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BIOASSAY OF SOME INSECTICIDE RESIDUES ON CAULIFLOWER

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Residual effectiveness of ethion, aldrin, EPN, diazinon, folidol M., and phosdrin applied each in the concentration of 0.05 per cent against fifth instar nymphs of *Bagrada hilaris* Burm. on cauliflower persisted for 9 to 11, 8 to 9, 8, 6 and 4 days, respectively.

INTRODUCTION

During the last few decades, there has been considerale success of chemical control in combating pest insects but the increasing trend of indiscriminate use of insecticides has created problems like appearance of resistance strains of insect pests, resurgence of pests due to the destruction of their natural enemies and toxic hazards to man and his animals due to insecticidal residues on edibles. The workers all over the world have been engaged in an endeavour to find out reliable insecticide Schechter and Hornstein (1957) observed that 90 per cent of phosdrin residue was lost in two days and over 99 per cent in four days after treatment. Whetstone (1957) reported the residual toxicity of phosdrin, applied at 0.25 to 0.5 lb. per acre against *Lygus* bug, to last for 3 days. West and Hardy (1961) stated that the residue of folidol M. persisted on crop foliage for 4 to 8 days after application.

Staples *et al.* (1967) observed that the residue of diazinon, completely disappeared 5 days after the treatment. Ahmad and Ahmad (1972) applied diazinon in 0.1 per cent concentration, on sugarcane, maize and mango foliage, and reported the residue to dissipate to 1.44 to 1.48 ppm. in 8 to 10 days after application. Rehman *et al.* (1973) reported the residual persistence of this insecticide to last for 10 to 12 days on "okra", bitter gourd and "tinda" gourd (with a minimum detectable limit of 0.24 to 0.27 ppm.). Ahmad and Javed (1973) in a similar experiment observed that ethion, aldrin, EPN, diazinon, folidol M, petkolin and phosdrin applied each in 0.05 per cent concentration on radish persisted for 9, 10, 8, 6-7, 5-6, 5 and 3-4 days, respectively.

MATERIALS AND METHODS

Residual effectiveness of ethion, folidol M., EPN, diazinon, phosdrin

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and aldrin applied each in the concentration of 0.05 per cent was determined by biological method on cauliflower, using fifth instar nymphs of painted bug, *Bagrada hilaris* Burm., as a test insect. The insecticides were applied on the crop grown in the field during November, 1968, and on plants raised in pots during May, 1969. In the case of field experiment, samples of leaves from each treatment were brought to the laboratory every day, placed in glass jars and fifteen nymphs of painted bug were liberated on them after 5 hrs. starvation. In the potted plants experiment, twenty nymphs were liberated on each of the sprayed leaf, selected at random from each treatment and sleaved *in situ*. The observation on the mortality of test insect were recorded 24 hrs. after liberation and the process was followed till the mortality ceased to occur.

For preparing the standard curve, 1, 5, 10, 15, 20, 25 and 30 ppm. concentrations were made. The leaves of the same size were dipped into solutions, dried under fan and placed in glass jars, and mortality data recorded as in the above mentioned experiments. The following regression equations were derived from the data.

	1968	1969
Ethion	$x = -1.2709 + 2.8528y$	$x = -0.7325 + 2.7236y$
Aldrin	$x = -1.5131 + 2.9063y$	$x = -0.1421 + 2.3824y$
EPN	$x = -0.9415 + 2.7552y$	$x = -0.7995 + 2.6663y$
Diazinon	$x = -2.4350 + 3.1759y$	$x = -1.187 + 2.7896y$
Folidol	$x = -1.6214 + 2.8473y$	$x = -0.6479 + 2.5761y$
Phosdrin	$x = -0.2105 + 2.3617y$	$x = -0.9055 + 2.7487y$

RESULTS AND DISCUSSION

The data, given in Table 1, show that the residual effectiveness of EPN, diazinon, folidol M., and phosdrin against *B. hilaris* persisted for 8, 6, 6, and 4 days, respectively, in both the experiments. However, the residual effectiveness of aldrin and EPN was variable in the field and the potted plants experiments; these insecticides in the two respective experiments remained effective for 11 and 9 days and 9 and 8 days. The loss of residue in the case of all the insecticides varied between 88.17 and 95.29 per cent during the period of their effectiveness. The minimum residue level in the case of all the insecticides varied between 1.12 and 2.99 ppm. This shows that with the use of B. hilaris as test insect, the insecticides residue could not be determined to the permissible tolerance level. However, it could be used to

TABLE 1. *Data on mortality and residues of insecticides on cauliflower during 1968.*

Days after treatment	ETHION		ALDRIN		EPN		DIAZINON		FOLIDOL		PHOSDRIN	
	Mortality (%)	Residue (ppm)	Mortality (%)	Residue (ppm)	Mortality (%)	Residue (ppm)	Mortality (%)	Residue (ppm)	Mortality (%)	Residue (ppm)	Mortality (%)	Residue (ppm)
1	87.50	39.93	83.75	38.06	73.75	24.23	76.25	36.59	70.00	32.38	75.00	31.03
2	82.50	33.55	73.00	28.31	62.50	18.71	62.50	20.43	58.75	25.33	50.00	16.08
3	70.00	24.09	66.25	24.31	52.50	15.11	47.50	20.81	43.75	18.65	23.75	8.02
4	56.25	17.94	52.50	18.31	38.75	11.31	33.75	16.08	30.00	13.85	2.50	2.38
5	43.75	13.91	42.50	14.98	23.75	7.90	17.50	11.06	17.50	9.94		
6	36.25	11.89	31.25	11.84	20.00	17.10	1.25	4.33	1.25	3.50		
7	22.50	8.56	22.50	9.57	8.75	4.63						
8	15.00	6.84	12.50	7.00	2.50	2.79						
9	10.00	5.61	1.25	2.99								
10	3.75	3.77										
11	1.25	2.64										

B. Data on mortality and residues of insecticides on cauliflower during 1969.

1	93.33	45.18	83.33	36.64	86.56	38.77	80.00	33.08	76.66	29.88	70.00	21.84
2	83.33	28.80	70.00	23.91	76.66	27.85	66.66	23.68	56.66	18.11	56.66	16.21
3	70.00	19.82	60.00	18.40	63.33	19.90	50.00	16.52	40.00	12.42	30.00	9.07
4	56.66	14.66	46.00	13.29	50.00	14.84	33.33	11.57	26.66	8.93	1.66	2.38
5	46.66	11.37	36.66	10.37	33.33	10.26	20.00	8.25	10.00	4.95	—	
6	36.66	9.55	20.00	6.38	23.33	7.91	3.33	3.62	1.66	2.34		
7	23.33	6.87	8.33	3.78	10.00	4.91						
8												

determine the residual toxicities of different insecticides used on cauliflower and other vegetables.

The results of the present study completely or partially agree with the findings of Schestor and Hornstein (1957), Whetsons (1957), West and Hardy (1961), Staples *et al.* (1967), Ahmad and Ahmad (1972), Ahmad and Javed (1973) and Rehman *et al.* (1973). The variations may be due to the differences in the conditions under which the present experiments were carried out. The test insect used might also be an important sources of variation. According to Schester and Hornstein (1957), phostrin lost 90 per cent of its residue within 2 days after application. In the present study, nearly the same amount of loss, i.e., 89.09 to 92.3 per cent was observed within 4 days after application. It, however, remained unexplained that the residual effectiveness of ethion and aldrin on cauliflower against *B. hilaris* was variable in the field and the potted plants experiments while it was similar for EPN diazinon, folidol M. and phosdrin in both experiments.

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