm.

Cowpea *Vigna unguiculata* Walp.) is one of the pulse crops grown over considerable area in Tamil Nadu both as seed crop and as green vegetable. This crop is subject to the attack of a number of pests of which leaf miner and the pod borers are important. For the control of the above pests, quite a large number of effective insecticides are used. Incidentally the determination of the residues of these insecticides has been attempted by several workers. The terminal residues in cowpea pods for the soil applied granules like disulfotan and fensulfothion have been reported by Rajukkannu *et al.* (1977). Agnihotri *et al.* (1974) reported terminal residues of B. H. C. and Aldrin in cowpea.

The present trial was undertaken to study the rate of dissipation of some of the foliar applied as well as newer insecticides used for the control of various pests on cowpea besides studying the translocation of the soil applied toxicants.

MATERIAL AND METHODS

A field trial was conducted during January-April, 1980 at Tamil Nadu Agricultural University, Coimbatore using variety C. 152 cowpea with a total of twelve treatments comprising of two soil and nine foliar application besides control. The plot size was 3 x 4 m. The foliar applied treatments were endosulfan 0.07%, chlorpyriphos 0.04%, monocrotophos 0.04%, carbaryl 0.05%, dimethoate 0.07%. quinalphos and methyl parathion 0.05%, methamidophos 0.04%, and phosalone 0.07%. Carbofuran 3.G and phorate 10.G were applied at 1.0 kg a.i/ha at the time of sowing. The crop was sprayed once at the early fruiting stage and a second time at the pod maturity stage. Samples of uniform sized pods were collected 1 hr. one, three, five and ten days after the second spray and the residues were determined by chemical methods.

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Residues of endosulfan were determined following the method of Maitlen *et al.* (1963), carbaryl by the method of Johnson (1964). methyl parathion by the method of George (1963). phosalone by the method given by Centre De Researches, Nicholas Grillet (1973), chlorpyriphos, methamidophos, quinalphos and phorate by the modified method of Mac Dougall *et al.* (1964), monocrotophos by the method of Getz and Watts (1964), dimethoate by Dimethoate panel method (1964), and carpofuran by method of Gupta and Dewan (1971). Half life values and waiting periods were worked out following the method of Hoskins (1961).

RESULTS AND DISCUSSION

The data revealed that the initial deposit ranged from 11.6 ppm for carbaryl to 1.2 ppm for chlorpyriphos. The half life values ranged from 0.81 days for methyl parathion to 2.80 days for dimethoate. The waiting periods ranged from one day for phosalone to seven days for quinalphos. Though the initial deposit for chlorpyriphos was as low as 1.2 ppm it has got a waiting period of 5 days since its tolerance limit is 0.2 ppm. Similarly for monocrotophos also, though the initial deposit is only 1.6 ppm a waiting period of four days has to be allowed due to the low tolerance level. Among the toxicants phosalone degraded more rapidly than the others. Dimethoate persisted longer than other insecticides.

In the case of soil applied insecticides viz., carbofuran and phorate, the terminal residues at harvest (90 days after application) were high considering their tolerance limits. The presence of 0.3 ppm of phorate residues proved to be toxic since the EPA tolerance for allied crops (tomato, beans) is 0.1 ppm. The terminal residues of carbofuran was 0.2 ppm which is the same amount prescribed as tolerance level. Several workers have reported the persistence of the residues of the above chemicals for fairly long periods. Krishnamoorthy *et. al* (1978) reported 0.33 ppm of carbofuran residues in *Okra* fruits 50 days after soil application of carbofuran at 1.0 kg a.i/ha. Residues of 8.7, 11.47 and 1.15 ppm of phorate were found on mustard green 15, 50 and 90 days respectively after soil application at 1 kg a.i./ha (Dixit *et al.* 1974).

Awasthi and Mishra (1978) reported 0.66 to 0.75 ppm of phorate residues in potatoes 70 days after soil application of 1.0 kg a.i./ha. However, Visalakshi and Nair (1978) reported that phorate residues of the basal dressed insecticide could be detected in the vegetative parts of cowpea, upto seven weeks but residues of the top-dressed insecticide could be detected in shoot for four weeks and in pods for three weeks only. These authors have used cowpea variety, 'Philippines' and they have estimated the phorate residues by enzyme inhibition method.

The results of the present study indicate that the basal applications of carbofuran and phorate at 1 kg a.i./ha posed problems since the terminal residues of these toxicants in the mature pods at harvest, 90 days after soil application were above tolerance limit and may be avoided for cowpea and the recommended waiting period for phosalone is one day, for endosulfan and methyl parathion two days, for carbaryl three days, for monocrotophos and dimethoate four days, for chlorpyriphos five days and for quinalphos seven days when these toxicants are sprayed at the given concentrations.

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Table 1 *Residues of Insecticides in cowpea (ppm)*

Treatments		Days after sparying					Terminal Residue at harvest	Half life value $t\frac{1}{2}$	Waiting Period in days	EPA tolerance
		Initial I	1 day	3 days	5 days	10 days				
Endosulfan	0.07%	3.60	2.60	1.80	0.60	0.12		2.0	2	2.0
Chlorpyriphos	0.4%	1.20	0.70	0.36	0.20	N.D.		1,98	5	*0.20
Monocrotophos	0.04%	1.60	0.70	0.30	0.14	N.D.		1.48	4	0.20
Carbaryl	0.05%	11.60	8.40	5.20	2.60	N.D.		2.34	3	5.0
Dimethoate	0.07%	6.40	3.87	2.47	1.48	0.49		2.60	4	*2.0
Methamidophos	0.04%	1.50	0.76	0.32	0.12	N.D.		1.41	NE	NA
Phosalone	0.07%	2.56	1.92	0.64	N.D.	...		1.46	1	2.0
Methyl parathion	0.05%	2.84	1.50	0.80	0.03	N.D.		0.81	2	1.0
Quinalphos		3.20	2.56	1.92	0.64	N.D.		2.27	7	**0.25
Carbofuran 1 kg a.i/ha		...	...	...	...	...	0.20	...	..	0.20
Phorate 1 kg a.i./ha		...	...	...	...	...	0 30	...	...	0.10

NE - Not estimated; NA – Not available; *EPA – tolerance available for beans;
**EPA – tolerance available for tomatoes.

Mean whether data: Maximum temperature 32.71; Minimum temperature 22.67; Relative Humidity 80.17
Rainfall 3,3 mm

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Irradiation Studies to Bambusa Bambos Willd.

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The response of *Bambusa Bambos* in germination, survival and early growth of plants to various doses of gamma ray under different periods of pre-soaking conditions was studied. Indications are noticed that the long period of culm generations necessary before flowering can be reduced by hastening the growth by irradiation. Seeds soaked in water for six hours germinate and survive better than dry seeds. Based on survival of seedlins, the L. D. 50 dose is indicated to be 6 Kr for hour presoaked seeds.

The paper industry utilizes *Bambusa bambos* willd., one of the major bamboo species as an important raw material for it contains long fibres. Extensive areas under natural stands of bamboo have been periodically cleared by the Paper Industries and proportionate afforestation with this species did not keep pace with the progressive loss in acreage. Much remains to be done on the inheritance of the growth features of this crop, which information may be necessary for the evolution of a desirable plant type. Very little information is available on these lines in the literature. Bamboo, because of the long period of vegetative growth required before flowering, does not lend itself for a programme of breeding generally followed for the annual crops. Further, due attention was not paid in the past particularly to understand the inherent growth habit of the crop and the potential variability available for breeding a desirable plant type. As an initial step in this direction. studies on mutation by gamma irradiation were initiated in the Department of Forestry, Tamil Nadu Agricultural University, Coimbatore-3 to find out the respose of bamboo to mutation particularly on the lines of developing a desirable plant type.

MATERIAL AND METHODS:

Dehusked seeds of *Bambusa bambos* collected from Thunakadavu valley of Top-slip were subjected to gamma irradiation doses to find out the L. D. 50 dose for this tree species and creatla population for intensive study.

Seeds well filled, sun-dried and of uniform size were treated as detailed below, adopting arbitration in the initial dosage selection.

Dosage of gamma rays:

Ist set (*dry seeds*): O Kr, 12 Kr, 14 Kr, 16 Kr, 18 Kr, 20 Kr, 22 Kr, and 24 Kr

2nd Set

Doses :2.5 Kr, 5.0 Kr, 7.5 Kr, 10.0 Kr, 12.5 Kr and 15.0 Kr.

Presoaking in distilled water for { 6 hours, 12 hours, 18 hours and 24 hours with dry seed treatment as control.

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