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AN INSECTICIDE TRIAL AGAINST CORN APHID (RHOPALOSIPHUM MAIDIS (FITCH)) ON SORGHUM

By P. H. TWINE, B.Agr.Sc.

SUMMARY

Six organophosphate insecticides were tested for their effectiveness against *Rhopalosiphum maidis*. All treatments gave a significant reduction in infestation. Applications involved only very low rates per acre but in each instance the minimum effective dosage level was not reached.

Predator populations were reduced considerably by all treatments. The predator level in untreated plots increased by a factor of 1·7 after 15 days and by this time had eliminated the aphid infestation.

I. INTRODUCTION

Corn aphid (*Rhopalosiphum maidis* (Fitch)) has sometimes caused concern to sorghum growers on the Darling Downs of south-eastern Queensland when present in large numbers in and around the developing grain. Under these situations the honey dew associated with high aphid population gives rise to harvesting problems unless hot dry weather has caused it to dry.

When present in large numbers the aphid is responsible by direct feeding for drooping and yellowing of young leaves, with a characteristic reddening of the leaf when fully developed. The pest has also been recognized as a vector of sugar cane mosaic in sorghum crops.

During the 1969-70 season a control trial was undertaken in a certified sorghum seed crop of the cultivar Pioneer 846 at St. Ruth on the Darling Downs. Its purpose was to compare the usefulness of a number of insecticides and also to study the population changes in insect predators and their effectiveness as controlling agents against the aphid.

II. MATERIALS AND METHODS

All insecticides used in the trial were organophosphates. The materials and spray strengths applied were as follows.

Parathion.—An emulsifiable concentrate containing 50·0% w/v active constituent; used at 3·0 oz of active constituent per acre.

Demeton-s-methyl.—An emulsifiable concentrate containing 25·0% w/v active constituent; used at (a) 2·0 oz and (b) 4·0 oz per acre.

Dimethoate.—A concentrate containing 30·0% w/v active constituent; used at (a) 1·5 oz and (b) 3·0 oz per acre.

Vamidothion.—An emulsifiable concentrate containing 40·0% w/v active constituent; used at 6·0 oz per acre.

Omethoate.—An emulsifiable concentrate containing 50·0% w/v active constituent; used at 4·0 oz per acre.

Mevinphos.—A concentrate containing 100·0% w/v active constituent; used at 2·0 oz per acre.

The trial area was of a 9 x 3 randomized block layout, unit plot being 1 row 66 ft long. Treated rows were separated by two guard rows. Treatments were applied with a knapsack unit at the rate of 42 gal of spray per acre. All applications were made on February 17, 1970.

Unit samples for assessment of aphid control comprised 50 heads randomly taken within plots. The heads were individually inspected and rated 0, 1, 2 or 3 respectively according to (a) absence of aphids, (b) one-third of the head infested, (c) two-thirds of the head infested and (d) total coverage of head with aphids. Actual counts of aphids were not taken. The heads were also examined for insect predators and the numbers with predators recorded. The ratings and counts were made as pretreatment and 2, 6 and 15 days post-treatment.

III. RESULTS

The aphid infestation rating within each plot was calculated by taking the mean of the sum of the individual head population ratings. Results are given in Table 1. The mean numbers of heads with predators are recorded in Table 2.

TABLE 1

MEAN APHID INFESTATION ON 50 HEADS PER PLOT

Treatment		Pretreatment	2 Days	6 Days*	15 Days*
Parathion	3 oz/ac	1·373	0·200		
Demeton-s-methyl ..	2 oz/ac	1·153	0·007		
Demeton-s-methyl ..	4 oz/ac	1·227	0·027		
Dimethoate	1½ oz/ac	1·633	0·100		
Dimethoate	3 oz/ac	1·520	0·013		
Vamidothion	6 oz/ac	1·493	0·067		
Omethoate	4 oz/ac	1·413	0·000		
Mevinphos	2 oz/ac	1·547	0·087		
Control	..	1·413	1·193	0·806	0·000
Necessary differences for significance	5%	0·518	0·258		
	1%	0·713	0·355		

* 100% control in all treatments.

TABLE 2

MEAN NUMBER OF PREDATOR-INFESTED HEADS ON 50 HEADS PER PLOT

Treatment	Pretreatment		Post-treatment 2 days		Post-treatment 6 days		Post-treatment 15 days	
	Trans. Mean	Equiv. Mean	Trans. Mean	Equiv. Mean	Trans. Mean	Equiv. Mean	Trans. Mean	Equiv. Mean
Parathion .. .. 3 oz/ac	4·37	19·05	3·65	13·33	3·80	14·43	4·26	18·21
Demeton-s-methyl 2 oz/ac	3·80	14·42	2·95	8·69	2·27	5·13	3·49	12·81
Demeton-s-methyl 4 oz/ac	3·87	14·97	2·55	6·50	1·82	3·33	3·64	13·25
Dimethoate .. 1½ oz/ac	4·39	19·24	3·36	11·30	3·12	9·71	3·90	15·21
Dimethoate .. 3 oz/ac	4·60	21·17	2·97	8·84	2·47	6·09	3·56	12·67
Vamidothion .. 6 oz/ac	4·07	16·53	2·58	6·66	1·99	3·97	4·18	17·47
Omethoate .. 4 oz/ac	3·84	14·75	2·43	5·92	1·46	2·13	3·72	13·84
Mevinphos .. 2 oz/ac	4·45	19·83	3·04	9·25	3·57	12·77	4·67	21·81
Control	4·55	20·70	5·07	25·66	4·74	22·49	6·01	36·12
Necessary differences for significance 5%	1·00		1·08		1·27		1·15	
Necessary differences for significance 1%	1·37		1·49		1·75		1·58	

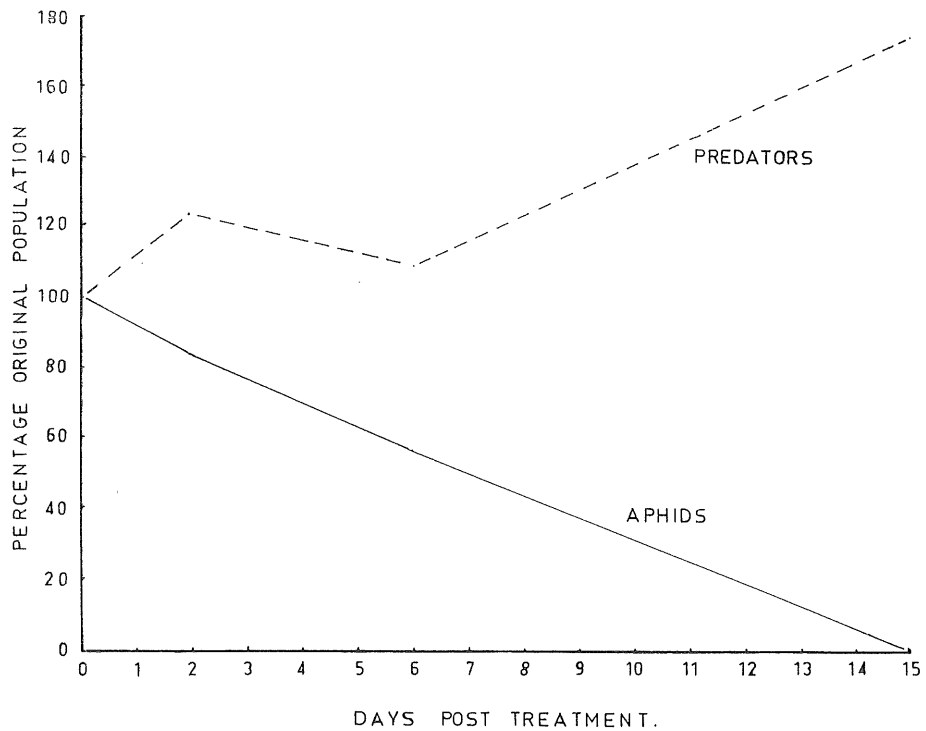

Fig. 1—Relationship between aphid populations and predator levels for untreated plots. Counts were made at 2, 6 and 15 days.

IV. DISCUSSION

All treatments reduced aphid populations to levels significant at the 1% level within 2 days with no significant differences at the 5% level between any treatments (Table 1). Control by each treatment was indicated at 100% after 6 days, but the aphid population in untreated plots at this time showed a natural decline.

The natural decline in the aphid population was marked, and was complete in untreated plots 15 days from the commencement of the trial. The build-up in predator numbers, mostly of coccinellid larvae, must have been the main causal factor for the decline (Figure 1).

Predator levels were reduced by all insecticide treatments after 2 and 6 days but this effect was short-lived, no doubt due to the short residual life of the insecticides. Predator populations subsequently showed a marked increase in all treatments (Table 2).

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The author is an officer of Entomology Branch, Queensland Department of Primary Industries, and is stationed at Toowoomba.