or differences in both of these measurements, the following treatments were superior to carbaryl: ½ lb Monitor, NC-6897, leptophos, and Supracide, and 1 lb Monitor and N-2596. One-half lb C-9491 and 1 lb R-15792 were similar to carbaryl and ½ lb chlorpyrifos was inferior. None of these materials were superior to carbaryl at all time periods, but ½ lb NC-6897 and 1 lb Monitor were superior at 3 and 10 days.

DISCUSSION.—The performances of ½ lb of methomyl or monocrotophos and 1½ lb of carbaryl against flea beetles were compared in 2 experiments. In one experiment all treatments reduced the infestation for 6 days, and there was no significant difference among the treatments. In the other experiment methomyl and carbaryl reduced the infestation for 10 days, monocrotophos reduced it for 3 days, and methomyl was superior to carbaryl and monocrotophos at 3 days. From this it was apparent that these materials do not perform as consistently as did DDT (Mistric and Smith 1970).

To obtain a better estimate of the average response of flea beetles to ½ lb methomyl or monocrotophos or 1½ lb carbaryl, treatment vs. check comparisons were made wherever these treatments were tested. Carbaryl was consistent in reducing flea beetle populations for 6 days, and in 2 of 4 experiments infestations were reduced for 10 days. Similar trends were obtained with methomyl. Monocrotophos reduced infestations for 6 days in 2 of 3 experiments and had no significant effect by the 10th day in any experiment. Thus, carbaryl and methomyl may be expected to reduce flea beetle populations for 6 or more days, while monocrotophos may be expected to reduce infestations for 6 or fewer days.

All the experimental treatments tested except ½ lb chlorpyrifos were similar or superior to 1½ lb carbaryl in effectiveness against flea beetles. The most effective new treatments tested were ½ lb NC-6897 or 1 lb Monitor.

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Toxicity of Acephate and Diazinon to Harlequin Bugs[1] on Cabbage[2]

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In southern areas of the United States the harlequin bug, *Murgantia histrionica* (Hahn), is regarded as a serious pest on cabbage and other cruciferous crops (Metcalf et al. 1962). When the bugs are numerous, their feeding on cabbage causes wilting, browning of leaves, and death of plants. Cabbage damaged by feeding harlequin bugs often appears scalded (Reed 1971) or burned by hot sun. These insects are sometimes difficult to control with chemicals that are suitable for controlling other major pests of cabbage (Thompson 1949).

During the spring of 1972, harlequin bugs invaded experimental plots of cabbage in the Texas Rolling Plains. The invasion was precipitated largely by the harvesting of commercial potato crops in the area. Adults appeared on cabbage at the end of May in small numbers. About the middle of June the population exploded, and by June 25 the adult density reached 100–300 ($\bar{x}$ = 100)/5 heads and the egg density 10–50 ($\bar{x}$ = 17)/5 heads (Fig. 1).

Chemicals recommended for controlling lepidopterous pests on cabbage (i.e., Monitor® O,S-dimethyl phosphoroamido, methomyl, endosulfan, carbofuran, chlordimeform) were ineffective in suppressing the harlequin bug population. Therefore a test was initiated to investigate the efficacy of additional compounds against it.

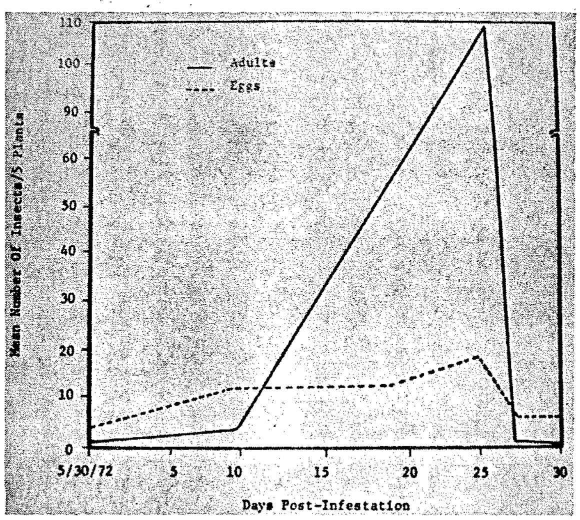

FIG. 1.—Profile of harlequin bug population on cabbage preceding and following application of acephate and diazinon (on 26th day post infestation).

MATERIALS AND METHODS.—Pretreatment counts and applications occurred June 26, 1972. Treatments consisted of acephate and diazinon AG500 applied in 40 gal of H_2O/acre. Triton® B-1956 was used as a spreader at 1.5 oz/100 gal of H_2O. Treatments were applied from a ground sprayer traveling 3.5 mph and under a pressure of 80 lb/in.^{2} through FS4.5, 73° fan-tip nozzles. The nozzles hung between the rows to insure thorough coverage on both sides of the heads.

Plots consisted of 4 rows 110 ft long. Each plot was divided into 5 equal subplots of 22 ft. Data were taken from the 2 inside rows near subplot centers. Samples consisted of the number of eggs and adults on 5 plants in each of the subplots. Very few older nymphs were present. Smaller nymphs that had not dispersed from empty chorions of egg clusters were included in the egg data.

Data were analyzed for variances by the F test and treatment means separated by applying Duncan's multiple range test.

RESULTS AND DISCUSSION.—Table 1 indicates the efficacy of acephate and diazinon against the harlequin bug. Acephate was significantly more effective (@ 5% level) in reducing the adult population than diazinon. All treatments

[1] Hemiptera: Pentatomidae.

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Table 1.—Chemical suppression of harlequin bugs on cabbage.

Treatment (AI/acre)	Harlequin bugs present (x̄/5 plants)						% reduction[a]			
	Pre-treatment		Post-treatment				3 days		7 days	
			3 days		7 days					
	Eggs	Adults	Eggs	Adults	Eggs	Adults	Eggs	Adults	Eggs	Adults
Acephate 2.0 lb	50	282	0	0	10	0	100 a	100 a	80 a	100 a
1.5 lb	0	120	6	0.2	2	0.4	—	99.8 a	—	99.7 a
1.0 lb	0	240	1	.4	8	0	—	99.8 a	—	100 a
0.73 lb	30	132	6	.8	19	.4	80 a	99.4 a	37 b	99.7 a
Diazinon 2.0 lb	25	137	10	55	19	48	60 a	60 b	24 b	65 b
1.0 lb	23	74	20	29	18	35	13 b	61 b	22 b	53 b
Untreated	20	135	20	146	30	159	0 b	0 c	0 b	0 c

[a] Numbers followed by the same letter are not significantly different at the 5% level of probability.

of acephate reduced the adult population by 99+%. While diazinon also gave significant suppression (@5% level) of the adults, it reduced the population by only 53–65%. Adults continued to increase in the untreated plots.

Acephate @ 0.75 and 2.0 lb and diazinon @ 2.0 lb AI significantly reduced (5% level) the egg population by the 3rd day posttreatment. By the 7th day posttreatment, however, only acephate @ 2.0 lb AI continued to significantly suppress the egg population. The apparent ineffectiveness of these chemicals in providing lasting suppression of the egg population may have been due to oviposition by adults migrating into the plots after treatment. Migrating gravid females could probably oviposit before being killed by chemical residues or before moving out of the plots.

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