MORLEY RESEARCH CENTRE

Weed control in winter linseed, 1997

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Summary

A range of herbicides was applied either post-drilling but pre-emergence of the crop and weeds, post-emergence during the autumn or in the spring. Some pre-emergence treatments were followed up in the spring with additional treatment. Programmes based on trifluralin applied to the soil surface shortly after drilling successfully checked weeds. The use of low rates of Butisan S was safe on the crop but the highest rate caused crop damage and delayed emergence. Spring applied treatments were also successful in controlling weeds but crop vigour had suffered over winter. This first year's work has highlighted the need for some autumn treatment in winter linseed where competitive species such as speedwells, mayweeds and chickweed are present.

Object

To find a cost effective programme for the control of weeds that will not compromise the financial and management advantages of growing winter linseed

Method

The experiment was marked out in a commercial crop of Oliver winter linseed on 26 September at Wood Farm. Plots were 2m wide by 12 m long. Work was carried out according to Morley standard operating procedures an abbreviated version of which is in the Appendix. Post drilling treatments were applied to the soil surface the day after drilling.

Treatments are summarised in Tables 1 & 2.

*Not for publication without the Director's consent. This report deals primarily with only one year's work, so any conclusions given are provisional.

Table 1. *Active ingredients of products applied as treatments*

Product	Active ingredient and formulation(g ai/l)
Treflan	trifluralin (480)
Butisan S	metazachlor (500)
Basagran	bentazone (480)
Vindex	*bromoxynil +clopyralid* (240 + 50)
Ally	metsulfuron methyl (20)
Eagle	amidosulfuron (75)
NAS	metazachlor + quinmerac (*)

(*) details not divulged

Table 2. *Details of treatment dose and timing*

Treatment	Product	Rate (l or g/ha)	Timing		
			Seedbed	Autumn	Spring
1	Untreated	-	-	-	-
2	Treflan	1.75	+	-	-
3	Treflan	1.75	+	-	-
	Ally	30.0	-	-	+
4	Treflan	1.75	+	-	-
	Eagle	40.0	-	-	+
5	Treflan	1.75	+	-	-
	Butisan S	0.5	+	-	-
6	Ally	30.0	-	-	+
7	Eagle	40.0	-	-	+
8	Basagran	2.0	-	+	-
	Vindex	1.0	-	+	-
9	Basagran	2.0	-	-	+
	Vindex	1.0	-	-	+
10	Butisan S	1.0	+	-	-
11	Butisan S	1.5	+	-	-
12	Butisan S	1.0	+	-	-
	Ally	30.0	-	-	+
13	NAS	2.0	+	-	-

Results

Table 3. *Populations of chickweed, mayweed, speedwell and total broad leaved weeds on 28 November 1996 (plants/m²) – drilling and autumn treatments only.*

Treatment	Number of weeds (plants/m²) Common chickweed	Mayweed spp.	Common Speedwell	Total broad leaved weeds
Untreated	21.5	44.4	317	389
Treflan	9.6	37.5	32	100
Treflan + Butisan S	0.9	3.1	0	39
Basagran + Vindex	15.3	15.7	84	127
Butisan S 1.0 l	0.7	1.1	5	35
Butisan S 1.5 l	0	0	0	6
NAS	0	0.4	2	12
LSD	11.51	25.5	191.7	198.4
SE per plot (27 df)	8.41	18.7	140.2	145.1
CV (%)	124.1	104.5	274.5	153.8

LSD = least significant difference at 95% level of probability

Treflan, Treflan plus Butisan S, Butisan S at either 1.0 or 1.5 l and NAS significantly reduced the number of chickweed plants. Butisan S at either rate, NAS and Treflan plus Butisan S and Basagran plus Vindex reduced the number of mayweeds. Speedwells were most effectively removed by Butisan S or NAS but Treflan alone or Basagran plus Vindex significantly reduced weed numbers (Table 3 and Figure 1a). Due to the lack of cleavers in any significant quantity the effect of quinmerac on the weed could not be assessed.

Table 4. *Crop damage (score 0 = dead, 10 = healthy) and weed vigour* (Score 0 = no weeds, 10 = carpet of vigorous weeds) *on 23 January 1997 - drilling and autumn treatments only.*

Treatment	Score 0 - 10	
	Crop damage	Weed vigour
Untreated	7.7	6.7
Treflan	7.3	2.7
Treflan + Butisan S	7.0	2.0
Basagran + Vindex	8.0	2.3
Butisan S @ 1.0l	6.5	1.3
Butisan S @ 1.5l	3.7	0.7
NAS	1.3	0.3
LSD	1.78	1.46
SE per plot (27 df)	0.635	1.27
CV (%)	9.7	39.5

Crop damage was most severe from NAS and Butisan S at the 1.5 l. There was no damage from other treatments. Weed vigour was reduced by all treatments but at the expense of the crop by treatments mentioned previously. These data are also presented graphically (Figures 1 & 1a).

Figure 1. *Crop damage score 23 January 1997*

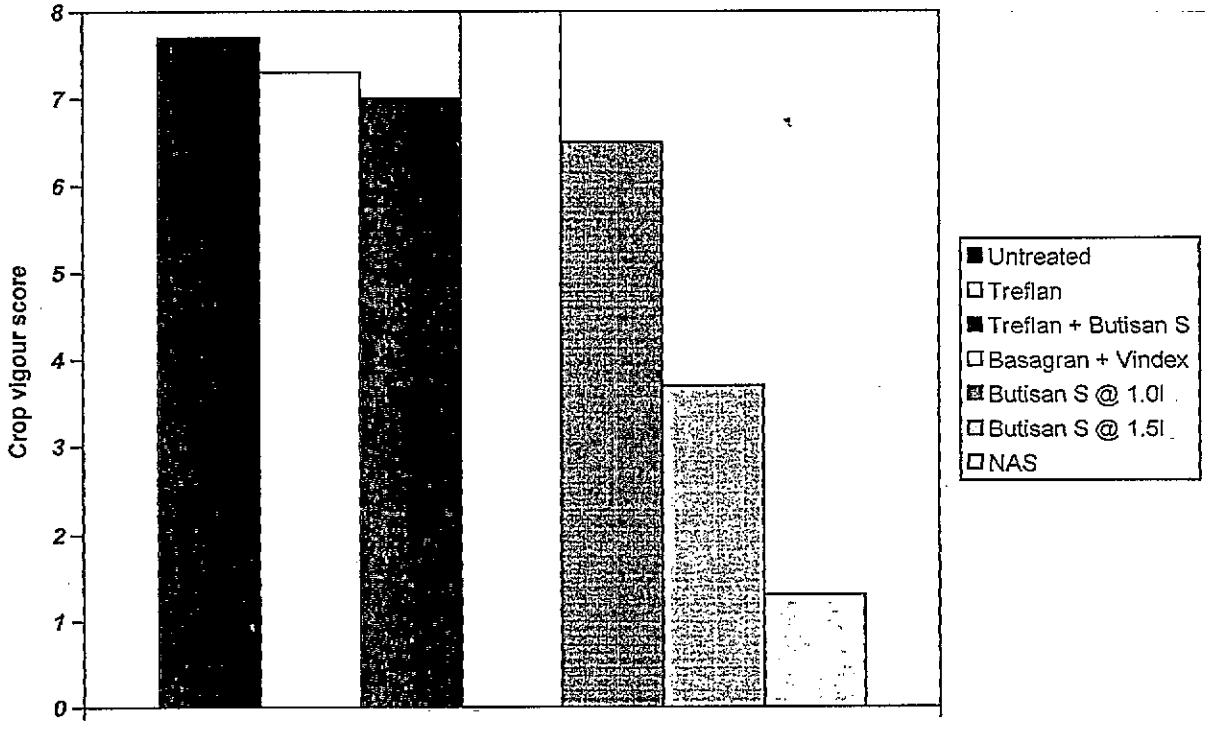


Figure 1a. *Weed vigour score 23 January 1997*

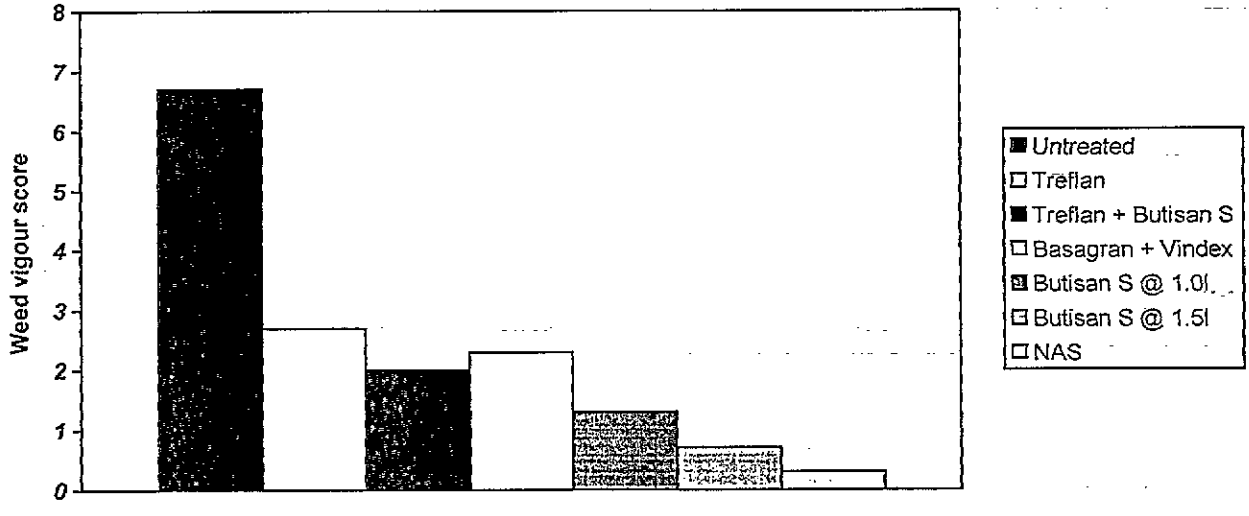
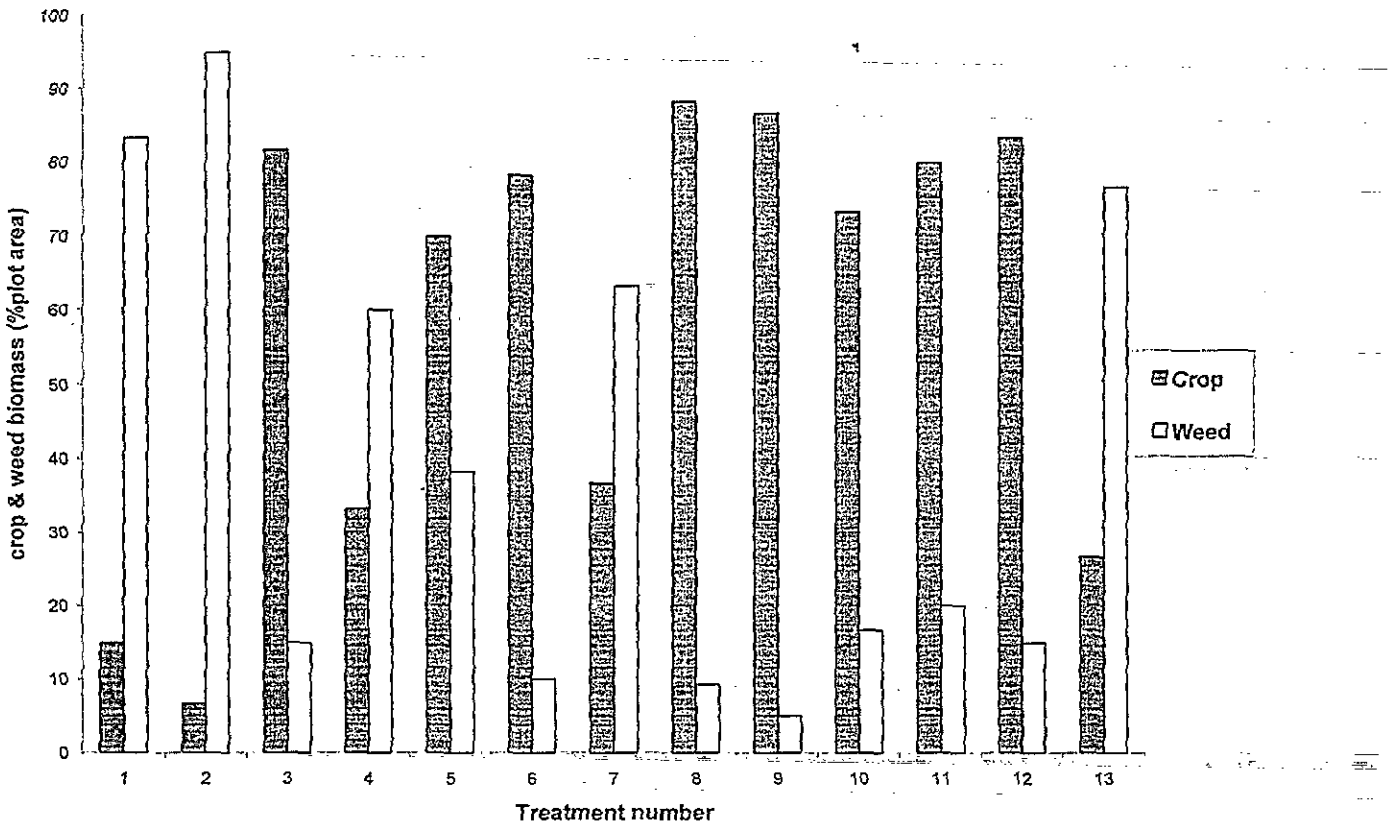


Table 5. *Crop biomass (as a % unaffected plots), weed biomass on 12 July 1997 (as a % untreated) and predominant species present.*

Treatment Number	Product	Rate (l or g/ha)	Biomass Crop	Biomass Weed	Predominant species
1	Untreated		15.0	83.3	Mayweed
2	Treflan	1.75	6.7	95.0	Mayweed
3	Treflan	1.75			
followed by	Ally	30.0	81.7	15.0	Pansy/cleaver
4	Treflan	1.75			
followed by	Eagle	40.0	33.3	60.0	Mayweed
5	Treflan	1.75			
plus	Butisan S	0.5	70.0	38.3	Mayweed
6	Ally	30.0	78.3	10.0	Pansy
7	Eagle	40.0	36.7	63.3	Mayweed
8	Basagran	2.0			
plus	Vindex	1.0	88.3	9.3	-
9	Basagran	2.0			
plus	Vindex	1.0	86.7	5.0	-
10	Butisan S	1.0	73.3	16.7	Knotgrass/cleaver
11	Butisan S	1.5	80.0	20.0	Knotgrass
12	Butisan S	1.0			
followed by	Ally	30.0	83.3	15.0	Cleaver/pansy
13	NAS	2.0	26.7	76.7	Knotgrass
LSD			23.33	22.22	
SE per plot (24 d f)			13.85	13.18	
CV (%)			23.7	33.8	

By July the worst affected plots were smothered by weeds 50 – 90 cm high which would have made harvesting very difficult. The predominant species present reflects the expected weed spectrum controlled by the chemicals when applied at the timings indicated in Table 2. Follow-up treatments in the spring reduced weed biomass to varying degrees. Autumn applications required a follow-up treatment in the spring either to control weeds outside their spectrum or to control late germinating weeds that emerged after their efficacy had declined. Leaving weed control until the spring was an option if Basagran + Vindex were used. However, in situations where a high weed population exists in the autumn this would be inadvisable. These data are presented graphically (Figure 2).

Figure 2. *Crop and weed biomass (% plot area) 12 July 1997*



Discussion

Weed numbers were high, the main species being common speedwell. Pre-emergence treatments all gave good control early on but by the summer weeds that had escaped treatment were competing with the crop. Crop damage from NAS was absolute on 28 November but some plants emerged over winter. The delayed emergence and thinning caused by 1.5 l of Butisan S was also unacceptable. Autumn application of Basagran plus Vindex, was more effective than Treflan or Butisan S as it controlled later germinating weeds. Autumn control was necessary with the level of weeds present at this site but application of follow-up sprays in the spring was required where Treflan or low doses of Butisan were used.

Crop damage from incorporated Treflan and from Butisan S has been reported by ADAS, particularly on light soils. The method used here of applying Treflan to the soil surface after drilling was safe. However, the duration of effective weed control provided will have been compromised by using this method and by the use of low doses of Butisan S.

This experiment has shown that Treflan applied to the soil surface (rather than being incorporated into the soil) proved to be a very cost effective autumn treatment and safe method of holding weed numbers to an acceptable level until the spring when a follow-up spray of Ally could be applied.

Acknowledgements

The assistance of colleagues at Morley is gratefully acknowledged, particularly in the crop and weed scores taken during the season. This experiment was funded by Morley Research Centre.

Appendix

The following information is presented as an appendix which is available on request.

Method
Field details
Experiment diary
Results

Table A1. *Populations of Knotgrass, charlock, poppy, pansy, cleaver and other broad leaved weeds on 28 November 1996 (plants/m²) – drilling and autumn treatments only.*

Method

This is an abbreviated version of the standard operating procedures used at Morley Research Centre.

1 Plot layout

1.1 Plots were marked out in a previously drilled crop. The plots were 12m long and 2.0 m wide.

1.2 Common treatments such as insecticides and herbicides were applied across all plots with farm machinery using wheelings, 24 m apart.

2 Spraying details

2.1 Treatments were applied using a CO_2 powered backpack sprayer, utilising 'Cornelius' vessels and a 2 m boom (four nozzles at 0.5 m spacings) with Lurmark F 110 - 03 nozzles at 2 bar pressure, to give 200 l/ha spray volume at 1.6 m/s forward speed.

3 Weather records

3.1 Weather data were obtained from a Campbells "Automatic Weather Station". Recordings are taken every minute and summarised every fifteen minutes, hourly, and daily.

4 Agronomic factors

4.1 Weed population was determined by making six counts of a 30.5 x 30.5 cm quadrat per plot.

4.2 Vigour scores were determined by assessing the whole plot on a 0-10 scale.

4.3 Biomass scores were determined by assessing the whole plot and estimating the proportion of crop to weed in each plot and relating this back to a weed-free crop or the worst affected plot.

Field details

Site	Wood Farm, Morley Research Centre
Field reference	Blofelds
Crop	Winter linseed
Variety	Oliver
Previous crop	1996 winter wheat 1995 sugar beet 1993 winter beans 1993 winter wheat
Soil type and series	silty clay loam

Soil analysis (index)	pH	P	K	Mg
29 August 1994	7.8	2	2	2

Seed	C1 generation		
Seedrate	7.8 kg/ha		
Date *sown*	26 September 1996		
Nutrients applied	Date	Fertiliser	Rate (kg/ha)
Nitrogen	6 March 1997	Double Top	39 N
Phosphate	8 September 1996	Payne 0:24:24	30 P_2O_5
Potash	8 September 1996	Payne 0:24:24	30 K_2O
Sulphur	6 March 1997	Double Top	17 S
Cultivations		Ploughed and pressed Power harrowed	

Applications to crop

Date	GS	Item	Dose/ha
2 May 1997		Fusilade	1.3 l
		non ionic wetter	0.2 l
11 July 1997		Roundup Biactive	2.5 l

Table A1. *Populations of knotgrass charlock, poppy pansy, cleaver and other broad leaved weeds on 28 November 1996 (plants/m²) – drilling and autumn treatments only.*

	Number of weeds (plants/m²)					
Treatment	Knotgrass	Charlock	Poppy	Pansy	Cleavers	Others
Untreated	0.9	0.4	0	4.5	0	0.5
Treflan	0.9	1.2	0	17.5	0.4	0.5
Treflan + Butisan S	1.4	0.9	0	31.9	0.4	0
Basagran + Vindex	0.4	0	0	11.2	0	0
Butisan S 1.0 l	2.0	0.7	1.6	23.3	0.7	0.2
Butisan S 1.5 l	0.9	0	0	5.4	0	0
NAS	0	0	0	8.5	0	0.5
LSD	NS	NS	NS	NS	NS	NS
SE per plot (27 df)	1.24	1.16	1.80	17.3	0.93	0.54
CV (%)	120.2	183.8	573.2	107.9	297.2	200.2

NS = no significant difference at 95% level of probability

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	Knotgrass	Charlock	Poppy	Pansy	Cleavers	Others
Untreated	0.9	0.4	0	4.5	0	0.5
Treflan	0.9	1.2	0	17.5	0.4	0.5
Treflan + Butisan S	1.4	0.9	0	31.9	0.4	0
Basagran + Vindex	0.4	0	0	11.2	0	0
Butisan S 1.0 l	2.0	0.7	1.6	23.3	0.7	0.2
Butisan S 1.5 l	0.9	0	0	5.4	0	0
NAS	0	0	0	8.5	0	0.5
LSD	NS	NS	NS	NS	NS	NS
SE per plot (27 df)	1.24	1.16	1.80	17.3	0.93	0.54
CV (%)	120.2	183.8	573.2	107.9	297.2	200.2

NS = no significant difference at 95% level of probability