



HORTICULTURE RESEARCH INTERNATIONAL

KIRTON

Report to: Horticultural Development Council
18 Lavant Street
Petersfield
Hants
GU23 3EW

HRI Contract Manager: M B Wood
Horticulture Research International
Willington Road
Kirton
Boston
Lincs
PE20 1EJ

Tel: 0205 723477
Fax: 0205 724957

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**CONTRACT REPORT
FV120
SPRAY RACE SCREENING
OF HERBICIDE COMBINATIONS
FOR CONTROL OF VOLUNTEER
POTATOES AND OILSEED RAPE
IN ONIONS AND LEEKS**

WILLINGTON ROAD · KIRTON · BOSTON · LINCOLNSHIRE PE20 1EJ
TELEPHONE: BOSTON (0205) 722391 · FACSIMILE: BOSTON (0205) 722922

CHAIRMAN: G.T. PRYCE · CHIEF EXECUTIVE: C.C. PAYNE · COMPANY SECRETARY: T.G. HELLER

PRINCIPAL WORKERS

M J Leatherland BSc, MIHort

AUTHENTICATION

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

.....*M. J. Leatherland*.....
(Signature)

M J Leatherland
HRI Kirton
Willington Road
Kirton
Boston
Lincs PE20 1EJ

Date*7/1/93*.....

Report authorised by:

.....*M B Wood*.....
(Signature)

M B Wood (Head of Station)
pp Dr M R Shipway
Head of Horticultural
Development Division
HRI Efford
Lymington
Hants SO41 0LZ

Date*7/1/93*.....

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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. In the event of doubt, the chemical supplier or local adviser should be consulted.

SUMMARY

Forty herbicide combinations were screened for phytotoxicity on onions and leeks grown in silty loam, and four combinations in peat soil. Treatments were applied to seedlings in 308 plastic modules at the first true leaf stage. Applications were made using a mist applicator mounted over a roller table. This was calibrated to give the equivalent of 200 l/ha water. Some treatments were repeated at the second true leaf stage. There were also applications of sodium monochloroacetate and of tribunil (methabenzthiazuron) at loop and post crook stages.

Tribunil applied at loop or post crook proved to be damaging. The only treatments applied at first true leaf which were damaging were Dosaflo (metoxuron) and combinations including Basagran (bentazone) at 1 l/ha. Combinations using 500 ml/ha were acceptable.

Results were used to help choose treatment lists for field trials during 1992.

INTRODUCTION

The search for reliable herbicide regimes for controlling volunteer potatoes and oilseed rape in alliums has been in progress for several years. It was decided to use facilities available at HRI Kirton to run a screening trial with modular plants raised under glass to test a wide range of combinations for phytotoxicity which could be done quickly and cheaply using a roller table mounted applicator and without the need for full field trials. It was intended that the most promising treatments would be chosen from this and previous field trials and put forward for field trials at Kirton and other sites in 1992.

MATERIALS AND METHODS

Treatments (a list of active ingredients can be found in Appendix 1)

Applied at first true leaf:

1. Starane 2 200 ml/ha
2. SMA 20 kg/ha + Totril 250 ml/ha

3. SMA 20 kg/ha + Fortrol 250 ml/ha
4. SMA 10 kg/ha + Totril 250 ml/ha
5. SMA 10 kg/ha + Fortrol 250 ml/ha
6. Starane 2 200 ml/ha + Totril 250 ml/ha
7. Starane 2 200 ml/ha + Fortrol 250 ml/ha
8. Starane 2 200 ml/ha + Shield 200 ml/ha
9. Totril 250 ml/ha + Fortrol 250 ml/ha + Starane 200 ml/ha
10. Totril 250 ml/ha + Fortrol 250 ml/ha
11. Totril 125 ml/ha + Fortrol 125 ml/ha + Starane 100 ml/ha
12. Basagran 1 l/ha + Totril 250 ml/ha + Fortrol 250 ml/ha
13. Basagran 500 ml/ha + Totril 125 ml/ha + Fortrol 125 ml/ha
14. Gesagard 575 g/ha
15. Gesagard 287 g/ha
16. Dosaflo 1 l/ha
17. Tribunil 2 kg/ha
18. Semeron 0.3 kg/ha
19. Linuron flo. 100 /ml/ha
20. Linuron flo. 250 ml/ha
21. Totril 250 ml/ha + Linuron 150 ml/ha
22. Fortrol 250 ml/ha + Linuron 150 ml/ha
23. Ronstar 1 l/ha
24. Lentagran 1.0 kg/ha
25. Gesagard 1 kg/ha
26. Gesagard 0.5 kg/ha + Lentagran 1.0 kg/ha

Applied at first true leaf stage and repeated at second true leaf

27. Starane 2 200 ml/ha
28. Starane 2 200 ml/ha + Totril 250 ml/ha
29. Starane 2 200 ml/ha + Fortrol 250 ml/ha
30. Totril 250 ml/ha + Fortrol 250 ml/ha
31. Totril 125 ml/ha + Fortrol 125 ml/ha + Starane 100 ml/ha
32. Basagran 1 l/ha + Totril 250 ml/ha + Fortrol 250 ml/ha
33. Basagran 500 ml/ha + Totril 125 ml/ha + Fortrol 125 ml/ha
34. Tribunil 1 kg/ha

Applied at loop stage

35. SMA 10 kg/ha
36. Tribunil 1 kg/ha
37. Tribunil 0.5 kg/ha

Applied at post crook

38. SMA 10 kg/ha
39. Tribunil 2 kg/ha
40. Tribunil 1 kg/ha

All of the above were applied to plants raised in sterilized silt loam. A further four treatments were sown into peat compost to simulate fen conditions:

First and second true leaf seedlings in peat soils

| | 1st leaf | 2nd leaf |
|-----|----------------|----------|
| 41. | T+F+Mn+A | T+F+Mn+A |
| 42. | T+F+Fu+A | T+F |
| 43. | T+F+Fu+Mn+A | T+F+Mn+A |
| 44. | T+F+St+Mn+Fu+A | T+F |

| | |
|-------------------------|-----------------|
| A = Agral | 1 ml per 1000 l |
| F = Fortrol | 350 ml |
| Fu = Fusilade | 1 l |
| Mn = Magnesium sulphate | 8 kg |
| St = Starane 2 | 500 ml |
| T = Totril | 350 ml |

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 by manipulation of spray pressure and roller table speed to apply chemicals in the equivalent of 200 l water/ha.

The time taken for chemicals to pass through the machine was carefully checked by monitoring treatments which contained 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.

Cultural details

Sowing date: onions - 30 Jan 1992
 leeks - 31 Jan 1992

Cultivar: onions - Goldito
 leeks - Autumn Giant white

System: 308 modular trays sown 5/6 seed per cell

Temperature: frost protection

Nutrition: standard liquid feed for modules

Treatment

Applications: loop stage: 2 March
post crook stage: 20 March
1st true leaf: 31 March. The 1st true leaf stage was only just reached but treatments had to be applied to allow time for assessments to be made prior to field treatments.

2nd true leaf: 29 April

Assessments

Two trays were sown for each treatment from which 10 days after the last treatments had been applied, three samples of plants from 50 cells were taken for fresh weighing. Samples were cut off at compost level and weighed immediately to prevent undue moisture loss. Fresh weights were taken on 8 May of all treatments applied to onions. This was repeated for leeks on 12 May.

RESULTS

The growth of seedlings in peat compost far exceeded that in the trays of silt soil. For this reason the peat treatments were atypical of the majority and were excluded from any statistical analyses. The only treatments showing clear reductions in growth were Dosaflo which suppressed growth of both onions and leeks and Tribunil when applied at earlier stages of growth, particularly at the higher rates. High rates of Basagran in combination with Totril and Fortrol also appeared to do damage on leeks. Gesagard did not appear to do as much damage as expected when applied at the first true leaf stage compared to reductions in growth seen in earlier screening trials at loop and post crook. Similar observations were Linuron flo. A control was not included as no commercially accepted standard yet exists but in any similar future work it is recommended that a water only treatment should be included.

Table 1. Fresh weights of plants from 50 cells (means of three replicates)

| <u>Treatment</u> | <u>Onions</u> <u>(g)</u> | <u>Leeks</u> <u>(g)</u> |
|--|-----------------------------|----------------------------|
| 1. Starane 2 200 ml/ha | 63.1 | 39.3 |
| 2. SMA 20 kg/ha+Totril 250 ml/ha | 52.4 | 28.3 |
| 3. SMA 20 kg/ha+Fortrol 250 ml/ha | 42.6 | 24.2 |
| 4. SMA 10 kg/ha+Totril 250 ml/ha | 57.3 | 29.2 |
| 5. SMA 10 kg/ha+Fortrol 250 ml/ha | 54.7 | 28.9 |
| 6. Starane 2 200 ml/ha+Totril 250 ml/ha | 53.7 | 32.1 |
| 7. Starane 2 200 ml/ha+Fortrol 250 ml/ha | 62.2 | 37.2 |
| 8. Starane 2 200 ml/ha+Shield 200 ml/ha | 64.1 | 36.6 |
| 9. Totril 250 ml/ha+Fortrol 250 ml/ha+Starane 200 ml/ha | 64.9 | 29.6 |
| 10. Totril 250 ml/ha+Fortrol 250 ml/ha | 56.6 | 26.5 |
| 11. Totril 125 ml/ha+Fortrol 125 ml/ha+Starane 2 100 ml/ha | 61.9 | 39.3 |
| 12. Basagran 1 l/ha+Totril 250 ml/ha+Fortrol 250 ml/ha | 55.2 | 26.2 |
| 13. Basagran 0.5 l/ha+Totril 125 ml/ha+Fortrol 125 ml/ha | 57.7 | 28.3 |
| 14. Gesagard 575 g/ha | 59.2 | 36.0 |
| 15. Gesagard 287 g/ha | 60.1 | 37.1 |
| 16. Dosaflo 1 l/ha | 44.4 | 19.3 |
| 17. Tribunil 2 kg/ha | 55.1 | 32.6 |
| 18. Semeron 0.3 kg/ha | 59.3 | 38.5 |
| 19. Linuron flo 100 ml/ha | 66.8 | 36.7 |
| 20. Linuron flo 250 ml/ha | 70.5 | 33.7 |
| 21. Totril 250 ml/ha+Linuron 150 ml/ha | 60.3 | 27.5 |
| 22. Fortrol 250 ml/ha+Linuron 150 ml/ha | 62.2 | 26.6 |
| 23. Ronstar 1 l/ha | 57.1 | 30.5 |
| 24. Lentagran 1.0 kg/ha | 54.6 | 28.0 |
| 25. Gesagard 1 kg/ha | 60.6 | 33.4 |
| 26. Gesagard 0.5 kg/ha+Lentagran 1.0 kg/ha | 58.7 | 36.3 |
| 27. Starane 2 200 ml/ha x 2 | 96.2 | 47.3 |
| 28. Starane 2 200 ml/ha+Totril 250 ml/ha x 2 | 81.5 | 42.0 |
| 29. Starane 2 200 ml/ha+Fortrol 250 ml/ha x 2 | 66.0 | 47.4 |
| 30. Totril 250 ml/ha+Fortrol 250 ml/ha x 2 | 71.7 | 46.3 |
| 31. Totril 125 ml/ha+Fortrol 125 ml/ha+Starane 2 100 ml/ha x 2 | 93.5 | 49.2 |
| 32. Basagran 1 l/ha+Totril 250 ml/ha+Fortrol 250 ml/ha x 2 | 66.9 | 14.4 |
| 33. Basagran 500 ml/ha+Totril 125 ml/ha+Fortrol 125 ml/ha x 2 | 71.0 | 36.1 |
| 34. Tribunil 1 kg/ha x 2 | 90.4 | 33.0 |
| 35. SMA 10 kg/ha (loop) | 52.8 | 38.8 |
| 36. Tribunil 1 kg/ha (loop) | 38.1 | 11.0 |
| 37. Tribunil 0.5 kg/ha (loop) | 59.3 | 28.7 |
| 38. SMA 10 kg/ha (p/crook) | 64.7 | 39.4 |
| 39. Tribunil 2 kg/ha (p/crook) | 28.2 | 25.4 |
| 40. Tribunil 1 kg/ha (p/crook) | 31.6 | 30.2 |
| 41. T+F+Mn+A x 2 (peat) | 131.7 | 78.9 |
| 42. T+F+Fu+A/T+F (peat) | 128.4 | 75.7 |
| 43. T+F+Fu+Mn+A/T+F+Mn+A (peat) | 134.6 | 81.8 |
| 44. T+F+St+Mn+Fu+A/T+F (peat) | 142.6 | 71.0 |
| SED (78 df) (excluding peat treatments) | 6.72 | 2.46 |
| LSD (5%) | 13.37 | 4.90 |

RECOMMENDATIONS

Using the results of this work and the knowledge of those working in the field on this subject the following treatment lists were suggested for 1992 field trials. The leek treatments were chosen after further information was obtained on efficacy from the onion trial where treatments had already been applied and the results observed.

onions - treatments

Starane 2 400 ml
SMA (Croptex Steel) 15 kg+Totril 250 ml
SMA 15 kg+Fortrol 250 ml
Starane 2 300 ml+Totril 250 ml
Starane 2 300 ml+Fortrol 250 ml
Starane 2 300 ml+Dowshield 200 ml
Totril 250 ml+Fortrol 250 ml+Starane 2 200 ml
Totril 250 ml+Fortrol 250 ml
Basagran 500 ml+Totril 125 ml+Fortrol 125 ml
Gesagard 575 g
Tribunil 2 kg
Totril 250 ml+PBI liquid Linuron 150 ml
Fortrol 250 ml+PBI liquid Linuron 150 ml

leeks - treatments

Tribunil 1 kg
Tribunil 1.5 kg
Totril 250 ml+Fortrol 250 ml
Totril 125 ml+Fortrol 125 ml
Totril 125 ml+Fortrol 125 ml+Actipon 300 ml
Totril 250 ml+Fortrol 250 ml+Starane 2 200 ml
Totril 125 ml+Fortrol 125 ml+Starane 2 200 ml
Totril 400 ml+Fortrol 400 ml+Starane 2 200 ml
Totril 300 ml+Fortrol 300 ml+Starane 2 300 ml
Totril 500 ml+Fortrol 500 ml+Starane 2 400 ml

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Appendix 1 Active ingredients and products

| <u>Product used</u> | <u>Active ingredient</u> |
|---------------------|-------------------------------------|
| Starane 2 | fluroxypyr 200 g/l EC |
| Croptex Steel | sodium monochloroacetate 95% w/w SP |
| Totril | ioxynil 725 g/l EC |
| Fortrol | cyanazine 500 g/l SC |
| Dowshield | clopyralid 200 g/l SL |
| Basagran | bentazone 480 g/l SL |
| Gesagard | prometryn 50% w/w WP |
| Dosaflo | metoxuron 500 g/l SC |
| Tribunil | methabenthiazuron 70% w/w WP |
| Semeron | desmetryn 25% w/w WP |
| PBI Linuron flo | linuron 133 g/l DC |
| Ronstar liquid | oxadiazon 250 g/l EC |
| Lentagran WP | pyridate 45% w/w WP |
| Fusilade 5 | fluazifop-p-butyl 125 g/l EC |

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