

GRAIN & GRAZE 2 CASE STUDY

Lucerne crop rotation improves water management

Written by Michelle Handley, Farm and General, Esperance
(May 2012)

Profile

Marg & Rob Agnew

Location: 'Brigadoon', Neridup, 35km north east of Esperance.

Farm Size: 870 ha

Annual Rainfall: 400mm (25% falling in summer)

Soil Type: Sand over gravel and heavy gravel.

Enterprises: 1200 mated merino ewes and lucerne followed by a 2 year cropping phase, of canola and a cereal, or two cereals.

For Marg and Rob Agnew, lucerne has become the most important plant grown on their Neridup property.

Before a major flood event in 1989 when a wall of water swamped their property, the Agnew's started to realise that they were facing a challenge to their long-term sustainability. They were seeing the beginnings of a rising groundwater table and salinity encroaching on some of their paddocks. They understood that this would impact on the productivity of their mixed livestock and cropping farm if they didn't start to address the problem soon. Clearly, water management needed to be factored into the way they approached farming practices on their property. Hence, the Agnew's first crop of lucerne was planted. Predominately they were aiming to stop the water-table from rising any further as well as keep the loss of productive cropping land to a minimum.

With no local experience to draw on and only eastern states reference material available, the Agnew's remained confident that a deep rooted perennial crop needed to become part of their farming system. In order to ensure the lucerne crop was having the desired effect, thirteen water-table observation wells were installed across the farm in the same year.

Marg and Rob quickly learnt that lucerne persisted well for 4-6 years on their sand over gravel soils but was less persistent on their heavy gravel areas. Knowing this factor, they divided their farm into two, 260ha suitable for lucerne, and the remaining 610ha for 'year in year



out cropping and grazing. They quickly developed a rotation on the 260ha portion that matched the need for replanting of the lucerne.

Currently this rotation remains at a lucerne lifespan of 4-6 years, followed by two years of crop, and then reseeding back to lucerne. At any one time 150-175ha of the 260ha will be growing lucerne. However, the length of the lucerne rotation is never static as the Agnew's will let the declining lucerne plant density tell them when to switch to a two year cropping phase, which normally constitutes canola and a cereal crop, or two cereals.



ABOVE: A four year old stand of lucerne on "Brigadoon", Neridup.

Experience has proven to Marg and Rob that a two year cropping break is important for the establishment of a lucerne stand because it helps to reduce the impact of soil-borne root diseases and root colonising insects such as vegetable weevil and small lucerne weevil. The break is also important for the control of broad-leafed weeds such as wild radish and capeweed which are hard to control with chemicals when seeding lucerne. However, observation of surface groundcover and monitoring of the water-table observation wells has demonstrated that, for their property, they should not stretch the cropping phase beyond two years. Without lucerne, low lying depressions quickly show signs of water-logging and surface salinity.

To establish their lucerne, the Agnew's approach it in the same way they would establish any grain crop, with attention paid to soil acidity (pH levels), nutrition, weeds and insects.

In 1989, there was no lime available in Esperance but since a local pit opened in the mid 1990's, lime is now applied at 1.5 to 2 tonnes /ha every four years to maintain subsoil pH between 5 and 6 in CaCl. An NPK (12N, 12P, 8K) compound fertilizer with added zinc and copper is also used for their crops is dispersed at sowing time for the lucerne, superphosphate is applied annually in autumn at 120kg/ha.

In addition, they noticed that as the lucerne stand gets older, potassium deficiency can become evident in times of rapid growth, normally in spring and after grazing. To mitigate this they apply muriate of potash. Peat *Rhizobium* inoculant is always used when establishing and re-establishing lucerne if there is soil moisture at sowing. If conditions are dry at sowing, Alosca granular inoculant is used.

Regular monitoring of the seedling lucerne is vital to identify signs of insect infestations, such as red legged earth mite and blue green aphid, before they can cause significant damage and/or patchy establishment of the lucerne stand.

Marg and Rob consider their lucerne functions as a constant living haystack which means they don't have a big need for handfeeding, particularly during autumn lambing. This contributes to a reduction in the management effort and financial burden that comes with farming in a region with variable summer rainfall, thus helping to drought-proof their property.

However, two significant stock management issues have been learnt over the years when in grazing lucerne. Firstly, to achieve maximum benefits from lucerne an investment in infrastructure is needed to subdivide paddocks into smaller ones to allow shorter grazing periods.

The second issue that has arisen is that during periods of rapid lucerne growth, stock must be supplemented with sufficient roughage to balance the high protein they are consuming. Marg and Rob have found that oaten hay provided on an ad-lib basis is enough to manage this issue.

In terms of overall farm productivity, and with 22 years of experience with lucerne and cropping under their belt, Marg and Rob prefer to make a conscious mind shift to cropping being the priority for that paddock in any particular season. This decision ensures all of their agronomic decisions are best suited to the crop and any negative effect on the remaining lucerne is not factored in.

They have also seen that in a year with a below average spring rainfall the crop following a lucerne rotation is likely to have a lower yield than a crop following an annual pasture. This is, however, balanced by an increase in the quality of grain with wheat protein at 14.5%, produced from the lucerne paddocks; the stock feed benefits of the lucerne; along with the water management benefits. All which contribute to maintenance of the arable cropping land available on the property.

Acknowledgments



The Grain & Graze 2 project is supported by GRDC and DAFF through funding from the Australian Government's Caring for our Country Programme.



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