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1973 Time of planting and rate of seeding on lupin yield

G Walton

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1973 Experimental Summary

Time of Planting and Rate of Seeding
on lupin yield.

G. Walton

Plant Research Division

WESTERN AUSTRALIAN
DEPARTMENT OF AGRICULTURE

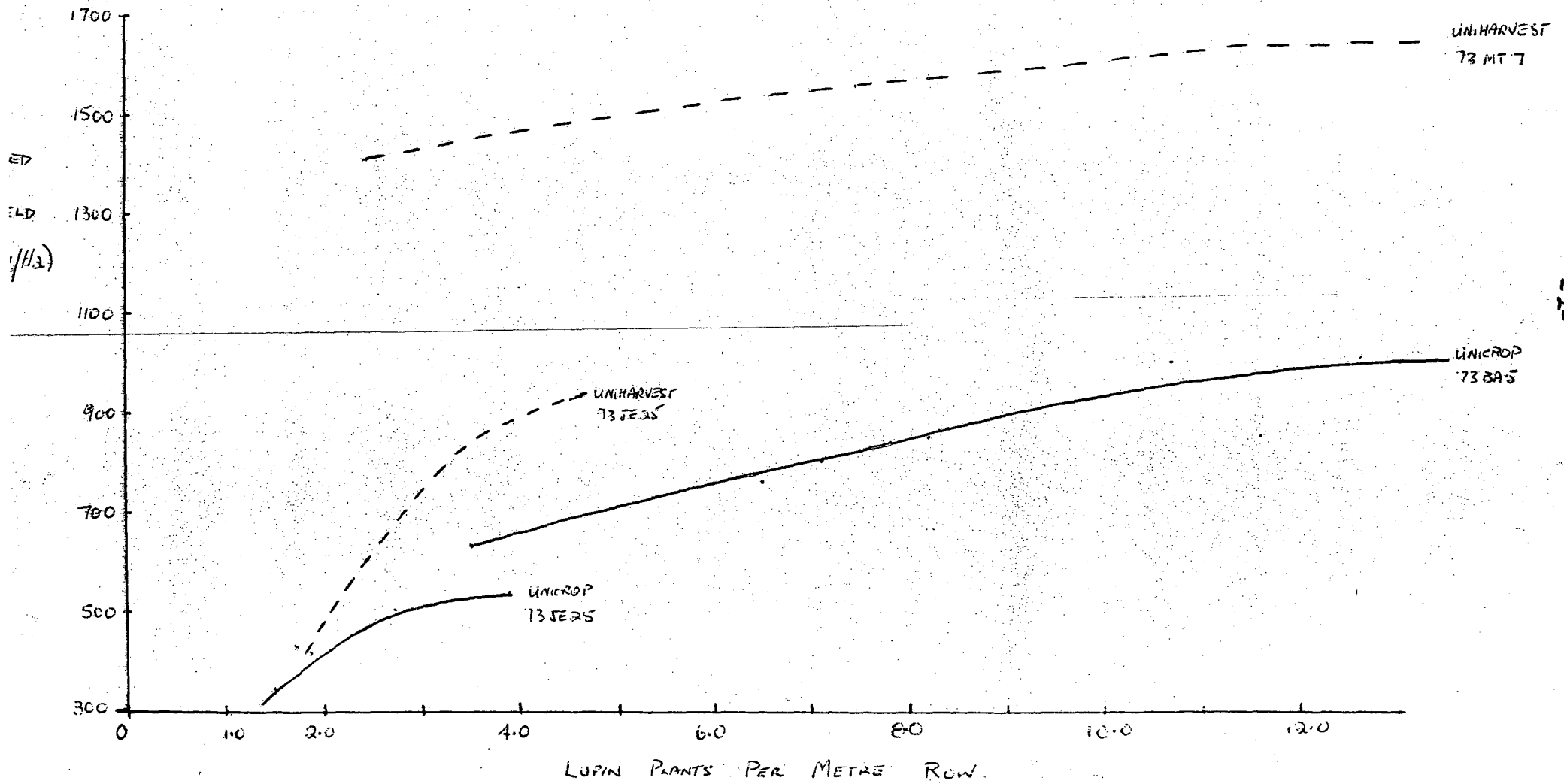
COMMENTS ON RESULTS.

Of the four time of planting trials two definitely showed superiority of earlier seeding (73BA5, 73E6). The two trials in the Southwest (73BR14 and 73MT7) gave highest yields with June sowing compared to May.

Three trials (73BR14, 73E6 and 73BA5) appear to have a Variety x Time interaction for plant density, but no definite trend for either Uniharvest or Unicrop although later sowing reduced plant density.

Seeding rates in excess of 82 kg/ha gave the highest yields in all trials. The rate of seeding experiments (73BA5 and 73MT7) show that the best crop density for yield (graph) lies between 8 and 10 plants per metre row, which is consistent with the 1971 work.

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No. 73BR14

TITLE: Lupin time of Planting Trial.

LOCALITY: W.V. Hales. Mayanup.

RAINFALL: May to October = 489 mm.

Nov. 1 - 15th = 31 mm.

SOIL: White sand over clay at 50 cm.

VEGETATION: Redgum,

HISTORY: Second crop after pasture 1971.

Barley 1972.

RECORD: Rates of planting: 11/5/73 and 14/6/73

Actual Rates of Seeding:

Wheat and Barley 56 kg/ha.

Lupins 69.4 and 108 kg/ha.

Rate of super-phosphate:

235.2 kg/ha.

Trial inspected 22/10/73: May sown lupins has extensive areas of small yellow plants.

(Waterlogging? and Brown Spot). May sown clipper barley has barley scald.

Weed Counts taken 28/6/73. (Weeds per 0.36 m²)

Cultivar	Time of planting	Seeding Treatment		69 + Treflan (2.8 l/ha)
		69	108	
Unicrop	11.5	8.9	8.8	6.0
	14.6	2.0	0	2.0
Uniharvest	11.5	7.8	7.7	6.8
	14.6	3.0	0	2.0

Appears to be some weed suppression with use of Treflan on May sown plots but the difference is not statistically significant. Later observation showed the chemical spray to have reduced the amount of regenerated Barley and of Wild Oats in both planting times, but no affect upon WRG infestation.

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Lupin establishment count, 28/6/73.

(Plant number/M drill row)

Table of Means				V x T		V
Variety	Seed Rate (kg/ha)			Time of Planting		Variety Mean
	69	69 + 108	Treflan	11/5/73	14/6	
Unicrop	4.2	6.3	4.3	4.9	5.0	4.9
Uniharvest	4.9	7.6	4.5	6.0	5.4	5.7
Seed Rate Means	4.6	7.0	4.4			

Coefficient of Variation = 9.4%

LSD's within Variety x Seed Rate Table; $p < 0.05 = 0.6$,
 $p < 0.01 = 0.8$, $p < 0.001 = 1.1$

LSD's within VxT table: $p < 0.05 = 0.9$

LSD's between Variety means at the same time of planting:
 $p < 0.05 = 0.5$

Significance of Replications: N.S.

Time of planting (T) : N.S.

Variety (V) : ***

Seeding Rate (S) : ***

VxS : * (Uniharvest gave relatively better establishment than U/c with higher Seed Rate.)

VxT : * (Early sown Uniharvest gave relatively better establishment than Unicrop).

SxT, VxSxT : N.S.

Mean Harvest Yield (kg/ha)

Cultivar	Time of Planting	Seed Rate			Time of Planting Mean
		69	108	69 + Treflan	
Unicrop	11.5	1810.2	2278.3	1935.0	2163.8
	14.6	2293.9	2652.9	2197.9	2410.6
Uniharvest	11.5	1997.4	2606/0	2356.3	
	14.6	2325.1	2543.6	2450.0	
Seed Rate Mean		2106.6	2519.7	2234.7	.../5..

Possible Variety x Seed Interaction (Table of Means)

	69	108	69+Treflan	Mean
Unicrop	2052.0	2465.6	2066.4	2194.7
Uniharvest	2161.2	2574.8	2403.1	2379.7

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No. 73JE25

TITLE: Rate of Seed x lupin variety x inoculation.
LOCALITY: P. Ellis. South Ongerup.
RAINFALL: May to October: 273 mm.
SOIL: 0-15 cm., dark grey sandy loam 15-20 cm.,
grey sandy clay >20 cm., grey clay.
VEGETATION: Various mallee spp.
HISTORY: 1968 sown subclover and oats (209 kg super No. 1
mix). 1969-71 pasture T.D. with 202 kg super/ha.
1972, pasture T.D. with 168 kg super/ha.

RECORD: Date seeded: 25/5/73.
Rate super-phosphate: 210 kg/ha.
Rates seeding: 20, 40, 60, 82, 117 kg/ha.
(Gum slurried).
Inoculation treatments: Nil, lime pelleted,
gum slurry applied to the 60 kg seed rate.

Trial inspected 12/10/73: All plots have a complete cover of Barley grass, Brome and WRG. Lupins appear thin and beginning to wilt.

Lupin Establishment count 12.7.73 (Plants/m drill row)

Variety	Seed Rate (kg/ha)					Inoculation technique		
	20	40	60	82	117	Nil	Lime P	Gum Slurry
Unicrop	0.7	1.5	2.6	2.7	3.9	2.7	2.3	2.6
Uniharvest	1.7	1.8	2.8	3.4	4.7	2.5	2.6	2.8
Means	1.2	1.7	2.7	3.0	4.3	2.6	2.5	2.7

Coefficient of Variation = 37.4%

Coefficient of Variation = 21.6%

LSD's between seed rate means:

p 0.05 = 1.2
p 0.01 = 1.6
p 0.001 = 2.2

Significance of Reps *
Significance of variety N.S.
Significance of inoc. N.S.

Significance of Varieties N.S.
Significance of Replicates N.S.
Significance of V x S N.S.

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Mean Harvest Yields (kg/ha)

Variety x inoculation treatments:

	Nil	Lime Pelleted	Gum Slurry
Unicrop	415.1	383.9	352.7
Uniharvest	302.7	677.2	583.6
Inoc. Mean	358.9	530.5	468.1

(Plot effect rather than treatment interaction?)

Variety x Rate of Seed treatment means:

	20	40	60	82	117
Unicrop	177.9	346.4	352.7	502.5	536.8
Uniharvest	433.8	424.4	583.6	877.0	936.3
Seed Mean	305.8	385.4	468.1	689.7	736.5

(Uniharvest superior to Unicrop because that cultivar was able to produce more flowers after the hot wind of 6/10/73?)

Harvest Notes:

Many plots in Replicate 3 were completely overgrown with grass, consequently the lupin yields are considerably lower than the other replicates. A large number of plants over the entire trial had stem lesions characteristic of Phomopsis rossiana.

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No. 73BA5

TITLE: Time of planting, Rate of seeding lupins.
LOCALITY: Badgingarra Research Station. Paddock 6A.
RAINFALL MAY- OCT: 638 mm and 29 mm April 23, 24, 25.
SOIL: Type 1, sand over clay/gravel at 23-40 cm.
VEGETATION: Banksia, Christmas tree scrub.
HISTORY: Site of 1972 cereal variety trial.
DATES SEEDED: 30/4, 15/5, 23/5, 5/6/73.
RATE OF FERTILISER: 220 kg plain super/ha.
RATES OF SEEDING: Unicrop, 55, 82, 114, 142, 166, 196, 224.
Uniharvest, 55, 114.

Inspected 22/6/73: Time of planting (and cultivation) effect upon the weed counts in each plot:

Plots seeded 30/4 have approx 32 weeds per quadrat (0.36m²).

15/5 have approx 5 weeds per quadrat.

23/5, 5/6 have approx 0.2 weeds per quadrat.

The June sown seedlings had a high proportion of abnormal seedlings which lost the cotyledons.

RECORD:

Plots inspected 4/9/73: large differences in crop height with time of planting.

April 30 = 90 cm tall with competitive weeds.

June 5 = 40 cm tall, no weeds.

Inspected 31/10/73: plots sprayed for budworm control. The April 30 sown plots lodged and will be quadrat sampled to check yield.

(See Harvest results)

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Lupin establishment counts 26/6 and 2/7/73.
(Plant numbers/m drill row)

Time of Planting x Seed Rates - Table of Means.

Variety	Time of Planting				Seed Rate Means
	30/4	15/5	23/5	5/6	
Unicrop	5.1	5.3	5.3	4.7	55 kg/ha = 3.9
Uniharvest	5.5	5.4	6.9	4.1	114 kg/ha = 6.6
Time Means	5.3	5.3	6.1	4.4	

Coefficient of variation = 14.0%

LSD's between Variety x Time of planting means; $p < 0.05 = 1.1$
(Uniharvest has significant variation in establishment with time.)

LSD's between varieties at same time of planting; $p < 0.05 = 0.9$

Significance of Replications N.S.

Time of planting (T) *

Variety (V) N.S.

Seeding Rate (S) ***

V x T *

V x S x T, V x S, S x T N.S.

Rate of Seeding - May 23rd sown Unicrop.

Seed Rate (kg/ha)	55	82	114	142	166	196	224
Unicrop plant No.	3.5	6.5	7.1	8.2	10.7	11.6	13.5

Coefficient of Variation = 18.2%

LSD's between seed rate means, $p < 0.05 = 2.8$

$p < 0.01 = 3.9$

$p < 0.001 = 5.6$

Replications N.S.

Harvest Yield (kg/ha) No apparent interaction between the two seed rates and variety or time; 55 kg seed/ha = 496.6 kg/ha
114 kg seed/ha = 611.6 kg/ha

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Mean Yield (with MF31 Header)

Variety	Time of Planting (Mean of 2 seed Rates).				Var. Mean
	30.4	15.5	23.5	5.6.73	
Unicrop	729.2	708.3	718.8	498.3	663.6
Uniharvest	616.3	508.7	394.1	243.0	440.5
Time Mean	672.7	608.5	556.4	370.6	

Mean Yield (Quadrat sampled, mean of 2 seed rates)

Variety	Time Planted		Variety Mean
	30.4	23.5	
Unicrop	1901.2	1387.3	1644.2
Uniharvest	1632.7	679.0	1155.8

MF31 Harvest Yield Rate of Seeding (kg/ha). Sown 23/5/73.

	55	82	114	142	166	196	224
Unicrop	632.0	760.5	805.6	850.7	1003.5	864.6	1007.0
Quadrat Harvested:	1759.3	972.2	1015.4	1515.4	1246.9	1500.0	2237.6

Total Dry Matter - Quadrat sampled 15/11/73 (kg/ha)

Date Planted	Seed Rate	Unicrop						Uniharvest		
		55	82	114	142	166	196	224	55	114
30.4	6460			5843					7710	6401
23.5	7960	8574	5768	7306	7364	7355	8654		8265	8349

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No. 73E6

TITLE: Lupin variety x Time of planting.
LOCALITY: Esperance Downs Research Station. Paddock W8.
RAINFALL: May to October = 355 mm.
SOIL: Fleming sand series: 0-10 cm grey sand,
 10-30 cm. gravel, >30 cm. clayey soil.
VEGETATION: Chittick, Blackboy, Blue Mallee.
HISTORY: Rape paddock 1972.
RECORD: Seeding dates: 16/4, 2/5, 11/5, 31/5, 7/6, 15/6
 7/8/73.
 Super Rate: 224 kg/ha plain super.
 Seeding Rates: 67.2, 118.7.
 Site sprayed
 with Avadex: 4.3 litres/ha prior to each
 seeding.

Plots inspected 26/6/73 - First time of
 planting sandblasted out of existence, instructed
 that these plots be reseeded at beginning of
 August.

Avadex gave good early WRG germination control
 except for 31/5 sown which had trasplanted WRG.

Weed Counts (per 0.36m ²)	
<u>Seeding date</u>	
2.5.73	4.8
11.5.73	0.6
31.5.73	20.9

Inspected 11.10.73 - WRG content of plots is very high, the
 higher rate of seeding has some success in covering the grass.
 Unicrop one level more advanced in flower pods than Uniharvest.

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Lupin establishment counts, 26.6 and 11.10.73.
(Plant Numbers/m drill row)

Variety x Time of Planting Table of Means.

Variety							Variety Mean	Seed Rate Means
	2/5	11/5	31/5	7/6	15/6	7/8		
Unicrop	3.6	2.8	3.9	4.7	4.8	4.3	4.0	67 kg = 3.0
Uniharvest	3.9	3.2	3.8	5.5	5.4	5.8	4.6	119 kg = 5.6
Time means	3.8	3.0	3.8	5.1	5.1	5.1		

Coefficient of variation = 12.3%

LSD's between Varieties at same Time of Planting $p < 0.05 = 0.6$

LSD's between Variety x Time means, $p < 0.05 = 0.7$

Significance of Replications N.S.

(T)Time of Planting : ***

Variety (V) : ***

Seed Rate (S) : ***

VxS, SxT, VxSxT : N.S.

VxT : * (Uniharvest improved plant establishment relative to Unicrop with later sowings.)

WRG rated 0-10 (level of infestation in Time of Planting blocks)

Time	2/5	11/5	31/5	7/6	15/6	7/8
Mean Rating	6.0	5.0	9.3	8.0	4.3	2.0

Mean Harvest Yields (kg/ha)

Cultivar	Seed Rate	Date Planted						Seed Rate Mean
		2/5	11/5	31/5	7/6	15/6	7/8	
Unicrop	67	998.7	1485.6	521.2	683.5	936.3	720.9	771.7
	119	1123.6	1925.7	543.0	696.0	1186.0	902.0	915.7
Uniharvest	67	786.9	1086.1	383.9	617.9	589.9	449.4	
	119	727.2	1504.3	515.0	624.2	627.3	614.7	

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Variety x Time interaction (Table of Means)

	2/5	11/5	31/5	7/6	15/6	7/8	Variety Mean
Unicrop	1061.1	1705.6	532.1	689.7	1061.1	811.4	976.8
Uniharvest	757.1	1295.2	449.4	621.1	608.6	532.1	710.6
Time Mean	909.1	1500.4	490.7	655.4	834.8	671.7	

.../14..

No. 73MP7

TITLE: Time of Planting x Rate of Seeding lupins.
LOCALITY: Mt. Barker Research Station.
RAINFALL: May to October = 518 mm. First 2 weeks Nov. = 71mm.
SOIL: Gravelly loamy sand.
VEGETATION: Jarrah, Redgum.
HISTORY: Second crop site - Barley trial 1972. Clover history.
RECORD: Dates seeded : 4th, 11th, 18th and 25th May, 1st and 11th June.
 Rates seeding: 28, 62, 92, 118, 151, 175 and 206 kg Uniharvest per hectare. Unicrop at 92 kg/ha.
 Rates super : 230 kg plain super/ha.
 Trial inspected and ranked on 27/9/73.
 Ranking 0-5 on height }
 0-5 on density } Total 10.

Seeding Rate (kg/ha)	28	62	92	118	151	175	206
Mean Ranking score	4.5	8.3	9.0	9.2	9.8	9.3	10

Uniharvest lupins appears to have reduced the number of days to flowering over the 1st three planting dates. This is not so for the Unicrop.

Lupin establishment counts 27.6 and 13.7.73
 (Plant number/m drill row)

Variety	Time of Planting (at 92 kg seed/ha)						Seeding Rate (kg/ha)						
	4/5	11/5	18/5	25/5	1/6	11/6	28	62	92	118	151	175	206
Unicrop	4.5	7.2	5.9	5.4	6.4	6.3							
Uniharvest	3.7	6.3	6.7	5.9	4.9	6.5	2.4	6.0	6.7	8.4	10.9	11.9	11.3
Means	4.1	6.7	6.3	5.7	5.6	6.4							

Coefficient of Variation = 13.1%

Coefficient of Variation = 8.0%

LSD's between T. means p 0.05 = 0.9
p 0.01 = 1.2
p 0.001 = 1.7

LSD's between seed rate means p < 0.05 = 1.2
p < 0.01 = 1.6
p < 0.001 = 2.3

Significance of Replications: N.S.
Variety : N.S.
VxT : N.S.

Replications: N.S.

The first Time of Planting was the only treatment to have weeds (2.2 per 0.36m² quadrat) at date of plant count.

Mean Harvest Yield (kg/ha)

Variety	Time of Planting						Var. Mean
	4.5	11.5	18.5	25.5	1.6	11.6	
Unicrop	1847.4	1781.2	1636.8	1741.8	1843.6	2028.7	1813.2
Uniharvest	1760.2	1809.4	1472.1	1666.2	1910.0	2116.0	1789.0
Time Mean	1803.8	1795.3	1554.4	1704.0	1876.8	2072.3	

Reduction in mid-May sown plots due to aphid infestation at critical point in flowering stage in mid-September. VxT interaction? with Uniharvest benefiting from the late spring.

Mean Harvest Yield (kg/ha) - Rate of Seeding (sown 18/5/73)

Variety	Rate:						
	28	62	92	118	151	175	206
Uniharvest	1412.5	1460.3	1721.8	1557.2	1629.2	1610.7	1704.1

Mean Total Dry Matter (kg/ha) - Quadrat sampled 27/11/73

S Rate	Uniharvest						Unicrop	
	28	62	92	118	151	175	206	92
	6851.8	8629.5	8537.0	10324.0	8956.7	9058.6	8509.2	8552.4

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Lupin Grain Crude Protein Analyses - Percent dry basis.

71BA19	Time of	Seed Rate (kg/ha)					Var. Time	Var.
Variety	Planting	22	44	67	88	112	Mean	Mean
Unicrop	20/5/71	33.3	34.5	33.6	33.9	32.9	33.6	
	14/6/71	33.0	32.6	33.4	33.8	33.1	33.2	33.4
Uniharvest	20/5/71	33.1	33.0	33.3	34.4	33.8	33.5	
	14/6/71	32.6	32.1	32.3	32.8	33.4	32.6	33.0
Seed Rate Mean		33.0	33.0	33.1	33.7	33.3		

72BR12	Time of	Rate of Seed (kg/ha)				Var. Time	Var.
Variety	Planting	39	55	79	96	Mean	Mean
Unicrop	10/5/72	31.1	32.6	31.1	30.9	31.4	
	30/5/72	32.1	31.4	31.0	31.7	31.5	
	30/6/72	34.1	32.1	33.5	34.3	33.5	32.1
Uniharvest	10/5/72	32.2	31.5	31.2	30.3	31.3	
	30/5/72	32.0	31.3	32.4	31.6	31.8	
	30/6/72	35.8	31.5	32.2	31.7	32.8	32.0
Seed Rate Mean		32.8	31.7	31.9	31.7		

72TS9 and 72ES7

Variety	Location	Mean C.P. %	Variety CP Mean	Location. CP Mean
Unicrop	Eneabba	33.0	33.2	33.3
	Coomalbidgup	33.4		33.1
Uniharvest	Eneabba	33.5	33.2	
	Coomalbidgup	32.8		

Rates of Super (76-812 kg/ha) had no effect upon C.P. level.

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M.F. drill settings for seed rates:

Mt. Barker Research Station.

Uniharvest lupin seed rate achieved:

28		62		151	118	206	175 kg/ha.
2nd 18 ^T fine	92	1st 18 ^T coarse		2nd 18 ^T coarse		2nd 27 ^T coarse	
		1st 24 ^T coarse		2nd 24 ^T coarse		2nd 31 ^T coarse	

Bridgetown District Office.

36	48	73	88
1st 12 ^T	1st 16 ^T	1st 24 ^T	2nd 20 ^T

PRD.

32	53	78	109
1st 12 ^T coarse	1st 22 ^T coarse	1st 27 ^T coarse	2nd 24 ^T c
	134		
	2nd 31 ^T c		

L. albus cv WB2 seed rate achieved:

Mt. Barker Research Station.

(coarse set)

101	135	184	215 kg/ha
2nd 18 ^T	2nd 24 ^T	2nd 31 ^T	4th 24 ^T
	249		258 kg/ha
	4th 27 ^T	4th 31 ^T	

Avondale Research Station.

100	140	180	210 kg/ha
1st 31 ^T	2nd 24 ^T	3rd 24 ^T	3rd 27 ^T
	260		290 kg/ha
	3rd 31 ^T	4th 31 ^T	

M.F. Harvester settings for lupins (narrow leaf)

Drum speed 724 RPM (could use 618 & 467 RPM if cogs available)

Ground speed 10 kmph.

Concave 14/15 mm front 11mm back

Shaker shoe bottom sieve 16 mm hole drain.

Minimum Wind.

MF 31 Header setting for L. albus cv. WB2

Concave Wide open.

Drum speed 450 RPM

Ground speed 6 km/hr.

Comments: Difficult to harvest without cracking seed.
Requires open-front header.