

Short Communication

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LABORATORY EVALUATION OF MALATHION AND VAPONA FOR THE CONTROL OF RED FLOUR BEETLE, *TRIBOLIUM CASTANEUM* (HERBST), IN WHEAT

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The red flour beetle, *Tribolium castaneum* (Herbst), has been regarded as one of the most destructive insect pests of stored products.^{2,3,5} Serious losses are incurred every year from its attack and demand effective control measures. Lindgren *et al.*⁷ reported laboratory trials showing that both Malathion and Chlorthion should be effective in protecting wheat from insect infestation. Lemon⁶ tested 16 organophosphorus insecticides against *Tribolium* spp. infesting wheat and found that Malathion and Fenitrothion were more toxic than others. But he did not observe the residual toxicity of these insecticides. Since no attempt appears to have been made to evaluate the relative toxicity and residual persistence of Malathion and Vapona (O,O-dimethyl-2,2-dichlorovinyl phosphate) for the protection of stored wheat against *Tribolium castaneum*, the present study was undertaken.

Four concentrations (4, 8, 16 and 32 p.p.m.) of Malathion 50 EC (50% emulsifiable concentrate) and Vapona 48 EC (48% emulsifiable concentrate) were prepared in acetone. Each of these was applied to 1 kg of wheat which was mixed for 10 min in a glass-jar of 2 kg capacity to ensure uniform distribution of the insecticides in the grain. A series of 12 glass jars (size 11×5 cm) each containing 50 g of treated wheat was set up. 20 adult beetles from laboratory culture which had starved for 24 hr were released in these jars and the jars were then covered with muslin. The percentage of mortality was recorded 48 hr after the release of the insects and the results were corrected by using Abbott's formula.¹ The residual toxicity of the insecticides was assessed by exposing the beetles to the grains 7, 22, 37 and 52 days after treatment. Controls were run for each experiment.

The experiments were conducted at 26.13±0.31°C and R.H. 68.05±0.8%. The moisture content of the grain was 12.5%.

Results obtained with various concentrations of the insecticides are given in Tables 1 and 2.

Malathion and Vapona killed all insects at concentrations greater than 4 p.p.m. This concentration of Malathion killed all insects but Vapona only 19.9% (Table 1). Malathion was more persistent than Vapona (Table 2) which apparently dispersed more rapidly and soon lost its efficacy.

TABLE 1. RELATIVE TOXICITY OF MALATHION AND VAPONA AGAINST THE RED FLOUR BEETLE IN WHEAT.

Concentration (p.p.m.)	Mortality % (48 hr)	
	Malathion	Vapona
4	100	19.9
8	100	100
16	100	100
32	100	100

TABLE 2. RESIDUAL EFFECTS OF MALATHION AND VAPONA IN PROTECTING WHEAT FROM THE RED FLOUR BEETLE.

Insecticides	Concentration (p.p.m.)	Mortality % (days)			
		7	22	37	52
Malathion 50 EC	4	15.3	12.1	6.8	5.0
	8	24.1	18.6	13.6	11.7
	16	46.6	37.3	27.1	16.7
	32	67.2	57.6	45.8	25.0
Vapona 48 EC	4	12.1	10.2	5.1	3.3
	8	23.1	15.3	10.2	5.0
	16	31.0	18.6	11.9	8.3
	32	58.6	42.4	30.5	16.7

Several workers have reported the satisfactory use of Malathion in practice.^{8,9,10} Malathion and Fenitrothion (Sumithion) dispersed slowly from barley and conferred good protection for as long as eight months.⁴ The results of the present study indicate that Malathion at concentrations above 32 p.p.m. could be used to protect wheat from infestation by the red flour beetle for nearly two months. Vapona might usefully be used to kill the beetles if storage conditions will not permit reinfestation.

References

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