Varying sheep production from different pasture types

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Abstract: *With high land values, and variable climatic and economic conditions which producers cannot control, there is a need to reduce the exposure of farm businesses to inflating costs and continue to make production gains to offset diminishing returns of trade.*

Australia possesses a unique position in the world where we can increase sheep productivity through fertility and finishing animals for market through improved and high quality pastures. While the costs of these improved pastures remains a concern for producers, new varieties and planting methods can be used in an integrated system to reduce the costs of long-term improved pastures and also allow producers to benefit from opportunity cropping programs. These systems are also an efficient tool in reducing the threat of long periods of drought as they are well adapted to dry climates and very effective water users.

Key words: biserrula, serradella, bladder clover, dry matter

Introduction

"Ardnai," "Glenholm" and "Lonepine" make up a mixed farming operation at Greenethorpe, New South Wales (NSW) a small village between Cowra, Young and Grenfell. Our farm is half cropping which is run by my brother David and I run the sheep operation. The farm is 850 ha with half sown to winter crops of wheat, lupins and canola. The other half dedicated to improved pastures, such as lucerne, clover, phalaris, fescue, cocksfoot and chicory. We run the pasture phases from 5 to 10 years, and run a composite ewe flock and a hay and silage contracting business which makes the most of excess feed. Our ewes cut about 4 kg of 32 micron wool and we are trying to maintain 150% adult lambing rate turning-off lambs that average 23 kg dressed weight. Our legume-based pastures produce quality feed as well as add nitrogen (N) for the cropping phase. Resistant ryegrass can be a problem in the cropping phase, but not to composite ewes or to a baler.

New plant varieties and plant selection are not a new concept in farming, in fact it has been practised since the inception of farming. New plant varieties and plant selection these days are big business and each producer needs to evaluate what is the right plant for the specific job in their environment for the most cost effective production response. These selection tools have been used in stock selection too. With the current Australian sheep flock as low as the early 1900s (Figure 1) much selection has already taken place in the industry. The Australian sheep flock now has far less wethers and a much larger percentage of breeding ewes (Curtis 2009) which means we should now have the means to capitalise on great gains on the remaining gene pools as remaining animals would have been retained on specific merits such as wool cut, micron, growth rate, meat yield and fertility.

Figure 1. Sheep and lamb numbers 1906–2006.

With many matings being based on meat outcomes in the past few years this has only heightened the need to maintain a higher reproductive rate with a lower wool income. Lamb marking percentages have been less than 80% in most states (Fogarty 1984*a*, *b*). While in Australian prime lamb operations 1.4 lambs appears to be the maximum per ewe per year and per 0.1 lambs between 1.0 and 1.4 can increase producers profitability by 5–15% (Hall 1984).

Wean More Lamb workshops held by Meat & Livestock Australia and the Department of Primary Industries (DPI) showed that more profitable producers have higher weaning percentages. Higher weaning percentages mean a larger return on investment for producers, but management must also be tailored to enhance higher fecundity, fertility and lamb survival.

Background

Many of our competing countries in the southern hemisphere are severely limited by their climatic conditions and the available pasture to produce stock. South Africa has veld, South America has majinas and desert landscapes. And the United Kingdom (UK) has different levels of nutrition at different levels in the landscapes and must conform to public ideals of production methods, but also maintain park appearances of some types of land with others carefully conserved under traditional farming methods.

While travelling on my Nuffield scholarship I found that there were very few countries that have the conditions we have here in Australia. South America is losing its meat sheep zones to soybean production and Patagonia is struggling to maintain nutrition levels of ewes for high levels of production. Even in the UK highly improved pastures require a lot of fertiliser and maintenance to produce good quality feed and the level of production is determined to land type. The lowlands achieve very high fertility rates in excess of 150% and high meat production where as the hill country struggles to sustain more than 60% fertility in the same animals (B Wolfe, pers. comm.) New Zealand has lost much of its high producing sheep country to dairying which is a constant reminder that per hectare gross margins need to be maintained.

A 10% increase in ovulation rate in New Zealand translates to 6.9% more lambs at lambing and 5.7% more lambs marked. What does this figure now translate to in Australia with a high dollar and high demand? Flushing is also a management tool being promoted to increase higher ovulation rates, but only appears responsive to a certain ewe liveweight and condition score. The EverGraze program recently found that flushing ewes for a week prior to joining increased ovulation rates in merino ewes at Wagga Wagga, and this is in line with techniques used in New Zealand and the UK. This shows an opportunity to the Australian industry that we can control ovulation rate through our pastures and then increase lamb survival with high quality pastures at low cost effective levels.

Pasture system

Improved pastures and mixed farming in the sheep-wheat belt can better boost fertility along with gross margins by selection pressure on sheep and re-evaluation of pasture/legume systems. For many years, the sheep-wheat belt has operated under the system of long cropping phases (up to 10 years) and a medium- to long-term pasture phase (5–10 years) depending on the region. Much of the cropping zone has approached this pasture phase as a N build up phase with grazing and opportunity hay or silage making. This approach has worked very well for us, but we have to re-evaluate the length and types of pastures we use due to the sowing and seed costs. Perhaps in the future we will also have to consider different pasture types due to the carbon scheme. Serradella has the benefit of no plant oestrogens and therefore there is no infertility with this legume as there are with some others (Craig 2005).

At our property "Glenholm", DPI have trialled some newer species to our region such as serradella, biserrula and bladder clover looking to reduce sowing costs and give a short-term pasture phase which fixes significant amounts of N and provides cheap good quality feed for livestock.

Recent trials conducted at "Glenholm", by B Hackney, DPI and her team trialled different types of establishment and measured dry matter (DM) production.

Dry matter production in year two varied with pasture type (Figure 2). Bladder clover being a clear stand out with cover cropping, but most of the pastures had much better DM production that the first sown pasture this year. With twin sowing a very good producer after laying dormant under a full wheat crop the year

before and germinating with good conditions the following year.

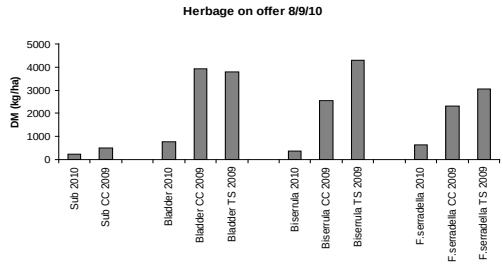

Figure 2. Winter production from regenerating stands. CC, pastures sown with a cover crop; TS, twin sowing – unscarified hardseed is sown with the crop to germinate the following year. Initial sowings were done in 2009. (Source: B Hackney)

Department of Agriculture and Food Western Australia (DAFWA) have conducted trials with biserrula and found it gave them a longer grazing window when compared with normal clovers. Additionally, some of these pastures are even more palatable with senescence and seed is very nutritious and sought after by stock.

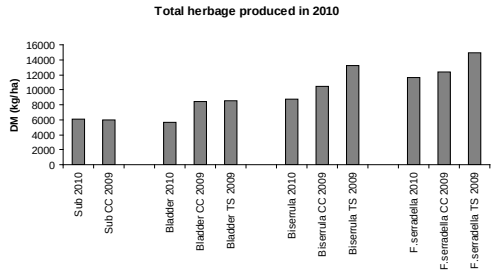

Figure 3. Total dry matter production in 2010. (Source: B. Hackney)

A substantial amount of DM can be produced from these new varieties compared with subterranean clover (Figure 3). The even bigger opportunity is to grow these in rotation with crops to gain the benefit of the N captured by the legumes, to lengthen feed production with other pastures and to reduce the cost of sowing pastures and N fertilisers. While some species may be better sown alone as scarified seed in the first year, once established, producers can crop on the hardseed and allow pasture to regenerate in subsequent years. The number of years that cropping can be supported varies between species and varieties and is related to the hardseed content of a particular variety. Twin sowing a hardseed pasture (unscarified) with a wheat crop reduces the number of machinery passes required to establish the crop and pasture and therefore fuel and sowing costs are reduced and potentially the number of in-crop sprays too.

Biserrula is high quality feed with serradella also with high crude protein content (Table 1) where lambs are expected to grow from 150-300 g/hd/day liveweight (Dunlop *et al.* 2003).

Table 1. Biserrula feed value. (from Loi et al. 2010)

Component	Vegetative	Reproduction	Senesced
Dry matter digestibility %	81	76	63
Metabolisable energy (MJ/kg DM)	11.7	10.9	8.7
Crude protein %	28	17	13
Neutral detergent fibre %	22	25	45
Acid detergent fibre %	15	16	30

These pastures have a high seed set when compared with traditional subterranean clover (Figure 4).

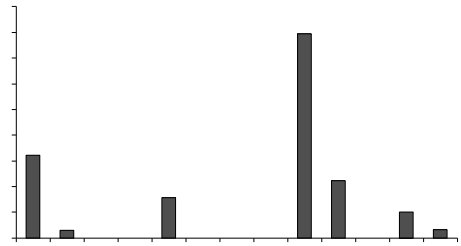

Figure 4. Seed production. (Source: B. Hackney)

Bringing it together

There are large opportunities for sheep producers to increase ewe fertility and weights with the use of improved legume pastures. Biserrula and serradella have moderate to high hardseed levels and have outperformed subterannean clovers in herbage production and seed set at Greenethorpe in the last few years. They also show a strong ability to integrate with a cropping program, providing N and high quality legume

feed and reduce sowing costs. With a longer growing season producers have more flexibility. Joining time and planning for the greatest feed availability can have a significant effect on reproductive performance (King *et al.* 1998).

The addition of new annual pastures allows producers to extend their feed availability, extend joining and lambing times and alters the pasture production curve. This would also allow producers more flexibility in their programs to better chase markets in lambing times, but also in finishing stock to meet market specifications and turn off more kilograms of lamb per hectare. Some of these plants are a bit unpalatable during flowering and encourage stock to graze weed plants instead of crop at this time. This is also usually at the top of the feed surplus in spring, if left plants will seed and be very palatable again. There is also an issue with photosensitivity with biserrula cv. Casbah (Loi *et al.* 2005) at particular times similar to grazing canola crops.

References

Craig A (2005) Serradella fact sheet PIRSA http://outernode.pir.sa.gov.au

Curtis K (2009) Australia's declining sheep flock. www.sheepcrc.org.au Department of Agriculture, Western Australia.

Dunlop L, McLennan N, Johnson B, Lloyd D (2003) Livestock nutrition sown pastures and fodder crops for prime lambs. Qld DPI&F.

Fogarty NM (1984*a*) Lamb Production and its Components in Pure Breeds and Composite Lines. I. Seasonal and Other Environmental Effects. *Journal of Animal Science* **58 (2)**, 285–300.

Fogarty NM (1984*b*) Lamb Production and Its Components in Pure Breeds and Composite Lines. II. Breed Effects and Heterosis. *Journal of Animal Science* **58 (2),** 301–311.

Hall DG (1984). Importance of ewe reproduction in the efficiency of lamb production. *Journal of Animal Production in Australia* **15**, 66–69.

King CF, Hopkins DL, Williams PM (1998) Reproductive performance of Border Leicester x Polwarth ewes with and without the Booroola gene (FecB). *Animal Production in Australia* **22**, 225–228. (DPI, Tasmania)

Loi A, Revell C, Nutt, B (2005) Casbah and Mauro biserrula: persistent pasture legume for Mediterranean farming systems. Farmnote No 37/2005. Department of Agriculture, Western Australia

Loi A, Hogg, N, Nutt B, Revell C, Fedorenko D (2010) Growing biserrula to improve grain and livestock production. Department of Food and Agriculture Western Australia Bulletin 4805.