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PERENNIAL PASTURE MANAGEMENT:

Perennial pastures in a crop-ley farming system - a personal perspective

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Coolamon

Summary: The Dyce family property is typical of many in the Eastern Riverina. It is of average area and the crops are produced in rotation with pastures in a ley system. What is quite different however, is the large and increasing proportion of the pastures which have a perennial component composed of phalaris and lucerne. In addition, cattle make up a significant proportion of the stock. This paper outlines the pasture establishment methods used, management imposed and presents the advantages of the perennial pasture system. It also briefly describes crop establishment following phalaris pasture.

We farm approximately 700 hectares 30 kms north west of Wagga Wagga. The rainfall is about 525 mm. The soils are two thirds loam and one third gravelly ridge, the whole area including the gravel being a quite reasonable red soil, typical of the Coolamon area. The natural pH approaches 6 in water where no farming has taken place. The farmed areas are about 5 in water and down to 4.4 in $CaCl_2$ with relatively low levels of Al and Mn - the highest Al readings being about 11 in small patches.

History

My father, Colin, purchased 259 ha in 1948, at that time only 8 ha had ever been sown to lucerne. The farm had been cropped using long fallows. Colin sowed clover and applied superphosphate; greatly improving, productivity.

In the mid sixties we began sowing lucerne and subclover pastures regularly at the end of each cropping rotation on the then 526 ha property. The drought of 1967 demonstrated the ability of lucerne pastures to provide feed at times when annual pastures failed to do so.

In the late eighties Colin began sowing lucerne, phalaris and clover pastures: the perennial grass being introduced for four reasons; lucerne production had begun to drop with soil acidification; Cattle were brought from a grazing property which we had sold, and we were also looking for some weed competition and insurance of still having a good perennial pasture if the lucerne failed to establish.

The first 62 hectares of lucerne and phalaris established proved to be a very good pasture, supporting fifty cows and calves quite comfortably for a number of years.

Preparation for pastures establishment

The usual rotation we use is four years of pasture and four years of crop. Weed control is usually started two seasons before cropping by spray topping the pasture with Gramoxone®, or Roundup®. The following winter the pasture is usually winter cleaned with simazine and a broadleaf spray. The paddock is then spray fallowed in September using 1.2 litres of Roundup® plus a miticide spray. This program is kept very flexible according to what weed problems exist and a weather eye is kept on herbicide resistance.

The paddocks are then limed before harvest with 2.5 t/ha (or if finance is limited, with half that amount which has still proved successful in establishing pasture). They are then worked with a scarifier using narrow points in the early autumn for weed control and to help incorporate the lime.

Our usual crop rotation is canola, wheat, lupins, barley. This rotation is not followed religiously and grazing oats are used at times, and at the moment we are looking for another pulse crop that is a bit more profitable. This basic rotation provides some very good weed control options without using the same chemicals too often thus slowing down the onset of herbicide resistance.

Establishment

Pasture is established in one of two ways; either under a cover crop in the autumn/winter or direct drilled in the early spring.

The direct drill-no cover crop option is usually taken in problem weed paddocks or when we have a feed shortage and want some winter grazing. Our usual process is to sow oats and graze it heavily in late winter then spray it out and direct drill the pasture in late August or early September. A mite spray is added when the crop is sprayed out and as we use only a conventional combine it is sometimes profitable to use a light working with a wideline where there has been heavy traffic by stock in the grazing process. Under our conditions weed control is not usually needed in the establishment phase of the pasture with a spring sowing. This method of establisment has probably provided higher establishment rates than under sowing in autumn.

Establishment of pasture under a cover crop is our usual method of establishment. We have established phalaris, lucerne and sub-clover pastures under wheat or barley sown at 20 to 30 kg/ha; the lower rate giving more consistent results. We have also had success under Mortlock oats at 12kg/ha, the oats yielding 2.0t/ha. A vigorous cover crop needs to be sown at a lower rate to achieve the same establishment result compared with a less vigorous cover crop.

At the moment we are still using a conventional combine with a small seeds box. A bandseeder attachment on the small seeds box allows reasonably accurate placement of the pasture seed, but leaves a restricted amount of room to level the soil between the last tynes of the combine and the placement of the pasture seed. This is not a problem in a clean seed bed as a bar dragged behind the tynes does a good job of filling furrows and avoiding excessive burial of the small seeds. A problem arises where the seed bed is trashy -such as broken down lupin stubble. The build up of trash around the last row of tynes and the bar necessitate the bar being left off. This can be compensated for by leaving off the covering harrows.

The seed placed in the bottom of the furrow is not buried but the paddock is left very rough. I am sure a trailing bandseeder would cope with trash much more easily.

When under sowing pasture, every second seed row in the combine is blocked off. The lucerne is sown between the cover crop rows and the more competitive phalaris is sown close to crop row. We use the clover seed mixed with both the lucerne and the phalaris to adjust the relative sowing rates of the perennials. The small seeds box has divisions for each run to allow different mixtures to be sown alternately. Our pasture sowing rates are usually about 2 kg/ha lucerne 1 kg/ha phalaris and 3 kg/ha sub clover although we have established effective pasture at half this rate. At the moment we are using Aurora, lucerne, Sirolan or Sirosa phalaris and a mixture of early and later varieties of sub clover.

I tend to avoid sowing the crop too early as I have found crops sown in April and early May often grow very vigorously and shade the pasture through the winter reducing the number of pasture plants that survive.

Clover and lucerne seed is inoculated and very lightly lime coated and treated with Apron fungicide. I don't treat the seed with a miticide but I do apply a bare earth pesticide treatment as the lucerne can be killed by mite before you even see it emerge. We normally fertiliser with about 100 kg/ha of DAP.

Weed control

We try to get as much weed control as possible through the rotation. If it is necessary to spray in the pasture establishment phase then a number of broadleaf options can be used and black oats can be controlled with Avadex BW® -Treflan® is not an option with phalaris; if grass weed control is necessary it may be wise to lift the sowing rate of the phalaris by fifty percent.

Cost of establishment

The total cost of seed is in the order of $25.00 per hectare. It may be necessary to allow for a more expensive herbicide if weed control is necessary say another $10.00/ha. A small amount of lime plus inoculant and apron fungicide and a bare earth pesticide which would total no more than $5.00 /ha. The extra machinery cost of our setup in negligible. The other main cost would be the opportunity cost of decreased yield from sowing the cover crop at a low rate for which I have allowed a fairly arbitrary figure of 0.6 tonne/ha of grain.

Grazing practices

During the first year after establishment I try to avoid prolonged grazing especially with sheep. I often put a small mob of ewes and lambs or a small mob of recently calved heifers on young pasture, or graze it quickly with a larger mob of weaned lambs, to avoid killing the young plants out. The pastures

seem to be able to survive set stocking by cattle for up to five years before the lucerne has declined to the point of not being productive, provided the pasture is given a spell at some time during the year and the lucerne allowed to flower. A rotational grazing system allows the lucerne to survive much longer and is necessary for the lucerne's survival under sheep. The phalaris portion of the pasture is much more resilient; we used twenty four hectares of pasture as a sacrifice paddock during the drought stocking it with 600 stud and cross bred ewes for about 6 months; the lucerne died out but the only loss of phalaris appeared to be within 50 metres of the water troughs and even there a significant amount survived.

The perennial pasture mix allows relatively high stocking rates. We are running 1300 ewes (800 merinos and 500 crossbreds and Texels) and an average of 50 rams plus 50 calving cows and 20 calving heifers. We sell calves at about 400 to 450 kg and lambs are sold 1/3 as suckers in the spring and 2/3 as old lambs about Easter. With about 45% of the farm in crop this equals to about 12-13 DSE/hectare on non cropped area which may vary according to how the DSE units are calculated. A reduction of stocking rates to 10 DSE has allowed us to consistently market out stock at the top of the market; as far as ease of management is concerned the lower stocking rate may be the more sensible way to go.

Pasture quality

We have found the phalaris/lucerne mix to be a good fattening pasture and the dry standing pasture in autumn quite capable of maintaining cows and calves, this may be partly due to there almost always being at least a small amount of green feed amongst it. An occasional vealer has been lost with bloat, we add "Teric" to the water troughs to arrest this problem. In August of the drought we had our only phalaris staggers problem. A mob of 600 lambs ate all the lucerne out of the 20 ha paddock and had nothing to eat except the phalaris - which was stressed with moisture deficiency and cold. We lost about 15% of the mob; about 40 initially and the rest over the next three to four months - even this loss was not all that significant considering the amount of feed provided during the drought as the annual species did not even germinate.

We do try to graze the dry phalaris out fairly well so that the allelopathic effect of the residue does not reduce cover germination too much, though at our high stocking rates we do not usually see too much of this problem.

Perennial pastures and the drought

A clear benefit from perennial pastures is that they can respond quickly to rainfall. During the recent drought and over the summer, we received some isolated but reasonable rains. While this produced no useful response from annual pastures, our perennials produced quite good feed. The following example is but one of the significant benefits we have experienced with our perennial pastures.

During the spring of '94, we fattened and sold 600 older ewes. Over the following summer, the rapid response to rain from our perennials produced enough feed to allow us to purchase replacements. In fact, we purchased a mob of 800 merino ewe weaners. Due to the general drought conditions, we were able to take advantage of low prices and buy replacement animals for $11.00/hd in December. The replacement ewes were unclassed, good quality western stock instead of the usual cull type animals. The perennial pastures were productive enough to carry these sheep through until the break eventuated. At this time we not only had a larger mob of replacement ewes of better quality than normal, but they would have been worth between $25.00 and $30.00/hd.

The lucerne component of the pasture was quite critical in this undertaking as it provided a supply of protein to allow the weaners to grow out.

Consequently we were able to come out of the drought with as many stock as we started with and to come in at only $10,000 below our yearly budget projections.

Other effects of the perennial pasture

The phalaris/lucerne pasture uses a large amount of the available moisture from the soil. In the Autumn I have found that although the soil may be very moist under clean stubble or fallow the soil under the pasture appears absolutely dry.

A good stand of perennial pasture significantly reduces the incursion of hairy panic grass. Annual winter grasses, while not controlled by the pasture seem to take longer to build up in density and are much less of a problem than they would otherwise be. Broadleaf weeds such as Patterson's curse are also suppressed by the pasture.

In the drought the perennial pasture paddocks were well protected against wind erosion at a time when clover paddocks had to be totally de-stocked and then worked so that the topsoil did not blow away.

Bringing the pasture back into the crop

During the pasture phase, weeds are managed by a combination of such methods as winter cleaning, spray topping and grazing pressure with a view to growing canola in the first season.

Two of the phalaris based pastures have been brought into cropping for 1996. The following is a brief outline of the method used to prepare the paddocks. In the process, it has become clear that the lucerne component can be easily removed by increasing stocking pressure with sheep. As is described below, the phalaris component of the pasture does not present any major difficulties either.

The first of these paddocks had been in pasture for about eight years and it was predominantly phalaris at the time of fallowing. The second paddock had only been in for 4 years but was used as a sacrifice paddock during the '94 drought. The intense grazing killed the lucerne but in 1995, before fallowing, the paddock had an excellent clover balance.

Both paddocks were fallowed with 1.2 l/ha Roundup® in early October. This rate of Roundup® was adequate, with only odd plants not dying (some were partly hidden under dry litter and some had dried mud from a silt patch on the leaves). Lime at 2.5 t/ha was applied and the paddocks were subsequently ploughed during January.

Available nitrogen following a phalaris pasture

One of the questions about using phalaris in a ley rotation has been about the amount and availability of fixed nitrogen so both paddocks were tested for available nitrogen on 9/5/96. The results are shown in Table 1.

Table 1. Effect of pastures in ley rotation on soil N.

Paddock	sample depth (cm)	Nitrate N (ppm)	Ammonium N (ppm)	Available N (kg N/ha)
(1) 8 years	0-10	86	9	123
	10-20	10	1	14
	20-60	5	1	32
(2) 4 years	0-10	111	9	156
	10-20	16	1	22
	20-60	8	1	44

On the basis of these tests and making an estimate for further mineralisation, it seems there is sufficient nitrogen to grow 3.6 t/ha in (1) and 4.7 t/ha in (2) of canola. In other words, nitrogen should not limit canola yields this year. It will be of great interest to re-test in autumn next season.

Conclusion

The use of perennial phalaris/lucerne based pasture in a 525 ml rainfall area in rotation with crop has proved to be quite successful allowing a significant lift in stocking rates, efficient water use with significant decrease of water percolation into the subsoil compared to an annual pasture. It provides a degree of weed control, and soil protection benefits under drought conditions. Some grazing management in the form of rotation grazing by sheep and resting periods under cattle is necessary to preserve the lucerne portion of the pasture. Grazing of the dry residue Autumn minimises allelopathic effects on clover emergence and reduce any feed gap. Some stock losses may occur from bloat and phalaris toxicity although on this property such losses have been relatively small.