RESIDUAL EFFECTIVENESS OF THREE CHRYSANTHEMUMATES AND TWO ORGANOPHOSPHORUS COMPOUNDS AGAINST MOSQUITOES

J. B. GAHAN AND G. C. LABRECQUE [1]

Entomology Research Division, Agr. Res. Serv., U. S. D. A.

Laboratory tests comparing the durability of residues of six organophosphorus compounds and DDT against adults of a nonresistant colony of *Anopheles quadrimaculatus* Say have been reported in a previous paper (LaBrecque *et al.* 1958). The results obtained with five additional compounds—three esters of chrysanthemumic acid prepared by chemists in the Entomology Research Division and two commercial organophosphorus compounds—are given in this paper. DDT was used as a standard.

Acetone solutions of the compounds were sprayed on plywood panels at 100 mg. of insecticide per square foot. At intervals after treatment approximately 50 *quadrimaculatus* adults were exposed on the treated surfaces under half-sections of Petri dishes for periods ranging from 5 to 120 minutes. The full range of exposures was not used each time, but an effort was made to achieve a range of mortalities that reached or approached 100 percent. After each exposure the insects were transferred to untreated screen holding cages, furnished cotton that had been saturated with a 10 percent sugar solution, and held for 24-hour mortality counts. Results of these tests appear in table 1.

The 2, 4–dimethylbenzyl chrysanthemumate was the most effective compound for 60 days, but lost its toxicity after 90 days. It had a very rapid action as a fresh treatment. Most of the mosquitoes were down when they were removed from the panels after the 5-minute exposures and were so severely paralyzed they could make no coordinated movements. The 2–chloroethyl 2, 2–dichlorovinyl ethyl phosphate was also highly effective for 30 days, but then lost its toxicity rapidly. Throughout the first 2 weeks this compound caused 100 percent mortality in 24 hours after exposures as short as 5 to 15 minutes, whereas 60 to 120 minutes were needed to obtain similar results with DDT. Barthrin was about equal to DDT for 14 to 30 days but inferior afterwards. The 6–bromopiperonyl ester was the poor-

[1] P. H. Adcock assisted in carrying out these tests.

est of the chrysanthemumic acid esters throughout the tests, and *O, O*–dimethyl *S*–(4–oxo–3*H*–1, 2, 3–benzotriazine–3–methyl) phosphorodithioate (Guthion) was ineffective the day after application. The DDT standard had the greatest durability and was the most effective treatment after 90 days. The check mortality ranged between 0 percent and 10 percent.

Literature Cited

LABRECQUE, G. C., GAHAN, J. B. and ADCOCK, P. H. 1958. Residual effectiveness of six organophosphorus compounds against *Anopheles quadrimaculatus* Say. Mosquito News 18(2):94–5.

TABLE 1—Mortality of *Anopheles quadrimaculatus* after exposure to residues of insecticides aged for various periods

Insecticide	Exposure (Minutes)	Percent mortality on residue aged— 1 day	7 days	14 days	30 days	60 days	90 days
		First Series					
2, 4–Dimethylbenzyl chrysanthemumate	5	98	100	100	81	27	—
	15	100	100	100	74	63	0
	30	—	—	—	100	95	8
	60	—	—	—	—	100	2
	120	—	—	—	—	—	12
Barthrin (6–chloropiperonyl chrysanthemumate)	5	17	4	10	9	14	—
	15	80	89	93	38	26	—
	30	100	98	100	94	44	0
	60	—	100	100	91	91	0
	120	—	—	—	—	96	0
6–Bromopiperonyl chrysanthemumate	5	5	—	—	—	—	—
	15	21	14	6	9	6	—
	30	51	61	94	16	17	—
	60	98	97	100	58	53	0
	120	100	100	100	97	81	6
DDT	5	2	0	54	24	4	—
	15	70	93	93	26	63	27
	30	97	100	100	63	71	—
	60	100	100	100	98	97	100
	120	—	—	—	—	100	100
		Second Series					
2–Chloroethyl 2,2–dichlorovinyl ethyl phosphate	5	100	100	74	0	—	—
	15	100	100	100	17	0	—
	30	100	100	100	100	0	—
	60	100	—	—	—	2	2
	120	—	—	—	—	66	0
O, O–Dimethyl *S*–(4–oxo–3*H*–1,2,3–benzotriazine–3–methyl) phosphorodithioate	60	5	—	—	—	—	—
	120	4	—	—	—	—	—
DDT	5	2	—	—	—	—	—
	15	19	30	11	24	4	—
	30	58	50	67	79	57	37
	60	100	97	100	88	100	69
	120	—	97	100	—	100	100