

# PHENMEDIPHAM FOR WEED CONTROL IN MANGOLDS

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## Summary

Phenmedipham at rates from  $\frac{1}{2}$  to 4 lb a.i./acre was tested at 6 sites. Mangold tolerance was excellent, while fathen (*Chenopodium album*) control was very good if sprayed before the 6- to 8-leaf stage. Similarly, spurrey (*Spergula arvensis*) control was excellent if sprayed early, but wireweed (*Polygonum aviculare*) appeared resistant. Pyrazon was usually inferior to phenmedipham in weed control efficiency.

## INTRODUCTION

SINCE the conclusion of herbicide studies on sugar beet (Meeklah, 1966), herbicide work within the beet family has continued at Invermay, using mangolds for testing since it is a popular crop with dairy farmers in the area.

At first the work concentrated unsuccessfully on means of improving the efficiency of pyrazon (Meeklah, unpubl. data). Later the introduction to New Zealand of phenmedipham (Sch. 4075) in 1967 led to initial proving trials in that season, with a more comprehensive series of field evaluation trials at present partially completed on farms within the Taieri Plain.

This paper is a progress report on this work up to May, 1969.

## MATERIALS AND METHOD

Five field experiments A to E and the treatments involved are reported in Tables 1 (1967) and 2 (1968). All rates are expressed in lb a.i./acre.

Materials were applied post-emergence during good spraying conditions by modified Oxford Precision sprayer, in 20 gal water/acre. A wetting agent (Citowett) was included at 0.03% with pyrazon.

The varieties used and growth stage at spraying were as follows:

- Expt. A: Red Intermediate — 1 to 2 true leaves.
- Expt. B: Yellow Globe — 1 to 2 true leaves.
- Expt. C: Yellow Globe — 1 to 2 true leaves.
- Expt. D: Red Intermediate — 2 true leaves.
- Expt. E: Red Intermediate — 4 to 6 true leaves.
- Expt. F: Yellow Globe — 3 to 4 true leaves.

In 1967, yields were taken from Experiment A and the number of bulbs harvested recorded.

Mangold vigour was assessed using the following scale: 1 = very poor; 2 = poor; 3 = fair; 4 = good; and 5 = very good.

In 1968, the initial effect on crop population at time of singling was recorded by counting the number of mangold-containing inches per 50 in. of row.

No yields have been obtained for 1968 trials.

## RESULTS

1967

Table 1 shows the results obtained in Experiments A and B, 1967.

### *Experiment A*

The main weeds at spraying were willow weed (*Polygonum persicaria*) 2 true leaves, followed by fathen (*Chenopodium album*), 2 pair true leaves, with wireweed (*Polygonum aviculare*) becoming more evident at the time of singling. Weed control by all treatments was very good, even ½ lb of Sch. 4072 (now an obsolete formulation of phenmedipham) was satisfactory. All materials reduced mangold vigour, and subsequently no significant yield increases occurred, nor was final population affected.

### *Experiment B*

The main weeds at spraying were fathen (1 to 2 pair true leaves), wireweed (2 true leaves), spurrey (*Spergula arvensis*) (1 true leaf). Control of weeds by the time of singling was good except in the case of pyrazon. Mangold vigour was reduced initially by phenmedipham at 4 lb, but later all treatments showed improved vigour.

1968

Table 2 shows 1968 results with a standard trial of phenmedipham ½, 1, 1½ and 2 lb at four sites.

### *Experiment C*

A dense cover by spurrey (1 true leaf) was easily controlled at the 1½ and 2 lb rates. The ½ lb rate and pyrazon were poor, with 1 lb intermediate. There were no significant effects on mangold population at singling time.

### *Experiment D*

The principal weed, fathen (1 to 2 pair true leaves), was satisfactorily controlled at 1½ and 2 lb of phenmedipham, but wireweed control was poor while willow weed was reduced slightly. There was no effect on mangold vigor at singling time. Pyrazon failed to control weeds.

### *Experiment E*

Spraying was late in this trial with wireweed starting to tiller and fathen 2 to 3 pair true leaves. Fathen was controlled only by phenmedipham but no control of wireweed was achieved. Mangold vigour was unaffected.

### *Experiment F*

Application was again late; the main weed fathen, with 3 to 4 pair true leaves to early tillering stage, was reduced in height and cover progressively by the increase in phenmedipham dosage, but complete control was not achieved. However, fathen cover was sufficiently reduced at singling by the 1½ and 2 lb rates to be considered acceptable for the purpose of delineating the crop for singling. Pyrazon had no effect. Mangold vigour was slightly reduced by 2 lb of phenmedipham.

TABLE 1

Expt. A		Expt. B									
Sprayed 13/11/67	Total % Weed Cover 6/12/67	Expt. A Mangold Vigour 6/12/67	Mangold Yield (tons)	No. Bulbs (000/acre)	Sprayed 22/11/67	% Weed Cover at 11/12/67	Other spp.	Mangold Vigour 11/12/67	17/1/67		
					Fathen	Spurrey	Wireweed				
Sch. 4072* 1/2	1	3.7	25.7 a	21.7	phenmedi- pham 1	2	5	1	4	3.8	4.4
Sch. 4072 1	1	3.6	25.4 a	21.7	phenmedi- pham 2	—	Tr.	1	1	3.7	4.3
Sch. 4072 2	Tr	3.4	26.9 a	21.9	phenmedi- pham 4	—	—	1	Tr.	3.3	4.2
pyrazon 6	Tr	2.5	26.6 a	21.9	pyrazon 6	20	13	3	6	4.3	3.6
Control CV	17	4.6	25.8 a 11.1%	21.9	Control	21	13	5	8	3.7	2.7

\*Sch. 4072 = phenmedipham, obsolete formulation.

TABLE 2

	EXPT. C Sprayed 5/11/68		EXPT. D Sprayed 5/12/68		EXPT. E Sprayed 18/12/68		EXPT. F Sprayed 18/12/68				
	Mangolds per 50 in. Row 27/11/68	Total Weed Cover 27/11/68	Spurrey % Cover 27/11/68	% Cover—17/12/68 Willow Weed Fathen	% Cover—3/1/69 Wireweed Fathen	% Fathen	Fathen Height (in.)	Mangold Vigour			
phenmedi- pham 1/2	8.1 a	29 bAB	27	24 bB	7	2	3	Tr.	76	10	4.8
phenmedi- pham 1	9.1 a	7 cdBC	5	11 cC	4	2	4	—	71	6	4.7
phenmedi- pham 1 1/2	8.4 a	2 cdC	1	5 dD	6	2	3	Tr.	39	5	4.4
phenmedi- pham 2	8.8 a	1 cdC	—	3 dD	5	2	2	—	32	4.5	4.2
pyrazon 6	8.3 a	16 bcBC	16	80 aA	9	1	5	5	100	11	5
Control	7.6 a	57 aA	47	81 aA	4	2	4	2	100	12	5
CV		10.3%		7.5%							

## DISCUSSION

Reduction of weed cover prior to singling is considered almost essential to both ease and speed up the task. Eddowes and Caldwell (1968) found that competition from weeds prior to singling at the 4-true-leaf stage reduced the final yield of sugar beet and no doubt the same factors apply to the mangold crop.

In the experiments reported above, phenmedipham, at rates of 1 lb and over, gave acceptable reduction in weed cover in time for singling. Even ½ lb sometimes gave good results if applied to fathen during the cotyledon to 1 pair true leaf stage. If spraying was delayed, as in Experiment F, rates of 1½ to 2 lb were necessary before appreciable control could be achieved of fathen in the 6 to 8 leaf and early tillering stages.

Wireweed control was often poor and results in the United Kingdom (Holmes, 1968) suggest that wireweed may be susceptible at the cotyledon to 1-true-leaf stage. However, Thomas (1968) noted that recovery can occur even when sprayed at this stage; he considered that polygonum species as a whole were relatively resistant after the 2-true-leaf stage.

In the trials reported above, willow weed and bindweed did not occur in any great density and acceptable control of both was noted on all occasions.

In Experiment D, a light infestation of wild turnip (*Brassica campestris*) was controlled by all rates of phenmedipham. On all occasions, except in Experiment A, pyrazon gave inadequate weed control.

Mangold tolerance to phenmedipham was satisfactory as shown by initial and final plant populations in Experiment C and A, respectively. Mangold vigour was unaffected, except in Experiment B where the 4 lb rate caused an initial reduction.

## CONCLUSIONS

Phenmedipham appears to be an excellent herbicide for post-emergence use in mangolds, at a dose rate of about 1 lb. The problem of resistant and semi-resistant weeds will have to be overcome by admixture with other herbicides or by an additional treatment with a pre-emergence herbicide. Because of its non-persistent nature, some late establishment of weeds may occur in the wide inter-row spaces at present common in mangold crops; the application of a material such as lenacil could be expected to solve this problem but in the long run a change in row spacing may be the answer. In fact, the arrival of efficient herbicides for use in mangold means that traditional spacings, both within and between row, must now be questioned.

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## REFERENCES

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