



farmtalk



This article contains information most relevant to the less than 350 mm rainfall mallee farming region

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Lucerne in the mallee

Andrew Schipp - District Agronomist, NSW Agriculture
Peter Field - Farming Systems Officer - Department of Primary Industries, Vic
Sean Murphy - Farming Systems Hydrologist, NSW Agriculture

Summary

Lucerne (*Medicago sativa* L.) has a deep root system and a high demand for stored soil water. This makes it an attractive option to return lost water to the production cycle in the Mallee, which often occurs on these lighter, sandier soils. Lucerne can be incorporated into current farming systems with minimal change to machinery or management. Mallee Sustainable Farming Inc. Focus paddock soil monitoring results indicate that:

- up to **69%** of focus paddocks have a high probability of lucerne persistence with greater than 250 mm of plant available stored soil water; and
- at least **40%** of focus paddocks offer the opportunity for successful lucerne establishment where sub soil constraints were low.

The issue

Lucerne can offer a wealth of benefits to Mallee farming systems. Plant breeding programs have developed varieties that are better suited for low rainfall cropping regions like the Mallee. However, surveys of farmers in the Mallee, conducted by MSF Inc., have shown that only **2%** of farmers grow lucerne.

Why is the planting of lucerne not being adopted? Consistent feedback from the farming community suggests that concerns about establishment, management and removal from the farming system all contribute to the low rate of adoption of this legume based pasture.

What we know about lucerne in the mallee

• **Extended growing season:** There are farmers successfully growing lucerne in the Mallee. In mixed farming enterprises, these growers have found lucerne to be particularly useful for filling the feed gap often

experienced in autumn. Lucerne also extends spring growth and responds to summer storms by providing high quality green feed.

• **Weed control:** A lucerne phase can provide opportunities for alternate weed control strategies in cropping rotations. Knock-down herbicides (e.g. Sprayseed® 250) or residuals (e.g. Diuron or Atrazine), can be applied to control grass weeds in stands without significant damage to the lucerne. The use of these chemicals can help avoid herbicide resistance issues related to the use of selective Group A chemistry. Research conducted at the Mallee Research Station, Walpeup, also suggests that lucerne pastures are very competitive against summer weeds (e.g. skeleton weed) and can be an additional tool for managing weeds in fallows (see Table 1).

Pasture species	Skeleton (plant/m ²)	Heliotrope (plant/m ²)	Others (plant/m ²)
Lucerne	2.33	0	0
Medics	4.33	52.17	5.33

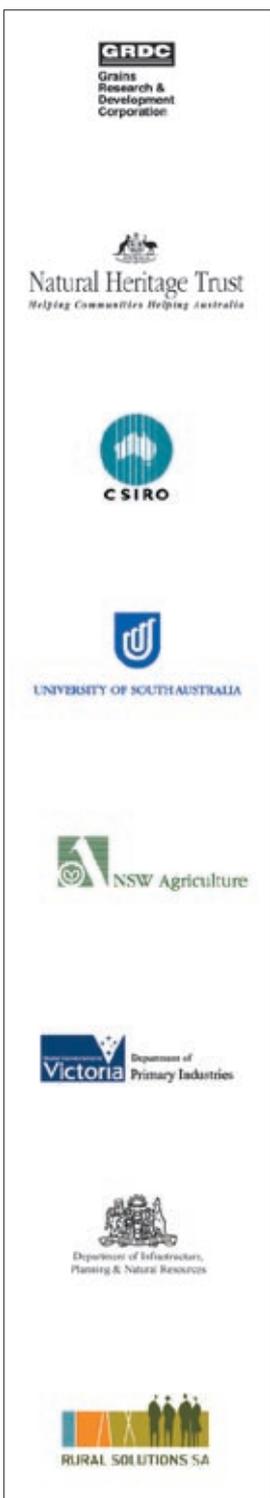
Table 1. Average plant density of summer weeds under lucerne and medic pastures in summer 1998 at the Mallee Research Station.

• **Nitrogen fixation:** Field research conducted by DPI Victoria at the Mallee Research Station, Walpeup, has shown that lucerne can improve the supply of nitrogen to following crops (Table 2). NSW Agriculture research suggests that lucerne grown for 3.5 years can eliminate the need for additional N in the next 5 crops (AgNote DPI-429), providing that the stored N is not leached out. The release of N to the farming system continues (up to 5 years) as the lucerne plant residues decompose.

Pasture species	% Change Soil Mineral N	Kg/ha Change Soil Mineral N	Soil Mineral N Sowing 2000
Lucerne	24%	16.3	74.5
Medics	56%	25.6	62.5

Table 2. Change in Soil Mineral Nitrogen Content Over a Two Year Pasture Phase at Speed, Vic 1998-200

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- **Deep drainage:** Lucerne can combat deep drainage when grown in a phase with annual cropping systems. It can retrieve water from deep in the profile and reduce the risk of groundwater recharge.

- **Lucerne establishment:** Consider the following points for success.

- **Soil water** - adequate supply for germination and for seedlings to survive for at least a few weeks without a follow-up rain
- **Weed control** - critical as weeds will compete with seedlings and reduce the number of established plants. Avoid paddocks where weeds are a problem as broadleaf herbicide options in seedling lucerne are limited.
- **Herbicide carry over** - ensure the soil is free of any potentially damaging herbicides for at least two years prior to planting
- **Seeding depth** - sow lucerne shallow (eg 5-10mm depth). Use press wheels to obtain better seed-soil contact and so improve emergence. If you sow lucerne with a companion crop, reduce the sowing rate of the crop by at least 40%, or go for alternate row configurations.
- **Cover crops** - using a cover crop, such as a cereal, is often seen as more economical than establishing lucerne on its own. The downside is a poorer establishment when compared to a pure lucerne stand. Plant densities are likely to be lower as the lucerne must compete with the crop for moisture and nutrients.

- **MSF Inc. Focus Paddock results:** Soil coring of MSF Inc. focus paddocks has helped identify some sub-soil constraints that may limit lucerne performance. Results indicate that:

- lucerne is **intolerant** of **acid** (pH <5.5 in CaCl₂) and **saline** (ECe >15 dS/m) soils;
- **acid soil** conditions were found in 14 of the 41 MSF Focus Paddocks at various depths between 2.5 and 6.0 m, limiting the rooting depth of lucerne;
- **saline soils** were found in 14 of 41 MSF Focus Paddocks at depths between 2.5 and 6.0 m; and
- other sub-soil constraints, such as concentration of boron and excessive alkalinity, may also reduce lucerne performance.

What you can do

To decide if lucerne may play a role in your farming system, you will need to consider the following.

- Rotation options (ie. 3 years of lucerne

followed by a resumption of annual crop sequences).

- Assess the potential role and use of lucerne in a mixed farming system
- Determine the goals and requirements of your livestock production enterprise and infrastructure.
- **Weed control options.** Think about options up to 2 years prior to establishment of lucerne to avoid use of residual chemicals that may impact on growth.
- **Stored soil water.** If soil water in the potential root zone of lucerne is marginal at pre-sowing (less than 250 mm), you may have to consider deferring planting until the following season.

Where to from here?

There are still a number of questions that research needs to answer about lucerne in the Mallee. These include the:

- sensitivity to subsoil constraints;
- spatial distribution of subsoil constraints;
- most effective grazing management in large cropping paddocks with multiple soil types;
- effective ground cover management; and
- the economic role of lucerne in the Mallee, including the benefit of returning soil water to the production cycle.

Further reading

- Success with Lucerne (1994 –2002), Mark Stanley, Ross Britton, Raymond Christinat, Primary Industries and Resources South Australia (PIRSA)

- Crocker G and Collett I (2003) Lucerne boosts cereals in crop rotations. AgNote DPI-429 (NSW Agriculture: Orange)

Technical contacts

Andrew Schipp

NSW Agriculture, Hay

Ph - 02 6993 1608

Email andrew.schipp@agric.nsw.gov.au

Peter Field

Department of Primary Industries, Swan Hill, Vic

Ph - 03 50 364 806

Email Peter.Field@dpi.vic.gov.au

Sean Murphy

NSW Agriculture, Tamworth

Ph - 02 6763 1244

Email sean.murphy@agric.nsw.gov.au

For general Farm Talk information contact

Gill Stewart, Extension Leader, MSF Inc.

Telephone 03 5021 9411

E-mail Gill.Stewart@dipnr.nsw.gov.au

Mallee Sustainable Farming Website

www.msfp.org.au

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