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## Row spacing on wheat yield

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WESTERN AUSTRALIAN DEPARTMENT OF AGRICULTURE

Summary of Results of Field Experiments

1982

82M56	Row spacing x grass weed density on wheat yield
82M57	Row spacing x grass weed density on wheat yield
82N37	Row spacing x grass weed density on wheat yield
82M54	Row spacing x seeding rate of wheat
82M55	Row spacing x seeding rate of wheat
82ME75	Row spacing x seeding rate of wheat
82ME76	Row spacing x seeding rate of wheat
82N36	Row spacing x seeding rate of wheat
82LG49	Row spacing x seeding rate of wheat

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Office.

Introduction:

The main aim of these trials was to provide preliminary information on the effect of row spacing on wheat yield. Farmers are now using a range of spacings from 14 cm out to 36 cm in ignorance of the effect this could have on yield.

It is commonly believed that when weed burdens are present, higher wheat seeding rates or narrower row spacings allow the wheat to compete more effectively against the weeds. The opportunity was taken to include different weed burdens in the spacing trials, using annual ryegrass and brome grass as weeds. This also allowed further information on the competitive effect of these weeds to be gathered, particularly the brome for which there is little information available.

Weed densities planned for the trials were 25, 50, 100, 200 and 400 plants  $m^{-2}$ . Actual densities obtained varied considerably from this and are given in the results.

Preliminary Indications

Summary of 18cm vs 36cm spacing results at 40 and 60 kg ha<sup>-1</sup> seeding rate.

Trial	Seeding Rate	Wheat Yield		
		18cm	36cm	$\frac{18cm}{36cm} \%$
82M56	approx. 45	930	790	117.7
82M57*	43	540	641	84.2
82N37	approx. 45	1875	1872	100.2
82M54*	40	312	174	179.3
	*	60	312	124.3
82M55	40	735	796	92.3
	60	886	872	101.6
82ME75	40	1944	1782	109.1
	60	2043	1707	119.7
82ME76*	40	579	451	128.3
	*	60	475	128.0
82N36	40	1603	1620	98.9
	60	2130	1649	129.2
82LG49	40	1840	2025	90.8
	60	2066	1834	112.6

Over the various trials and treatments the general picture emerges that 18cm is superior to 36cm spacing. If the low yielding trials are ignored (Marked with \*), and remaining trials are averaged, then superiority is of the order of 7.4 %. Handling the data in this way is fraught with danger, but until further trials are carried out and statistical analysis is completed, it will have to do.

Trial: 82M56 File No.  
 Title: Row spacing x grass weed density on wheat yield.  
 Location: Merredin Research Station. Paddock 9D.  
 Soil type: Light land.  
 Dated planted: 16.6.82. Gamenya wheat.  
 Fertilizer: 150 kg Agras No. 1. T.D. before seeding.  
 Results: Grain yields  $\text{kg ha}^{-1}$  and weed densities plants  $\text{m}^{-2}$ .  
 Harvested 8.12.82.

Grass density	plants/ $\text{m}^2$	18cm rows	36cm rows
Nil		930	790
Brome	40	835	737
	80	679	714
	128	618	647
	132	532	487
	242	341	367
Ryegrass	42	903	769
	69	799	780
	98	716	786
	133	594	572
	183	566	507

Comment:

1. Weed free treatments showed small superiority of 18cm over 36cm, but probably not significant.
2. At equivalent densities, similar yield depression caused by both grass species.
3. No obvious interaction between row spacing and competitiveness of weeds.

Trial: 82M57 File No.  
 Title: Row spacing x grass weeds density on wheat yield.  
 Location: Merredin Research Station. Paddock 3A1.  
 Soil Type: Clay loam. Heavy land. Burden of background barley grass over all plots.  
 Date planted: 10.6.82. Gamenya wheat @ 43 kg ha<sup>-1</sup>.  
 Fertilizer: Nil  
 Results: Grain yields kg ha<sup>-1</sup> and weed densities plants m<sup>-2</sup>.  
 Harvested 8.12.82.

Grass density	plants/m <sup>2</sup>	18cm rows	36cm rows
Nil		540	641
Rye	47	485	505
	61	492	503
	154	451	476
	160	398	399
	169	308	395
Brome	36	537	507
	68	468	514
	75	394	450
	157	351	479
	250	315	298

Comment:

1. The barley grass background over all plots lessens the value of this trial.
2. Maybe slight superiority of 36cm over 18cm rows for wheat yield.
3. No interaction between rowspacing and weed burden on competitiveness of weeds with wheat.
4. At similar densities both grass weeds causing similar decline in yields.

Trial: 82N37 File No.  
 Title: Row spacing x grass weed density on wheat yield.  
 Location: Newdegate Research Station.  
 Soil Type: Sandplain. Sand over gravel/clay.  
 Date planted: 15.6.82.  
 Fertilizer: Nil  
 Results: Weed densities plants  $m^{-2}$ , wheat yield  $kg\ ha^{-1}$ .  
 Harvested 4.12.82.

Grass density	plants/ $m^2$	18cm rows	36cm rows
Nil		1875	1872
Brome	20	1615	1701
	67	1412	1366
	117	1458	1435
	143	1285	1250
	273	1019	903
Ryegrass	24	1748	1591
	52	1782	1649
	121	1562	1424
	213	1262	1088
	290	1244	1094

Comment:

1. Excellent trial, almost free of weeds other than those planted.
2. Equivalent yields from 18cm and 36cm rows.
3. Maybe slight interaction with wheat in 18cm rows competing better than in 36cm rows.
4. Similar competitiveness of both grass species with wheat at equivalent densities.

Trial: 82M54 File No.  
 Title: Row spacing x seeding rate of wheat.  
 Location: Merredin Research Station lease block at Belka.  
 Soil Type: Light land.  
 Date Planted: 4.6.82.  
 Fertilizer: 150 kg Agras No. 1 T.D. prior to seeding.  
 Results: Wheat yields kg/ha.

## Seeding rate kg/ha

Treatment	T.D.	18	27	36	$\bar{X}$
10	41	64	77	58	60
20	75	104	108	179	117
30	81	150	154	156	135
40	220	312	216	174	231
60	266	388	303	312	317
$\bar{X}$	137	204	172	176	

Comment:

1. Yields too low to be of much value to the trial programme.
2. Response to highest seeding rate.
3. 18cm spacing generally superior.



Trial: 82M55 File No.

Title: Row spacing x seeding rate of wheat.

Location: Merredin Research Station. Paddock 3A1.

Soil Type: Clay loam, heavy land. Background burden of barley grass.

Date Planted: 10.6.82. Gamenya wheat.

Fertilizer: Nil.

Results: Wheat Yields kg ha<sup>-1</sup>

Seeding rate kg ha <sup>-1</sup>	Topdressed	SPACING		
		18cm	27cm	36cm
10	329	312	428	349
20	478	557	619	618
30	561	660	759	772
40	612	735	848	796
60	601	886	843	872
Mean	516	630	699	681

Comment:

1. Response to seeding rate, to highest rate.
2. 27cm and 36cm spacings appeared slightly superior.
3. No startling interactions between seeding rates and row spacings.

Trial: 82ME75 File No.

Title: Row spacing x seeding rate of wheat

Location: Merredin. I.H. Flockhart & Sons.

Soil Type: Light land.

Dated Planted: 4.6.82. Gamenya wheat.

Fertilizer: Site topdressed with 40 kg/ha D.A.P. immediately before seeding.

Results: Wheat yields kg ha<sup>-1</sup>.

## Seeding rate kg/ha

Treatment	T.D.	18	27	36	$\bar{X}$
10	839	1244	1317	1181	1145
20	1198	1823	1507	1539	1517
30	1418	1875	1646	1638	1644
40	1453	1944	1749	1782	1732
60	1568	2043	1898	1707	1804
$\bar{X}$	1295	1786	1623	1569	

Comment:

1. Response to highest seeding rate, though differences in the 30-60 kg ha<sup>-1</sup> range are small.
2. 18cm spacing superior.
3. No interactions of importance.

Trial: 82ME76 File No.  
 Title: Row spacing x seeding rate of wheat.  
 Location: Nangeenan. V.D. Cahill & Co.  
 Soil Type: Clay loam. Very heavy barley grass competition.  
 Date Planted: 21.6.82. Gamenya wheat @ 40 kg ha<sup>-1</sup>.  
 Fertilizer: 40 kg ha<sup>-1</sup> plain superphosphate topdressed immediately before seeding.  
 Results: Wheat yields kg ha<sup>-1</sup>.

Treatment	Spacing (cm)				
	TD	18	27	36	$\bar{X}$
10	145	243	242	231	215
20	197	399	303	336	309
30	208	492	448	480	407
40	272	579	473	451	444
60	278	608	509	475	468
$\bar{X}$	220	464	395	395	

Comment:

1. Heavy barley grass competition makes value of this trial questionable.
2. Topdressed treatment is poor.
3. Response to highest rate of seeding.
4. 18cm row spacing best.

Trial: 82N36 File No.  
 Title: Row spacing x seeding rate of wheat.  
 Location: Newdegate Research Station.  
 Soil Type: Sandplain. Sand over gravel/clay.  
 Date Planted: 15.6.82.  
 Fertilizer: Nil.  
 Results: Wheat yields kg ha<sup>-1</sup>.

## Spacing (cm)

Treatment	TD	18	27	36	$\bar{x}$
10	1128	1192	1250	1042	1153
20	1424	1453	1517	1186	1395
30	1672	1736	1435	1678	1630
40	1858	1603	1611	1620	1681
60	2043	2130	1692	1649	1879

Seeding rate kg/ha.

Comment:

1. It appears that maximum yield was obtained with 60 kg/ha seeding rate for the TD and 18cm treatments and at 40 or 30 kg/ha for the 27cm and 36cm treatments. Statistical analysis is required to clarify this.
2. TD and 18cm treatments were superior to wider row spacings.

Trial: 82LG49 File No.  
 Title: Row spacing x seeding rate of wheat.  
 Location: Kondinin. M. Tyson.  
 Soil Type: Heavy land.  
 Date Planted: 17.6.82. Halberd wheat.  
 Fertilizer: Nil.  
 Results: Wheat yields kg ha<sup>-1</sup>.

## Spacing (cm)

Treatment	TD	18	27	36	Mean
10	1394	1325	1425	1447	1398
20	1678	1690	1671	1736	1694
30	1823	1939	1965	1898	1906
40	2060	1840	1939	2025	1966
60	2008	2066	1939	1834	1962
Mean	1793	1772	1788		

Seeding rate kg/ha.

Comment:

1. An excellent trial almost free of weeds.
2. No response to seeding rate above 40 kg ha<sup>-1</sup>.
3. No difference between spacing on effect on wheat yield.