

Too dry? - Pastures in the wheatbelt:

Using Lucerne in a Cereal Cropping System

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Summary: The engine room of a farm is its soil. Management and the rainfall can vary the production from this soil between weeds, good pastures, profitable and unprofitable crops. In this paper, I have set out how lucerne has been used in our cropping rotation to produce not only profits but good soils for long term sustainability.

My first farming experience was with wheat and sheep on red soil west of Gulargambone. When we purchased Hatton in 1960 we planned to commence a similar operation, on what had been a grazing only property. We were to become the first wheat growers in the locality. We have continued to grow wheat for the past 36 years and seen the cropping area increase to at least 20% of the surrounding land.

The Property, 'Hatton'

Hatton is situated sixteen kilometres north of Warren. Average rainfall has been 461 mm for the last thirty-six years. Property size is 1,550 ha. Approximately 60% of the area of Hatton has a red clay to sandy loam on land that was originally thickly timbered with pine, box, wilga and buddah. It has phosphate levels of around 40 mg/kg on the Bray scale. The balance of Hatton has grey brown clay soils on areas that were open plains with phosphate levels less than 20 mg/kg. The pH on both soil types is around neutral.

Lucerne has been grown primarily on red soil on Hatton.

Development

Red soil areas on Hatton had been cleared for grazing around the turn of the century, but these were frequently problem areas in spring and summer, due to grass seed from barley grass and corkscrew. We commenced a programme of cleaning up dead timber; clearing some more of the green timber and we initially grew wheat to pay the bills.

Rotation of Crops

We felt that continuous cropping was not viable on Hatton and that a rest phase would be beneficial after a period of cropping. The options for the rest phase as we saw them were:

- Option 1. Cease cropping and wait for natural species to return. This is still a common practice in the district.
- Option 2. Sow lucerne

We went with the second option as lucerne was being successfully used in cropping grazing rotations not far to the east of us by the mid-sixties. Rotation of crops has always been a problem due to uncertainty of rainfall, but our aim was to sow lucerne after four to five winter crops. Linseed, safflower, canola and oats have all been part of this rotation at different times.

Sowing Technique

We purchased a band seeder approximately thirty years ago to attach to the back of our combine. This has been extended numerous times. Sowing lucerne with the band seeder has only once failed to produce an excellent result. I should add that we always tried to sow lucerne blocks as soon as possible after rain. Lucerne has always been undersown to wheat except in one year when rain was too late. Wheat is sown at approximately 20 kg/ha and lucerne at 1.5 kg/ha. We also added a mix of two medics at 0.5 kg/ha to give a total pasture mix of 2.5 kg/ha. This seemed about the lowest rate a small seed runs evenly from the machine. Our lucerne seed has always been inoculated.

With this system of lucerne establishment we have been able to stock new stands at our normal rate 12 months after sowing.

Extra Productivity

Natural Pasture areas on Hatton regularly carry approximately 2.5 DSE/ha and average grazing lucerne stands 5 DSE/ha and often better. Comparative analysis by the Gulargambone Rural Advisory Service (GRAS) shows a similar increase on other properties (Figure 1). Higher stocking rate coupled with elimination of the grass seed problems

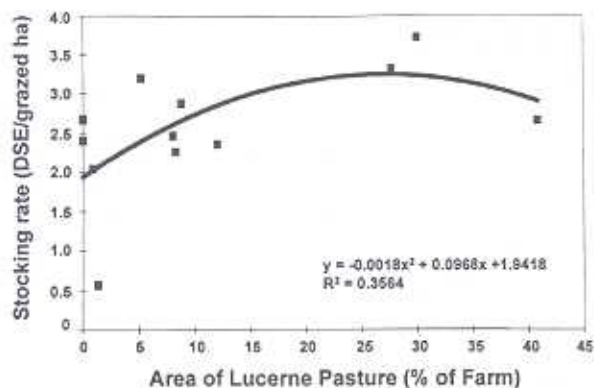


Figure 1. Merino stocking rate versus area of lucerne pasture as a percentage of farm area. (GRAS Data 1995/96).

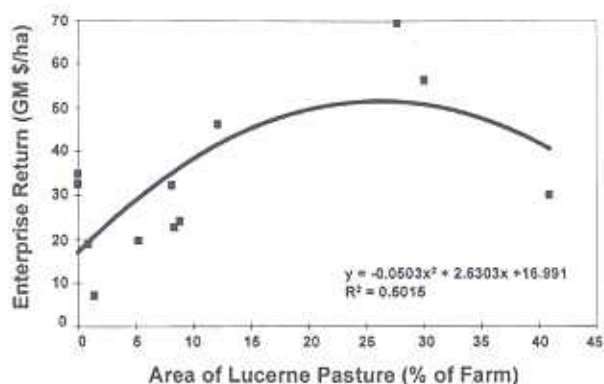


Figure 2. Gross margin for Merino sheep versus area of lucerne pasture as a percentage of farm area. (GRAS Data 1995/96).

made the lucerne a very profitable rotation for us. Our experience is supported by that of the GRAS group (Figure 2).

We have never taken the 'Option 1', I mentioned earlier, of rotation with natural weeds. However I am sure the stocking rate on this system would take something like two years to increase to a rate comparable to a natural pasture area.

Management

With the great variability of seasonal conditions, we've had years when young lucerne has been a problem in the wheat sample! On other occasions there has hardly been any evidence of lucerne at harvest and we've had to wait for summer rain to see much of it. In the first situation a quick light grazing took place after harvest and in the latter, first grazing has been delayed until autumn. Our aim has been to have 4-5 paddocks of 40-50 ha. These carry approximately 1,500 DSEs of sheep only, with an average grazing time of 10 to 14 days. I'm aware this is less resting time than we hear from

the research people, but we have to have some compromise between paddock size, watering points and so on.

Our system has always been flexible, changing from an excellent season when a block or two could be cut for hay (on a share basis) to a drought situation when an area has been completely destocked.

Our endeavour has generally been to use lucerne for young stock. For example, we would wean lambs into lucerne in September ahead of the barley grass problem period. Whenever the rain fall was frequent enough, it created times when wethers were of sufficient weight to sell into the fat market before they were twelve months of age. We did this on numerous occasions, when the fat market was better than the store market.

A disadvantage of this strategy was that as the lucerne thinned there were always a few 'undesirables', eg. barley grass and black oats, in danger of seeding in the paddock we've quietly held waiting for the weaners. A strategic spray can fix the problem, but may burn off the lucerne as well!

Weed Control

Weed control is most important in the crop into which the lucerne is undersown. Broadleaf weed such as mustard types are usually sprayed in all our cereal crops. We are generally successful with 2,4-DB and Tigrex® when we have a particular problem with wild radish. Grasses such as vulpia, can be a problem coming into the second or subsequent winters but these can be economically controlled with grass herbicides such as Sertin® or Verdict®. We have only done this once.

The most important point on weeds is that one should stop grasses seeding in the final year before going back into cropping. A well-timed application of Roundup is an economical way of achieving this. We aim to spray when grasses are at the milky dough stage.

Going out of Pasture Phase

It is difficult to predict the best time to change from the lucerne phase back to cropping.

The stand can decline quickly if a hard autumn and winter follow a summer drier than average. Barley grass and similar weeds can invade a weak lucerne stand and use nutrients that should have been available for the cropping phase. It is relatively easy to plough out a lucerne stand that has been weakened by borers, moisture stress and weed competition.

On the other hand it is very difficult to remove a strong lucerne stand. We removed a lucerne stand in the recent summer. To achieve this we sprayed with Roundup® mixtures in spring and summer, then chiselled the paddocks twice. The paddocks will be

chiselled the paddocks twice. The paddocks will be sprayed with a third dose of Roundup® in the autumn.

Moisture Infiltration

The red soils on Hatton set quite hard in a grazing lucerne paddock and heavy rain will frequently run to the lower areas. However the incidence of this killing the lucerne is very slight. I attribute this to the taproot of the lucerne allowing water to drain quickly in these areas - an uneven growth pattern will then be noticeable around the paddocks. This is not a problem. Low areas that used to pond after heavy rain no longer do so, since lucerne has been in these paddocks.

Effect on soil nutrition

This is difficult to quantify as we've not taken soil tests after four years of lucerne and compared the results with, for example, the soil tests taken prior to the crop being sown to lucerne. However we have seen a trend of higher protein in the first wheat crop following lucerne than in later crops.

Direct drilled second year wheat produced around 3.5 t/ha and 14% protein, caused by pinched grain. Direct drilled third year wheat produced only 1.7 t/ha with 10% protein. This latter paddock should have been cropped to canola for a disease break. We felt at the time the sowing window was too late and sub-soil moisture inadequate. However, who would have predicted a 1996 winter/spring?!!

A third area was sown after a last minute decision, direct into a 4th year lucerne stand that had thinned considerably in early 1996. We sprayed as it was coming away, with 1.5 l/ha Roundup. The soil was quite hard on top but a good emergence resulted and crop yield was 3.7 t/ha and 12% protein without fertiliser.

The Move to Minimum Till

Red soils in our district, and in a wide area of the central west, are low in organic matter. They are prone to blow in the dry summers and autumns we've had in recent years. They will also wash with heavy rain if there is some slope. These soils set hard after rain and problems with crop emergence can occur if rain falls shortly after sowing. For these reasons we have been making a move to a reduced and if possible a no tillage programme prior to sowing. Just how lucerne will fit into this system is

still being examined.

Where to Now?

An off river irrigation scheme came through Hatton in the mid seventies. After seven years of trying various irrigation crops a change was made to cotton growing. This coupled with other changes in land ownership has resulted in us no longer owning sheep. Consequently, no lucerne will be sown this year. We plan to sow canola into paddocks that have had more than one cereal crop in the current rotation.

Conclusion

Lucerne in our cropping rotation has been very successful and beneficial to our operation for the following reasons:

- We have doubled stocking capacity from the lucerne as compared with natural pasture areas on the property.
- There has been increased productivity from stock run on lucerne. This is due to the almost complete elimination of any grass seed problems and the generally higher body weights of the stock as compared with those on natural pasture areas.
- Protein in wheat crops following lucerne has been higher in the initial years following a lucerne phase.
- Lucerne has been a fairly easy and not very expensive crop to establish on Hatton. Lucerne is far more productive than the alternative rotation with natural weeds.

For all of these reasons I believe lucerne should remain an essential component of a cropping system in this wheat sheep region of NSW.

Removing the lucerne is the real challenge!. They were then chisel ploughed on 30cm spacing to approximately 10 cm. I did this because I felt the soil needed to be opened to allow even moisture retention. The lucerne should have thinned on this treatment but coupled with a wet spring/summer it now appears thicker than in September, though we've not done plant counts. It was also sprayed in January with 1.2 L/ha Roundup® and 120 ml/ha Garlon®. This achieved a good kill on weeds but very little effect on lucerne and the area has since been cultivated as the next rainfall resulted in weeds that could not economically be sprayed.