

Evercrop explores low risk lucerne establishment for the Mallee

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Key messages:

- Lucerne establishment can be enhanced through the use of lupin cover crops.

Aims:

- Investigation of potential cover crops for protecting lucerne during establishment.

Background:

Lucerne can deliver many benefits to mixed farming systems, including greater drought tolerance due to its deep tap root, ability to convert summer rainfall into high quality feed and through the supply of nitrogen to following crops. Up to 80% of arable Mallee soils are suitable for lucerne, yet adoption remains low. In a recent farmer survey conducted by the DPI Victoria, poor establishment was considered a major constraint to the adoption of lucerne by mixed cropping and livestock farmers in the Mallee region. In response to farmer concerns, the Low Rainfall Evercrop project funded by the CRC for Future Farm Industries and the GRDC, has been exploring different strategies for enhancing lucerne establishment to facilitate greater adoption.

About the trial:

Field research commenced in 2008 to investigate the potential of cover crops (seeding two or more plant species simultaneously) for protecting lucerne seedlings from sand blasting during establishment whilst providing an income in the first year. Past research in South Australia recommended sowing lucerne at 1 - 2 kg/ha at 0.35 m row spacing behind the covering tines of the seeder, which were between every second 0.175 m spaced sown crop row. The risk of cover crops out-competing the lucerne was also investigated. An experiment was sown at DPI, Walpeup in June, where lucerne was established under lupin and barley cover crops at different spatial plant arrangements, and compared with lupin, barley and lucerne sown in monoculture (see Table 1) to determine if plant competition could be mitigated.

Table 1. Treatment descriptions for the lucerne establishment field experiment at Walpeup

Treatment	Treatment description
Barley all row Lucerne alt row	Barley cover crop sown in all seeding rows with lucerne sown with barley in every second seeding row.
Barley all row Lucerne nil	Barley sown alone in all seeding rows.
Barley alt row Lucerne alt row	Barley cover crop sown in alternate seeding rows to lucerne.
Lucerne alt row	Lucerne sown alone in every second seeding row.
Lupin all row Lucerne alt row	Lupin cover crop sown in all seeding rows with lucerne sown with lupin in every second seeding row.
Lupin all row Lucerne nil	Lupin sown alone in all seeding rows.
Lupin alt row Lucerne alt row	Lupin cover crop sown in alternate seeding rows to lucerne.

Initial plant populations from the lucerne sown in alternate rows to a lupin cover crop were equivalent to populations where lucerne was sown alone (see Figure 1). Lucerne populations were lower where lucerne was sown in the same seeding row as a lupin cover crop or in alternate rows to the barley cover crop and lowest where lucerne was sown in the same seeding row as the barley (see Figure 1 and 2). Lupins provided less competition than the barley cover crop with competition further reduced by alternate row sowings. Furthermore lupin cover crops allow the use of additional pre-emergent herbicide for controlling grasses and broadleaf weeds which are not suitable in barley crops.

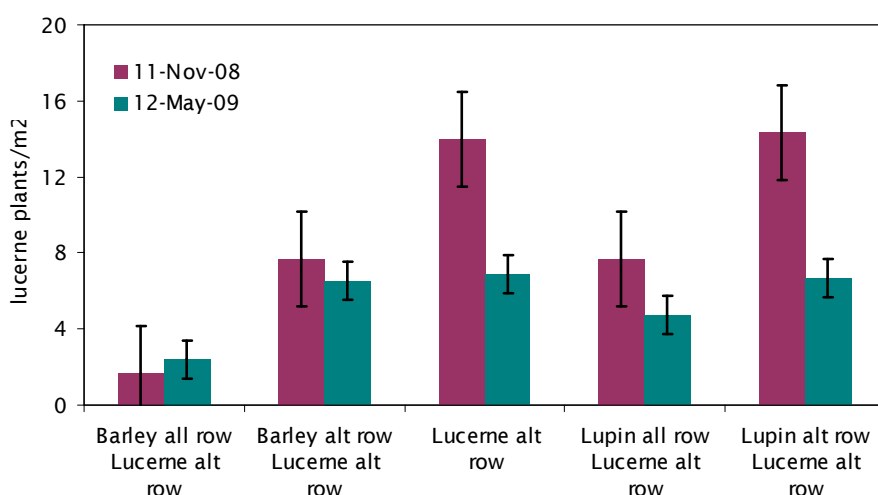


Figure 1. Lucerne plant populations measured on the 11 November 2008 and 12 May 2009 at Walpeup under different lucerne establishment strategies.

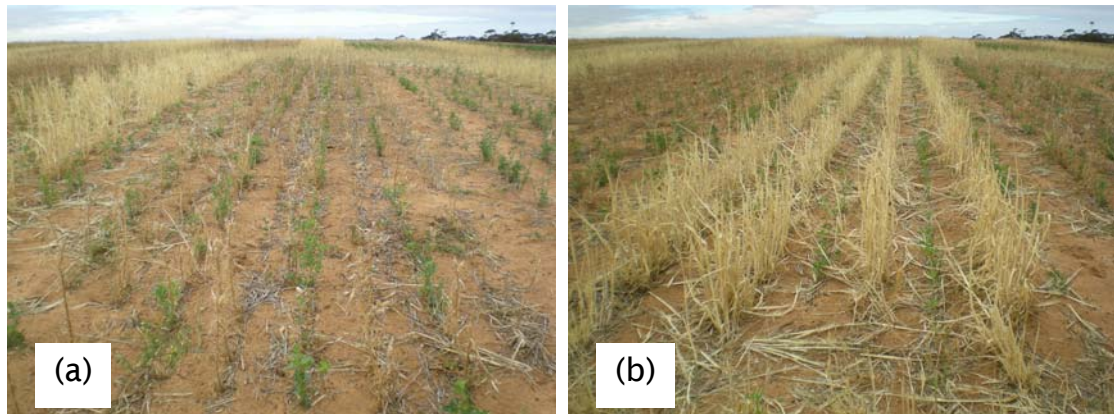


Figure 2. Lucerne established in (a) alternate rows to lupins and (b) in alternate rows to barley

Results:

In the summer after establishment, plant populations in the lucerne monoculture and the alternate seeding rows to the lupin cover crop, declined to similar levels as the other lucerne establishment treatments (see Figure 1). This decline came about from dry conditions experienced over the second half of the 2008/09 summer when only 7 mm of rainfall was recorded from the beginning of January to the end of March. The fact that a similar decline occurred in the monoculture and the cover crop suggests that the cover crop did not out compete the lucerne.

Grain yields were unaffected by the presence of lucerne seedlings despite a growing season rainfall (April - October) of only 115 mm. (see Figure 3). This indicates the potential of cover crops to provide an income in the establishment year for lucerne without penalising either the grain crop or lucerne. Although lucerne pod contamination of the harvested cover crop grain was not an issue last year, under more favourable growing season conditions, contamination may represent a limitation to the use of cover crops for establishing lucerne.

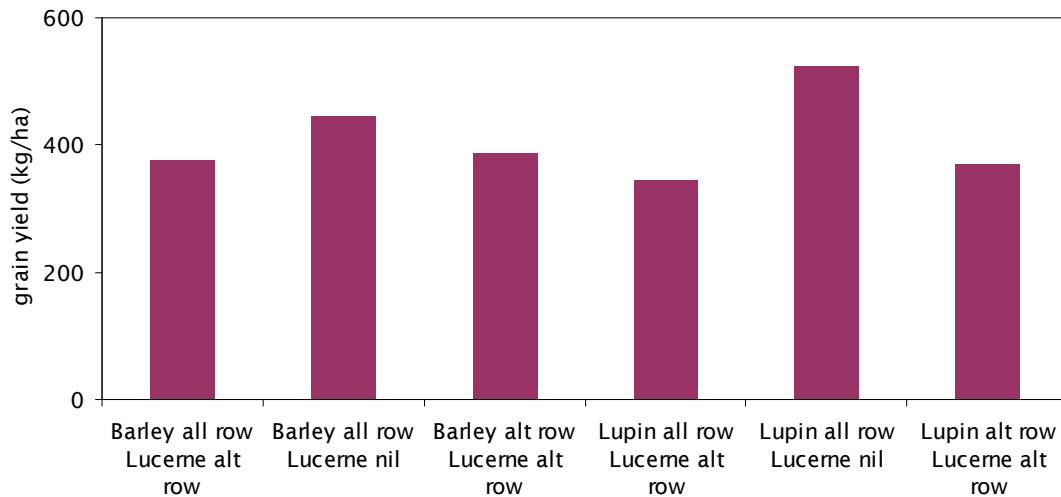


Figure 3. Grain yield measured on 24 November at Walpeup from lupin and barley sown as cover crops with lucerne and sown alone in monoculture.

Future Directions:

Plans are underway to establish an Evercrop site at Werrimul (the Northern Victorian Mallee) through collaboration with the Mallee CMA. Kevin Chaplin, from the Mallee CMA, is working with a group of farmers from the Millewa Carwarp Landcare Group who are keen to investigate and learn more about the potential role of forage shrubs and dual purpose cereals on marginal cropping soils.

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