1986

Barley trials, Lupin trials, Wheat trials

Rob Delane

John Hamblyn

*

Experimental Summary

1986 Season

Mr. Rob Delane

Dr. John Hamblin

The technical assistance of Miss Julie Bright, Mr. James Matthews and Mr. Glenn Adam is gratefully acknowledged.

This report examines the results of a number of research projects being conducted throughout the Geraldton region. Trials were conducted at twelve sites within the northern and central parts of the wheat-belt. This research is funded by the following research projects:

BIRC "The value of early flowering in cereals as a path to higher yields"
WIRC "Potential of low tillering and uniculm cereals for low rainfall cropping regions"
GLRC "Water use efficiency of reduced branching lupins"

Trials sown in 1986 are listed below:

Barley Trials

86C54 Effect of Maturity and Sowing Date on Wheat and Barley.
86C55 Effect of Flowering Date on Growth and Yield of Barley.
86C56 Effect of Flowering Date on Barley Yield.
86C90 Effect of Flowering Date on Barley Yield.
86C91 Effect of Flowering Date on Barley Yield.
86GE26 Effect of Flowering Date on Barley Yield.
86GE44 Effect of Flowering Date on Barley Yield.
86GE45 Effect of Flowering Date on Barley Yield.
86GE46 Effect of Flowering Date on Barley Yield.
86TS27 Effect of Flowering Date on Barley Yield.
86WH37 Effect of Flowering Date on Barley Yield.
86ME66 Effect of Flowering Date on Barley Yield.

Lupin Trials

86C57 Effect of Soil Moisture Supply on Lupin Growth.
86C58# Response of Lupin Plant Types to Seeding Rate.
86C59# Genetic and Chemical Control of Lupin Branching.
86C60# Yield Potential of Reduced Branching Lupins.
86C72 Effect of Seeding Date and Seeding Rate on Lupin Growth and Yield
86C73* Effect of Seed Quality on Lupin Production.
86C74* Effect of Stubble Management and Tillage on Lupin Establishment (Demonstration)
86C97 Chemical Control of Lupin Branching

YIELD COMPONENTS OF LUPINS - (25 LVT sites)
Effect of Variety and Site on the Growth, Branching, Yield and Yield Components of Lupins

abandoned due to flooding or waterlogging
* demonstrations for 4th International Lupin Conference - no data recorded

Wheat Trials

86C61 Effect of Controlled Tillering on Growth and Water Use of Wheat
86C62 Low Tillering Variety Assessment.
WEUNI (CRS and MRS) - Response of Low Tillering Breeding Lines and Standard Varieties to Sowing Rate.
86GE48 Response of Wheat to Seeding and Nitrogen Rate at a Low Rainfall Site.

TRIAL 86C54

Effect of Maturity and Sowing Date on Wheat and Barley.

AIMS

To assess the value of early maturity in cereals for lower rainfall cropping zones.

INTRODUCTION

Earlier maturity has been postulated as a avenue of cereal yield improvement in low rainfall areas, particularly on soils of poor water holding capacity. Trial data suggests that early maturing wheat and barley varieties are advantageous in marginal areas and for late sowings. This trial assesses the value of early types at several sowing dates.

TRIAL SITE	ECRS
PAST HISTORY	Lupin stubble.
SOIL TYPE	Yellow sandplain.
VARIETIES	Gutha wheat (early), Gamenya wheat (normal) IB 286 barley (early), Stirling barley (normal).
SEEDING DATE	May 21(break), June 9/6(normal), July 1(late). 50 kg/ha.
CULTIVATION	Deep ripping to 30cm 11/3/86 Direct drill.
FERTILIZER	DAP Sowing 100kg/ha
HERBICIDE	Roundup 1l/ha 8/5/86; Sprayseed 2l/ha 20/5/86
FUNGICIDE	Baytan (barley seed) 225ppm
DESIGN	Split-split block Ripping(main)*Date(sub)*Variety(sub-sub)

RESULTS and DISCUSSION

The effect of sowing date and deep tillage on the growth and yield of barley (IB286 early; Stirling) and wheat (Gutha early; Gamenya) was examined. A long period of dry weather following both the May 20, and June 9 sowings resulted in delayed emergence and reduced stand densities (Table 1). However, dry matter production at anthesis (individual sampling for each variety and date) was not adversely affected (Table 2). There were large effects of species, variety, sowing date and deep tillage on grain yield (Table 3). Contrary to expectations, the early varieties out-yielded the standard varieties at all sowing dates by a significant margin. Favourable spring rainfall and cool temperatures were expected to enhance the yield of Gamenya and Stirling relative to Gutha and IB 286, especially when sown early. Gutha out-yielded Gamenya by 9%, 11% and 20%, and IB 286 out-yielded Stirling by 32%, 17% and 27% for the early, mid-, and late sowing date, respectively. Barley out-yielded wheat by 29%; based on current price estimates this would represent an economic advantage for both manufacturing and feed grades of barley, relative to wheat. Delayed sowing resulted in a dramatic decrease in yield of all varieties, giving an average decline of 33kg/ha/day for barley and 26kg/ha/day for wheat. There was a 33% response to deep tillage. Overall, results from this trial suggest that earlier maturity may be beneficial in this environment (deep, light-textured soils; medium rainfall) irrespective of sowing date.

Table 1: Effect of sowing date and deep tillage on stand density of barley and wheat varieties differing in maturity (pl/sqm.)

Deep Tillage	Variety	Sowing Date Early 21/5/86	Mid 9/6/86	Late 1/7/86	Mean
+Ripping	Gutha	98	104	172	125
	Gamenya	73	108	108	96
	IB 286	59	84	85	76
	Stirling	95	163	117	125
		81	115	120	105
-Ripping	Gutha	61	87	112	87
	Gamenya	52	86	142	93
	IB 286	48	75	102	75
	Stirling	57	89	104	83
		54	84	115	84

Table 2: Effect of sowing date and deep tillage on anthesis dry weight of barley and wheat varieties differing in maturity (g/sqm.). Samples taken at individual anthesis dates for each variety and sowing date.

Deep Tillage	Variety	Sowing Date Early 21/5/86	Mid 9/6/86	Late 1/7/86	Mean
+Ripping	Gutha	506	383	314	401
	Gamenya	490	353	276	373
	IB 286	797	563	423	494
	Stirling	639	384	352	458
		608	421	341	431
-Ripping	Gutha	306	273	260	246
	Gamenya	331	304	207	281
	IB 286	410	374	370	345
	Stirling	552	416	252	407
		400	342	272	320

Table 3: Effect of sowing date and deep tillage on grain yield of barley and wheat varieties differing in maturity (t/ha.)

Deep Tillage	Variety	Sowing Date: Early 21/5/86	Sowing Date: Mid 9/6/86	Sowing Date: Late 1/7/86	Mean
+Ripping	Gutha	2.35	1.56	1.08	1.66
	Gamenya	2.14	1.41	0.94	1.50
	IB 286	3.25	2.23	1.33	2.27
	Stirling	2.74	1.86	1.06	1.89
		2.62	1.76	1.10	1.83
-Ripping	Gutha	1.74	1.30	0.84	1.29
	Gamenya	1.61	1.16	0.66	1.14
	IB 286	2.41	1.75	1.16	1.76
	Stirling	1.54	1.49	0.90	1.31
		1.82	1.41	0.88	1.38

Additional growth data (7 weeks and anthesis), and yield components have been recorded, but are not reported here.

TRIAL 86C55

Effect of Flowering Date on Growth and Yield of Barley.

AIMS

To determine the advantage of early maturity of cereals on deep sandy soils. To understand the relationship between dry matter production and grain yield on these soils.

INTRODUCTION

This project aimed to improve both mean grain yields and consistency of yield in low rainfall zones. On deep, coarse-textured soils, grain yield is usually related linearly to crop growth. To be high yielding in most seasons, early maturing varieties need high crop growth rates. Barley was used as a model crop as it is not susceptible to major late-season leaf diseases (cf. Septoria in wheat), and there is much genetic diversity for both seedling vigour and flowering time. Trials to date have indicated that on sandplain soils in lower rainfall areas, early Ketch barley can yield similarly or better than normal maturity Stirling. Management (deep tillage; N rate) are being used to manipulate crop growth rate and yield potential.

TRIAL SITE	ECRS
PAST HISTORY	Lupin stubble.
SOIL TYPE	Yellow sandplain.
VARIETIES	Ketch barley (early), Stirling barley (normal)
SEEDING DATE	29/5/86 50kg/ha
CULTIVATION	+/- ripping Direct drill. Deep ripped 5/3/86
FERTILIZER	Superphosphate 200 kg/ha Agran 34:0 0 weeks 0,12.5,25,50,100 kgN/ha
HERBICIDE	Sprayseed Sowing 21/ha
FUNGICIDE	Baytan seed dressing 225 ppm
DESIGN	Split block. Deep ripping(main)*Variety(sub)*Nrates

RESULTS and DISCUSSION

A detailed comparison of Ketch (early) and Stirling barley was made at this sandplain soil site (230mm May-October rainfall). The effects of deep tillage, nitrogen rate, and irrigation (mini-plots) were examined. Patterns of tillering, leaf area increase, dry matter accumulation and water use were followed throughout the season. Only harvest data are presented in detail here.

Ketch produced fewer tillers than Stirling, but had higher biomass and leaf area index (LAI) at any given time. Ketch flowered 10 days earlier than Stirling, and the varieties had similar biomass at anthesis.

At maturity, the expected nitrogen responses were observed for all growth and yield components, and there were significant interactions between variety, deep tillage and nitrogen. Summarized varietal responses for harvest data are given in Table 1. The varieties did not differ in biomass production or grain yield (Tables 2, 3 and 9). Stirling had a higher harvest index (reflecting its shorter stature) (Table 4), and more heads (Table 5), but Ketch had larger heads than Stirling (Table 7). The two varieties has similar grain size (Table 8).

Table 1: Summarized harvest data and yield components for early Ketch and Stirling barley. (means for +/- deep tillage and 5 nitrogen rates).

Yield Component	Measurement units	Ketch	Stirling	Level of statistical significance
Dry wt.	g/sqm	569	569	N.S.
Grain wt.	g/sqm	225	239	N.S.
H.I.		0.40	0.42	***
Heads	no./sqm	310	343	***
Seeds	no./sqm	5590	5860	N.S.
Seeds/head		18.1	16.9	***
1000 Seed wt	g	40.0	40.6	N.S.
M/H grain yield	t/ha	1.75	1.75	N.S.

N.S. non-significant *** highly significant ($P<.001$)

The varieties had identical water use. Deep tilled plots (gross water use 230mm) used 20mm more water than the uncultivated plots, reflecting the growth and yield response to deep tillage (Table 10).

Mini-plot irrigation treatments were used to examine the effect of a good seasonal finish on yield components of the two varieties (25 kgN/ha treatment only). The irrigation treatment received an additional 139mm water. Mean data for +/- ripping treatments are given in Table 11.

These results gave strong support to our thesis that 'earlier maturity is desirable in this environment'. That is, even in a good season (235mm growing season rainfall, and a cool spring), the yield of early Ketch equalled that of the current commercial variety. Results of other trials (e.g. 86C54) have shown that adapted, early maturing, short-statured varieties can out-yield the current commercial variety Stirling by a significant margin.

Table 2: Effect of variety, deep tillage and nitrogen rate on harvest dry weight of barley (g/sqm.).

+RIP	-RIP
620	517

KETCH	STIRLING
569	569

N 0	N100	N12.5	N 25	N 50
446	708	514	562	613

	KETCH	STIRLING
+RIP	606	634
-RIP	530	504

	N 0	N100	N12.5	N 25	N 50
+RIP	482	725	575	643	674
-RIP	409	691	453	481	552

	N 0	N100	N12.5	N 25	N 50
KETCH	463	680	535	560	605
STIRLING	428	736	492	564	622

	KETCH					STIRLING				
	N 0	N100	N12.5	N 25	N 50	N 0	N100	N12.5	N 25	N 50
+RIP	517	711	533	631	638	448	739	617	656	710
-RIP	408	648	536	489	570	410	734	369	474	535

Table 3: Effect of variety, deep tillage and nitrogen rate on grain yield of barley (g/sqm.).

+RIP	-RIP
252.6	211.0

KETCH	STIRLING
225.0	238.6

N 0	N100	N12.5	N 25	N 50
185.9	277.2	210.6	236.6	248.7

	KETCH	STIRLING
+RIP	239.4	265.8
-RIP	210.6	211.4

	N 0	N100	N12.5	N 25	N 50
+RIP	207.8	282.4	239.5	258.2	275.0
-RIP	164.1	272.1	181.6	215.0	222.4

	N 0	N100	N12.5	N 25	N 50
KETCH	185.0	257.5	221.0	224.6	236.9
STIRLING	186.9	296.9	200.1	248.5	260.5

	KETCH					STIRLING				
	N 0	N100	N12.5	N 25	N 50	N 0	N100	N12.5	N 25	N 50
+RIP	213.8	271.0	229.9	232.3	250.0	201.8	293.8	249.0	284.1	300.1
-RIP	156.2	244.1	212.0	216.9	223.9	172.0	300.0	151.2	213.0	221.0

Table 4: Effect of variety, deep tillage and nitrogen rate on harvest index (H.I.) of barley.

+RIP	-RIP
0.4112	0.4070

KETCH	STIRLING
0.3975	0.4207

N 0	N100	N12.5	N 25	N 50
0.4143	0.3907	0.4114	0.4237	0.4055

	KETCH	STIRLING
+RIP	0.3989	0.4235
-RIP	0.3961	0.4179

	N 0	N100	N12.5	N 25	N 50
+RIP	0.4317	0.3885	0.4235	0.4045	0.4079
-RIP	0.3968	0.3929	0.3994	0.4429	0.4031

	N 0	N100	N12.5	N 25	N 50
KETCH	0.3959	0.3800	0.4147	0.4070	0.3899
STIRLING	0.4326	0.4014	0.4081	0.4404	0.4211

	KETCH					STIRLING				
	N 0	N100	N12.5	N 25	N 50	N 0	N100	N12.5	N 25	N 50
+RIP	.4147	.3810	.4367	.3742	.3877	.4488	.3960	.4103	.4348	.4280
-RIP	.3770	.3790	.3928	.4398	.3920	.4165	.4068	.4060	.4460	.4142

Table 5: Effect of variety, deep tillage and nitrogen rate on head number of barley (no./sqm.).

+RIP	-RIP
341.7	311.4

KETCH	STIRLING
310.1	343.0

N 0	N100	N12.5	N 25	N 50
274.3	387.3	295.4	331.8	343.8

	KETCH	STIRLING
+RIP	320.3	363.1
-RIP	299.9	322.8

	N 0	N100	N12.5	N 25	N 50
+RIP	286.3	397.8	317.6	351.6	355.1
-RIP	262.4	376.9	273.3	311.9	332.5

	N 0	N100	N12.5	N 25	N 50
KETCH	272.0	339.0	303.1	317.3	319.1
STIRLING	276.6	435.6	287.8	346.3	368.5

	KETCH					STIRLING				
	N 0	N100	N12.5	N 25	N 50	N 0	N100	N12.5	N 25	N 50
+RIP	287.8	353.8	306.0	338.3	315.8	284.8	441.8	329.3	365.0	394.5
-RIP	256.3	324.3	300.3	296.3	322.5	268.5	429.5	246.2	327.5	342.5

Table 6: Effect of variety, deep tillage and nitrogen rate on seed number of barley (no./sqm.).

+RIP	-RIP
6179	5271

KETCH	STIRLING
5590	5860

N 0	N100	N12.5	N 25	N 50
4698	6974	5103	5639	6211

	KETCH	STIRLING
+RIP	5855	6503
-RIP	5324	5218

	N 0	N100	N12.5	N 25	N 50
+RIP	5202	7080	5687	6187	6738
-RIP	4194	6869	4519	5090	5684

	N 0	N100	N12.5	N 25	N 50
KETCH	4863	6437	5291	5407	5949
STIRLING	4533	7511	4914	5871	6473

	KETCH					STIRLING				
	N 0	N100	N12.5	N25	N50	N 0	N100	N12.5	N25	N50
+RIP	5506	6464	5392	5758	6156	4898	7696	5982	6617	7320
-RIP	4221	6411	5191	5056	5741	4168	7327	3847	5125	5627

Table 7: Effect of variety, deep tillage and nitrogen rate on seeds per head of barley (no./head).

+RIP	-RIP
18.16	16.85

KETCH	STIRLING
18.09	16.92

N 0	N100	N12.5	N 25	N 50
17.07	18.00	17.16	17.02	18.27

	KETCH	STIRLING
+RIP	18.51	17.81
-RIP	17.67	16.03

	N 0	N100	N12.5	N 25	N 50
+RIP	18.13	17.68	17.84	17.64	19.51
-RIP	16.01	18.33	16.47	16.40	17.03

	N 0	N100	N12.5	N 25	N 50
KETCH	17.80	19.04	17.48	17.08	19.06
STIRLING	16.33	16.97	16.83	16.96	17.48

	KETCH					STIRLING				
	N 0	N100	N12.5	N 25	N 50	N 0	N100	N12.5	N 25	N 50
+RIP	19.20	18.25	17.61	17.11	20.40	17.05	17.11	18.08	18.17	18.63
-RIP	16.40	19.83	17.35	17.05	17.72	15.62	16.83	15.59	15.75	16.34

Table 8: Effect of variety, deep tillage and nitrogen rate on individual grain weight of barley (g).

+RIP	-RIP
.04082	.03980

KETCH	STIRLING
.04005	.04057

N 0	N100	N12.5	N 25	N 50
.03925	.03968	.04100	.04156	.04006

	KETCH	STIRLING
+RIP	.04075	.04089
-RIP	.03935	.04025

	N 0	N100	N12.5	N 25	N 50
+RIP	.04000	.03998	.04213	.04138	.04063
-RIP	.03850	.03937	.03988	.04175	.03950

	N 0	N100	N12.5	N 25	N 50
KETCH	.03775	.04000	.04163	.04100	.03988
STIRLING	.04075	.03935	.04037	.04213	.04025

	KETCH					STIRLING				
	N 0	N100	N12.5	N 25	N 50	N 0	N100	N12.5	N 25	N 50
+RIP	.0390	.0420	.0427	.0397	.0402	.0410	.0379	.0415	.0430	.0410
-RIP	.0365	.0380	.0405	.0422	.0395	.0405	.0407	.0392	.0412	.0395

Table 9: Effect of variety, deep tillage and nitrogen rate on machine harvested grain yield of barley (kg/ha.).

+RIP	-RIP
1838	1667

KETCH	STIRLING
1752	1752

N 0	N100	N12.5	N 25	N 50
1425	2270	1508	1625	1934

	KETCH	STIRLING
+RIP	1811	1865
-RIP	1691	1642

	N 0	N100	N12.5	N 25	N 50
+RIP	1532	2345	1615	1689	2009
-RIP	1318	2195	1400	1561	1860

	N 0	N100	N12.5	N 25	N 50
KETCH	1496	2145	1537	1649	1934
STIRLING	1354	2395	1478	1600	1934

	KETCH					STIRLING				
	N 0	N100	N12.5	N25	N50	N 0	N100	N12.5	N25	N50
+RIP	1548	2147	1646	1732	1984	1515	2543	1584	1646	2034
-RIP	1442	2141	1426	1565	1883	1194	2249	1374	1556	1836

Table 10: Effect of variety and deep tillage on water use efficiency of barley.

	+ Rip		- Rip		
	Ketch	Stirling	Ketch	Stirling	Bare Plot
Initial soil water (S)mm	167	161	152	146	155
Final soil water (S)mm	171	162	173	163	156
	+ 4	+ 1	+21	+17	+ 1
Rainfall 19/5-29/10 mm	232	232	232	232	232
Total water use mm	228	231	211	215	231
Water use efficiency BY	26.6	27.4	25.1	23.4	
kg/mm GY	10.5	11.5	10.0	9.8	

Table 11: Effect of watering on yield components of Ketch and Stirling barley. N 25 treatment only. Means of + and - ripping.

	Control		Watered	
	Ketch	Stirling	Ketch	Stirling
Dry Wt	560	565	729	641
Grain Wt	225	248	254	234
Harvest Index	0.41	0.44	0.35	0.36
Heads/sqm	317	346	359	300
Seeds/sqm	5407	5871	5038	4948
Seed/head	17.1	17.0	14.9	16.2
Seed wt	.041	.042	.051	.047

TRIAL 86C56

Effect of Flowering Date on Barley Yield

AIMS

To assess the value of early maturity in barley across a range of environments and soil types.

INTRODUCTION

Trial results have indicated a possible advantage for earlier maturity of cereals in low rainfall zones. The application of early maturity across a range of rainfall zones and soil types is being examined.

TRIAL SITE ECRS

PAST HISTORY ECRS (Lupin)

SOIL TYPE ECRS (yellow sandplain)

VARIETIES Ketch (early), IB 286 (early), CMB 73-375 (very early) Stirling (normal maturity). 50kg/ha

SEEDING DATE 31/6/86

CULTIVATION / FERTILIZER / HERBICIDE
As for Cereal Variety Trial. Nitrogen application additional to basal fertilizer application.

FUNGICIDE Baytan seed dressing Sowing 225 ppm

DESIGN Randomized Block

RESULTS and DISCUSSION

Early barley varieties Ketch and IB 286 (7-10 days earlier than Stirling) and a very early line 73-375 were compared with commercial variety Stirling. Nitrogen application adversely affected seedling growth (Table 1), but this was not reflected in grain yield. Machine harvested yield variety was not related to hand harvested yield differences (Tables 2 and 3).

Table 1: Effect of variety and nitrogen application on seedling growth of barley - East Chapman R.S. Sampled 18/7/86

		PLANT NO pl/m2	TILLER NO til/m2	DRY WT g/m2	LEAF AREA INDEX	TILLER /PLANT	DWT PER PLANT g/pl
73-375							
	N0	92.00	220.50	15.99	0.343	2.42	0.16
	N25	70.00	130.50	5.71	0.126	2.15	0.11
		81.00	176.00	10.85	0.234	2.28	0.14
IB 286							
	N0	65.50	167.00	19.02	0.369	2.68	0.31
	N25	77.25	167.50	8.31	0.210	2.23	0.11
		71.38	167.25	13.67	0.290	2.46	0.21
KETCH							
	N0	130.00	388.25	30.43	0.560	3.09	0.22
	N25	67.00	112.50	5.95	0.147	2.07	0.09
		98.50	250.38	18.19	0.354	2.58	0.15
STIRL							
	N0	101.75	256.25	10.36	0.233	2.62	0.10
	N25	100.00	197.50	9.73	0.181	2.02	0.10
		100.88	226.88	10.04	0.208	2.32	0.10
Trial means							
		87.94	205.00	13.19	0.271	2.41	0.15

Table 2: Effect of variety and nitrogen application on yield components of barley - East Chapman R.S. Sampled 18/7/86

variety	nrate	Dry Wt. g/sqm	Grain Yield g/sqm	H.I.	Heads /sqm	Seeds /sqm	Seeds /head	Seed Wt. g/seed
73-375	NO	531.88	172.06	0.328	258.00	4093.75	15.88	0.0422
	N25	480.62	167.44	0.347	229.50	3931.25	17.85	0.0427
		506.25	169.75	0.338	243.75	4012.50	16.86	0.0424
IB 286	NO	914.44	375.19	0.412	413.25	6831.25	16.79	0.0547
	N25	697.31	302.50	0.435	355.50	5648.75	16.14	0.0534
		805.88	338.84	0.424	383.88	6240.00	16.47	0.0540
KETCH	NO	738.75	280.75	0.377	407.00	6601.75	16.16	0.0424
	N25	674.25	261.31	0.386	375.00	6390.25	17.07	0.0408
		706.50	271.03	0.382	391.00	6496.00	16.62	0.0416
STIRL	NO	666.75	281.25	0.422	422.75	6816.25	16.15	0.0412
	N25	757.06	320.00	0.423	425.00	7920.00	19.11	0.0404
		711.90	300.56	0.422	423.88	7368.12	17.63	0.0408
Trial means		682.63	270.06	0.391	360.75	6029.16	16.89	0.0447

Table 3: Effect of variety on machine harvested grain yield of barley (kg/ha). Mean of two nitrogen rates.

	Grain Yield (kg/ha)
73-37	1406 A
IB 286	1810 B
Ketch	1508 A
Stirling	1635 AB
LSD (.05)	= 239

Values with the same letter are not significantly different

Table 4: Effect of nitrogen rate on machine harvested grain yield of barley (kg/ha). Mean of 3 varieties

	Grain Yield (kg/ha)
NO	1499
N25	1680

LSD (.05) = 169

Values with the same letter are not significantly different

TRIAL 86C90

Effect of Flowering Date on Barley Yield.

AIMS

To assess the value of early maturity in barley across a range of environments and soil types.

INTRODUCTION

Trial results have indicated a possible advantage for earlier maturity of cereals in low rainfall zones. The application of early maturity across a range of rainfall zones and soil types is being examined.

TRIAL SITE CVRS

PAST HISTORY Pasture

SOIL TYPE Sandy loams

VARIETIES Ketch (early), IB 286 (early), Stirling (normal maturity). 50 kg/ha

SEEDING DATE Sown 1/6/86

CULTIVATION / FERTILIZATION / HERBICIDE
As for Cereal Variety Trial. Nitrogen application additional to basal fertilizer application

FUNGICIDE Baytan seed dressing Sowing 225 ppm

DESIGN Randomised block.

RESULTS AND DISCUSSION

The growth and yield components of three barley varieties was examined. Seedling growth data are given in Table 1 and yield component data are summarized in Table 2. No machine harvest yield figures are available.

Table 1: Effect of variety and nitrogen application on seedling growth of barley - Chapman R.S. Sampled 21/7/86

VAR/NRATE	PLANT NO PL/M2	TILLER NO TIL/M2	DRY WT G/M2	LEAF AREA INDEX	TILLER /PLANT	DWT PER PLANT G/PL
IB 286						
N0	91.25	237.25	112.25	2.077	2.64	1.24
N25	77.00	268.00	90.68	1.560	3.59	1.23
	84.12	252.62	101.46	1.819	3.12	1.24
KETCH						
N0	102.00	432.00	120.39	1.437	4.28	1.20
N25	116.25	521.50	119.70	1.966	4.76	1.12
	109.12	476.75	120.05	1.702	4.52	1.16
STIRL						
N0	125.75	442.00	123.09	1.869	3.55	1.00
N25	120.00	498.00	100.91	1.962	4.28	0.86
	122.88	470.00	112.00	1.916	3.91	0.93
Trial means	105.37	399.79	111.18	1.812	3.85	1.11

Table 2: Effect of variety and nitrogen application on yield components of barley - Chapman R.S.

VARIETY /NRATE	DRY WT g/sqm	GRN WT g/sqm	H.I.	HEADS /sqm	SEEDS /sqm	SEEDS /HEAD	SINGLE SEED WT. g/seed
IB 286							
N0	666.82	307.89	0.463	386.25	7415.25	19.19	0.042
N25	909.78	466.33	0.515	478.75	9318.25	19.41	0.051
	788.30	387.11	0.489	432.50	8366.75	19.30	0.046
KETCH							
N0	707.62	355.50	0.502	425.75	7865.00	18.73	0.045
N25	670.26	328.19	0.492	409.00	6963.75	17.07	0.047
	688.94	341.85	0.497	417.38	7414.38	17.90	0.046
STIRL							
N0	809.59	413.68	0.510	471.75	9124.50	19.24	0.046
N25	682.13	330.79	0.489	435.75	7721.75	17.77	0.043
	745.86	372.23	0.500	453.75	8423.12	18.50	0.044
Trial means	741.03	367.06	0.495	434.54	8068.08	18.57	0.046

TRIAL 86C91

Effect of Flowering Date on Barley Yield.

AIMS

To assess the value of early maturity in barley across a range of environments and soil types.

INTRODUCTION

Trial results have indicated a possible advantage for earlier maturity of cereals in low rainfall zones. The application of early maturity across a range of rainfall zones and soil types is being examined.

TRIAL SITE	North Mullewa (NMRS)
PAST HISTORY	wheat stubble
SOIL TYPE	clay loam
VARIETIES	Ketch (early), IB 286 (early), Stirling (normal maturity). 50 kg/ha
SEEDING DATE	23/5/86

CULTIVATION / FERTILIZATION / HERBICIDE
As for Cereal Variety Trial. Nitrogen application additional to basal fertilizer application

FUNGICIDE	Baytan seed dressing Sowing 225 ppm
DESIGN	Randomised block.

RESULTS AND DISCUSSION

Seedling growth data are given in Table 1. Yield component data (Table 2) and machine harvested yields are also presented (Table 3 and 4).

Table 1: Effect of variety and nitrogen application on seedling growth of barley - North Mullewa R.S. Sampled 11/7/86.

		PLANT NO PL/M2	TILLER NO TIL/M2	DRY WT G/M2	LEAF AREA INDEX	TILLER /PLANT	DWT PER PLANT G/PL
IB 286							
	N0	53.25	178.25	34.62	0.769	3.40	0.66
	N25	46.75	189.25	32.19	0.749	4.03	0.69
		50.00	183.80	33.40	0.759	3.72	0.68
KETCH							
	N0	79.50	331.75	40.12	0.938	4.21	0.50
	N25	48.75	258.75	29.50	0.636	5.58	0.62
		64.12	295.25	34.81	0.787	4.89	0.56
STIRL							
	N0	102.00	351.50	35.81	0.967	3.49	0.35
	N25	63.25	212.50	20.44	0.439	3.59	0.35
		82.62	282.00	28.12	0.703	3.54	0.35
Trial means		65.58	253.67	32.11	0.750	4.05	0.53

Table 2: Effect of variety and nitrogen application on yield components of barley - North Mullewa R.S.

VARIETY /NRATE		DRY WT g/sqm	GRN WT g/sqm	H.I.	HEADS /sqm	SEEDS /sqm	SEEDS /HEAD	SINGLE SEED WT. g/seed
IB 286								
	N0	618.56	242.22	0.391	280.50	4441.75	16.08	0.0546
	N25	700.38	239.42	0.342	300.50	4432.00	14.75	0.0539
		659.47	240.82	0.366	290.50	4436.88	15.42	0.0543
KETCH								
	N0	547.62	217.34	0.394	264.25	4693.25	17.65	0.0462
	N25	703.88	256.71	0.367	309.50	5997.75	19.36	0.0431
		625.75	237.02	0.381	286.88	5345.50	18.50	0.0447
STIRL								
	N0	646.62	271.55	0.422	356.00	6110.75	17.11	0.0445
	N25	669.75	261.88	0.388	378.75	6024.75	16.09	0.0432
		658.19	266.71	0.405	367.38	6067.75	16.60	0.0438
Trial means		647.80	248.18	0.384	314.92	5283.38	16.84	0.0476

Table 3: Effect of variety on grain yield of barley (kg/ha). Mean of two nitrogen rates.

	Grain Yield (kg/ha)
IB 286	2603
Ketch	2183 A
Stirling	2243 A
LSD (.05)	= 155

Values with the same letter are not significantly different

Table 4: Effect of nitrogen rate on grain yield of barley (kg/ha). Mean of 3 varieties

	Grain Yield (kg/ha)
N0	2333 A
N25	2353 A

LSD (.05) = 127

Values with the same letter are not significantly different

TRIAL 86GE26

Effect of Flowering Date on Barley Yield

AIMS

To assess the value of early maturity in barley across a range of environments and soil types.

INTRODUCTION

Trial results have indicated a possible advantage for earlier maturity of cereals in low rainfall zones. The application of early maturity across a range of rainfall zones and soil types is being examined.

TRIAL SITE Binnu

PAST HISTORY Lupins stubble

SOIL TYPE Yellow sandplain

VARIETIES Ketch, IB 286, Stirling Barley. 50 kg/ha

SEEDING DATE 5/6/86

CULTIVATION / FERTILIZATION / HERBICIDE
As for Cereal Variety Trial. Nitrogen application additional to basal fertilizer application

FUNGICIDE Baytan seed dressing sowing 225 ppm

DESIGN Randomised block.

RESULTS AND DISCUSSION

Seedling grwoth data are given in Table 1. Yield component data (Table 2) and machine harvested yields are also presented (Tables 3 and 4).

Table 1: Effect of variety and nitrogen application on seedling growth of barley - Binnu-Ajana Sampled 29/7/86

		PLANT NO pl/m2	TILLER NO til/m2	DRY WT g/m2	LEAF AREA INDEX	TILLER /PLANT	DWT PER PLANT g/pl
IB 286							
	N0	75.75	381.25	255.59	2.611	5.10	3.40
	N25	81.25	393.00	276.60	2.432	4.86	3.42
		78.50	387.12	266.09	2.522	4.98	3.41
KETCH							
	N0	76.75	438.50	191.40	2.072	5.86	2.49
	N25	92.00	550.75	252.76	2.681	6.41	2.90
		84.38	494.62	222.08	2.376	6.13	2.70
STIRL							
	N0	85.00	596.25	174.11	2.588	7.06	2.03
	N25	84.75	444.25	197.02	2.881	5.46	2.32
		84.88	520.25	185.56	2.734	6.26	2.17
Trial means		82.58	467.33	224.58	2.544	5.79	2.76

Table 2: Effect of variety and nitrogen application on yield components of barley - Binnu-Ajana

variety /nrate		Dry Wt. g/sqm	Grain Yield g/sqm	H.I.	Heads /sqm	Seeds /sqm	Seeds /head	Seed Wt. g/seed
IB 286								
	N0	956.61	458.45	0.481	449.50	1369.25	3.17	0.3349
	N25	1275.12	593.98	0.466	567.00	1356.75	2.46	0.4382
		1115.87	526.22	0.473	508.25	1363.00	2.81	0.3865
KETCH								
	N0	1025.00	454.79	0.447	506.75	1706.50	3.49	0.2668
	N25	1192.55	503.08	0.423	548.75	1750.50	3.21	0.2876
		1108.78	478.94	0.435	527.75	1728.50	3.35	0.2772
STIRL								
	N0	891.38	386.23	0.437	396.75	1693.00	4.34	0.2283
	N25	1134.09	468.29	0.420	506.75	1678.25	3.40	0.2795
		1012.73	427.26	0.429	451.75	1685.62	3.87	0.2539
Trial means		1079.12	477.47	0.446	495.92	1592.37	3.34	0.3059

Table 3: Effect of variety on grain yield of barley (kg/ha). Mean of two nitrogen rates.

	Grain Yield (kg/ha)
IB 286	2800 A
Ketch	2035
Stirling	2695 A
LSD (.05)	= 467

Values with the same letter are not significantly different

Table 2: Effect of nitrogen rate on grain yield of barley (kg/ha). Mean of 3 varieties

	Grain Yield (kg/ha)
N0	2390 A
N25	2630 A

LSD (.05) = 381

Values with the same letter are not significantly different

TRIAL 86GE44

Effect of Flowering Date on Barley Yield.

AIMS

To assess the value of early maturity in barley across a range of environments and soil types.

INTRODUCTION

Trial results have indicated a possible advantage for earlier maturity of cereals in low rainfall zones. The application of early maturity across a range of rainfall zones and soil types is being examined.

TRIAL SITE Allanooka

PAST HISTORY Lupins stubble

SOIL TYPE Sand/gravel

VARIETIES Ketch, IB 286, Stirling Barley. 50 kg/ha

SEEDING DATE 3/6/86

CULTIVATION / FERTILIZATION / HERBICIDE
As for Cereal Variety Trial. Nitrogen application additional to basal fertilizer application

FUNGICIDE Baytan seed dressing sowing 225 ppm

DESIGN Randomised block.

RESULTS and DISCUSSION

Wind erosion caused poor stand establishment and seedling growth. High winter rainfall resulted in heavy leaching of applied nitrogen fertilizers and poor crop growth. Summarized data are given Tables 1 and 2. Machine harvested yields were not measured.

Table 1: Effect of variety and nitrogen rate on seedling growth of barley - Allanooka. Sampled 01/08/86.

VAR/NRATE		PLANT NO /sqm	TILLER NO /sqm	DRY WT g/sqm	LEAF AREA INDEX	TILLER /PLANT	DWT PER PLANT g/pl
IB 286							
	N0	33.00	141.00	12.79	0.275	4.05	0.33
	N25	49.25	196.50	28.90	0.369	3.96	0.54
		41.12	168.75	20.85	0.322	4.00	0.43
KETCH							
	N0	28.00	118.75	13.16	0.177	4.32	0.49
	N25	39.50	137.25	19.48	0.260	3.32	0.42
		33.75	128.00	16.32	0.218	3.82	0.45
STIRL							
	N0	42.50	169.75	22.61	0.288	3.65	0.47
	N25	45.75	171.75	25.89	0.310	3.75	0.55
		44.12	170.75	24.25	0.299	3.70	0.51
Trial means		39.67	155.83	20.47	0.280	3.84	0.47

Table 2: Effect of variety and nitrogen rate on harvest dry matter production and head numbers of barley - Allanooka.

variety	nrate	Dry Wt. g/sqm	Heads /sqm
IB 286			
	N0	212.40	143.00
	N25	173.50	119.75
		192.95	131.38
KETCH			
	N0	234.25	134.25
	N25	220.25	126.25
		227.25	130.25
STIRL			
	N0	194.29	118.25
	N25	210.01	123.00
		202.15	120.62
Trial means		207.45	127.42

Grain yield and seed number data not yet available.

TRIAL 86GE45

Effect of Flowering Date on Barley Yield.

AIMS

To assess the value of early maturity in barley across a range of environments and soil types.

INTRODUCTION

Trial results have indicated a possible advantage for earlier maturity of cereals in low rainfall zones. The application of early maturity across a range of rainfall zones and soil types is being examined.

TRIAL SITE Mingenew

PAST HISTORY Lupins stubble

SOIL TYPE Sand/gravel

VARIETIES Ketch, IB 286, Stirling Barley. 50 kg/ha

SEEDING DATE 4/6/86

CULTIVATION / FERTILIZATION / HERBICIDE
As for Cereal Variety Trial. Nitrogen application additional to basal fertilizer application

FUNGICIDE Baytan seed dressing sowing 225 ppm

DESIGN Randomised block.

RESULTS and DISCUSSION

Poor soil water holding capacity, and a 5-week rain-free period following sowing resulted in very low plant density, mean 44plants/sqm. (Table 1). Heavy leaching of applied nitrogen fertilizer due to high winter rainfall also limited barley growth and yield in this trial. Summarized seedling growth and yield component data are given in Table 1 and 2.

Table 1: Effect of variety and nitrogen rate on seedling growth of barley - Mingenew. Sampled 01/08/86

VAR/NRATE		PLANT NO /sqm	TILLER NO /sqm	DRY WT g/sqm	LEAF AREA INDEX	TILLER /PLANT	DWT PER PLANT g/pl
IB 286							
	NO	56.50	148.00	17.98	0.207	2.62	0.32
	N25	51.00	155.75	15.11	0.237	3.30	0.33
		53.75	151.88	16.54	0.222	2.96	0.32
KETCH							
	NO	26.00	102.00	14.47	0.188	4.02	0.56
	N25	41.50	105.00	6.77	0.133	2.49	0.16
		33.75	103.50	10.62	0.160	3.25	0.36
STIRL							
	NO	48.25	116.25	11.71	0.159	2.67	0.33
	N25	43.25	114.00	20.05	0.289	2.74	0.48
		45.75	115.12	15.88	0.224	2.70	0.40
Trial means		44.42	123.50	14.35	0.202	2.97	0.36

Table 2: Effect of variety and nitrogen rate on dry matter production, grain yield and yield components of barley - Mingenew

variety /nrate	Dry Wt. g/sqm	Grain Yield g/sqm	H.I.	Heads /sqm	Seeds /sqm	Seeds /head	Seed Wt. g/seed
IB 286							
NO	212.44	113.11	0.536	147.50	1608.75	11.00	0.0699
N25	199.00	97.52	0.489	152.50	1859.25	12.42	0.0526
	205.72	105.32	0.513	150.00	1734.00	11.71	0.0613
KETCH							
NO	252.58	125.31	0.495	169.25	1504.25	9.53	0.0824
N25	304.50	150.02	0.494	171.50	1462.75	11.95	0.1062
	278.54	137.66	0.494	170.38	1483.50	10.74	0.0943
STIRL							
NO	217.38	100.44	0.460	157.25	1790.00	11.72	0.0567
N25	243.44	138.99	0.571	171.00	1450.00	9.59	0.0983
	230.41	119.72	0.516	164.12	1620.00	10.65	0.0775
Trial means	238.22	120.90	0.508	161.50	1612.50	11.03	0.0777

TRIAL 86GE46

Effect of Flowering Date on Barley Yield.

AIMS

To assess the value of early maturity in barley across a range of environments and soil types.

INTRODUCTION

Trial results have indicated a possible advantage for earlier maturity of cereals in low rainfall zones. The application of early maturity across a range of rainfall zones and soil types is being examined.

TRIAL SITE Morawa

PAST HISTORY Pasture.

SOIL TYPE Red loam

VARIETIES Ketch, IB 286, Stirling Barley. 50 kg/ha

SEEDING DATE 22/5/86

CULTIVATION / FERTILIZATION / HERBICIDE
As for Cereal Variety Trial. Nitrogen application additional to basal fertilizer application

FUNGICIDE Baytan seed dressing sowing 225 ppm

DESIGN Randomised block.

RESULTS and DISCUSSION

Summarized seedling growth and yield component data are given in Tables 1 and 2. No machine harvested yields are available.

Table 1: Effect of variety and nitrogen rate on seedling growth of barley - Morawa. Sampled 14/7/86

VAR/NRATE	PLANT NO /sqm	TILLER NO /sqm	DRY WT g/sqm	LEAF AREA INDEX	TILLER /PLANT	DWT PER PLANT g/pl
IB 286						
N0	118.50	417.50	44.56	0.937	3.60	0.39
N25	146.75	478.00	48.69	0.887	3.32	0.34
	132.62	447.75	46.62	0.912	3.46	0.36
KETCH						
N0	132.75	371.50	42.81	0.833	2.77	0.32
N25	134.00	455.00	49.31	0.893	3.45	0.37
	133.38	413.25	46.06	0.863	3.11	0.34
STIRL						
N0	111.75	416.00	43.69	0.859	3.74	0.40
N25	129.75	406.25	45.25	0.843	3.29	0.37
	120.75	411.12	44.47	0.851	3.52	0.38
Trial means	128.92	424.04	45.72	0.875	3.36	0.36

Table 2: Effect of variety and nitrogen rate on dry matter production, grain yield and yield components of barley - Morawa

variety /nrate	Dry Wt. g/sqm	Grain Yield g/sqm	H.I.	Heads /sqm	Seeds /sqm	Seeds /head	Seed Wt. g/seed
IB 286							
N0	636.62	260.62	0.412	300.00	4692.50	15.66	0.0556
N25	681.69	281.96	0.415	294.00	4966.00	16.89	0.0570
	659.16	271.29	0.414	297.00	4829.25	16.28	0.0563
KETCH							
N0	598.69	233.35	0.391	278.00	5301.50	19.07	0.0439
N25	648.75	248.30	0.384	330.50	6045.75	18.43	0.0413
	623.72	240.82	0.387	304.25	5673.62	18.75	0.0426
STIRL							
N0	729.00	302.31	0.414	387.00	6839.25	17.84	0.0439
N25	639.38	257.29	0.402	304.25	6074.50	19.93	0.0423
	684.19	279.80	0.408	345.62	6456.88	18.88	0.0431
Trial means	655.69	263.97	0.403	315.63	5653.25	17.97	0.0473

TRIAL 86ME66

Effect of Flowering Date on Barley Yield.

AIMS

To assess the value of early maturity in barley across a range of environments and soil types.

INTRODUCTION

Trial results have indicated a possible advantage for earlier maturity of cereals in low rainfall zones. The application of early maturity across a range of rainfall zones and soil types is being examined.

TRIAL SITE Dryland's Research Station. Merredin.
(1). Heavy soil
(2). Medium soil

PAST HISTORY Pasture

SOIL TYPE Medium and heavy soil.

VARIETIES Ketch, IB 286, Stirling Barley. 50 kg/ha

SEEDING DATE Medium sown 5/6/86 and Heavy sown 30/5/86

CULTIVATION / FERTILIZATION / HERBICIDE
As for Cereal Variety Trial. Nitrogen application additional to basal fertilizer application

FUNGICIDE Baytan seed dressing Sowing 225 ppm

DESIGN Randomised block.

RESULTS and DISCUSSION

Seedling growth data for 3 barley varieties on two soil types are given in Tables 1 and 4. Machine harvested yield data are given in Tables 2,3,5 and 6. Yield component samples are yet to be processed.

Table 1: Effect of variety and nitrogen rate on seedling growth of barley - Merredin Medium land. Sampled 5/8/86

VAR/NRATE		PLANT NO /sqm	TILLER NO /sqm	DRY WT g/sqm	LEAF AREA INDEX	TILLER /PLANT	DWT PER PLANT g/pl
IB 286							
	NO	102.75	341.50	25.93	0.274	3.33	0.26
	N25	76.00	269.00	25.77	0.324	3.56	0.35
		89.38	305.25	25.85	0.299	3.45	0.30
KETCH							
	NO	96.50	306.75	32.51	0.358	3.16	0.36
	N25	108.25	408.25	39.46	0.374	3.73	0.36
		102.38	357.50	35.99	0.366	3.44	0.36
STIRL							
	NO	101.00	331.75	31.44	0.330	3.22	0.33
	N25	118.00	411.25	32.03	0.362	3.42	0.27
		109.50	371.50	31.73	0.346	3.32	0.30
Trial means		100.42	344.75	31.19	0.337	3.40	0.32

Table 2: Effect of variety on grain yield of barley (kg/ha). Mean of two nitrogen rates. Merredin Medium land

	Grain Yield (kg/ha)
IB 286	958 A
Ketch	809
Stirling	899 A
LSD (.05) =	82

Values with the same letter are not significantly different

Table 3: Effect of nitrogen rate on grain yield of barley (kg/ha). Mean of 3 varieties Merredin Medium land

	Grain Yield (kg/ha)
NO	752
N25	1025
LSD (.05) =	67

Values with the same letter are not significantly different

Table 4: Effect of variety and nitrogen rate on seedling growth of barley - Merredin Heavy land. Sampled 5/8/86

VAR/NRATE	PLANT NO /sqm	TILLER NO /sqm	DRY WT g/sqm	LEAF AREA INDEX	TILLER /PLANT	DWT PER PLANT g/pl
IB 286						
NO	82.00	381.75	87.87	1.708	4.72	1.07
N25	72.50	373.00	77.08	1.510	5.38	1.10
	77.25	377.38	82.47	1.609	5.05	1.08
KETCH						
NO	91.00	515.00	78.27	1.359	5.68	0.85
N25	104.25	571.75	87.64	1.520	5.44	0.80
	97.62	543.38	82.96	1.439	5.56	0.82
STIRL						
NO	105.50	641.50	79.48	1.799	6.10	0.75
N25	117.25	768.75	87.65	1.797	6.52	0.73
	111.38	705.12	83.57	1.798	6.31	0.74
Trial means	95.42	541.96	83.00	1.616	5.64	0.88

Table 5: Effect of variety on grain yield of barley (kg/ha). Mean of two nitrogen rates. Merredin Heavy land

	Grain Yield (kg/ha)
IB 286	2421 A
Ketch	2569 A
Stirling	2392 A

LSD (.05) = 263

Values with the same letter are not significantly different

Table 6: Effect of nitrogen rate on grain yield of barley (kg/ha). Mean of 3 varieties. Merredin Heavy land

	Grain Yield (kg/ha)
NO	2315
N25	2606

LSD (.05) = 215

Values with the same letter are not significantly different

TRIAL 86TS27

Effect of Flowering Date on Barley Yield.

AIMS

To assess the value of early maturity in barley across a range of environments and soil types.

INTRODUCTION

Trial results have indicated a possible advantage for eaelier maturity of cereals in low rainfall zones. The application of early maturity across a range of rainfall zones and soil types is being examined.

TRIAL SITE	North Eneabba.
PAST HISTORY	Lupin stubble
SOIL TYPE	White sand
VARIETIES	Ketch, IB 286, Stirling Barley. 50 kg/ha
SEEDING DATE	11/6/86

CULTIVATION / FERTILIZATION / HERBICIDE
As for Cereal Variety Trial. Nitrogen application additional to basal fertilizer application

FUNGICIDE	Baytan seed dressing Sowing 225 ppm
DESIGN	Randomised block.

RESULTS and DISCUSSION

Seedling growth data are summarized in Table 1. Machine harvested yield data are presented in Table 2 and 3. Yield component samples are yet to be processed.

Table 1: Effect of variety and nitrogen rate on seedling growth of barley - North Eneabba. Sampled 1/8/86

VAR/NRATE	PLANT NO /sqm	TILLER NO /sqm	DRY WT g/sqm	LEAF AREA INDEX	TILLER /PLANT	DWT PER PLANT g/pl
IB 286						
NO	72.25	346.75	64.38	1.178	5.01	0.93
N25	78.75	330.00	64.34	1.209	4.32	0.83
	75.50	338.38	64.36	1.193	4.67	0.88
KETCH						
NO	75.75	383.25	59.44	1.043	5.19	0.79
N25	94.25	533.00	78.30	1.555	5.73	0.84
	85.00	458.12	68.87	1.299	5.46	0.82
STIRL						
NO	95.50	503.75	54.52	0.891	5.66	0.61
N25	83.50	525.75	61.16	1.107	6.31	0.73
	89.50	514.75	57.84	0.999	5.99	0.67
Trial means	83.33	437.08	63.69	1.164	5.37	0.79

Table 2: Effect of variety on grain yield of barley (kg/ha). Mean of two nitrogen rates. North Eneabba.

	Grain Yield (kg/ha)
IB 286	2216
Ketch	1672 A
Stirling	1708 A
LSD (.05)	= 200

Values with the same letter are not significantly different

Table 3: Effect of nitrogen rate on grain yield of barley (kg/ha). Mean of 3 varieties

	Grain Yield (kg/ha)
NO	1882 A
N25	1848 A

LSD (.05) = 163

Values with the same letter are not significantly different

TRIAL 86WH37

Effect of Flowering Date on Barley Yield.

AIMS

To assess the value of early maturity in barley across a range of environments and soil types.

INTRODUCTION

Trial results have indicated a possible advantage for earlier maturity of cereals in low rainfall zones. The application of early maturity across a range of rainfall zones and soil types is being examined.

TRIAL SITE	Wongan Hills Research Station.
PAST HISTORY	Lupin stubble
SOIL TYPE	Wongan loamy sand.
VARIETIES	Ketch, IB 286, Stirling Barley. 50 kg/ha
SEEDING DATE	12/6/86
CULTIVATION	Single cultivation
FERTILIZATION	120 kg/ha superphosphate No. 1 50 kg/ha urea at sowing. Nitrogen application additional to basal fertilizer application
HERBICIDE	Roundup 600 ml/ha
FUNGICIDE	Baytan seed dressing Sowing 225 ppm
DESIGN	Randomised block.

RESULTS and DISCUSSION

Seedling growth data are given in Table 1. Machine harvested yield values are given in Tables 2 and 3. Yield component samples are yet to be processed.

Table 1: Effect of variety and nitrogen rate on seedling growth of barley - Wongan Hills. Sampled 6/8/86

VAR/NRATE		PLANT NO /sqm	TILLER NO /sqm	DRY WT g/sqm	LEAF AREA INDEX	TILLER /PLANT	DWT PER PLANT g/pl
IB 286							
	NO	77.50	223.75	24.61	0.406	3.05	0.34
	N25	86.00	228.75	25.47	0.436	2.69	0.30
		81.75	226.25	25.04	0.421	2.87	0.32
KETCH							
	NO	113.50	275.50	21.02	0.305	2.47	0.19
	N25	86.00	247.00	17.70	0.275	2.94	0.21
		99.75	261.25	19.36	0.290	2.70	0.20
STIRL							
	NO	127.50	351.25	24.34	0.403	2.83	0.21
	N25	138.25	333.75	22.04	0.350	2.46	0.16
		132.88	342.50	23.19	0.376	2.65	0.19
Trial means		104.79	276.67	22.53	0.363	2.74	0.24

Table 2: Effect of variety on grain yield of barley (kg/ha). Mean of two nitrogen rates. Wongan Hills.

	Grain Yield (kg/ha)
IB 286	3048
Ketch	2323 A
Stirling	2332 A
LSD (.05)	= 182

Values with the same letter are not significantly different

Table 3: Effect of nitrogen rate on grain yield of barley (kg/ha). Mean of 3 varieties. Wongan Hills.

	Grain Yield (kg/ha)
NO	2275
N25	2860

LSD (.05) = 149

Values with the same letter are not significantly different

TRIAL 86C57

Effect of Soil Moisture Supply on Growth of Normal and Reduced Branching Lupins

AIMS

To determine the effect of soil moisture supply on growth and yield of normal and reduced branching lupins. To determine the partitioning of dry matter and grain yield in lupins under different yield levels.

INTRODUCTION

Current lupin varieties produce yields below theoretical expectations for both low and high rainfall regions. This may be due to the growth pattern of the lupin plant, with branching continuing until the onset of water or temperature stress. Reduced branching lupins, with genetic branching control may produce higher yields under both situations due to a more efficient growth pattern.

TRIAL SITE	Carson's Binnu.
PAST HISTORY	Wheat stubble.
SOIL TYPE	Yellow sandplain
VARIETIES	Illyarrie, Danja, 75A330.
SEEDING DATE	Sown 19/5/86 Target density 50 plants/sqm.
CULTIVATION	Direct drill with culti-trash.
FERTILIZER	Superphosphate Cu,Zn,Mo #1 @ sowing 210 kg/ha Potash @ sowing 100 kg/ha
HERBICIDE	Sprayseed Pre-sowing 2l/ha Simazine Sowing 1.5l/ha Fusilade 7/7 0.5l/ha Simazine 28/7 1.0l/ha (double-gee control)
DESIGN	3 Sites; Randomised block

RESULTS and DISCUSSION

A detailed trial comparing growth and yield of 3 lupin varieties was conducted at 3 sites within the same paddock. The soil was a deep sand over clay ("Lake Country"). The sites were at different positions up the slope, so that the wet site was some 0.6m above the clay, the medium site some 2m and the dry site >4m. In this way the crops would have different moisture relations through the growing season. Only the dry site was monitored for water use by neutron tubes; water supply was virtually unlimited for the other sites. The wet site was abandoned due to flooding. Mini-plot irrigation treatments (3.4 sqm.) were imposed at the dry site; this treatment received approximately 175 mm water. Results are reported for the medium and dry sites and the watered treatment.

Data were obtained on the growth of crops every 2 weeks, but only last harvest is reported here. Table 1 gives the growth, yield and yield components of Illyarrie (recommended variety) Danja (released 1986) and 75A330 (an advanced reduced branching line).

The responses of all the growth and yield components to differing moisture supply are too numerous and varied to be summarized here. Brief summaries of some responses only are given.

Dry and medium site data: Table 1 shows that biological yield increased markedly with more available water from 903 to 1264 g/m2 (40%) and the varieties behaved similarly. For seed yield the increase was less marked, (from 324 to 395 g/m2 (22%), and there was a marked difference between the varieties. Illyarrie only showed a yield improvement of 15% over the dry environment yield, whereas Danja improved 23% and 75A330 (the reduced branching line) had a yield increase of 35%, similar to its improvement in Biological Yield. The branched types had fewer pods and seeds/pod, but larger seeds than the reduced branching type. The amount of water available affected pods/m2 much more than either seeds/pod or seed weight. The H.I. was less at the medium site than at the dry site for all varieties. The data illustrate 2 things: Firstly the yield improvement with newer varieties has come primarily from an improved H.I. as a greater proportion of growth is going into grain. There is no indictation that there has been any change in Total growth. Secondly the results show that the reduced branching types are highly responsive to improved environments. This is in general agreement with the result of Hamblin et al (1986).

Dry site and watered plot data: The effect of irrigation on dry matter production was similar to the effect of sowing at the medium site. However, the effect of watering on seed yield and yield components was more complicated than for the site comparison. For example, yield of Danja seemed to respond less to watering because this cultivar could not fill the many additional pods formed in response to watering. Individual responses are being examined in more detail and will be reported in a Technical Report later.

At the dry site all plots contained neutron tubes and the water use efficiency of the two growth habits was examined. The results are given in Table 9. No account was taken for deep drainage, however, it is not likely that differential drainage occur between types. The results show that the total water used was identical, as was total growth (Table 1). The genotypes distinct differ in water use efficiency for total growth. The difference in WUE for grain yield was related to the improved yield of the reduced branching type and not to differences in water uptake.

Table 1: Yields in g/m2, HI and Yield Components

Site	Variety	Biol Yield	Seed Yield	Harvest Index	Pods /sqm	Seeds /pod	Wt / Seed g
Dry	Illyarrie	918	307	0.33	563	3.6	0.150
	Danja	893	310	0.35	523	3.6	0.164
	75A330	898	355	0.40	725	3.8	0.128
	mean	903	324	0.36	604	3.7	0.147
Medium	Illyarrie	1259	353	0.28	575	3.7	0.165
	Danja	1295	382	0.29	680	3.3	0.169
	75A330	1237	451	0.36	892	3.8	0.132
	mean	1264	395	0.31	746	3.6	0.155
Water	Illyarrie	1191	402	0.34	569	3.7	0.189
	Danja	1338	384	0.29	716	3.0	0.179
	75A330	1174	484	0.41	859	3.7	0.151
	mean	1234	423	0.35	715	3.5	0.173

Table 2: Medium as % dry

Site	Variety	Biol Yield	Seed Yield	Harvest Index	Pods /sqm	Seeds /pod	Wt / Seed g
	Illyarrie	137	115	.85	102	103	110
	Danja	145	123	.83	130	92	103
	75A330	138	135	.90	123	100	103
	mean	140	122	.86	124	97	105

Table 3: Water as % dry

Site	Variety	Biol Yield	Seed Yield	Harvest Index	Pods /sqm	Seeds /pod	Wt / Seed g
	Illyarrie	130	131	103	101	103	126
	Danja	150	124	83	137	84	109
	75A330	131	136	102	118	97	118
	mean	137	130	96	119	95	118

Table 4: Total dry weight partitioning between branch levels (%)
1 B = Primary branch; 2 B = Secondary branch
3 B = Tertiary branch; 4 B = Quaternary branch

Site	Variety	Main Stem	1 B	2 B	3 B	4 B	Basal Branch	Leaf Drop
Dry	Illyarrie	39	42	6			1	12
	Danja	41	42	5				12
	75A330	50	38	2			1	9
	mean	43	41	4			1	11
Medium	Illyarrie	24	27	26	8	1	2	12
	Danja	24	30	24	10	1	1	10
	75A330	38	39	11			2	10
	mean	29	32	20	6	1	2	11
Water	Illyarrie	29	42	18	2		1	9
	Danja	31	43	14	2		1	10
	75A330	40	45	7	1		1	7
	mean	33	43	13	2		1	9

Table 5: Seed yield partitioning between branch levels (%)

Site	Variety	Main Stem	1 B	2 B	3 B	4 B	Basal Branch	Leaf Drop
Dry	Illyarrie	36	54	5			1	4
	Danja	37	55	5			1	2
	75A330	49	46	1			1	3
	mean	41	52	4			1	3
Medium	Illyarrie	18	32	33	12		2	3
	Danja	18	34	29	13	2		4
	75A330	34	50	12			2	2
	mean	23	39	25	12	1	1	3
Water	Illyarrie	25	54	18	1			2
	Danja	35	48	14	1		1	1
	75A330	39	53	6			1	1
	mean	33	52	13	1		1	1

Table 6: Pod number partitioning between branch levels (%)

Site	Variety	Main Stem	1 B	2 B	3 B	4 B	Basal Branch	Leaf Drop
Dry	Illyarrie	32	54	8			1	5
	Danja	32	50	8			1	3
	75A330	45	48	3			1	3
	mean	36	51	6			1	4
Medium	Illyarrie	12	31	34	12	1	1	4
	Danja	15	32	31	16	2		4
	75A330	33	47	16			2	2
	mean	20	37	27	9	1	1	3
Water	Illyarrie	24	50	21	1		1	4
	Danja	28	51	17	1		1	2
	75A330	34	55	7	1		1	3
	mean	29	52	15	1		1	3

Table 7: Seed number partitioning between branch levels (%)

Site	Variety	Main Stem	1 B	2 B	3 B	4 B	Basal Branch	Leaf Drop
Dry	Illyarrie	32	57	6			1	4
	Danja	34	58	6				2
	75A330	47	48	2			1	2
	mean	38	54	5			1	3
Medium	Illyarrie	17	31	34	14		1	3
	Danja	12	32	30	15	2		4
	75A330	32	50	15			2	1
	mean	20	38	26	10	1	1	3
Water	Illyarrie	22	57	18	1			2
	Danja	35	48	15	1		1	1
	75A330	37	55	6			1	1
	mean	31	53	13	1		1	1

Table 8: Stem weight partitioning between branch levels (%)
Stem weight is the weight of actual stem material and attached petioles only.

Site	Variety	Main Stem	1 B	2 B	3 B	4 B	Basal Branch	Leaf Drop
Dry	Illyarrie	45	27	7			1	20
	Danja	45	26	5				24
	75A330	52	26	2			1	19
	mean	47	26	5			1	21
Medium	Illyarrie	30	24	19	6		1	20
	Danja	32	26	20	6		1	15
	75A330	37	32	7			2	22
	mean	27	27	15	4		1	19
Water	Illyarrie	34	29	16	3		1	16
	Danja	38	29	14	3		2	15
	75A330	43	29	8	2		2	16
	mean	38	29	13	3		2	16

Table 9: Water use efficiency

	Variety Illyarrie	Danja	75A330
Initial soil water (S)mm	238	236	238
Final soil water (S)mm	152	153	157
	86	83	81
Rainfall 19/5-29/10 mm	334	334	334
Total water use	420	417	415
Water use efficiency BY	22.0	21.2	21.6
GY	7.3	7.4	8.5

Hamblin, J.; Delane, R.; Bishop, A. and Gladstones, J.S. (1986) Yield potential of reduced branching lupins (*Lupinus angustifolius*) on sandy soils in a short season environment. Aust. J. Agric. Res. 37, 611-620

TRIAL 86C72

Effect of Seeding Date and Seeding Rate on Lupin Growth and Yield.

AIMS

To determine the seeding date and seeding rate response for normal and reduced branching lupins.

INTRODUCTION

There are marked optima for both sowing date and sowing rate of lupins. The date*rate response for reduced branching lupins may differ from that of normal lupin types.

TRIAL SITE ECRS

PAST HISTORY Barley stubble

SOIL TYPE Yellow sandplain

VARIETIES Illyarrie, 75A39-119
Dry (9/5/86), Break (21/5/86), Break + 2 weeks (9/6/86), Break + 4 weeks, (19/6/86).
20, 40, 60, 80, 100 plants/m2

CULTIVATION Direct drill with cultitrash.

FERTILIZER Superphosphate 200 kg/ha

HERBICIDE Roundup 8/5 1.5l/ha
Sprayseed Pre-sowing 2l/ha
Simazine Sowing 1.5l/ha
Fusilade Wetting Agent 9/6 500ml/ha
Fusilade 3/7 0.5l/ha

DESIGN Split plot. Dates * (Variety * Rates)

RESULTS AND DISCUSSION

Plant stand was lowest for the dry sowing treatment. Despite adjustments for varietal seed size and % germination the reduced branching line (75A39-119) had higher mean plant stand than Illyarrie - 57 vs 49 plants/sqm. Plant stand at anthesis was closely related to sowing rate (pl/sqm) - R squared =0.81 for both varieties. Stands were generally lower than the target stand for the higher sowing rates. Mean anthesis dry matter levels were lower for the two early sowings (mean =164 g/m2) compared with the two later sowings (mean =192 g/m2).

Dry weight, seed yield and harvest index (HI) of 40 single plants per plot was also determined. This data is being processed and will help determine the inter-plant variability in HI, potential HI, and effect of seeding rate, sowing and plant type an HI variation in lupins. Results will be available later in 1987.

Table 1: Effect of sowing date, plant type and sowing rate on stand density, anthesis dry weight and seed yield (m/h) of lupins.

	-------Anthesis-------			
	PLANTS /SQM	DRY WT G/SQM	DRY WT G/PLANT	G.Y. KG/HA
DRY (9/5/86)				
119				
S 20	16.00	38.82	2.39	1406.40
S 40	35.00	103.47	3.24	2101.73
S 60	45.67	92.56	2.01	2077.60
S 80	62.33	126.86	2.05	2083.93
S100	73.00	144.74	1.97	2139.50
	46.40	101.29	2.33	1961.83
ILL				
S 20	15.67	57.39	3.76	1472.00
S 40	21.67	74.25	3.33	1687.87
S 60	45.00	91.53	2.08	1788.80
S 80	49.33	113.85	2.27	2027.57
S100	61.67	137.61	2.28	2033.63
	38.67	94.93	2.74	1801.97
	42.53	98.11	2.54	1881.90
BREAK (21/5/86)				
119				
S 20	38.67	136.60	3.42	1232.27
S 40	35.33	121.13	3.43	1565.30
S 60	48.00	152.61	3.17	1917.53
S 80	70.67	180.52	2.54	1688.17
S100	74.33	213.51	2.90	1947.70
	53.40	160.87	3.09	1670.19
ILL				
S 20	21.00	102.38	4.88	1291.10
S 40	37.00	142.84	3.85	1548.50
S 60	47.00	177.71	3.74	1828.07
S 80	53.00	181.83	3.51	1936.27
S100	74.00	245.68	3.35	1628.17
	46.40	170.09	3.86	1646.42
	49.90	165.48	3.48	1658.31

BRK+2WKS (9/6/86)				
119				
S 20	25.00	105.63	4.32	637.33
S 40	38.67	134.73	3.46	844.00
S 60	70.67	223.80	3.12	1142.93
S 80	82.33	261.07	3.19	1177.33
S100	94.00	247.87	2.63	1223.73
	62.13	194.62	3.34	1005.07
ILL				
S 20	27.67	149.13	5.33	768.53
S 40	40.33	204.63	6.12	779.73
S 60	60.67	215.77	3.56	998.67
S 80	65.33	161.03	2.47	1087.47
S100	79.33	253.63	3.19	1057.87
	54.67	196.84	4.13	938.45
	58.40	195.73	3.74	971.76
BRK+4WKS (19/6/86)				
119				
S 20	29.00	159.73	5.46	495.47
S 40	35.67	132.33	3.66	664.80
S 60	66.00	218.60	3.37	897.07
S 80	84.67	213.07	2.54	983.20
S100	115.00	249.80	2.21	900.80
	66.07	194.71	3.45	788.27
ILL				
S 20	20.67	113.63	5.56	512.27
S 40	24.00	111.73	4.61	599.47
S 60	61.67	202.17	3.32	869.33
S 80	82.00	243.57	2.98	776.80
S100	76.67	237.00	3.06	898.40
	53.00	181.62	3.91	731.25
	59.53	188.16	3.67	759.76
*** Trial means ***	52.59	161.87	3.36	1317.93

Table 2: Effect of sowing rate and plant type on stand density, anthesis dry weight and seed yield (m/h) of lupins.

	-------Anthesis-------			
	PLANTS /SQM	DRY WT G/SQM	DRY WT G/PLANT	G.Y. KG/HA
S 20				
119	27.17	110.20	3.90	942.87
ILL	21.25	105.64	4.88	1010.98
	24.21	107.92	4.39	976.92
S 40				
119	36.17	122.92	3.45	1293.96
ILL	30.75	133.36	4.48	1153.89
	33.46	128.14	3.96	1223.92
S 60				
119	57.58	171.89	2.92	1508.78
ILL	53.58	171.79	3.17	1371.22
	55.58	171.84	3.05	1440.00
S 80				
119	75.00	195.38	2.58	1483.16
ILL	62.42	175.07	2.81	1457.03
	68.71	185.22	2.69	1470.09
S100				
119	89.08	213.98	2.43	1552.93
ILL	72.92	218.48	2.97	1404.52
	81.00	216.23	2.70	1478.73
*** Trial means ***	52.59	161.87	3.36	1317.93

Table 3: Effect of plant type and sowing date on stand density, anthesis dry weight and seed yield (m/h) of lupins.

	-------Anthesis-------			
	PLANTS /SQM	DRY WT G/SQM	DRY WT G/PLANT	G.Y. KG/HA
119				
DRY	46.40	101.29	2.33	1961.83
BREAK	53.40	160.87	3.09	1670.19
BREAK+2WKS	62.13	194.62	3.34	1005.07
BREAK+4WKS	66.07	194.71	3.45	788.27
ILL				
DRY	42.53	98.11	2.54	1881.90
BREAK	46.40	170.09	3.86	1646.42
BREAK+2WKS	54.67	196.84	4.13	938.45
BREAK+4WKS	53.00	181.62	3.91	731.25
*** Trial means ***	52.59	161.87	3.36	1317.93

Table 4: Effect of sowing date on stand density, anthesis dry weight and seed yield (m/h) of lupins.

	PLANTS /SQM	Anthesis DRY WT G/SQM	Anthesis DRY WT G/PLANT	G.Y. KG/HA
DRY	42.53	98.11	2.54	1881.90
BREAK	49.90	165.48	3.48	1658.31
BREAK+2WKS	58.40	195.73	3.74	971.76
BREAK+4WKS	59.53	188.16	3.67	759.76
*** Trial means ***	52.59	161.87	3.36	1317.93

TRAIL 86C97

Chemical Control of Lupin Branching.

AIMS

To determine whether chemical control of lupin branching increases grain yields in high production situations. To further understand the influence of branching on yield determination in lupins.

INTRODUCTION

A new growth hormone PP 333 (ICI) offers potential for chemical control of lupin branching. The influence of both genetic and chemical control of branching on lupin growth and yield will be examined at a site promoting excessive vegetative growth (Wet Site) and a freely drained site.

TRIAL SITE	Carson's, Binnu. Wet and Dry Sites. Also at Katanning (J.Warren), Esperance (F.Hannon)
PAST HISTORY	Wheat stubble
SOIL TYPE	Sandplain
VARIETIES	Illyarrie (Farmer's crop)
SEEDING DATE	19/05/86 100 kg/ha
CULTIVATION	Direct drill with culti-trash.
FERTILIZER	Superphosphate Cu,Zn,Mo#1 Sowing 19/5 100 kg/ha
HERBICIDE	Sprayseed Pre-sowing 2l/ha Simazine sowing 1.5l/ha Fusilade Post-emergance 0.5l/ha PP-333 28/7 - BB 0.25 0.5l/ha PP-333 13/8 - FLO 0.25 0.5l/ha
DESIGN	Randomised block. 2m buffers between plots

RESULTS and DISCUSSION

The results of the Binnu trials only are reported here. Application of 0.5 l/ha PP-333 was the only treatment causing detectable reductions in branch length (Table 1). Application of PP-333 reduced seed yield, the effect being greater the higher the rate, and the earlier the application (Table 2). Hormone application reduced growth at the wet site, but had no effect on seed yield (Table 3 and 4).

Table 1: Effect of PP-333 growth hormone on primary branch length of Illyarrie lupins at a free-draining site, Binnu.

	-----Chemical rate and application time-----				
	NIL	Big Bud 0.25l/ha	Big Bud 0.5l/ha	Flower -ing 0.25l/ha	Flower -ing 0.5l/ha
Plants/sqm	46.50	37.50	44.75	44.50	42.75
Branch length (cm)					
B1	29.75	29.55	26.00	27.80	27.65
B2	30.75	32.25	27.75	30.35	30.30
B3	28.70	29.15	25.40	28.65	28.90
B4	20.70	21.50	17.40	21.10	22.55
B5	15.50	16.50	12.55	16.90	18.00
B6	8.90	10.00	7.70	10.65	12.80
B7	6.70	7.70	6.35	7.75	10.00
MS-BASE #	39.35	37.80	35.35	38.25	42.05
MS-TOP ##	55.90	58.30	54.55	56.15	58.15

Length of main stem to bottom of main inflorescence
Length of main stem to top of main inflorescence

Table 2: Effect of PP-333 growth hormone on dry matter partition of Illyarrie lupins at a free-draining site, Binnu.

	-----Chemical rate and application time-----				
	NIL	Big Bud 0.25l/ha	Big Bud 0.5l/ha	Flower -ing 0.25l/ha	Flower -ing 0.5l/ha
Dry matter partition (g/sqm)					
MS	240.70	169.90	205.20	217.35	235.52
B1	262.30	214.48	191.10	260.63	244.80
B2	96.70	59.95	107.80	120.02	101.48
BASAL	10.75	35.50	30.15	24.15	41.92
MS PODS	18.52	26.05	32.52	20.35	14.12
B1 PODS	2.37	3.15	4.15	4.15	5.2
TOT DWT	631.32	508.98	646.63	646.62	643.02

MS = Main stem; B1 = Primary branch; B2 = Secondary branch

Table 3: Effect of PP-333 growth hormone on grain yield of Illyarrie lupins at a free draining site (kg/ha), Binnu.

			Grain Yield (kg/ha)
Control			1515 C
Big bud	0.25 l/ha	BB 0.25	1392 AB
Big bud	0.50 l/ha	BB 0.5	1293 A
Flowering	0.25 l/ha	BB 0.25	1432 BC
Flowering	0.50 l/ha	FL 0.25	1346 AB

Values with the same letter are not significantly different

Table 4: Effect of PP-333 growth hormone on growth of Illyarrie lupins at a high water-table site (kg/ha), Binnu.

	-----Chemical rate and application time-----				
	NIL	Big Bud 0.251/ha	Big Bud 0.51/ha	Flower -ing 0.251/ha	Flower -ing 0.51/ha
Plants/sqm	26.00	27.25	32.25	29.75	28.00
Tot. Dwt. (g/sqm)	749.30	553.35	648.40	552.42	577.25
Dwt/plant	28.87	20.32	20.42	19.45	21.58

Table 5: Effect of PP-333 growth hormone on grain yield of Illyarrie lupins at a high water table site (kg/ha).

			Grain Yield (kg/ha)
Control			2167 A
Big bud	0.25 l/ha	BB 0.25	2108 A
Big bud	0.50 l/ha	BB 0.5	2119 A
Flowering	0.25 l/ha	FL 0.25	2030 A
Flowering	0.50 l/ha	FL 0.5	2051 A

Values with the same letter are not significantly different

TRIAL 86C61

Effect of Controlled Tillering on Growth and Water Use of Wheat.

AIMS

To determine the growth, tillering and water use, and yield of wheat lines differing in tillering capacity.

INTRODUCTION

Current commercial wheat varieties produce many tillers which do not survive to produce viable heads. Controlled tillering offers potential for increasing cereal yields in low rainfall regions by 10-20%, particularly on soils of good water-holding capacity. Limited soil moisture reserves will be utilised more efficiently giving higher and more stable yields.

TRIAL SITE	Critch, Tenindewa
PAST HISTORY	Pasture (barrel medic).
SOIL TYPE	Red loam (deep).
VARIETIES	Bodallin 81W28-139 low tillering(oligoculm/Bodallin cross) 81W28-44 normal tillering(oligoculm/Bodallin cross) Kau low tillering(recurrent backcross to Kite) Kam normal tillering(recurrent backcross to Kite)
SEEDING DATE	30/5/86 Target density 120plant/sqm
CULTIVATION	Scarified
FERTILIZER	Superphosphate 150 kg/ha Agran 34:0 Sowing 0,25 kgN/ha
HERBICIDE	Sprayseed Pre-sowing 21/ha Tribunil 9/7 1.7 kg/ha (double-gee control) Isoproturon 18/7 21/ha (barley grass control)
DESIGN	Randomised block.

RESULTS and DISCUSSION

Rain-free conditions prevailed for 5 weeks after sowing, when 100 mm rainfall was received. The long period of dry weather followed by heavy rainfall has resulted in both poor establishment and grass weed problems at this site. Adequate weed control was later achieved, limited sampling conducted, and seed stocks multiplied. However, due to the poor establishment, detailed measurements of growth, tillering, crop water use, water relations and yield partitioning could not be conducted confidently on these trials. Sampling was only conducted at maturity, and results must be treated with caution. There were no genotypic effects on dry matter yield or grain yield (mean 2.6 t/ha). However, preliminary analysis of soil water data indicates that Kau used less water than Kam, its high tillering sister-line, giving a higher grain water use efficiency.

TRIAL WEUNI

Effect of Tillering Pattern and Sowing Rate on Growth and Yield of Wheat - Plant Breeders' Trial

AIMS

To determine the effect of sowing rate on growth, tillering and yield components of wheat lines differing in tillering capacity.

INTRODUCTION

Current commercial wheat varieties produce many tillers which do not survive to produce viable heads. Controlled tillering offers potential for increasing cereal yields in low rainfall regions by 10-20%, particularly on soils of good water-holding capacity. Limited soil moisture reserves will be utilised more efficiently giving higher and more stable yields.

TRIAL SITE CRS and MRS
(Breeders trials also sown at ECRS, and WHRS).

PAST HISTORY Pasture

SOIL TYPE CRS - Red sandy loam.
MRS - Red-brown sandy clay loam

VARIETIES 6 standard varieties
35 breeding lines differing in tillering

SEEDING DATE CRS 28/5/86. MRS 26/5/86

CULTIVATION/FERTILIZER/HERBICIDE As for Breeders' Trials

DESIGN Randomised block.

RESULTS and DISCUSSION

WEUNI trials conducted by the Wheat Breeding Programme were sampled at Chapman and Merredin Research Stations. Samples were taken at estimated peak tillering for normal tillering varieties (4/8/86 at MRS and 11/8/86 at CRS). Plant density, tiller number and dry matter production were determined. At maturity, dry matter production, grain yield and yield components were measured. The plots were also harvested by machine.

Summarized genotype and sowing rate responses are given below. Combined analysis of trials over two years by the Wheat Breeding Programme and myself will be presented in detail later.

TRIAL 86C62

Low Tillering Genotype Assessment.

AIMS

To assess the yield potential of low tillering lines compared with current varieties recommended for low rainfall zones.

INTRODUCTION

Current commercial wheat varieties produce many tillers which would do not survive to produce viable heads. Controlled tillering offers potential for increasing cereal yields in low rainfall regions by 10-20%, particularly on soils of good water-holding capacity. Limited soil moisture reserves will be utilised more efficiently giving higher and more stable yields.

TRIAL SITE	Critch, Tenindewa
PAST HISTORY	Pasture (barrel medic)
SOIL TYPE	Red loam (deep)
VARIETIES	50 lines differing in tillering capacity. Set of standard varieties
SEEDING DATE	30/5/86 50 kg/ha
CULTIVATION	Scarified
FERTILIZER	Superphosphate 150 kg/ha
HERBICIDE	Sprayseed Pre-sowing 21/ha Tribunil 9/7 1.7 kg/ha (double-gee control) Isoproturon 18/7 21/ha (barley grass control)
DESIGN	Randomised block

RESULTS and DISCUSSION

Rain-free conditions prevailed for 5 weeks after sowing, when 100 mm rainfall was received. The long period of dry weather followed by heavy rainfall has resulted in both poor establishment and grass weed problems at this site. Adequate weed control was later achieved, and seed stocks multiplied. However, due to the poor establishment, results must be treated with caution.

Forty two breeding lines and eight commercial varieties were tested. Establishment ratings ranged from 20% to 100% of normal stand density. Grain yield varied in the range 1.07 to 3.80 tonne/ha; Fourteen lines and five varieties yielded above 2.70 tonne/ha. All breeding lines from the W.A. Department of Agriculture programme yielded above 2.85 tonne/ha and ranked in the 16 highest yielding genotypes. Most of the high yielding breeding lines were identified in 1985 as low tillering types. Short - statured "uniculm" lines, with marked gigas characteristics generally had low plant density, and low yields.

WEUNI - CHAPMAN RESEARCH STATION

TILLERS/SQM

GRAND MEAN 462.9

LINE

.81W28-1	.81W28-1	.81W28-1	.81W28-1	.81W28-4	.81W28-4	.81W29-1	.81W29-2	.81W30-1	.81W30-1	.81W30-1
438.9	377.2	512.8	426.1	477.2	403.9	348.9	476.7	545.0	503.9	460.0

.81W30-1	.81W30-1	.81W30-1	.81W30-2	.81W30-3	.81W30-6	.81W30-6	.81W30-7	.81W30-7	.81W30-8	.81W30-8
344.4	520.6	490.0	442.2	445.4	410.0	491.7	532.2	508.9	364.4	467.2

.81W30-9	.81W31-1	.81W31-1	.81W31-1	.81W31-1	.81W31-1	.81W31-2	.81W31-2	.81W31-2	.81W31-2	.81W31-2
461.1	457.8	465.6	473.3	361.7	427.8	392.2	434.4	428.3	431.7	491.1

.81W31-9	.81W31-9	BODALLIN	GAMENYA	HALBERD	KULIN	MILING	TINCURRIN
468.3	401.7	538.9	556.7	546.7	421.7	772.8	457.8

SRATE

40KG	80KG	120KG
383.2	460.7	544.7

HARVEST DWT/SQM

GRAND MEAN 762.4

LINE

.81W28-1	.81W28-1	.81W28-1	.81W28-1	.81W28-4	.81W28-4	.81W29-1	.81W29-2	.81W30-1	.81W30-1	.81W30-1
829.0	779.5	771.8	801.2	722.7	732.3	816.3	709.7	694.7	844.2	694.7

.81W30-1	.81W30-1	.81W30-1	.81W30-2	.81W30-3	.81W30-6	.81W30-6	.81W30-7	.81W30-7	.81W30-8	.81W30-8
843.7	762.6	846.5	813.0	780.1	690.3	782.1	737.9	802.2	676.8	776.4

.81W30-9	.81W31-1	.81W31-1	.81W31-1	.81W31-1	.81W31-1	.81W31-2	.81W31-2	.81W31-2	.81W31-2	.81W31-2
740.5	700.9	736.2	723.3	682.3	844.6	717.2	650.0	784.4	798.6	752.9

.81W31-9	.81W31-9	BODALLIN	GAMENYA	HALBERD	KULIN	MILING	TINCURRIN
679.3	833.6	852.4	771.9	682.6	835.8	790.3	773.7

SRATE

40KG	80KG	120KG
745.3	758.2	783.6

HARVEST GWT/SQM

GRAND MEAN 290.6

.81W28-1	.81W28-1	.81W28-1	.81W28-1	.81W28-4	.81W28-4	.81W29-1	.81W29-2	.81W30-1	.81W30-1	.81W30-1
289.4	307.1	279.5	291.7	292.9	304.4	307.6	285.0	244.7	302.3	280.6
.81W30-1	.81W30-1	.81W30-1	.81W30-2	.81W30-3	.81W30-6	.81W30-6	.81W30-7	.81W30-7	.81W30-8	.81W30-8
308.3	269.5	327.5	291.8	287.0	277.1	294.8	290.8	305.5	243.2	287.6
.81W30-9	.81W31-1	.81W31-1	.81W31-1	.81W31-1	.81W31-1	.81W31-2	.81W31-2	.81W31-2	.81W31-2	.81W31-2
291.4	290.1	267.4	277.2	264.9	300.8	287.4	281.1	312.1	296.9	305.6
.81W31-9	.81W31-9	BODALLIN	GAMENYA	HALBERD	KULIN	MILING	TINCURRIN			
252.0	317.7	315.4	295.5	271.8	288.3	324.9	305.3			

SRATE

40KG	80KG	120KG
289.1	287.7	295.0

HARVEST INDEX

GRAND MEAN 0.3856

LINE

.81W28-1	.81W28-1	.81W28-1	.81W28-1	.81W28-4	.81W28-4	.81W29-1	.81W29-2	.81W30-1	.81W30-1	.81W30-1
0.3569	0.3968	0.3719	0.3718	0.4057	0.4190	0.3886	0.4010	0.3683	0.3661	0.4069
.81W30-1	.81W30-1	.81W30-1	.81W30-2	.81W30-3	.81W30-6	.81W30-6	.81W30-7	.81W30-7	.81W30-8	.81W30-8
0.3662	0.3616	0.3900	0.3683	0.3660	0.4042	0.3764	0.3971	0.3802	0.3590	0.3811
.81W30-9	.81W31-1	.81W31-1	.81W31-1	.81W31-1	.81W31-1	.81W31-2	.81W31-2	.81W31-2	.81W31-2	.81W31-2
0.4007	0.4132	0.3642	0.3876	0.3874	0.3569	0.4013	0.4307	0.4004	0.3751	0.4044
.81W31-9	.81W31-9	BODALLIN	GAMENYA	HALBERD	KULIN	MILING	TINCURRIN			
0.3794	0.3868	0.3710	0.3811	0.3973	0.3591	0.4121	0.3974			

SRATE

40KG	80KG	120KG
0.3908	0.3849	0.3810

HEADS/SQM

GRAND MEAN 330.4

LINE

.81W28-1	.81W28-1	.81W28-1	.81W28-1	.81W28-4	.81W28-4	.81W29-1	.81W29-2	.81W30-1	.81W30-1	.81W30-1
368.3	383.3	327.2	339.4	288.3	272.8	288.3	292.2	261.1	350.6	321.7
.81W30-1	.81W30-1	.81W30-1	.81W30-2	.81W30-3	.81W30-6	.81W30-6	.81W30-7	.81W30-7	.81W30-8	.81W30-8
396.1	299.4	382.2	343.3	373.9	343.3	407.8	323.9	377.8	356.7	318.3
.81W30-9	.81W31-1	.81W31-1	.81W31-1	.81W31-1	.81W31-1	.81W31-2	.81W31-2	.81W31-2	.81W31-2	.81W31-2
267.2	264.4	362.2	328.3	303.3	418.9	329.4	214.4	332.8	335.0	328.9
.81W31-9	.81W31-9	BODALLIN	GAMENYA	HALBERD	KULIN	MILING	TINCURRIN			
271.7	362.2	360.0	320.0	291.1	336.1	347.8	357.8			

SRATE

40KG	80KG	120KG
323.5	333.1	334.6

SEEDS/HEAD

GRAND MEAN 25.90

LINE

.81W28-1	.81W28-1	.81W28-1	.81W28-1	.81W28-4	.81W28-4	.81W29-1	.81W29-2	.81W30-1	.81W30-1	.81W30-1
22.28	22.64	27.28	25.97	26.26	32.31	28.62	31.39	35.38	25.94	28.04
.81W30-1	.81W30-1	.81W30-1	.81W30-2	.81W30-3	.81W30-6	.81W30-6	.81W30-7	.81W30-7	.81W30-8	.81W30-8
20.80	25.18	22.50	25.90	21.08	28.05	19.10	24.67	23.57	19.10	25.76
.81W30-9	.81W31-1	.81W31-1	.81W31-1	.81W31-1	.81W31-1	.81W31-2	.81W31-2	.81W31-2	.81W31-2	.81W31-2
33.29	27.84	22.68	24.42	26.48	19.87	22.69	33.42	27.43	24.79	23.27
.81W31-9	.81W31-9	BODALLIN	GAMENYA	HALBERD	KULIN	MILING	TINCURRIN			
30.80	28.72	21.52	25.12	25.04	28.88	26.70	27.04			

SRATE

40KG	80KG	120KG
26.26	26.52	24.92

WT/SEED

GRAND MEAN 0.03857

LINE

.81W28-1	.81W28-1	.81W28-1	.81W28-1	.81W28-4	.81W28-4	.81W29-1	.81W29-2	.81W30-1	.81W30-1	.81W30-1
0.03877	0.03800	0.03511	0.03630	0.03928	0.03672	0.03911	0.03829	0.03537	0.03533	0.03637

.81W30-1	.81W30-1	.81W30-1	.81W30-2	.81W30-3	.81W30-6	.81W30-6	.81W30-7	.81W30-7	.81W30-8	.81W30-8
0.04023	0.03994	0.04080	0.03783	0.04039	0.03499	0.04047	0.04105	0.03679	0.03830	0.03888

.81W30-9	.81W31-1	.81W31-1	.81W31-1	.81W31-1	.81W31-1	.81W31-2	.81W31-2	.81W31-2	.81W31-2	.81W31-2
0.03632	0.03885	0.04204	0.04136	0.03860	0.04077	0.03828	0.03871	0.03794	0.03956	0.04323

.81W31-9	.81W31-9	BODALLIN	GAMENYA	HALBERD	KULIN	MILING	TINCURRIN
0.03323	0.03741	0.04454	0.04001	0.03866	0.03552	0.03910	0.03904

SRATE

40KG	80KG	120KG
0.03872	0.03745	0.03955

MERREDIN RESEARCH STATION

TILLERS/SQM

GRAND MEAN 330.2

LINE

.81W28-1	.81W28-1	.81W28-1	.81W28-1	.81W28-4	.81W28-4	.81W29-1	.81W29-2	.81W30-1	.81W30-1	.81W30-1
282.8	253.0	344.4	291.4	297.7	238.0	266.1	337.8	340.1	361.1	423.9

.81W30-1	.81W30-1	.81W30-1	.81W30-2	.81W30-3	.81W30-6	.81W30-6	.81W30-7	.81W30-7	.81W30-8	.81W30-8
274.7	316.6	356.4	372.3	283.4	277.2	343.9	405.5	383.0	292.0	331.8

.81W30-9	.81W31-1	.81W31-1	.81W31-1	.81W31-1	.81W31-1	.81W31-2	.81W31-2	.81W31-2	.81W31-2	.81W31-2
375.0	359.4	388.3	359.2	305.8	281.1	280.3	301.7	249.2	280.9	305.3

.81W31-9	.81W31-9	BODALLIN	GAMENYA	HALBERD	KULIN	MILING	TINCURRIN
359.7	337.8	311.7	361.7	452.8	286.4	551.6	318.9

SRATE

40KG	80KG	120KG
289.3	309.4	392.0

HARVEST DWT/SQM

GRAND MEAN 652.9

LINE

.81W28-1	.81W28-1	.81W28-1	.81W28-1	.81W28-4	.81W28-4	.81W29-1	.81W29-2	.81W30-1	.81W30-1	.81W30-1
683.6	672.5	664.7	667.1	698.9	651.7	580.6	730.9	552.4	749.4	769.3
.81W30-1	.81W30-1	.81W30-1	.81W30-2	.81W30-3	.81W30-6	.81W30-6	.81W30-7	.81W30-7	.81W30-8	.81W30-8
622.5	628.4	572.2	686.6	615.8	607.2	619.9	727.1	799.9	641.1	750.7
.81W30-9	.81W31-1	.81W31-1	.81W31-1	.81W31-1	.81W31-1	.81W31-2	.81W31-2	.81W31-2	.81W31-2	.81W31-2
677.7	676.9	717.4	634.0	690.9	589.9	492.4	633.5	630.7	475.0	660.8
.81W31-9	.81W31-9	BODALLIN	GAMENYA	HALBERD	KULIN	MILING	TINCURRIN			
600.6	668.9	728.8	599.1	739.3	593.9	633.6	631.0			

SRATE

40KG	80KG	120KG
669.0	637.4	652.2

HARVEST GWT/SQM

GRAND MEAN 259.9

LINE

.81W28-1	.81W28-1	.81W28-1	.81W28-1	.81W28-4	.81W28-4	.81W29-1	.81W29-2	.81W30-1	.81W30-1	.81W30-1
265.9	267.0	227.3	250.8	264.0	271.8	222.8	277.2	212.2	299.5	306.3
.81W30-1	.81W30-1	.81W30-1	.81W30-2	.81W30-3	.81W30-6	.81W30-6	.81W30-7	.81W30-7	.81W30-8	.81W30-8
274.3	256.7	229.2	253.5	226.9	251.6	253.0	287.2	313.9	265.1	312.1
.81W30-9	.81W31-1	.81W31-1	.81W31-1	.81W31-1	.81W31-1	.81W31-2	.81W31-2	.81W31-2	.81W31-2	.81W31-2
269.9	283.6	284.5	249.8	296.7	241.2	201.0	234.9	255.7	201.6	265.0
.81W31-9	.81W31-9	BODALLIN	GAMENYA	HALBERD	KULIN	MILING	TINCURRIN			
243.9	280.0	294.1	220.9	251.4	249.2	259.2	286.3			

SRATE

40KG	80KG	120KG
269.1	256.8	253.8

HARVEST INDEX

GRAND MEAN 0.3985

LINE

.81W28-1	.81W28-1	.81W28-1	.81W28-1	.81W28-4	.81W28-4	.81W29-1	.81W29-2	.81W30-1	.81W30-1	.81W30-1
0.3906	0.3976	0.3420	0.3770	0.3761	0.4175	0.3826	0.3809	0.3870	0.3984	0.3972

.81W30-1	.81W30-1	.81W30-1	.81W30-2	.81W30-3	.81W30-6	.81W30-6	.81W30-7	.81W30-7	.81W30-8	.81W30-8
0.4413	0.4096	0.4004	0.3793	0.3668	0.4140	0.4108	0.3966	0.3843	0.4170	0.4188

.81W30-9	.81W31-1	.81W31-1	.81W31-1	.81W31-1	.81W31-1	.81W31-2	.81W31-2	.81W31-2	.81W31-2	.81W31-2
0.3990	0.4173	0.3941	0.3970	0.4281	0.4122	0.4045	0.3712	0.4043	0.4252	0.4015

.81W31-9	.81W31-9	BODALLIN	GAMENYA	HALBERD	KULIN	MILING	TINCURRIN
0.4040	0.4140	0.4039	0.3672	0.3427	0.4060	0.4089	0.4511

SRATE

40KG	80KG	120KG
0.4024	0.4034	0.3897

HEADS/SQM

GRAND MEAN 193.9

LINE

.81W28-1	.81W28-1	.81W28-1	.81W28-1	.81W28-4	.81W28-4	.81W29-1	.81W29-2	.81W30-1	.81W30-1	.81W30-1
171.1	246.9	224.6	159.6	198.5	142.7	170.6	253.9	177.8	234.3	228.9

.81W30-1	.81W30-1	.81W30-1	.81W30-2	.81W30-3	.81W30-6	.81W30-6	.81W30-7	.81W30-7	.81W30-8	.81W30-8
158.8	213.4	195.9	212.0	180.6	150.0	205.0	232.6	223.4	162.9	202.3

.81W30-9	.81W31-1	.81W31-1	.81W31-1	.81W31-1	.81W31-1	.81W31-2	.81W31-2	.81W31-2	.81W31-2	.81W31-2
213.2	186.1	229.4	195.9	165.6	154.4	151.4	149.2	169.3	86.4	198.1

.81W31-9	.81W31-9	BODALLIN	GAMENYA	HALBERD	KULIN	MILING	TINCURRIN
173.4	179.4	236.7	184.4	250.0	178.7	298.0	203.8

SRATE

40KG	80KG	120KG
175.2	184.9	221.6

SEEDS/HEAD

GRAND MEAN 37.17

LINE

.81W28-1	.81W28-1	.81W28-1	.81W28-1	.81W28-4	.81W28-4	.81W29-1	.81W29-2	.81W30-1	.81W30-1	.81W30-1
39.13	30.58	25.87	42.06	36.19	50.15	34.60	27.26	30.11	36.51	33.01
.81W30-1	.81W30-1	.81W30-1	.81W30-2	.81W30-3	.81W30-6	.81W30-6	.81W30-7	.81W30-7	.81W30-8	.81W30-8
46.52	29.95	33.17	33.86	33.32	45.56	33.77	37.76	37.60	45.72	40.26
.81W30-9	.81W31-1	.81W31-1	.81W31-1	.81W31-1	.81W31-1	.81W31-2	.81W31-2	.81W31-2	.81W31-2	.81W31-2
33.48	42.00	33.62	33.83	45.02	44.14	34.67	46.24	36.79	57.06	36.42
.81W31-9	.81W31-9	BODALLIN	GAMENYA	HALBERD	KULIN	MILING	TINCURRIN			
38.43	40.88	32.58	33.98	28.94	34.75	27.75	40.23			

SRATE

40KG	80KG	120KG
41.24	38.67	31.59

WT/SEED

GRAND MEAN 0.03954

LINE

.81W28-1	.81W28-1	.81W28-1	.81W28-1	.81W28-4	.81W28-4	.81W29-1	.81W29-2	.81W30-1	.81W30-1	.81W30-1
0.03952	0.04229	0.04094	0.03819	0.03894	0.03883	0.04031	0.04253	0.04121	0.03975	0.04100
.81W30-1	.81W30-1	.81W30-1	.81W30-2	.81W30-3	.81W30-6	.81W30-6	.81W30-7	.81W30-7	.81W30-8	.81W30-8
0.04371	0.04509	0.03750	0.03753	0.03940	0.04028	0.03896	0.03397	0.03885	0.03760	0.04022
.81W30-9	.81W31-1	.81W31-1	.81W31-1	.81W31-1	.81W31-1	.81W31-2	.81W31-2	.81W31-2	.81W31-2	.81W31-2
0.03824	0.03837	0.03842	0.03962	0.04040	0.03778	0.04108	0.04112	0.04256	0.04259	0.03852
.81W31-9	.81W31-9	BODALLIN	GAMENYA	HALBERD	KULIN	MILING	TINCURRIN			
0.03980	0.04360	0.03952	0.03706	0.03574	0.04188	0.03299	0.03532			

SRATE

40KG	80KG	120KG
0.03998	0.04004	0.03861

TRIAL 86GE48

Response of Wheat to Seeding and Nitrogen Rate at a Low Rainfall Site.

AIMS

To assess the effect of seeding rate and nitrogen fertilization on growth and yield of wheat in a low rainfall environment.

INTRODUCTION

Many cereal seeding rate experiments have been conducted over many sites and years. Generally, there have been only small responses to seeding rates, reinforcing the view that the wheat plant has remarkable flexibility in its tillering, spikelet number, grains/spikelet and grain size. However, farmers need repeated demonstrations of the effect of management factors on crop performance.

TRIAL SITE	North Mullewa Research Station (NMRS)
PAST HISTORY	Wheat stubble
SOIL TYPE	Red clay loam
VARIETIES	Gutha wheat
SEEDING DATE	23/5/86 10,20,30,40,50 kg/ha
CULTIVATION	Cultivated then sown with cone seeder
FERTILIZER	Superphosphate as for CVT`s Agran 34:0 Sowing 0, 15kg N/ha
HERBICIDE	As for Cereal Variety Trials
DESIGN	Randomised block.

RESULTS and DISCUSSION

A long period of dry waether ater sowing, and soil surface crusting resulted in reduced plant stands; nitrogen application further reduced stand density. Sampling on 11/7/86 showed the expected growth response to sowing rate; tillering (mean 2.8 tillers/plant) and leaf area development (mean LAI 0.53) were low at 7 weeks after sowing. (Table 1).

Machine-harvested grain yield was determined, but no yield component sampling conducted. There was no significant yield difference for sowing rates 30 - 50 kg/ha, and no response to applied nitrogen (Table 2). Results do not disagree with the farmer practice of reducing sowing rates below 50 kg/ha in low rainfall areas.

Table 1: Effect of sowing rate and nitrogen fertilizer application on seedling growth of Gutha wheat - North Mullewa. Sampled 11/7/86.

SEED RATE	NRATE	PLANT NO PL/M2	TILLER NO TIL/M2	DRY WT G/M2	LEAF AREA INDEX	TILLER /PLANT	DWT PER PLANT G.
S 10							
	N 0	37.33	87.33	8.58	0.187	2.41	0.24
	N15	34.67	94.67	8.58	0.179	2.73	0.25
		36.00	91.00	8.58	0.183	2.57	0.24
S 20							
	N 0	60.00	159.00	15.42	0.344	2.66	0.26
	N15	51.67	162.67	17.58	0.401	3.17	0.34
		55.84	160.84	16.50	0.372	2.92	0.30
S 30							
	N 0	80.00	228.67	33.08	0.660	2.94	0.44
	N15	66.67	188.67	22.67	0.495	2.90	0.35
		73.34	208.66	27.88	0.578	2.92	0.40
S 40							
	N 0	91.33	218.33	24.25	0.546	2.39	0.26
	N15	62.00	210.33	27.42	0.608	3.37	0.42
		76.66	214.34	25.84	0.576	2.88	0.34
S 50							
	N 0	121.67	316.67	42.08	0.946	2.61	0.35
	N15	92.67	265.00	35.92	0.901	2.85	0.38
		107.16	290.84	39.00	0.924	2.73	0.36
Trial Means		69.80	193.13	23.56	0.527	2.80	0.33

Table 2: Effect of sowing rate and nitrogen fertilizer application on yield of Gutha wheat - North Mullewa

	Grain Yield kg/ha
S 10 kg seed/ha	1860
S 20	2142
S 30	2524 A
S 40	2511 A
S 50	2502 A
N 0 kg/ha	2275 B
N 15	2341 B

Treatments with the same letter are not significantly different.