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Summary of 1977 field trials

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SUMMARY OF 1977 FIELD TRIALS

M. L. POOLE, RESEARCH OFFICER,
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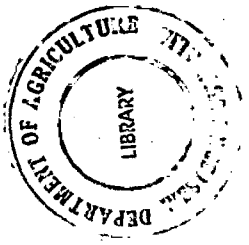


TRIALS:

1. 77WH6 Competition between wheat and annual ryegrass at six rates of seeding wheat, six ryegrass densities and five rates of nitrogen fertiliser.
2. 77WH7 Time of removal of annual ryegrass from a wheat crop.
3. 77M52 Effect of different tillage systems on establishment and yield of wheat.
4. 77M030 Rapeseed variety trial - Lancelin.
5. 77B5 Sunflower Agronomy Trial.
6. 77MT25 Shedding losses in rapeseed.
7. 77WH47 Time of germination of ryegrass in wheat.
8. OTHER TRIALS.

77WH6

Title: Competition between wheat and annual ryegrass at six seeding rates of wheat, six ryegrass densities and five rates of nitrogen fertiliser.

Location: Wongan Hills Research Station.

Soil type: Wongan loamy sand.

History: Wheat 1976.

Treatments: Wheat rates: 18, 36, 50, 93, 137 kg/ha.
Wrg. densities (intended): 0, 50, 100, 200, 400, 800 plants/m^2.
Nitrogen rates: 0, 12, 24, 48, 48 x 2 kg/ha.

Design: Main plots wheat x ryegrass complete factorial.
Main plots split into five N rates. 2 replications.

Details: Weed Control: Autumn scratch followed by ploughing at the break. Worked back three times. Grass weed control was excellent and "background" level of ryegrass was very low. Some doublegee and capeweed which was sprayed with banex.

Problems:

1. Heavy winds the night the trial was sown blew ryegrass seed on to adjoining plots. This completely confused the original complete factorial design. The contaminated nil ryegrass, wheat only plots were sprayed with Hoegrass at 2.5 l/ha to remove the ryegrass. This was completely effective.

2. Although the wheat yields achieved were quite satisfactory (up to 2000 kg/ha), drought obviously operated differentially across the trial and contributed to variability.

RESULTS

1. Wheat yield and ryegrass density

To salvage, the trial ryegrass counts were taken on each of the 360 sub plots so that regression analysis of wheat yield against ryegrass density. The 15m plots were harvested with a Hege. To date hand fitted curves have been drawn for each of the wheat seeding rate x nitrogen treatment giving twenty-five curves. The relationships between yield and ryegrass density seems surprisingly good in view of the difficulties encountered with the trial. The shapes of the curves, the middle seeding rates (36-93) and all nitrogen rates except the highest are very similar. At the highest seeding rates and nitrogen rates, the curve is steeper, probably due to more severe drought affect or the high ryegrass levels. The general relationships found are shown in Fig. 1.

2. Wheat yield x ryegrass dry matter

As an alternative to 1, two quadrats each 60 cm x 70 cm were

...2

harvested from each sub plot. The wheat was kept for Harvest Index and yield component analysis.

Again for each wheat seeding rate x nitrogen rate combination wheat yield was plotted against ryegrass yield for each quadrat. The relationships established were fairly poor, not nearly as good as wheat on ryegrass density.

The type of relationship found in the better cases is shown in Fig. 2.

3. Other data

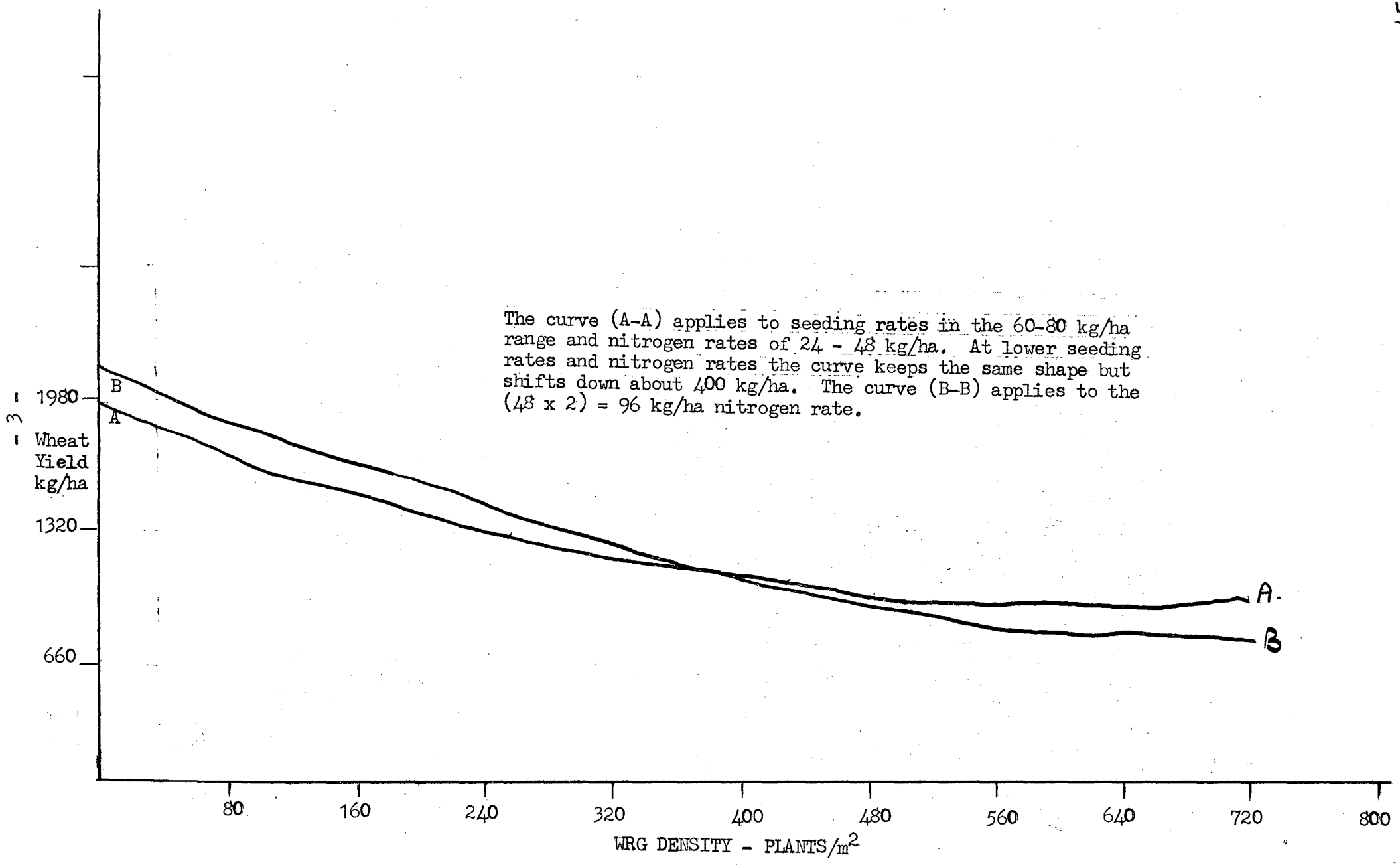
The results of this trial will take considerable time for full analysis but the tables below show some of the preliminary results.

(a) Wheat Yields kg/ha. No ryegrass present

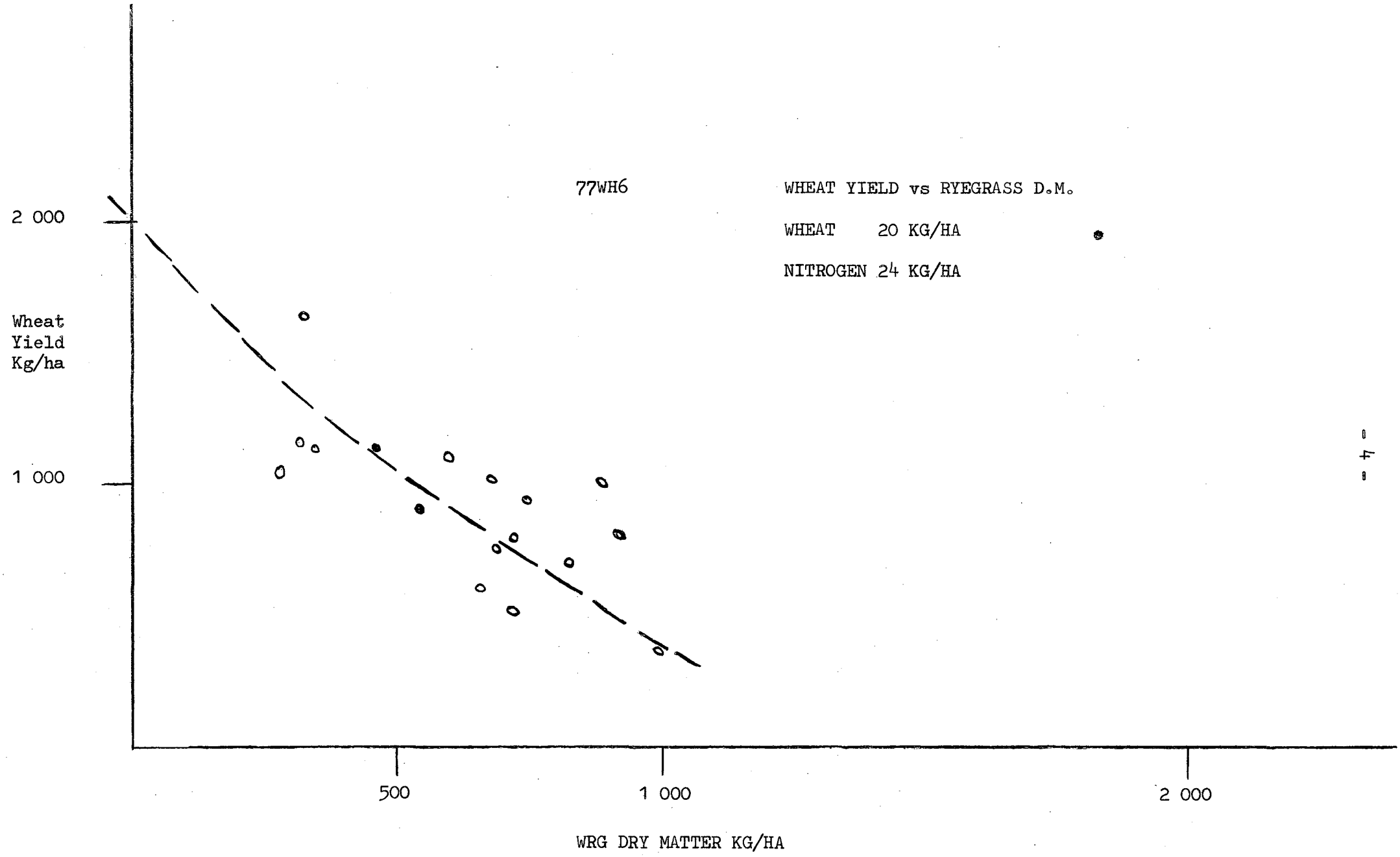
		Rate of Nitrogen kg/ha					Av. for each seeding rate
		0	12	24	48	96	
	18	1267	1036	1620	1685	1751	1472
Rate of Seeding Wheat kg/ha	36	1528	1386	2287	1643	1884	1746
	50	1604	1686	1979	1884	2199	1870
	93	1673	1964	1653	2058	2326	1935
	137	1805	1595	1843	1653	1448	1669
Av for each Nitrogen rate	1575	1533	1876	1784	1921		

(b) Harvest Index ($\frac{\text{grain}}{\text{grain \& straw}}$)

		Rate of Nitrogen (kg/ha)				
		0	12	24	48	96
	18	.41	.41	.42	.45	.37
Rate of seeding Wheat kg/ha	36	.45	.44	.40	.40	.34
	50	.42	.40	.39	.38	.36
	93	.41	.40	.41	.37	.38
	137	.37	.36	.35	.36	.34



The curve (A-A) applies to seeding rates in the 60-80 kg/ha range and nitrogen rates of 24 - 48 kg/ha. At lower seeding rates and nitrogen rates the curve keeps the same shape but shifts down about 400 kg/ha. The curve (B-B) applies to the (48 x 2) = 96 kg/ha nitrogen rate.


77WH6
WHEAT YIELD vs RYEGRASS D.M.
WHEAT 20 KG/HA
NITROGEN 24 KG/HA
2 000
1 000
Wheat Yield Kg/ha
500
1 000
2 000
WRG DRY MATTER KG/HA

(c) Wimmera ryegrass yields in absence of wheat.

RATE OF NITROGEN (KG/HA)

Yields - kg/ha

	0	12	24	48	96
50	1776	2124	1708	2752	2916
100	1288	2604	2712	3556	2784
200	1188	1752	2400	3160	2872
400	1536	2604	3672	3364	4088
800	1608	2632	3220	3444	3820

(d) Head number unit per area of wheat in absence of ryegrass

RATE OF NITROGEN (KG/HA)

Head numbers/m^2.

RATE OF SEEDING WHEAT (KG/HA)	0	12	24	48	96
18	139.2	165.6	161.4	142.2	163.8
36	117	142.8	197.4	154.2	193.8
50	159.6	209.4	236.4	222	243
93	229.8	212.4	229.2	244.2	243.6
137	282	311.4	308.4	309	228

Caution: Although a very good relationship was established in this trial between ryegrass density and wheat yield, it remains to be seen whether the relationship is site specific for WHRS in 1977; is typical of sandplain in the Wongan Region or has more general application. Work in 1978 and later will concentrate on determining the appliability of this relationship.

...6

77WH7

Title: Time of removal of annual ryegrass from a wheat crop.

Location: Wongan Hills Research Station.

Soil type: Wongan loamy sand.

History: Wheat 1976.

Treatments: Removal of ryegrass from wheat at 2, 4, 6, 8, 10, 12, 14, 16 weeks compared with weedfree and not removed.

Design: 10 treatments x 3 reps. Randomized block. Plots 2.5 x 60 m.

Details: Ryegrass was removed with 2.5 l/ha H.23408. Ryegrass control was excellent. Due to drought and perhaps site history a large "hole" appeared in the centre of the trial. Eventually only 10 m were harvested with the Hege, but this section appeared fairly even.

It was obvious that the wheat was slightly affected by the late spray treatments. The design did not allow for a weed free sprayed treatment to measure this effect as it was not anticipated. However, future trials should allow for check treatments.

Ryegrass: The density of ryegrass established in the plots was 115 plants/m^2 which was a little lower than planned (150m^2).

Results are given in the table below. Differences will not be significant. Coincidentally perhaps, the "weed free" are "not removed" yields at a density of 115 plants/m^2 fit very nicely onto the curve established in 77WH6.

WHEAT YIELDS - KG/HA

Treatment:	Yield
1. No ryegrass.	2557
2. Ryegrass removed at 2 weeks	2608
3. " " " 4 "	2383
4. " " " 6 "	2630
5. " " " 8 "	3123
6. " " " 10 "	2329
7. " " " 12 "	2513
8. " " " 14 "	2087
9. " " " 16 "	2384
10. Ryegrass not removed.	2156

Comment: No conclusive results. Site too variable. Ryegrass density too low.

77M52

Title: Effect of different tillage systems on establishment and yield of wheat.

Location: Merredin Research Station.

Soil Type: Clay loam. Salmon Gum. Pad. 3D5.

History: Pasture 76, 75.

Treatments and Results:

	Wheat Yields kg/ha	Yield
1. Conventional	- Disc plough - work back with scarifier. Sow with combine	561
2. Spray seed	- Triple disc drill - no harrows	No result
3. Spray seed	- Triple disc drill - covered with heavy angle iron pulled behind drill.	No result
4. Spray seed	- Standard combine and trailing harrows.	611
5. Modified combine a la Booth. Sowing points only cut down to $1\frac{1}{4}$".		352
6. Modified combine a la Booth. Furrows covered with trailing angle iron.		450
7. Modified combine. Lucerne point $\frac{1}{4}$" wide. No harrows.		394
8. Modified combine. Lucerne points harrows.		605

Comments: Trial very severely affected by drought. Dry conditions at seeding caused numerous problems with the "non conventional" seeding systems, particularly the triple disc drill treatments which showed very poor germination. Weed control was satisfactory. Covering harrows appears to have been useful.

...8

77M030

Title: Rapeseed variety trial.

Location: Lancelin.

Soil Type: Yellow sand.

Aim: To assess the performance of new rapeseed crossbreds at this site in terms of yield, blackleg and flowering time.

Design: Plots 60 m x 2.5 m

3 replications. Randomized blocks.

Results: Weeds, roos and site variability prevented yields being taken. Very little stem cankering occurred. Plots were rated for flowering time and blackleg leaf lesions. Mr. Barbetti has reported the blackleg results.

Flowering Data

	18/8	17/11
Tower	Flowering	Mature
Span	Late podding	Mature
Midas	Flowering	Almost mature
73N09-1A	5% flowers	Last flowers/pods green
73N09-2A	Rosette	" " " "
73N02-2A	Rosette	Flowering/winter types
73N10-02	Rosette	Last flowers/pods green
73N10-03	Rosette	Flowering/pods v. green
73N22-1	20% flowers	Almost mature/shedding
73N09-B4	Rosette	Flowers/many winter types

Comments:

None of the crossbreds are as early maturing as Tower and Midas. The Norin cross N22-1 was the earliest maturing of the crossbreds but was showing severe shedding. The later crossbreds showed a very wide spread of flowering time and obviously were still segregating for winter habit. The lack of vernalization treatment at this warm site is of concern and I don't think most of the crossbreds would be suitable for this area. Earlier maturing types are required.

77MT25/3541

Title: Shedding losses in rapeseed.

Location: Mt. Barker Research Station.

Aim: This trial was conducted jointly with Mr. J. Parish who with Mt. Barker R.S. staff did most of the work. The objective was to compare the degree of shattering of new rapeseed varieties of French background against the "old" Canadian varieties and the shedding prone Norin 20. A separate comprehensive report is available. Main results are given below.

Genotype	% pods shed at 7.2.78.
Norin 20	73%
73N09-B4	44%
73N09-1	57%
Turret	39%

Comments:

The new varieties were slightly more prone to shedding than the Canadian variety Turret, but were much superior to the Japanese variety Norin 20.

77WH

Title: Time of germination of ryegrass on wheat yield.

Location: Wongan Hills R.S.

Plan: The aim of this trial was to sow ryegrass into a wheat crop at 0, 1, 2, 3, 4, 5, 6 weeks after establishment of the wheat to examine the effect of ryegrass plants of different ages on the yield of wheat.

The very dry season ruined the trial, as the ryegrass germination was very erratic due to drying out of the surface soil layer.

This remains an important research area and a similar trial will be attempted in 1978.

77B5

Title: Sunflower trial investigating the effects of stand density on yield and oil characteristics of two sunflower hybrids of widely differing maturity.

Location:
Bramley Research Station.

Soil type:
Heavy grey clay loam, supposedly summer moist. This soil type gets very wet after rain but is not summer moist. It dries out rock hard and the sunflowers suffered severe drought. Drought didn't operate evenly across the trial and separate figures are given for each replication to show this.

Spacing between rows was 53cm.

Results

Within row Spacing	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3
5 cm	556	83	83	445	83	111
10 cm	583	306	83	473	111	111
15 cm	417	83	55	500	83	42
20 cm	278	222	69	375	320	97
25 cm	500	334	28	306	195	55

Comment: Even rep 1, the best rep, gave very disappointing yields. Yields not commercial.

...12

Other trials

1. Co-operative trials with Dr. Roy and Mr. Barbetti at Green Range have been reported elsewhere. These trials were deliberately sited on rapeseed stubble to ensure severe blackleg. Results from these and other trials have allowed the release of 73 No. 9-2a (Wesreo) this year.

2. Precision Seeder trial. A sunflower trial was planted at Wongan Hills Research Station in mid August to test the new Nodet Gougis precision seeder. The seeder worked perfectly. The sunflowers grew much better than expected. Yields were not taken. A comprehensive time of planting x variety x seeding rate sunflower trial will be sown at Wongan in 1978.

3. Co-operative sunflower trials were carried out with Mr. G. Parlevliet. Results are available in a separate report.