INTERACTION OF TIME OF SOWING AND WEED MANAGEMENT OF LUPINS

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AIM

- To better understand the tradeoffs between lupin yield and weed management with delayed sowing.
- To demonstrate shielded spraying in controlling large weed populations, which often arise after dry sowing.

BACKGROUND

Growers need to know the effect of altering time of sowing and sowing tactic (dry vs wet sown) on costs in terms of lupin yield and the benefits in terms of weed control. Sowing time and weed burden interact to affect final yield. This interaction of weed burden and sowing time on yield is dynamic and dependant on environment. Trials were sown with the Liebe Group and the Mingenew Irwin Group in an attempt to better understand the effect of dry and wet sowing on weed burden and yield over two differing rainfall zones.

It was intended to use a shielded sprayer to control weeds in some plots, however due to the season this treatment was not undertaken. The aim was to see if weeds could be effectively controlled in dry sown crops using a shielded sprayer. If this can be achieved it gives the option to dry sow without sacrificing weed control.

TRIAL DETAILS

Property	Ian Syme, Main Trial Site, Buntine.
Plot size & replication	50cm plots 2.0m x 18m, 25cm plots 1.75m x 18m, 4 replications.
Soil type	Red sandy loam grading to a clay at a depth of 30-40cm. pH 5.0 ($CaCl_2$) grading to 5.8 at 30cm.
Sowing dates	28/4/06 (Dry), 17/5/06 (On the break, the day after 14.5 mm), 30/5/06
Seeding rate	100 kg/ha cv. Mandelup
Fertiliser (kg/ha)	80 kg/ha Super deep banded below the row
Row spacing (cm)	50 & 25
Paddock rotation	2005= Wheat, 2004= Wheat, 2003= Wheat, 2002= Volunteer Pasture
Herbicides	Glyphosate 1.0 L/ha and simazine 1.5 L/ha immediately prior to each time of sowing. No post emergent herbicides were applied.
Growing Season Rainfall	124mm

RESULTS & DISCUSSION

Results presented are from Buntine, the trial seeded at Mingenew was abandoned.

There were significant differences in the numbers of lupins established at each time of sowing (Figure 1). The second time of sowing, seeding soon after the break, gave the poorest establishment. This occurred because the seeding operation dried the soil in a marginal moisture situation. The third time of sowing had the best establishment because it was sown into the best, wettest, seeding conditions.

The trial was designed to achieve a range of weed populations. It was anticipated that by using the different seeding strategies (dry, on the break and delayed after the break) this would be achieved. This did occur (Table 1, Figure 2). Weed populations prior to seeding were lowest in the dry sown and highest in the delayed sown. Hence by delaying seeding a higher proportion of the weed seed bank was controlled by knockdown herbicides and tillage at seeding. Conversely when weed populations were measured in August the dry sown plots had the highest weed populations and the late sown plots the lowest. The dry sown plots had almost five times the weed population of the delayed sown plots (Figure 2). At the end of the season all the ryegrass from the plots was harvested and weighed. Again the dry sown plots contained more ryegrass plants (Table 1). There was a clear trend that the earlier the plots were sown the more ryegrass biomass they contained (Figure 3).

Lupins were hand harvested. The final lupin dry matter (Table 1) includes the weight of whole plants with seed. Seed yield was too low to be worth threshing the plants. Throughout the trial, plants from the third time of sowing were visually much smaller than the earlier sown treatments. While individual plants were smaller in the third time of sowing the better establishment rate compared to the other treatments compensated for this and there were no significant differences in final lupin dry matter.

Row spacing did not influence any of the variables measured. It was included with the aim of using a shielded sprayer. This was not used as the crop was too poor.

Table 1: Weed population and lupin growth as affected by time of sowing and row spacing.

					Ryegrass			Lupin	
Sowing time	**Row spacing (cm)**	weeds/m2 prior to seeding	Establishment 18/6 (ppm2)	Weeds/ m2 3/8	Final No. plants	Plant wt. (g)	Total DM (g/m2)	Final pt. wt. (g)	Final DM (g/m2)
Dry	25	1.3	43.2	22.0	319	1.8	16.1	2.5	205.0
Dry	50	1.3	39.9	23.8	356	1.4	15.8	2.1	138.5
On the break	25	9.5	34.5	10.3	147	2.3	11.6	2.1	107.5
On the break	50	10.0	28.8	16.3	176	2.7	14.0	2.6	125.0
10-14 days after the break	25	12.8	58.9	1.5	152	1.4	5.8	1.4	151.5
10-14 days after the break	50	12.0	52.8	7.0	157	1.6	6.0	1.5	132.5
LSD 5% Sowing time		hs (3.175)	hs (8.31)	hs (8.42)	hs (89.6)	s (0.875)	ns	ns	ns
LSD 5% Row spacing		ns	ns	ns	ns	ns	ns	ns	ns

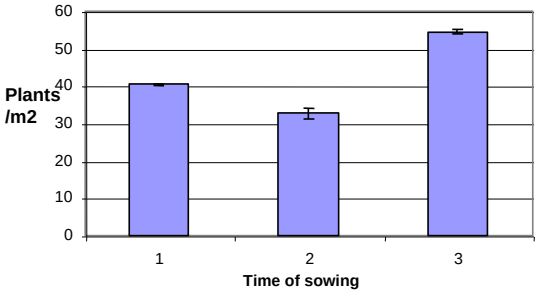

Figure 1: The effect of time of sowing on establishment.

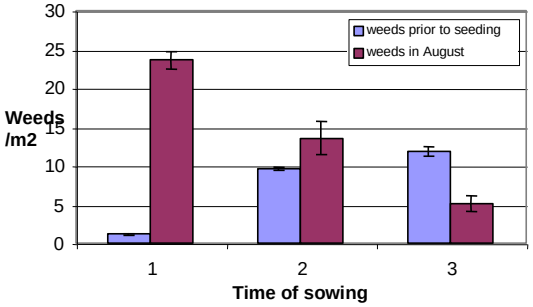

Figure 2: Weed populations prior to seeding and in August.

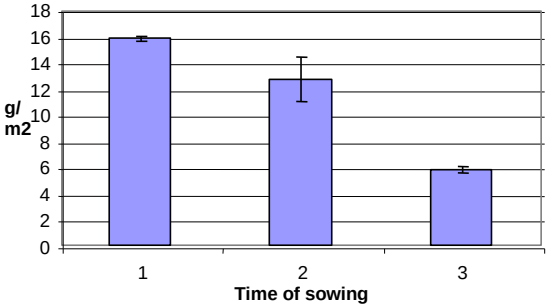

Figure 3: Ryegrass biomass at the end of the season.

COMMENTS

Dry sowing resulted in the poorest weed control at seeding and as a consequence this treatment was the weediest later in the year. Establishment was best at the third time of sowing. A well established crop will compete against weeds more vigorously than a poor established weak crop. Clearly delaying sowing is the best option for weed control. This needs to be weighed against typical yield declines of the district. Shielded spraying was not used in this trail due to the poor yield of the crop. If shielded spraying can be used effectively it will give a robust weed management option that can be utilised in conjunction with dry sowing, alleviating the need to delay sowing for adequate weed control.

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