



HORTICULTURE RESEARCH INTERNATIONAL

KIRTON

CONTRACT REPORT C284/FV103
DRY BULB ONIONS: ALTERNATIVE TO
CHLORBUFAM PLUS CHLORIDAZON (ALICEP)
FOR EARLY POST EMERGENCE WEED CONTROL.

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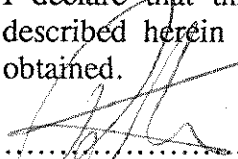
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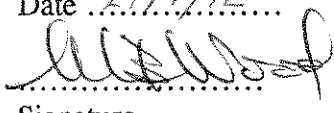
I declare that this work was done under my supervision according to the procedures described herein and that this report represents true and accurate records of the results obtained.


.....
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Dry bulb onions: alternatives to chlorbufam plus chloridazon (Alicep) for early post emergence weed control.

Disclaimer

The products and rates used in this work are not necessarily approved for use on onions or leeks and references to them in this report should in no way be taken as recommendations. Before using a herbicide, the product label should always be consulted and the instructions followed, If there are any doubts the chemical supplier or local adviser should be consulted.

Summary

Alicep was, and still is, extensively used for early post emergence weed control in the onion crop. However it was announced in March 1991 that the Alicep component, chlorbufam, would no longer be manufactured and that stocks of Alicep were limited. Therefore it became a matter of some urgency to find an alternative. This was tackled in two ways, firstly a field trial was set up and secondly a spray race evaluation of potential chemicals and cocktails was done to select non phytotoxic combinations for future field evaluation.

The initial field trial looked at 16 potentially useful product and product combinations and from this work chloridazon plus pendimethalin mixtures appears the most promising. The spray race was used to assess 30 treatments made up of separate chemicals or combinations of them for loop stage application to onion and leeks and 29 at the post crook stage. Information from the field and spray race work was combined to make selections for 1992 field trials.

Object

To test a range of proprietary herbicides to replace the present use of Alicep at the early post emergence stages.

Introduction

Good weed control during the early growth of the onion crop is essential as it is quite slow growing and not a very competitive plant being of spindly exact habit and easily swamped by vigorous low growing and bushy weed species.

Following intensive work by ADAS in the seventies the onion herbicide strategy advocated, was to sow as early as possible and apply residual herbicides just prior to emergence when the first flush of weeds were burnt off with a paraquat formulation applied in combination with residual herbicides such as propachlor plus chlorthal dimethyl (Ramrod and Dacthal) or none recently, propachlor plus pendimethalin (Ramrod plus Stomp). This late application of the residues to a cleaned up seedbed effected weed control until the first true leaf of the onion crop was well grown and when a number of herbicides could then be used.

The above strategy depends upon growers of large acreages monitoring pre-emergence development to apply the paraquat plus residuals at the right time and that spraying conditions occur during the time and up to emergence. Anyone who can remember back beyond the last three springs will know that spraying windows in Lincolnshire, especially in March, come few and far between and so the adopted strategy shifted to applying residuals plus paraquat, if needed, as soon as possible after drilling. However this meant that the effect of the residual broke down and needed bolstering not long after emergence, this did not then pose a problem as Alicep could be applied at the loop and post crook stages thus effecting good weed control until the first true leaf stage when the usual armoury could come into play.

A problem arose in late March 1991 when it became known that manufacture of chlorbufam, one of the components of Alicep was to cease being manufactured and that present stocks of Alicep would only last until the 1992 crop. Therefore a substitute for Alicep was urgently needed. It was decided, with HDC funding, to tackle the problem in two ways. Firstly to set up an immediate field trial looking at reduced rates of presently used herbicides and herbicide mixtures which are normally used later in the crops life and secondly to screen using a spray race a much larger selection of herbicide mixtures to cheaply and speedily select promising candidates for inclusion in the 1992 trial. The main body of this report deals with the 1991 field trial whilst the Autumn 1991 spray race results are presented in Appendix I.

Materials and Methods

1. Site
HRI Kirton is located in the village of Kirton situated five miles south of the town of Boston on the A17 in the county of Lincolnshire.

The trial was drilled on the field designated lane 2 on the northern (lighter silt) side of the Station. Storage and grading facilities were used.

2. Test crop
(1) Onions dry bulb variety Hyton
3. Trial design and treatments
Randomised block with three replicates and 18 treatments per replicate.

Post emergence herbicide treatments

Chemical	Rate	Timing of application
I Chlorbufam + chloridazon as Alicep	1 kg/ha	Loop & post crook
II Chlorbufam + chloridazon as Alicep	1 kg/ha	Loop & post crook
III Pendimethalin as Stomp	3 l/ha	Loop
IV Pendimethalin as Stomp	3 l/ha	Loop & post crook
V Chloridazon + ethofumesate as Magnum	2 l/ha	Loop
VI Ethofumesate as Nortron	3.5 l/ha	Loop
VII Ethofumesate as Nortron	2 l/ha	Loop & post crook
VIII Ethofumesate as Nortron	3.5 l/ha	Post crook
IX ICI new chemical	0.2 kg/ha	Loop
X ICI new chemical	0.2 kg/ha	Post crook
XI Chloridazon as Pyramin DF + Stomp	1.4 kg + 2l/ha	Loop
XII Chloridazon as Pyramin DF + Stomp	1.4 kg + 2l/ha	Post crook
XIII Chloridazon as Pyramin DF + Stomp	1.4 kg + 4l/ha	Loop
XIV Chloridazon as Pyramin DF + Stomp	1.4 kg + 4l/ha	Post crook
XV Stomp + ioxynil as Totril	2l + 150ml/ha	Loop
XVI Stomp + ioxynil Totril	2l + 150ml/ha	Post crook
XVII Methabenzthiazuron as Tribunil	2 kg/ha	Post crook
XVIII Methabenzthiazuron as Tribunil	1 kg/ha	Loop & post crook

NB All above applied at 300 l/ha water.

4. Husbandry

The onion crop was established from seed of a currently typical commercial variety (see above) precision drilled with a Stanhay drill. Herbicide applications, pest and disease control and general husbandry were done to a good commercial standard, (see crook diary).

5. Records

- i Trial diary
- ii Weed control efficacy and crook vigour scores
- iii Yield by weight and diameter size samples at maturity.

6. Trial diary

Field/Soil Type: Lane 2/ coarse silty marine alluvial

Previous cropping: 1990 Summer Brassica
1987 Onions
1984 Minor Bulbs/Grass

Soil Analysis: ph 7.1, =index 4, =index 2, Mg =index

Cultivations: 17.01.91 ploughed E → W
04.04.91 beds prepared with one pass of lelyrotema.

Fertilizer: 13.03.91 46.5 kg 15.8.23 Equivalent to 90 kg/ha Nitrogen applied.

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Sowing:	04.04.91 drilled
Insecticides:	17.07.91 Cypermethrin as Ambush C 26.07.91 Malathon
Herbicides:	08.04.91 Propachlor as ramrod (pl/ha) plus pendimetharin (as stomph 1l/ha) 28.06.91 full rate Alicep 07.05.91 loop treatments applied 24.05.91 post crook treatment applied
Irrigation:	Nil

Results and Discussion

- At 1st true leaf crop growth stage, all treatments gave reasonably good weed control, it was observed that the standard Alicep was not outstanding as most of the other treatments were similar or better than Alicep. The best group of treatments were the Pyramin plus Stomp combinations, the ICI new chemical at the loop stage and the tribunal dual application. Results are shown in Table 1.

Table 1 Weed control of treatments at the first true leaf growth stage.

Treatment chemical	Rate	Timing	% Weed ground cover
I Alicep	1 kg/ha	L & PC	5
II Alicep	1 kg/ha	L & PC	2
III Stomp	3 l/ha	L	5
IV Stomp	3 l/ha	L & PC	2
V Magnum	2 l/ha	L	5
VI Nortron	3.5 l/ha	L	4
VII Nortron	2 l/ha	L & PC	2
VIII Nortron	3.5 l/ha	PC	2
IX ICI new chemical	0.2 kg/ha	L	>1
X ICI new chemical	0.2 kg/ha	PC	5
XI Pyramin DF + Stomp	1.4 kg + 2l/ha	L	>1
XII Pyramin DF + Stomp	1.4 kg + 2l/ha	PC	>1
XIII Pyramin DF + Stomp	1.4 kg + 4l/ha	L	>1
XIV Pyramin DF + Stomp	1.4 kg + 4l/ha	PC	2
XV Stomp + Totril	2l + 150ml/ha	L	5
XVI Stomp + Totril	2l + 150ml/ha	PC	2
XVII Tribunal	2 kg/ha	PC	3
XVIII Tribunal	1 kg/ha	L & PC	>1

NB L = loop growth stage

P = post crook growth stage

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2. Observations of crop vigour at the first true leaf crop growth stage showed that only the higher rate of Nortron applied PC and the double application of Tribunil noticeably checked crop growth and vigour with the Pyramin plus Stomp combinations looking more vigourous than the Alicep controls.

Table 2 Crop vigour at the first true leaf growth stage

Treatment			Crop vigour scores 1-10
Chemical	Rate	Timing	1 = poor 10 = vigourous
I Alicep	1 Kilo/ha	L & PC	7
II Alicep	1 Kilo/ha	L & PC	7
III Stomp	3 l/ha	L	7
IV Stomp	3 l/ha	L & PC	7
V Magnum	2 l/ha	L	7
VI Nortron	3.5 l/ha	L	8
VII Nortron	2 l/ha	L & PC	7
VIII Nortron	3.5 l/ha	PC	5
IX ICI new chemical	0.2 kg/la	L	7
X ICI new chemical	0.2 kg/la	PC	8
XI Pyramin DF + Stomp	1.4kg + 2l/ha	L	8
XII Pyramin DF + Stomp	1.4kg + 2l/ha	PC	9
XIII Pyramin DF + Stomp	1.4kg + 4l/ha	L	8
XIV Pyramin DF + Stomp	1.4kg + 4l/ha	PC	8
XV Stomp + Totril	2l + 150ml/ha	L	6
XVI Stomp + Totril	2l + 150ml/ha	PC	9
XVII Tribunil	2 kg/ha	PC	7
XVIII Tribunil	1 kg/ha	L & PC	4

3. Observations of yield data

The date of 80% fallow, which is indicative of time of harvest, was relatively unaffected at treatment with no treatment significantly different from Alicep except Tribunil applied at both growth stages. Although there were small differences in population these were not significant when compared with Alicep treatment. However when the yield figures are looked at the Alicep treatments are out yielded by most other treatments with the Pyramin plus Stomp mixture doing exceptionally well.

Treatment Chemical	Rate	Timing	Date of 80% Fallover	Population at harvest p/m ²	Marketable yield t/ha > 40mm dia
I Alicep	1 kg/ha	L & PC	12 Sept	72.6	39.1
II Alicep	1 kg/ha	L & PC	12 Sept	72.0	36.3
III Stomp	3 l/ha	L	12 Sept	75.8	41.5
IV Stomp	3 l/ha	L & PC	14 Sept	75.4	40.5
V Magnum	2 l/ha	L	14 Sept	70.5	38.5
VI Nortron	3.5 l/ha	L	12 Sept	73.5	38.8
VII Nortron	2 l/ha	L & PC	11 Sept	72.3	41.0
VIII Nortron	3.5 l/ha	PC	12 Sept	69.6	38.3
IX ICI new chemical	0.2 kg/ha	L	13 Sept	78.3	39.6
X ICI new chemical	0.2 kg/ha	PC	12 Sept	73.4	41.9
XI Pyramin DF + Stomp	1.4kg + 2l/ha	L	12 Sept	74.3	43.5
XII Pyramin DF + Stomp	1.4kg + 2l/ha	PC	11 Sept	73.4	42.8
XIII Pyramin DF + Stomp	1.4kg + 4l/ha	L	10 Sept	72.4	41.7
XIV Pyramin DF + Stomp	1.4kg + 4l/ha	PC	10 Sept	72.6	42.0
XV Stomp + Totril	2l + 150ml/ha	L	11 Sept	68.3	37.5
XVI Stomp + Totril	2l + 150ml/ha	PC	12 Sept	70.7	40.6
XVII Tribunil	2 kg/ha	PC	12 Sept	72.1	41.4
XVIII Tribunil	1 kg/ha	L & PC	15 Sept	67.9	36.3
LSD			2.25 days	8.2	5.13

From the foregoing tables the most promising Alicep replacement would appear to be a Pyramin plus Stomp combination. Whilst these treatments should be pursued in further field studies it would be unwise to place too heavy a reliance on them so early and stop the search for other alternatives for two reasons. Firstly these are only one years results under one set of environmental conditions and historically we know that single years results in herbicide trials can be misleading, and secondly, due to the lateness in the season that the impending loss of Alicep became known the trial was established approximately four weeks later than normal with subsequently faster emergence and early growth and so the residual herbicides would probably be having a greater effect than normal at the loop and post crook stages.

Conclusion.

If this years work is repeatable then Pyramin plus Stomp combinations appear to offer acceptable alternative weed control to the use of Alicep early post emergence until first true leaf.

Recommendations for further work.

The best treatments from this trial are to be repeated in 1992 and the spray race work will be continued to select non- phytotoxic combinations for field trial use at early growth stages on mineral and peat soils.

Acknowledgements

Mr Gary Steele for technical assistance in the field. Also Mr Andrew Mead of HRI-

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Storage of data

The data will be kept by HRI-Kirton for a minimum of five years and will not be disposed of without prior consultation with the client.

APPENDIX I

Report to HDC on Contract FV/103 B
Spray race screening of alternative herbicides to
chlorbufam and chloridazon (Alicepe)
Autumn 1991

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Disclaimer

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Summary

The likely loss of the chemical 'Alice' (chlorbufam + chloridazon) prompted work to find suitable alternative herbicides for early post emergence application to onions and leeks. 30 treatments were applied via a spray race to plants grown in cellular trays, at the loop stage and 29 treatments at the post crook stage during the autumn of 1991. Phytotoxicity was assessed visually and by fresh weight records in January. Two chemicals, Gesagard and Linuron were found to be totally unsuitable and there were doubts over others but a number of promising chemicals and combinations were found which could be included in further field scale trials.

Introduction

Following the initial field trial at Kirton in 1991 reported in the main body of the report, a large range of chemical combinations were screened using a 'spray race' to assess their suitability for use with onions and leeks. The results of this screening work are presented in the following report. The spray race used was a Mistral ultrasonic chemical applicator produced by Team Sprayer.

Materials and Methods

1. List of proprietary and chemical names used in trial

<u>Proprietary name</u>	<u>Chemical name</u>
* Totril	ioxynil
Stomp	pendimethalin
Pyramin	chloridazon
** Gesagard	prometryn
* Fortrol	cyanazine
* Basagran	bentazone
Nortron	ethofumesate
* Ashlade c.p.	chloridazon + propachlor
Kerb	propyzamide
Alice	chloridazon + chlorbufam
* Fusilade 5	fluazifop-p-butyl
Linuron	linuron
Portman propachlor	propachlor

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* Approved for onions

** Label recommendations for planted leeks and off label for drilled leeks

These approvals are believed correct at the time of writing but should not be taken as recommendations. Always check the label or with your chemical supplier if there is any doubt.

2. Treatments

Twenty nine treatments were applied to onions and leeks at the post crook stage of seedlings from a sowing made on 7 October in multi-seeded cellular trays. The sprays were applied on 30 and 31 October. A second sowing was made on 21 October to be sprayed at the loop stage. This was done on 6 and 7 November. On this occasion a slightly different set of 30 treatments was used following a phytotoxic reaction to some of the earlier treatments. All treatments were applied in the equivalent of 200 litres of water per hectare.

Seed was sown in 308 Hassy trays and kept in a venlo glasshouse under frost protection. The trays were filled with sterilised silt soil typical of the area, treated with methyl bromide. Normal watering and feeding regimes were followed until final assessments were made in January. Two trays of each species were treated on each occasion.

2A. Post crook treatments

- | | |
|---|--|
| 1. Water (control) | 16. Nortron 2l/ha + Propachlor 4.5l/ha |
| 2. Totril 100ml/ha | 17. Nortron 3.5l/ha + Propachlor 9.0l/ha |
| 3. Totril 150ml/ha | 18. Propachlor 4.5l/ha + Stomp 2l/ha |
| 4. Stomp 3l/ha + Totril 150ml/ha | 19. Propachlor 9.0l/ha + Stomp 4l/ha |
| 5. Stomp 2l/ha + Totril 100ml/ha | 20. Ashlade c.p. 5l/ha |
| 6. Pyramin 1.4kg/ha + Totril 100ml/ha | 21. Ashlade c.p. 10l/ha |
| 7. Pyramin 1.4kg/ha + Totril 150ml/ha | 22. Kerb 625g/ha |
| 8. Totril 100ml/ha + Fortrol 100ml/ha | 23. Kerb 1250g/ha |
| 9. Totril 150ml/ha + Fortrol 150ml/ha | 24. Alicep 2kg/ha |
| 10. Gesagard 287g/ha | 25. FD4132 (ICI) 200g/ha post crook |
| 11. Gesagard 575g/ha | 26. Fusilade 5 250ml/ha + 200ml/ha Agral |
| 12. Propachlor 4.5l/ha | 27. Fusilade 5 500ml/ha + 200ml Agral |
| 13. Propachlor 9.0l/ha | 28. Linuron Flowable 500ml/ha |
| 14. Propachlor 9.0l/ha + Basagran 250 ml/ha | 29. Linuron Flowable 1000ml/ha |
| 15. Propachlor 9.0l/ha + Basagran 500ml/ha | |

2B. Loop treatments

- | | |
|--|--|
| 1. Water (control | 16. Nortron 2l/ha + Propachlor 4.5l/ha |
| 2. Totril 100ml/ha | 17. Nortron 3.5l/ha Propachlor 9.0l/ha |
| 3. Totril 150ml/ha | 18. Propachlor 4.5l/ha + Stomp 2l/ha |
| 4. Stomp 3l/ha + Totril 150ml/ha | 19. Propachlor 9.0l/ha + Stomp 4l/ha |
| 5. Stomp 3l/ha + Totril 100ml/ha | 20. Ashlade c.p. 5l/ha |
| 6. Pyramin 1.4kg/ha + Totril 100ml/ha | 21. Ashlade c.p. 10l/ha |
| 7. Pyramin 1.4kg/ha + Totril 150ml/ha | 22. Kerb 625g/ha |
| 8. Totril 100ml/ha + Fortrol 100ml/ha | 23. Kerb 1250g/ha |
| 9. Totril 150ml/ha + Fortrol 150ml/ha | 24. Alicep 2kg/ha |
| 10. Stomp 3l/ha | 25. FD4132 (ICI) 100g/ha |
| 11. Stomp 6l/ha | 26. Fusilade 5 250ml/ha + 200ml/ha Agral |
| 12. Propachlor 4.5l/ha | 27. Fusilade 5 500ml/ha + 200ml Agral |
| 13. Propachlor 9.0l/ha | 28. Linuron Flowable 500ml/ha |
| 14. Propachlor 9.0l/ha + Basagran 250ml/ha | 29. Linuron Flowable 1ml/ha |
| 15. Propachlor 9.0l/ha + Basagran 500ml/ha | 30. Butisan S 1.5l/ha |

3. Method of application

Chemicals were applied using a Team Sprayers 'Mistral' ultrasonic mist applicator consisting of a spray chamber mounted over a variable speed roller table designed primarily for the application of pre-storage chemicals to stored products such as potatoes and bulbs.

The machine was carefully calibrated to apply chemicals at a rate of 200l/ha equivalent of water by manipulation of spray pressure and roller table speed.

The time taken for chemicals to pass through the machine was carefully checked by monitoring treatments which contain strong dyes. These criteria were then carefully applied to all spraying and washing operations and generous margins allowed to ensure no cross contamination between treatments. The success of this was confirmed in the assessments where treatments which killed seedlings were applied before treatments having no adverse affect on them; the two effects were clearly separated in the glasshouse.

The chemicals were applied to dry leaves in all cases and no further watering was applied within 24 hours of application.

4. Observations and assessments

Notes were made of when treatments first began to show phytotoxic responses. Fresh weights were recorded on 2 January 1992. Three samples of 50 plants were taken longitudinally across the trays. These samples were then weighed fresh immediately after cutting to prevent desiccation. Results were analysed using a standard analysis of variance programme.

Results and Discussion

The treatments applied at the post crook stage began to show symptoms approximately 2 weeks after application. The loop stage applications were slower to respond and began to show symptoms after about 6 weeks. This may have been due to the lower ambient temperatures and levels of plant activity at that time. The final results were however similar from both application dates and also similar trends were seen on both onions and leeks. The leeks were, in general, proportionally more damaged than the onions by herbicide treatments.

Tables 1 and 2 show the fresh weights of treatments on the 2 January. Two chemicals were eliminated from any further trials. These were Gesagard and Linuron. There was an apparent interaction between Totril and Fortrol which gave reductions in growth particularly post-crook in leeks and loop stage in onions, at the 150ml/ha rate. Totril alone was however quite safe. There was a doubt about the use of Pyramin at the loop stage but it did appear to be safer applied later on. Basagran gave some reduction in growth when applied with propachlor at the post crook stage particularly at the higher rate. It appeared less damaging to onions at the loop stage but was still suspect on leeks. Ashlade c.p. used at the 10l rate was also suspect.

The safest chemicals were Totril, propachlor, Nortron, Kerb, Fusilade and Alicep. The ICI trial chemical FD4132 appeared to be safe at the 100g rate but caused some growth suppression at 200g.

Table 1 The effect of treatments applied at post crook

Treatment	Fresh weight (g) of 50 cells (2.1.92) (mean of 3 replicates)	
	Onions	Leeks
1. Water (control)	13.4	2.6
2. Totril 100ml	15.7	2.0
3. Totril 150ml	16.9	2.9
4. Stomp 3l + Totril 150ml	15.1	1.4
5. Stomp 3l + Totril 100ml	13.5	2.0
6. Pyramin 1.4kg + Totril 100ml	11.8	1.1
7. Pyramin 1.4kg + Totril 150ml	9.1	0.7
8. Totril 100ml + Fortrol 100ml	3.7	0.7
9. Totril 150ml + Fortrol 150ml	4.5	0.3
10. Gesagard 287g	3.0	0.3
11. Gesagard 575g	0.6	0.1
12. Propachlor 4.5l	13.5	2.5
13. Propachlor 9l	15.5	2.2
14. Propachlor 9l + Basagran 250ml	11.7	0.3
15. Propachlor 9.1 + Basagran 500ml	5.6	0.1
16. Nortron 2l + Propachlor 4.5l	14.8	1.4
17. Nortron 3.5l + Propachlor 9.0l	14.3	1.6
18. Propachlor 4.5l + Stomp 2l	12.5	2.6
19. Propachlor 0.1 + Stomp 4L	12.1	1.5
20. Ashlade c.p. 5l	9.8	2.4
21. Ashlade c.p. 10l	11.2	1.5
22. Kerb 625g	16.8	2.1
23. Kerb 1250g	15.0	2.1
24. Alicep 2kg	14.6	2.7
25. FD4132 200g	10.5	1.1
26. Fusilade 5 250ml	15.4	2.8
27. Fusilade 5 500ml	15.3	2.4
28. Linuron Flowable 500ml	0.0	0.1
29. Linuron Flowable 1000ml	0.0	0.0
SED (56df)	0.89	0.19
LSD (5%)	1.78	0.38

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Table 2 The effect of treatments applied at loop

Treatment	Fresh weight (g) of 50 cells (2.1.92) (mean of 3 replicates)	
	Onions	Leeks
1. Water (control)	7.8	0.9
2. Totril 100ml	6.0	0.5
3. Totril 150ml	4.5	0.5
4. Stomp 3l/ha + Totril 150ml	5.8	0.4
5. Stomp 3l/ha + Totril 100ml	5.6	0.3
6. Pyramin 1.4kg + Totril 100ml	3.6	0.2
7. Pyramin 1.4kg + Totril 150ml	4.2	0.2
8. Totril 100ml + Fortrol 100ml	4.0	0.1
9. Totril 150ml + Fortrol 150ml	2.7	0.1
10. Stomp 3l	5.9	0.7
11. Stomp 6l	5.1	0.6
12. Propachlor 4.5l	7.6	0.5
13. Propachlor 9l	8.1	1.0
14. Propachlor 9l + Basagran 250ml	6.9	0.3
15. Propachlor 9l + Basagran 500ml	6.3	0.2
16. Nortron 2l + Propachlor 4.5l	7.6	0.6
17. Nortron 3.5l + Propachlor 9l	6.5	0.4
18. Propachlor 4.5l + Stomp	5.7	0.6
19. Propachlor 9.0l + Stomp 4l	6.7	0.7
20. Ashlade c.p. 5l	6.5	0.6
21. Ashlade c.p. 10l	2.1	0.4
22. Kerb 625g	6.9	0.7
23. Kerb 1250g	6.0	0.8
24. Alicep 2kg	6.5	0.6
25. FD4132 100g	7.7	0.9
26. Fusilade 5 250ml	6.4	0.9
27. Fusilade 5 500ml	7.6	0.8
28. Linuron Flowable 500ml	0.8	0.1
29. Linuron Flowable 1ml	0.4	0.1
30. Butisan S 1.5l	2.5	0.2
SED (58df)	0.51	0.07
LSD (5%)	1.02	0.14

COMMERCIAL IN CONFIDENCE

Recommended Action

From the field trial and spray race work reported above plus discussions with other R&D workers, the industry and their advisors, the following treatments were agreed for the 1992 field trials.

Onions - Treatments

1. Hand weed control (A)
2. Alicep 1kg + 1KG loop and p/crook (B)
3. Pyramin 1.4kg + Stomp 2l (C)
4. Pyramin 1.4kg + Stomp 4l (D)
5. Magnum 2l (E)
6. Kerb 1250g (G)
7. Ashlade c.p. 5l (H)
8. Portman Pyramin + propachlor
9. Kerb 1250g + propachlor 4.5l (K)
10. Kerb 1250g + Nortron 3.5l (L)
11. Totril 100ml + stomp 4l (M)
12. Pyramin 1.4kg (P)
13. Tribunil 2kg post crook (Q)
14. Stomp 4l (R)
- (R)
15. CIPC 1l (S)
16. Alicep 1kg + 1kg loop and p/crook (T)

Leeks - Treatments

1. Hand weed control (A)
2. Alicep 1kg + 1kg loop and p/crook
3. Pyramin 1.4kg + Stomp 2l (C)
4. Pyramin 1/4kg + Stomp 4l (D)
5. Kerb 1250g (E)
6. Ashlade c.p. 5l (G)
7. Portman Pyramin + propachlor (H)
8. Kerb 1250g + propachlor 4.5l (J)
9. Fusilade 500ml (K)
10. Pyramin 1.4kg (L)
11. Tribunil 2kg post crook (M)
12. Stomp 4l (P)
13. CIPC 1l (Q)
14. Alicep 1kg + 1kg loop and p/crook

All treatments to be applied at late loop stages unless otherwise specified

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