How has grazing management changed to utilise differences in the landscape? A follow up to 2001 Gundagai Conference

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Abstract: *The south western slopes area of New South Wales encompasses the full spectrum of land classes from I to VIII. Typically this area has a reliable annual rainfall that ranges from 650 to 1000 mm and land use is best suited to grazing enterprises. The profitability of these grazing enterprises is constantly being diminished by increasing input costs, in particular phosphorus based fertiliser. The invasion of grazing land by weeds has necessitated an increased use of chemical and labour inputs. Land values of all classes of land on the south western slopes are close to historic highs as a flow on from land use changing from grazing to plantation forestry, horticulture and viticulture. It is important for graziers to monitor the profitability and sustainability of their grazing enterprises on all land classes present on their properties.*

Key words: ground cover, perennial pasture, native pasture, stocking rate, subdivisional fencing

Introduction

"Elouera" consisting of 1700 ha is located near Brungle 25 km south east of Gundagai. Average annual rainfall for the past 20 years is 750 mm. The country is undulating to hilly encompassing all land classes from I to VIII. Soil types range from red clay loams on ridges and hills to black clay loams on the lower slopes and flats, with areas of pipe clay and sandy loams. pH of the red and black clay loams is 4.5 to 5.0 ($CaCl_2$) with pipeclay at 4.0 to 4.5 ($CaCl_2$) and aluminium >10%.

The main enterprises on "Elouera" are a beef breeding herd of 800 cows and steer and cull heifer weaners grown out to 440 kg at 15 months for feedlots. Average carrying capacity is 20000 dry sheep equivalents (DSE) in spring and 16000 in autumn. We achieve this by selling steers mid to late spring, weaning calves at the age of 7–8 months in late summer, pregnancy testing females and selling empties in late summer, and calving in winter. Peak carrying capacity of 23000 DSE was achieved in mid winter of 2002 and again in 2011 with a low of 7000 DSE in the summer of the 2006–07 drought.

Business goals

- To reduce our cost of production ($1.26/kg beef or $17.30/DSE in 2011)
- To have a sustainable grazing system without damaging the environment
- To provide superannuation for a smooth succession to the next generation

What has not changed since 2001

We have continued with the practice of not conserving any fodder grown on the property, purchasing 100 bales of silage annually for the explicit purpose of yard weaning the calves. We simply find it is easier to purchase fodder that we need, avoiding issues with sourcing contractors and the risk of spoilage due to adverse weather.

Stocking rate was adjusted to suit available pasture throughout the drought by selling breeding cattle which resulted in a 73% reduction of DSEs in 2006. A move into trading cattle filled the gap until the breeding herd was rebuilt.

Single superphosphate is currently applied annually at the blanket rate of 125 kg/ha to the improved and modified native pastures. We endeavour to maintain this application rate on an annual basis, however no fertiliser was spread during the 2006–07 drought to cut costs and in 2011 the wet autumn prevented spreading. Colwell phosphorus (P) levels were up to 30 ppm prior to 2006 and need to be monitored for long term trends. A rethink of application rates based on land capability may deliver a more efficient return on the money invested

in fertiliser. We have resisted the temptation to apply superphosphate to the hill country, which typically has Colwell P levels of 9 ppm, because we cannot control the grazing effectively until paddocks are subdivided further.

What has changed since 2001

The drought demanded that a water reticulation system was set up over consecutive years. A shift to selling steers to feedlots rather than over the hooks. Yard weaning was introduced to produce a quieter weaner which was more desirable to sell into feedlots. The drought sharpened our cattle management practices with every joined female pregnancy tested and empties sold. The start of calving was moved from mid May to mid June and duration of 10 weeks rather than the previous 12 weeks for the cow herd. Heifers commence calving in mid June for a 7 week period. A two shot vaccination program for Bovillus and Pestivirus for all weaners is now undertaken with the heifers receiving an annual booster in their second year. Heifers now calve at 24 months rather than the previous 36 months. After deaths in 15-month-old steers and 3- to 6-month-old calves a selenium deficiency was diagnosed in the herd and has been corrected initially with an injection and on going with additive spread with the fertiliser.

Perennial pasture establishment consisting of phalaris (*Phalaris aquatica*), cocksfoot (*Dactylis glomerata*), fescue (*Festuca arundinacea*), subterrean clover (*Trifolium subterraneum*) and white clover (*Trifolium repens*) on land classes I to V has increased from 41% of the total farm area in 2001 to 65 % in 2007. This improved country is carrying an average of 18 DSE/ha, if this country is not managed in a manner that allows at least 14 DSE to be maintained then the return on investment for the pasture establishment cost on land classes I to V will not reach the break even point.

A further 12.5 % of the total farm area with native pastures growing on undulating country has been managed as an 'improved' native pasture. Species growing on this country include; subterranean clover, Microlaena (*Microlaena stipoides*), Danthonia (*Austrodanthonia* spp.), red grass (*Bothriochloa macra*) and Warrego summer grass (*Paspalidium jubiflorum*). These pastures add value to the business as they provide late spring to autumn production. The response of these pastures to summer rainfall and the addition of 125 kg/ha of single superphosphate has added to the diversity of grazing at a time when introduced species are not as productive. The native country is carrying up to 15 DSE/ha, if this system were to collapse the cost to the business would be a decrease of up to 3000 DSE overall. If this country was to be sown with introduced species it would cost about $400/ha to establish and eight years to break even on investment. Given the increase from 7 to 15 DSE using fertiliser applications and subdivisional fencing further gains from pasture sowing would only be minimal.

What we have learnt

- We always strive for 100% ground cover. We cannot rotationally graze at this stage because the movement of the breeding herd is made difficult by creeks, especially during floods, and the demands placed on infrastructure such as watering points and yards by larger mob sizes. We appreciate that any rest period for pastures is far better than continuous set stocking.
- Sowing perennial ryegrass is a waste of money as it just does not persist long enough to cover the expense of sowing.
- Phalaris and subterranean clover will eventually dominate improved pastures under a set stocked grazing system at the expense of cocksfoot and the older fescue cultivars such as Demeter. Quantum Fescue has proven far more persistent in more recent sowings.
- We could not detect any increased dry matter production from higher application rates of up to 250 kg/ha of single superphosphate in the years from 2001 to 2006. We suspect this could be, due to a lack of grazing management in the larger paddocks or the ongoing rainfall deficiency over those years. It did however build Colwell P levels of up to 50 ppm in 2004 and 36 ppm in 2005.

- To appreciate native pastures as valuable feed producers in times of variable rainfall especially with the increased prevalence of summer storms.

Management of class VI to VIII land (hills)

These land classes make up 22.5 % of our total grazing area and have a carrying capacity of 5 DSE/ha. Currently land values for these areas east of the Hume Highway range from $1500/ha up to $3000/ha and local government rates $6.60/ha to $13.20/ha. They contain our greatest diversity of native flora and fauna. Maintaining vegetation and ground cover is paramount to prevent erosion and flooding runoff from these areas.

Greatest challenge currently is the invasion of weeds namely St Johns wort (Hypericum perforatum), blackberry (Rubus spp.), Bathurst burr (Xanthium spinosum) and St Barnaby's thistle (Centaurea calcitrapa). Native grasses such as Microlaena and kangaroo grass (*Themeda triandra)* are successfully competing with and suppressing these weeds. By resting paddocks in spring/summer the natives are able to set seed and recruit new plants increasing their density and ground cover. Access to hills for spraying and fencing has been increased with a network of roads being constructed. We feel this is a better option than aerial spraying which leads to the loss of non-target desirable species.

Two of our hill paddocks are too large (148 and 88 ha) to manage for a good grazing outcome and appropriate rest periods. With the elevation (300 to 600 m) water reticulation is difficult and expensive to implement. Sub-divisional fencing between land classes is often prevented by rocky outcrops. We are considering sub-division to reduce paddock size where it suits watering points and ease of construction of fencing, but not on land class division contours.

Our third hill paddock of 97 ha was subdivided in 2006 into three paddocks with financial assistance from the Murrumbidgee Catchment Management Authority and has shown that with rest periods between grazing the perennial native grasses have been favoured. This subdivision has enabled a 25% increase in the carrying capacity over the original large paddock.

Currently our focus is on maintaining and encouraging ground cover by sustainable grazing rather than increasing carrying capacity. These hills have maintained 5 DSE/ha for 30 years without P application. With an overall gross return of $26.20/DSE in 2011 they are worth $51109 to the business. If we were to lift the carrying capacity to 10 DSE by applying 125 kg/ha of single superphosphate, then this would add an extra $51109 per annum to the business. Given the cost of $360/tonne for single superphosphate and the cost of spreading by air of $130/tonne then the profit on the extra DSEs is $27203. The cost of production per DSE over the entire business would reduce to $15.90/DSE. This is provided the increase in DSEs can be actually achieved by firstly growing the extra dry matter and then fully utilising it by suitable grazing and rest periods. The other advantage of using P on the hill country would be to suppress St Johns wort, reducing the need for spraying.

Conclusions

Future grazing profitability of the south western slopes area of NSW will be subject to the cost of P-based fertiliser or in its absence the ability of land managers to implement fencing and grazing strategies to maintain or increase current stocking rates. These stocking rates will need to utilise a base of perennial plants which have to be managed in a sustainable system.

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