

LINSEED

WEED THRESHOLD LEVELS, 1993
(HGCA funded)

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Summary

The competitive effect of different weed species was studied, using oats, common chickweed and fat-hen. The oats were found to have more of an effect on the linseed, compared to the other weed species.

Object

To determine the effect of different populations of three weed species on linseed growth and yield.

Method

Treatments

Weed populations	0 (control) levels 1 - 4 (see Table 1)
Weed species	oats (cv Rollo) common chickweed (<i>Stellaria media</i>) fat-hen (<i>Chenopodium album</i>)

Details of weed population levels are given in Table 1.

Table 1. Target weed population levels as seeds sown/m²

Population levels	Oats	Common chickweed	Fat-hen
0	0	0	0
1	12.5	62	100
2	50	250	400
3	100	500	800
4	200	1000	1600

*Not for publication without the Director's consent.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

The experiment layout was a factorial design with three replicates and plots were 12 m by 1.56 m. The weeds were sown in the middle 4 m length of the plot. The oats were sown first, then the crop on 31 March 1993. Owing to weather conditions, the remaining weed seeds were not sown until 2 April. The trial received normal farm treatments of nitrogen and insecticides.

The parts of the plot sown with weeds were watered with the equivalent of 3 mm of rain on 12 May as a period of dry weather had affected emergence of the weeds.

Counts on the crop and weeds were carried out in May with an additional weed count in August. The plots were hand weeded in June and scores for % cover and weed biomass were carried out during the summer. The trial was desiccated on 30 July and a one square metre area of the "weed" plot hand harvested on 2 September.

Results

Weed counts

The target weed populations were not achieved by any of the weed species, but with the oats and fat-hen reasonable differences in populations occurred as shown in Table 2.

Table 2. *Weed populations on 3 August 1993 (numbers/m²)*

Weed level	Oats	Common chickweed	Fat-hen
0	0.0	5.3	1.3
1	17.3	64.0	10.7
2	49.0	45.7	23.7
3	65.7	50.7	45.3
4	<u>173.7</u>	83.3	<u>68.7</u>
LSD	46.77	25.04	27.93
SE per plot (8 df)	±24.84	±13.30	±14.83
CV%	40.6%	26.7%	49.5%

LSD = least significant difference at 95 % probability level

Weed scores

Differences could be seen in the amount of weed biomass present. This was most obvious in the common chickweed plots (Table 3), which also showed the greatest difference in % cover. However, the most competitive weed was the sown oat crop.

Yield

For all weed species, there appeared to be a slight reduction in yield between the highest and nil weed populations, but only with oats was the difference significant (Table 4).

Table 3. % Cover score on 30 June 1993
(scores used 0 for no cover and 100 for complete cover)

Weed level	Oats	Common chickweed	Fat-hen	Mean
0	0.0	0.0	0.0	0.0
1	1.0	6.3	1.0	2.8
2	6.3	18.7	1.3	8.8
3	9.0	19.0	4.3	10.8
4	18.3	48.3	9.0	25.2
LSD		6.64		3.83
Mean	6.9	18.5	3.1	
LSD		2.97		
SE per plot (28df)		±3.97		
CV%		41.7%		

Table 4. Yield at 91% dm (t/ha)

Weed level	Oats	Common chickweed	Fat-hen	Mean
0	1.55	1.60	1.68	1.61
1	1.50	1.55	1.55	1.53
2	1.52	1.35	1.74	1.54
3	1.15	1.42	1.51	1.36
4	0.64	1.36	1.50	1.17
LSD		0.438		0.253
Mean	1.27	1.46	1.60	
LSD		0.196		
SE per plot (27df)		±0.173		
CV%		18.1%		

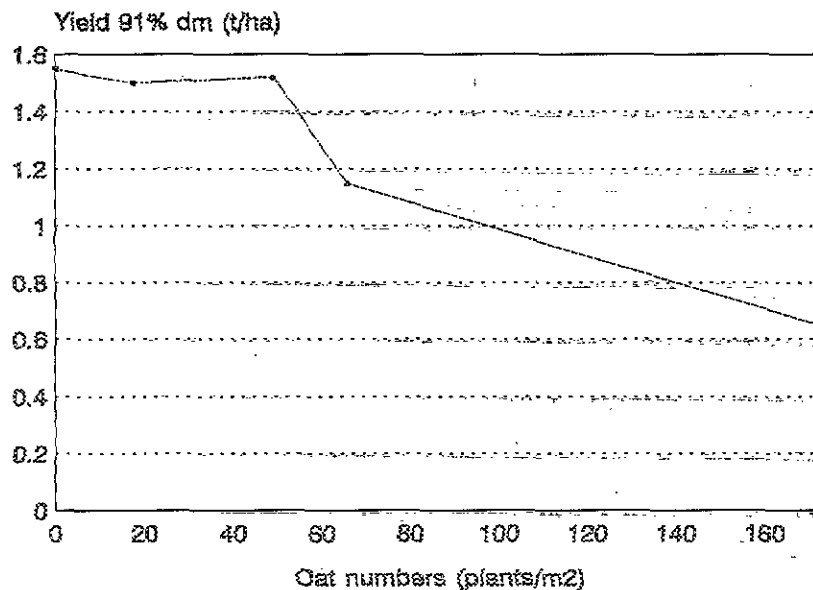
Discussion and conclusion

The target weed populations were not met owing to the prolonged dry weather following sowing. However, for oats, differences between populations were satisfactory and showed the potential for competition.

The weed scores showed that common chickweed produced differences in % cover and weed biomass, but this was owing to the habit of the weed rather than population levels. This weed had little effect on crop yield, mainly because the linseed had established well before the common chickweed had fully emerged.

The oats and fat-hen had little impact on weed biomass or % cover scores, again owing to the physical nature of the weed. The oats did show a competitive effect as emergence was early and uniform. It is likely that the oats competed with the linseed soon after emergence and this was reflected in the yields obtained (Fig. 1).

Figure 1. *Yield against oat numbers*



Acknowledgements

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Field details

Site	Myll Field, Manor Farm, Morley [ref. 19M]
Previous crop	1992 Winter wheat 1991 Sugar beet 1990 Winter barley 1989 Winter barley
Soil type and series	Sandy loam over chalky boulder clay (Ashley series)
Soil analysis	
	pH P K Mg
8 August 1992	7.5 4.0 2.0 1.0
Seed	Antares seedrate 700 seeds/m ²
Date sown	31 March 1993
Cultivations	18 November 1992, ploughed 30 March 1993, power harrowed
Applications to crop	
15 April 1993	90 kg/ha urea (46%)
24 April	0.25 l/ha Somicidin (fenvalerate, 100 g/l)
16 May	1.0 l/ha Vindex (bromoxynil, 240 g + clopyralid, 50 g/l)
18 May	0.25 l/ha cypermethrin (100 g/l)
28 May	30 g/ha Ally (metsulfuron-methyl, 20% w/w)
25 June	1.0 l/ha Laser (cycloxydim, 200 g/l) + Actipron (97% mineral adjuvant oil)
30 July	2.0 l/ha Roundup Four 80 (glyphosate, 480 g/l) + Lo-Dose (tallow amine ethoxylate, 800 g/l)

Method

Plot layout

Plots were sown with linseed at 700 seeds/m² using an Oyjord drill. The drilled plots were 12 m long and 1.56 m wide from outside row to outside row (12 rows at 12.8 cm spacing). Plots were separated by a buffer of the same size with a 54 cm gap between successive plots and buffers.

Common treatments such as fertiliser, insecticides, fungicides or growth regulators were applied across all plots with farm machinery using wheelings, 12 m apart.

The oats were sown in the middle 4 m length of the plot with the Oyjord drill, the area being marked out using lime. The remaining weed seeds were broadcast and harrowed using an Oyjord drill fitted with deflection plates, again in the middle 4 m length of the plot.

Agronomic factors

Weed population was determined by making six counts of a 30 cm by 30 cm quadrat per plot in the weed area.

Crop population was determined by making six counts along one side of a 50 cm bar per plot in the weed area.

Harvest details

One square metre of each "weed" plot was marked out and the crop hand harvested. Samples were threshed using a Wintersteiger plot combine.

Post harvest determinations

Samples were pre-cleaned using a 2mm sieve.

Moisture content was determined by weighing out the plot sample, oven drying for 24 hours at 100-102°C and weighing again at an ambient temperature.

Weed scores

Cover was determined by estimating the percentage of ground covered by oats, common chickweed or fat-hen present in the plot.

Biomass was assessed by using a 0 to 10 linear scale where 0 = no weed present and 10 = dense, uniform and complete weed cover of oats, common chickweed or fat-hen.

Competitiveness was assessed by using a 0 to 10 linear scale where 0 = no weed competition and 10 = maximum weed competition and no crop competition.

Experiment diary

31 March 1993	Oats drilled into middle 4m of plot. Linseed drilled and harrowed.
2 April	Common chickweed and fat-hen seeds were broadcast and harrowed onto middle 4m of plot.
12 May	Weed parts of plots were watered with 3 l/m ² of water \equiv 3 mm rain.
24 May	Crop and weed counts
24 June	Handweeding on plots in reps 1 and 2
26 June	Handweeding on plots in rep 3
30 June	Weed biomass and % cover scores
20 July	Weed competitiveness score
3 August	Weed counts
2 September	1 m ² of weed plots hand harvested and threshed
28 September	Pre-cleaning of samples and moistures

Results

A1. *Weed populations on 24 May 1993 (number/m²)*

Weed level	Oats	Common chickweed	Fat-hen
0	0.0	8.4	9.6
1	4.8	20.9	13.8
2	21.5	24.5	22.1
3	45.5	35.9	16.2
4	86.7	22.1	22.1
LSD	39.78	16.10	13.08
SE per plot (8 df)	±21.12	±8.55	±6.94
CV%	66.6%	38.2%	41.5%

A2. *Biomass score on 30 June 1993*

(score used 0 for nil weed biomass and 10 for plot only containing weed)

Weed level	Oats	Common chickweed	Fat-hen	Mean
0	0.0	0.0	0.0	0.0
1	0.1	0.3	0.1	0.2
2	0.4	1.1	0.2	0.5
3	0.9	1.4	0.5	0.9
4	1.8	3.2	1.1	2.0
LSD		0.67		0.39
Mean	0.6	1.2	0.4	
LSD		0.30		
SE per plot (28 df)		±0.40		
CV%		54.6%		

A3. *Weed competitiveness score*
(score used 0 for no weeds and 10 for maximum weed competition)

Weed level	Oats	Common chickweed	Fat-hen	Mean
0	0.1	0.1	0.1	0.1
1	0.2	0.2	0.2	0.2
2	1.7	0.2	0.3	0.7
3	2.4	0.3	0.3	1.0
4	5.2	0.7	1.2	2.4
LSD		0.75		0.43
Mean	1.9	0.3	0.4	
LSD		0.34		
SE per plot (28 df)		±0.45		
CV%		51.0%		