POST-EMERGENCE WEED CONTROL IN GARDEN PEAS

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Summary

Garden peas (*Pisum sativum* cultivars) tolerated post-emergence application of 1.5 lb methabenzthiazuron, 0.5 to 0.75 lb prometryne and 0.5 lb terbutryne. Tolerance of peas was marginal to a mixture of 0.375 lb prometryne plus 0.5 lb MCPB and the mixture cannot be recommended for field use. The mixture of 0.375 lb terbutryne plus 0.5 lb MCPB produced less visible crop symptoms than the prometryne plus MCPB mixture. Further work is required to confirm its suitability for field-scale use. All the above treatments killed fumitory (*Fumaria* sp.) spurrey (*Spergula arvensis*), fathen (*Chenopodium album*), willow weed (*Polygonum persicaria*) and cornbind (*P. convolvulus*). MCPB (1.25 lb) and terbutryne (0.5 lb) proved most effective against calandrinia (*Calandrinia menziesii*).

INTRODUCTION

FOLLOWING the introduction of prometryne and prometryne plus MCPB (Duff and Moffat, 1965) and the indication that, though weed control was satisfactory, crop reaction was variable (Smith and Dow, 1966) trials were laid down in 1967-8 to gain information on the tolerance of garden peas to chemicals in common use.

During 1967-8, a screening trial showed peas tolerant to methabenzthiazuron at rates (1.4 to 2.1 lb) which gave almost complete kill of wireweed (*Polygonum aviculare*) (all rates in lb active ingredient per acre). Wallace (1968) reported the promise of this chemical. G. R. Cassels (pers. comm.) indicated that terbutryne was promising and likely to replace prometryne for weed control in peas. Trials in 1968-9 were modified to investigate weed susceptibility and give some indication of crop tolerance to these chemicals in comparison with currently used treatments.

EXPERIMENTAL

The trials were sprayed with a bicycle-wheel-mounted boom sprayer with 14 in. spaced independently-fed nozzles operated by compressed air at 30 lb/sq. in. pressure and pushed at a speed of travel timed to give 20 gal of spray mixture per acre. Treatments were randomized with 3 to 6 replicate blocks using plots 5 ft to 6 ft wide and from 0.5 to 2.0 chains long depending on the site available. Seed yields were obtained by direct heading whole plots and green pea yields by vining duplicate 12 sq. ft samples from each plot.

The 1967-8 trials at Lincoln (both in the same field) and the 1968-9 trial at Irwell were almost weed-free and primarily crop tolerance trials.

The Prebbleton and Southbridge sites were heavily infested with weeds and the trials primarily to assess herbicidal efficiency. Calandrinia (*Calandrinia menziesii*) and spurrey (*Spergula arvensis*) gave 90% ground cover at Prebbleton and effectively suppressed fathen (*Chenopodium album*) and storksbill (*Erodium cicutarium*) in the untreated plots. At Southbridge, willow weed (*Polygonum persicaria*), cornbind (*P. convolvulus*), fumitory (*Fumaria* sp.), fathen and spurrey predominated, with a trace of other weeds.

Details of treatments are included in Tables 1 to 3.

RESULTS

EFFECT ON THE CROP PLANT

Prometryne, methabenzthiazuron and terbutryne tended to cause mottling of the sprayed leaves and a delay to maturity, the intensity of the symptoms varying with the material and site. Terbutryne showed only slight symptoms, while the lower leaves and stipules of the prometryne plus MCPB treated plants died prematurely. Symptoms were marked at Southbridge and barely detectable at Irwell. The addition of MCPB increased the effects. (The addition of 0.5 lb MCPB to 1.4 lb methabenzthiazuron in a screening trial in 1967-8 killed 90% of the peas.)

WEED CONTROL

All treatments gave good control of calandrinia though a few plants, mainly in the rows, recovered in the dinoseb, dinoseb plus MCPB, and the methabenzthiazuron plots. No treatment killed storksbill.

At Southbridge, the treatments could be grouped on the basis of weed control. Terbutryne, prometryne and the mixtures of these chemicals with MCPB killed all weeds other than the trace of storksbill. The methabenz-

TABLE 1: YIELD OF GREEN PEAS AND MATUROMETER READINGS, PREBBLETON 1968-9

(Treated 1/11/68 Greenfeast peas 7-8 node. Vined 31/12/68.)

Treatment (lb)	Yield (tons/acre)	Maturometer Reading
MCPB 1.25	2.27 aAB	266
dinoseb (ammonium) 0.69	2.35 aAB	278
dinoseb (amine) 1.35/MCPB 1.0	2.32 aAB	280
prometryne 0.375/MCPB 0.5	2.24 aAB	276
terbutryne 0.5	2.43 aA	255
methabenzthiazuron (B.5653) 1.5	2.27 aAB	244
methabenzthiazuron ("Tribunal") 1.5	2.27 aAB	255
Untreated	1.73 bB	304
		NS
CV	8.6%	8.4%

TABLE 2: YIELD OF PEA SEED — LINCOLN 1967-8

(Treated 9/11/67 Peas 7-8 node. Headed 8/2/68.)

Treatment (lb)	Yield as % of Untreated	
	Small Sieve Freezer	Greenfeast
MCPB 0.5	103 ab	97
MCPB 1.0	93 abcd	98
linuron 0.12	93 bcd	98
linuron 0.24	105 a	98
prometryne 0.375	100 abc	96
prometryne 0.75	99 abc	95
dinoseb (ammonium) 0.69	98 abc	98
linuron 0.12/MCPB 0.5	102 abc	95
linuron 0.24/MCPB 1.0	91 cd	95
prometryne 0.375/MCPB 0.5	97 abcd	97
prometryne 0.75/MCPB 1.0	86 d	88
Untreated (%)	100 abc	100
Untreated (bu/acre)	57.2	63.6
		NS
CV	7.2%	6.3%

TABLE 3: YIELD OF PEA SEED, SOUTHBRIDGE AND IRWELL 1968-9

(Variety: Dark Skinned Perfection at Southbridge, Small Sieve Freezer at Irwell.)

Treatment (lb)	Yield as % of Untreated			Irwell
	Trial 1	Trial 2	Combined Analysis	
MCPB 1.25	98	104	101 abc	106
dinoseb (ammonium) 0.98	121	120	116 a	108
prometryne 0.5	110	101	105 ab	106
terbutryne 0.5	83	91	87 bc	102
dinoseb (amine) 1.35/MCPB 0.5	117	122	120 a	109
prometryne 0.375/MCPB 0.5	77	77	77 c	93
terbutryne 0.375/MCPB 0.5	79	96	87 bc	112
methabenzthiazuron 1.5	82	105	93 abc	97
Untreated (%)	100	100	100 abc	100
Untreated (bu/acre)	29.3	30.9	30.2	49.5
	NS	NS		NS
CV	35.9%	26.0%	29.3%	9.8%
Treatment date	Nov. 19	Nov. 22		Nov. 23
Stage of growth of peas	8 node	8 node		7 node

thiazuron plots had a few stunted cornbind plants. Dinoseb-containing treatments had spurrey and a trace of cornbind and willow weed. MCPB controlled only fathen and cornbind but the latter recovered to add to the spurrey, willow weed and fumitory, giving a weed density of about half that of the untreated plots.

YIELD OF GREEN PEAS

All yields at Prebbleton (Table 1) were similar and much better than untreated. The slight delay in maturity noted more especially with methabenzthiazuron, terbutryne, and prometryne plus MCPB is reflected in the maturometer readings though these do not differ significantly from untreated.

YIELD OF SEED PEAS

In the weed-free trials, differences between treatments were not significant at Irwell (Table 3) or in Greenfeast at Lincoln (Table 2). The double rate of prometryne plus MCPB yielded significantly less than untreated in Small Sieve Freezer (Table 2) but the fact that 0.12 lb linuron yielded less than 0.24 lb linuron is a reminder of the meaning of 95% confidence limits.

The results from the Southbridge site (Table 3) reveal an unexpectedly large variation within the site. As a consequence, despite the near perfect weed control by treatments other than MCPB, the large variations in yield cannot be ascribed to treatment differences. However, if the combined results are analysed as a 12 replicate trial (Table 3), the difference between prometryne plus MCPB or terbutryne plus MCPB and dinoseb or dinoseb plus MCPB becomes significant.

Though only the high rate prometryne plus MCPB treatment on Small Sieve Freezer (Table 2) was significantly less than untreated, the fact that mixtures of prometryne and MCPB are the lowest ranked treatments in all the trials supports the contention that 0.375 lb prometryne plus 0.5 lb MCPB is not sufficiently selective for field-scale use.

Prometryne at up to 0.75 lb gave superior annual weed control and similar yields to the standard MCPB and dinoseb treatments.

Terbutryne produced fewer symptoms in the growing crop than prometryne, gave luxury weed control at 0.5 lb and, save for the unsatisfactory (from the yield point of view) Southbridge trial, has yielded the same as the MCPB and the dinoseb treatments. From observation plots, 0.375 lb is adequate for 3- to 4-leaf fathen, but marginal for 2- to 3-leaf willow weed.

Methabenzthiazuron at 1.5 lb produced more foliage symptoms and gave slightly less effective control of calandrinia and cornbind than terbutryne. Incompatibility with MCPB will restrict the use of this chemical where Californian thistle (*Cirsium arvense*) is a problem. Greater surface activity when the chemicals were applied to moist foliage in Trial 1 at Southbridge may account for the greatly reduced yields of methabenzthiazuron and terbutryne plus MCPB compared with those of Trial 2.

Mixing MCPB with dinoseb gave no advantage over dinoseb alone in terms of weed control for the weeds and environmental conditions encountered in these trials.

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