

## A NEW SEED PRESSING SYSTEM FOR RYEGRASS SUPPRESSION AND HEALTHY LUPIN ESTABLISHMENT

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**Abstract** A new seeding technique - press the seed, not the soil - was developed, tested and demonstrated in comparison with the conventional methods of seeding using press wheels and harrows on lupins. The lupin seed was pressed into the soil but the soil was left relatively loose above the seed (no ryegrass-seed soil contact) as compared to firming seed and soil together by press wheels.

The new seed pressing gave excellent results in terms of early plant vigour, crop growth and establishment, ryegrass suppression and yield in a range soil-moisture environments in western Australia. During 1997 and 1998, lupin yield improvement up to 20% (on an average 10%) with 58% ryegrass suppression have been observed in field experiments.

### INTRODUCTION

In dryland agriculture, seedbed management techniques involving stubble retention, degree of soil disturbance and placement of seed and fertiliser in relation to soil moisture have significant effects on crop establishment, weed and disease control problems and ultimately on yield and productivity. The development of herbicide resistance in ryegrass now adds a major new challenge for lupin producers and its impact will be felt first and most severely by producers who have developed, and now depend on a continuous wheat lupin rotation. In managing resistance, establishment will be the key phase where success or failure will determine the viability of the wheat-lupin system.

### MATERIAL AND METHODS

In several of our experiments in 1995, when compared with harrows, press wheels (PW) generally reduced lupin establishment (by between 4 and 28%) and usually yield (from 10 to 23%) under direct drilling situations in lupin growing areas of the state. During 1996, a different technique of seed side pressing by press wheels was used instead of the conventional technique of seed top pressing to overcome the 1995 negative results and to improve lupin emergence and yield by using press wheels. Side pressing did not give the disadvantages seen from top pressing the previous year. During 1997, a new technique of pressing lupin seed, not soil, was investigated and compared with the conventional methods of lupin seeding using press wheels and rotary harrows (Amjad *et al.*, 1998).

The lupin seed was pressed into the soil for good seed-soil contact but the soil was left relatively loose above the seed (no ryegrass seed-soil contact) as compared to firming seed and soil together by press wheels. For the new seed pressing technique, the seed boots were taken from the seeding tines and mounted directly in front of press wheels by using specially made tube holders. The press wheel pushed seeds into the groove and the furrow was partially filled using the light rotary closers. Throughout the season, crop was monitored in terms of early vigour, crop establishment, ryegrass suppression and yield. A catcher bin attachment was used on the harvester to collect ryegrass seed.

### RESULTS AND DISCUSSION

Lupin yield improvement up to 23% has been observed in field experiments. Table 1 shows the average ryegrass seed numbers and lupin yield results from a time of sowing experiments at Wongan Hills. Seed pressing gave 10% better yield and 58% better ryegrass suppression than the conventional practice of top pressing using press wheels respectively. Side pressing was not significantly different.

This approach allows better seed-soil contact, moisture conservation, deep fertiliser placement, and better seed cover and herbicide incorporation and is an inexpensive adaptation for conventional seeders. Many farmers have reported the adaptation in their existing machinery systems and are now pressing the seed into the groove rather than pressing the soil on top of the seed, not only for lupins but also for cereals, pulses and canola. This work needs to be demonstrated for establishment of more healthy crop and weed suppression for all grain and oilseed crops in a range of soil-moisture environments.

**Table 1.** Comparison of new seed pressing technique with the top (conventional) and side pressing using press wheels on ryegrass suppression and lupin yield.

Seeding method	Ryegrass Seed Nos. m <sup>2</sup>	Lupin Yield (t/ha)
Top press - Conventional	176	1.37
Side Press - Improved	153	1.43
Seed Press – New method	74	1.51
LSD (0.05)	70.4	0.09

#### CONCLUSIONS

The development of a new seed pressing technique which is simple and inexpensive but readily adaptable to existing systems, is the most significant research discovery of this GRDC funded project. Seed pressing can give up to 20% yield improvement compared to the conventional systems. Other additional benefits are weed and disease suppression due to healthy crop growth and establishment, thus reduction in chemical costs and seeding rate.

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#### REFERENCES

Amjad, M., Riethmuller, G. and Jarvis, R. (1998). Pressing lupin seed, not soil is better. Crop Updates, Perth, 18-20 Feb.