A COMPARISON OF HERBICIDE MIXTURES IN OTAGO/SOUTHLAND WHEAT

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Summary

Two trials are reported in which several herbicide mixtures were compared, some at the 2-leaf stage but mostly at the 5- to 6-leaf stage of wheat. In one trial methabenzthiazuron/dichlorprop depressed yields when applied at the 5- to 6-leaf stage. Reduction in grass cover (mainly *Poa annua*) in the base of a wheat crop did not result in any yield advantage. Chickweed (*Stellaria media*) was the dominant species in both trials and was shown to affect yields considerably, thus favouring mixtures containing mecoprop.

INTRODUCTION

In New Zealand, weed control in wheat at one time was largely centred around the use of 2, 4-D and MCPA. Subsequently, with the development of less susceptible weed populations, there was a swing towards MCPA/dicamba mixtures. These, although giving very good weed control, have developed some disrepute because of reduced wheat tolerance at either the early (2- to 3-leaf), or late (early boot) stages.

Thus there have been recent introductions of several other herbicide mixtures. Each of these mixtures has been developed in commercial trials in isolation from the others and no comparative data have been available for guidance of advisory officers.

This paper reports results from two field experiments in which several fully registered herbicide mixtures were compared, some at the 2-leaf stage, but mostly at the 5- to 6-leaf stage with MCPA/dicamba and heavy rate of MCPA as standard treatments.

MATERIALS AND METHOD

Spring-sown Aotea wheat at two sites, Mataura and Waimumu, was sprayed at the 2-leaf stage on 15/10/71 and 3/11/71, respectively, and at the 5- to 6-leaf stage on 2/11/71 and 24/11/71, respectively; weather and soil conditions were satisfactory on all occasions.

The following treatments were applied (all rates in kg/ha):

1. methabenzthiazuron 0.8/dichlorprop 0.9 at 2-leaf stage.
2. ioxynil 0.4/mecoprop 1.1 at 2-leaf stage.
3. mecoprop 2.5 at 2-leaf stage.
4. methabenzthiazuron 1.2/dichlorprop 1.4 at 5-leaf stage.
5. ioxynil 0.5/mecoprop 1.5 at 5-leaf stage.
6. mecoprop 2.5 at 5-leaf stage.
7. dicamba 0.05/mecoprop 1.7/MCPA 0.5 at 5-leaf stage.

TABLE 1: WEED COVER, WEED AND WHEAT YIELDS

	1 metha + dichlor- prop	2 ioxynil/ meco- prop	3 meco- prop	4 metha/ dichlor- prop	5 ioxynil/ meco- prop	6 meco- prop	7 dic./ meco/ MCPA	8 MCPA/ dic./ 2,3,6-TBA	9 bromo- nil/ MCPA	10 MCPA/ dicamba	11 MCPA	12 Control
Mataura, 23/11/71:												
% cover—weeds	—	Tr.	1	—	1	4	1	4	3	1	1	8
% cover—grass	2	5	3	Tr.	4	4	4	5	5	4	4	4
Mataura, 21/12/71:												
% cover—weeds	—	1	2	—	—	4	Tr.	Tr.	6	—	2	15
% cover—grass	7	10	9	3	10	8	10	11	10	10	10	8
Mean wt (g)												
Willow weed	1	1	10	1	3	3	1	4	1	5	12	18
Chickweed	10	6	3	—	1	2	7	3	13	12	9	30
Grasses	31	36	38	21	45	57	51	41	59	45	40	53
Waimumu, 21/12/71:												
% cover—												
chickweed	1	1	1	—	1	2	2	7	15	5	8	28
% cover—spurrey	—	1	1	—	4	6	7	8	7	6	3	15
Mean wt (g)												
Chickweed	37	78	73	5	173	9	20	125	694	201	386	714
Spurrey	—	7	12	—	3	2	Tr.	3	20	1	5	25
Grasses	5	14	16	12	27	44	47	34	10	40	14	4
% Yield (control = 100):												
Mataura												
CV 3.4%	98abA	98abA	101 abA	89 cB	96 bAB	97 abA	101 abA	102 aA	98 abA	97 abA	102 aA	5240 abA
Waimumu	118abA	117ab	120 aA	117 abAB	116 ab	117 abA	117 abA	107c	104 cd	111 bc	107 c	3620 dE
CV 2.2%	ABC	ABC	ABC	ABC	ABC	ABC	BCDE	BCDE	DE	ABCD	CDE	

8. MCPA 0.8/dicamba 1.4/2,3,6-TBA 1.0 at 5-leaf stage.
9. bromoxynil 0.36/MCPA 0.36 at 5-leaf stage.
10. MCPA 0.72/dicamba 0.12 at 5-leaf stage.
11. MCPA 2.25 at 5-leaf stage.
12. Control.

Application was in 220 l/ha water at 1.75 kg/cm².

Trial design was randomized block of 4 replicates, plot size 1.5 m × 30 m.

Observations for herbicide efficiency were made by three independent observers at Matura on 23/11/71 and at both sites on 21/12/71. Weed weights from 4 quadrats per plot, each 900 cm² were taken on 8/2/72, and wheat yields on 3/3/72 (Matura), and 11/4/72 (Waimumu).

A strip 70 cm × 30 m was harvested from the centre of each plot. Moisture content of grain was determined and yields corrected to 15% moisture.

RESULTS

All chemical rates and the grain yields of the control are in kg/ha while the grain yields of the treatments are expressed as a percentage of the controls.

The Matura site was considerably less weedy than Waimumu, consisting mainly of poa annua (*Poa annua*), chickweed (*Stellaria media*) and willow weed (*Polygonum persicaria*), giving a total cover of 5 to 10% at 15/10/71 and 15 to 20% at 2/11/71. At Waimumu there was a dense association of chickweed and spurrey (*Spergula arvensis*), with lesser quantities of poa annua that increased in vigour to some extent when broad-leaved weeds were controlled. There were small quantities of other weeds, including Californian thistle (*Cirsium arvense*) at both sites, but they were of irregular distribution; the total weed cover was 15 to 20% at 2/11/71 and 15 to 25% at 24/11/71.

Methabenzthiazuron/dichlorprop at the 2-leaf stage caused severe scorch to wheat foliage and appeared to give early and complete weed control. Application at this early stage apparently gave wheat a greater period for recovery as it yielded significantly better than application at the 5- to 6-leaf stage (Matura only). Although a marked reduction occurred in grass weeds by this treatment at the 5- to 6-leaf stage, it was not reflected in higher wheat yields. At Waimumu very good control of broad-leaved weeds did not raise wheat yield above that of several apparently less efficient herbicides.

At Matura, methabenzthiazuron/dichlorprop at the 5- to 6-leaf was the only treatment to affect yields significantly, in this case adversely. Ioxynil/mecoprop at this site yielded significantly less than MCPA/dicamba/2,3,6-TBA and MCPA.

Treatment differences were more frequent on the weedy Waimumu site where, apart from methabenzthiazuron, generally any treatment that did not include mecoprop yielded significantly less through presumably poor control of chickweed. MCPA/dicamba was intermediate in its effects, not being significantly different from the more efficient treatments applied at the 5- to 6-leaf.

Considering the control of specific weeds, mecoprop (2-leaf stage) and MCPA gave inadequate control of willow weed, while chickweed was poorly controlled by bromoxynil/MCPA and MCPA/dicamba. Only methabenzthiazuron/dichlorprop gave appreciable reduction in grass weights. At Waimumu, bromoxynil/MCPA clearly was unsatisfactory on

chickweed; similarly on this weed MCPA was unsatisfactory. The high yield of chickweed with ioxynil/mecoprop (5- to 6-leaf) is probably anomalous.

The rather heavy infestation of spurrey tended to collapse under wheat competition and weed yields were only moderate, but only bromoxynil/MCPA is probably unsatisfactory for control.

DISCUSSION AND CONCLUSIONS

The weed flora in these experiments was insufficient at Matura, resulting in most treatments being unable to show yield increases, thus it could be considered as a tolerance trial to some extent. Waimumu was chickweed/spurrey dominant, and so favoured treatments containing mecoprop.

Nevertheless, some important points have been demonstrated:

- (1) Methabenzthiazuron/dichlorprop can sometimes depress yields when applied at the 5- to 6-leaf stage of wheat development. In addition, reduction in grass cover in the base of a wheat crop by this herbicide does not appear to produce any yield advantage, although it may be considered worth while to reduce disease incidence such as eyespot and take-all (not noted in these trials).
- (2) Mixtures including mecoprop should be preferred where chickweed occurs, as this weed may have considerable adverse effect on yields.
- (3) Of the materials applied at the 2-leaf stage, methabenzthiazuron/dichlorprop at Matura was the only herbicide to benefit from early application. However, in a times of application study still being conducted, there was a clear advantage through application at the 2-leaf rather than pre-emergence or at the 5- to 6-leaf stage; but Californian thistle is generally a complicating factor in Otago/Southland, and general observations in these trials showed Californian thistle to persist in treatments applied at the 2-leaf stage.
- (4) There are clearly mixtures other than MCPA/dicamba that can be considered for weed control in wheat, giving good weed control and wheat tolerance. Similarly, heavy rates of MCPA can be considered where alternatives to MCPA/dicamba are considered imperative.

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