NEW CHEMICALS FOR WEED CONTROL IN PEAS, ONIONS AND POTATOES

E. G. R. WALLACE

Henry H. York & Co. Ltd., Hastings

Summary

In a one-year series of screening trials in Hawke's Bay for post-emergence weed control on peas, two materials, benthiazuron and buturon have been shown to be equivalent to the present accepted material for this crop. Two screening trials on early potatoes in Pukekohe for the control of fumitory (*Fumaria officinalis*) showed that none of the materials used gave adequate control of this weed. From pre- and post-emergence screening trials in Hawke's Bay on onions, pyrazon plus chlorbufam gave most promising results for pre-emergence applications and benthiazuron was the most satisfactory material for post-emergence application.

INTRODUCTION

THE traditional materials for weed control in peas are still giving satisfactory results but, because of the toxicity of the dinoseb compounds and the susceptibility of other cultivated plants to the phenoxy acetic acid group, better and safer materials are being sought for weed control. Some of the newer materials at present in use have disadvantages, such as relatively low crop tolerance or poor weed control under some climatic conditions. Hence, any progress in this field would be welcomed.

Chemical weed control in early potatoes has been the accepted practice for a number of years. However, the number of chemicals available is limited and it does appear that these have little or no effect on fumitory (*Fumaria officinalis*). New materials to be used in conjunction with accepted materials are needed for the control of this weed.

During the past few years, many new materials have replaced the traditional sulphuric acid for weed control in onions. The greatest need in this field is for an efficient programme of chemical weed control with a wide spectrum of weed species susceptible to it.

With these points in mind the following trials were initiated.

EXPERIMENTAL

All treatments were applied with a hand-pushed rig on which was mounted a six-nozzle boom. The nozzle spacing as 14 in., giving an effective coverage of 6 ft 6 in. Carbon dioxide gas was employed as the propellant and, by using a pressure of 20 lb/sq. in. T.J. 730308 nozzles and a forward speed of 2.25 mph, an output of 32 gal/acre was achieved. Any error in application with this machine amounted to a maximum of $\pm 0.475\%$.

Plot size was in all cases 0.03125 acres and replications were no fewer than 5.

An endeavour was made at all times to spray under conditions of minimum drift and also to obtain maximum coverage.

TABLE 1: WEED CONTROL IN GREEN PEAS, HAWKE'S BAY

<i>Treatment (lb)</i>				<i>Overall Control</i>		<i>Phytotoxicity</i>	
				<i>Tri. 1</i>	<i>Tri. 2</i>	<i>Tri. 1</i>	<i>Tri. 2</i>
TRIAL NO. 1 & NO. 2.							
dinoseb 0.59/MCPB 1.00			....	4.2	8.3	0.2	0.3
metobromuron 2.00	....	....	....	7.0	9.6	9.4	9.1
metobromuron 1.00	....	....	....	5.0	8.6	4.4	5.5
metobromuron 1.00/morphactin (HZ 3456)							
1.00	....	....	....	4.8	9.0	9.2	9.3
metobromuron 1.00/MCPB 1.00			....	4.4	9.5	7.8	8.8
morphactin (HZ 3456) 1.00	....	....	....	3.4	4.8	8.0	7.6
prometryne 0.75	....	....	....	6.0	9.6	1.4	0.6
benzthiazuron 1.40	....	....	....	5.8	9.3	0.4	0.6
Bayer 5710 7.50	....	....	....	1.0	3.1	0.2	3.0
buturon 2.00	....	....	....	6.2	9.5	1.8	0.1
Untreated	....	....	....	0.4	0.0	0.0	0.0
TRIAL NO. 3							
benzthiazuron 1.40	....	....	....	9.2		1.4	
benzthiazuron 0.70/alkylaryl poly glycol ether							
100% 2 pts	....	....	....	7.2		4.2	
buturon 2.00	....	....	....	7.6		0.8	
buturon 1.00/alkylaryl poly glycol ether							
100% 2 pts	....	....	....	9.8		3.0	
prometryne 0.62	....	....	....	9.8		1.8	
dinoseb 0.59/MCPB 1.00	....	....	....	8.8		0.4	
TRIAL NO. 4							
benzthiazuron 0.35	....	....	....	9.1		0.0	
benzthiazuron 0.52	....	....	....	9.7		0.3	
benzthiazuron 0.70	....	....	....	9.9		0.0	
benzthiazuron 0.87	....	....	....	9.9		0.7	
benzthiazuron 1.05	....	....	....	10.0		0.8	
benzthiazuron 1.27	....	....	....	9.9		0.6	
benzthiazuron 1.40	....	....	....	10.0		1.0	
benzthiazuron 0.17/alkylaryl poly glycol ether							
100% 1 pt	....	....	....	9.6		1.0	
benzthiazuron 0.35/alkylaryl poly glycol ether							
100% 1 pt	....	....	....	10.0		1.3	
benzthiazuron 0.52/alkylaryl poly glycol ether							
100% 1 pt	....	....	....	9.9		2.2	
benzthiazuron 0.70/alkylaryl poly glycol ether							
100% 1/2 pt	....	....	....	10.0		2.5	
dinoseb 0.59/MCPB 100	....	....	....	9.8		1.0	

RELATIVE YIELD OF GREEN PEAS—HAWKE'S BAY—TRIAL NO. 5

<i>Treatment (lb)</i>	<i>Yield/acre (lb)</i>	<i>Gross Return/acre (\$)</i>
benzthiazuron 1.40	6,270	133, 10
dinoseb 0.59/MCPB 1.00	6,280	133, 40

Ratings for weed control and phytotoxicity are based on a 0 to 10 visual scale as follows: Weed control—0 = no control, 10 = 100% control. Phytotoxicity—0 = no damage, 10 = crop death. All rates are expressed in lb active ingredient per acre.

RESULTS

PEAS

All the trials on peas were conducted on crops situated on the Here-taunga Plains in Hawke's Bay. Soil types ranged from silt to clay loams of alluvial origin. Results are given in Table 1.

Trials No. 1 and No. 2

A range of materials believed to have a use in this field were selected for these trials. The rates of application chosen for new materials were those indicated by overseas literature and for standard treatments the rates selected were those applicable to the area.

Trial No. 3

From the results of Trials 1 and 2, the two most promising new materials were further tested. A belief that the addition of a surfactant to lower rates of material would give similar results to the full rates was also incorporated in this trial.

Trial No. 4

Owing to the encouraging results from benthiazuron (Bayer 5653), this material was further tested on its own to determine the lowest economic rates. Also, because of the phytotoxicity encountered in Trial 3 with the addition of a surfactant to a lower rate of the material, a further variation of this idea was incorporated.

Trial No. 5

Obtaining yield results from a fully replicated small plot trial is not entirely satisfactory for green peas owing to changing maturity. A simple comparison trial was laid down under commercial conditions. An area, just under one acre, was treated and harvesting was carried out with mobile Scott-F.M.C. mills.

POTATOES—TRIALS No. 6 & No. 7

Fumitory has become a major weed problem in early potatoes in the Pukekohe area and hence two trials were laid down to assess new materials for efficiency with relation to this weed. Results are given in Table 2.

ONIONS—TRIALS No. 8 & No. 9

A programme of two trials was adopted here to assess efficiency of new materials for both pre- and post-emergence use. Results are given in Table 3.

TABLE 2: WEED CONTROL IN POTATOES, PUKEKOHE—TRIALS NO. 6 AND NO. 7

		Mature weeds/ sq. ft.		Seedling weeds/ sq. ft.		Yield (trial No. 7)		
Treatment (lb)		Tr. 6	Tr. 7	Tr. 6	Tr. 7	1st (lb)	2nd (lb)	Total (lb)
metobromuron 1.0/bentranil 1.0	1.0	1.8	35.9	4.6	3.2	75.3	6.9	82.2
metobromuron 1.0	....	2.7	31.7	4.5	5.1	74.9	10.7	85.6
metobromuron 2.0	....	2.0	20.2	3.4	2.5	77.1	7.5	84.6
buturon 1.0/bentranil 1.0	....	2.8	29.1	4.0	3.0	74.1	7.5	81.6
buturon 2.0	....	2.8	21.4	1.8	2.3	79.5	7.9	87.4
linuron 1.0	....	1.1	24.1	1.2	3.7	77.2	6.3	83.5
linuron 0.5/bentranil 1.0	....	1.4	20.2	3.0	2.9	75.9	8.9	84.8
linuron 0.5/monolinuron 0.5	....	1.5	23.9	1.2	3.8	77.9	6.9	84.8
monolinuron 1.0	....	1.8	22.3	2.1	3.2	80.3	8.9	89.2
Untreated	....	1.5	39.8	10.1	6.7	69.1	7.9	77.0

TABLE 3: WEED CONTROL IN ONIONS, HAWKE'S BAY

Treatment (lb)				Weed	Phyto-	Yield (lb)		
				Control	toxicity	1st	2nd	Total
TRIAL NO. 8—PRE-EMERGENCE								
pyrazon 1.5/chlorbufam 1.2	....			9.4	0.4	88.0	63.0	151.0
pyrazon 1.5/chlorbufam 1.2/alkylaryl-								
poly glycol ether 100% 2 pts	....			10.0	0.0	86.2	65.6	151.8
linuron 1.5	....			10.0	10.0	0.4	0.2	0.6
Bayer 5710 7.5	....			6.2	0.0	80.4	60.2	140.6
buturon 1.0	....			9.2	7.4	56.0	23.6	79.6
benzthiazuron 2.1	....			7.4	4.0	74.8	36.4	111.2
Untreated	....			3.0	0.0	71.6	61.4	133.0
TRIAL NO 9—POST-EMERGENCE								
pyrazon 1.5/chlorbufam 1.2	....			6.6	0.0	117.6	29.8	147.4
Bayer 5710 7.5	....			6.8	0.0	115.4	20.4	135.8
benzthiazuron 1.4	....			7.2	0.0	137.6	35.0	172.6
pyrazon 1.5/chlorbufam 1.2/alkylaryl-								
poly glycol ether 100% 2 pts	....			5.2	0.2	112.2	27.2	139.4
Untreated	....			5.4	0.0	123.8	28.0	151.8

DISCUSSION

PEAS

Although only one season's trial work has been conducted, it appears that benthiazuron and buturon are equivalent in their weed control and phytotoxicity properties to the accepted materials for selective weed control in peas—*i.e.*, dinoseb plus MCPB and prometryne.

The results given by these two products are encouraging enough for further assessment to be done in the 1968–9 season.

POTATOES

As fumitory is the major weed problem in the Pukekohe area, and as this weed was not controlled to a satisfactory level by any treatment, further exploratory screening trials will have to be done to find a suitable herbicide.

It does appear that none of the treatments applied gave a lower yield than the untreated.

ONIONS

Pyrazon plus chlorbufam, with or without the inclusion of a surfactant as a pre-emergence application, gave the best weed control and least phytotoxicity. Yield did not appear to be affected by this treatment.

In the post-emergence trial, benzthiazuron appeared to give the most satisfactory control with no phytotoxicity, and yield was not apparently affected.

It is intended in future seasons to assess these two products in an onion weed control programme in order to maintain good weed control throughout the growing period of the crop.