

THE EFFECTS OF SOWING TIME AND RADISH DENSITY ON LUPIN YIELD

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AIM

The aim was to assess the impacts of delayed sowing and radish infestation on lupin yield. By doing this we can better understand the extra weed control required to make delayed sowing profitable.

BACKGROUND

Lupins were sown at two times, May 22 and June 25. Radish was seeded at different rates with the lupins. This resulted in a range of densities of radish plants which competed with the lupins. The effects of the delay in sowing and the competition with radish were monitored.

TRIAL DETAILS

Property	Wongan Hills Research Station
Plot size & replication	18m x 1.75m x 6 replications
Soil type	Yellow sandy over gravel
Sowing dates	TOS1: 22/5/07; TOS2: 25/6/07
Seeding rate	100 kg/ha Mandelup lupins
Fertiliser (kg/ha)	80 kg/ha Big Phos, deep banded at seeding
Herbicides & Insecticides	Knockdown immediately before each sowing. At seeding: 100 mL/ ha Talstar®. At 6 leaf crop stage 250 mL/ha Select®.
Growing Season Rainfall	241mm

RESULTS

Establishment

Lupin establishment averaged 49 plants per square metre. Lupin plant density declined as radish densities increased due to competition from radish plants. Radish populations followed the expected trend and density ranged from 0 to 8 plants per square metre.

Biomass

When sampled on September 20 the denser radish populations had suppressed lupin growth.

Protein

Grain protein was lower in lupins sown on May 22 compared to those sown on June 25; 33.7 per cent and 35.0 per cent respectively. Radish density affected protein content of the lupin grain. Lupins grown in plots with high numbers of radish had the highest grain protein content. This response was more dramatic for plants sown later; on June 25 rather than those sown on May 22.

Yield

Average yield from sowing on May 22 was 1481 kg/ha. This compared to an average yield of 830 kg/ha when sown on June 25. Hence delaying sowing cost 651 kg/ha or 19 kg/ha/day.

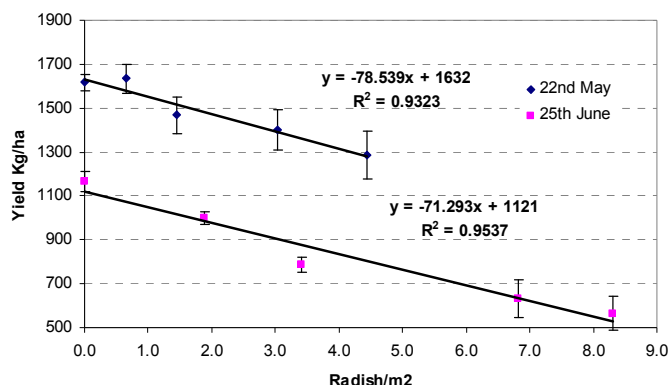
Average yield from the control without radish infestation was 1392 kg/ha. This compared to an average yield of 926 kg/ha at the highest radish populations; a loss of 466 kg/ha.

The response of lupin yield to radish infestation fitted a linear decline for each time of sowing (Figure 1). When the lupins were sown on May 22 each radish plant per square metre reduced yield by 79 kg/ha. When the lupins were sown on June 25 each radish plant per square metre reduced yield by 71 kg/ha.

Yield loss caused by one radish plant per square metre was between 70 and 80 kg/ha regardless of sowing time. Considering that yield loss per day was approximately 19 kg/ha the yield loss caused by one radish per square metre was equivalent to the loss from delaying sowing by three or four days.

Table 1: Effect of time of sowing and radish infestation on lupin grain yield (kg/ha).

Time of sowing	Target radish density (plants/m ²)					Av. TOS
	0	3	6	12	24	
22 May	1617	1635	1467	1401	1287	1481
25 Jun	1166	998	788	631	565	830
Av. radish density	1392	1317	1127	1016	926	
TOS lsd (5%)						**88.6
Radish density lsd (5%)						**89.1
Interaction lsd (5%)						*133.1

**Figure 1:** Lupin yield decline caused by radish infestation when lupins were sown on May 22 and June 25.

COMMENTS

The practice of dry sowing was promoted heavily in the 1980's and early 1990's. Many growers are reluctant to delay sowing, particularly in lower rainfall areas, because of the yield losses that are incurred. Consequently there is still a large proportion of the states lupin crop that is dry sown. Under a dry sowing regime selective herbicides are relied on to control almost all the weeds. Weeds, particularly ryegrass and radish, are developing resistances to many selective herbicides and are becoming increasingly difficult to control. Wet sowing or delayed sowing ensures the first germination of weeds is effectively controlled by mechanical tillage and non-selective herbicides.

CONCLUSIONS

- Lupin yield loss caused by delaying sowing by 3 or 4 days is similar to the yield loss caused by 1 radish plant per square metre growing within the crop.
- As more populations of wild radish develop resistances to common herbicides it becomes critical to obtain effective weed control before and at seeding.

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