Landscape and grazing management affects on pasture production and persistence on "Dunns Plains"

B. Townson

"Dunns Plains", Rockley, NSW 2795

Abstract: *"Dunns Plains" covers approximately 2600 ha with an elevation ranging from 800 to 1000 m (average annual rainfall 700 mm). The past 10 years have been a challenge with the light and variable rainfall. The overall livestock policy includes self-replacing breeding flocks and herds which are supplemented with trading stock as seasons and markets allow. The different landscapes that occur on the three dominant soil types (light shale, red basalt, and heavy black basalt) are described. In the early 2000s, the average June stocking rate on "Dunns Plains" was around 9 dry sheep equivalents (DSE)/ha, but this has reduced to around 7 DSE/ha over the past decade.*

Key words: native pastures, improved pastures, sheep, cattle, variable rainfall

Introduction

Since 1989 "Dunns Plains" has been owned and operated by John Fairfax. It is located at Rockley, 40 km south of Bathurst and covers approximately 2600 ha with an elevation ranging from 800 to 1000 m above sea level. The average annual rainfall for the area of 700 mm tends to be evenly distributed throughout the year.

In August 1996, I took on the position of managing the property. My aim was to further improve pastures and to increase stocking rates in a sustainable fashion. This I hoped to do with the use of fertiliser, weed control, and fodder conservation *via* hay and silage production. A lot of the pastures were in good shape when I arrived; however, the fences needed a little work to adopt suitable grazing management. In 1997, we planned to sow three paddocks to new pastures which turned out well despite it being a very dry year. This result was due mainly to good weed control the previous spring. For the next three years, we had average rainfall and were able to conserve a lot of fodder.

The past 10 years have been a challenge with the light and variable rainfall. From 2000 to 2010, average annual rainfall has been around 600 mm per annum, 100 mm below the long-term average. However, 2010 was the wettest year on record with 1100 mm.

The overall livestock policy being undertaken at "Dunns Plains" includes self-replacing breeding flocks and herds which are supplemented with trading stock as seasons and markets allow. Breeders are maintained at moderate levels and in the event of a serious extended dry period, numbers are reduced to allow maintenance of ground cover. In maintaining this policy, the operation is not exposed to restocking with often expensive and lower quality breeding animals with poor age structure.

We are currently running 650 Angus cows and 300 heifers which calve in spring, as well as 4200 crossbred ewes, which lamb in autumn and spring. Most of the steer calves are sent to our other property near Cootamundra to be grown out to heavier weights. Also, some store lambs are sent to Cootamundra as we have found it to be better country for lamb finishing.

The property has three different types of landscape that are associated with three dominant soil types (Figure 1). The three main soil types may be described as being light shale, red basalt, and heavy black basalt. Most of these soils have a pH of 5.0–5.5 ($CaCl_2$) and, with the exception of the light country, the rest of the farm has a good history of superphosphate application.

Light shale

The country dominated by light shale soils represents about 500 ha, and is located on the higher slopes up to 1000 m elevation and is quite steep in places. It is very fragile and prone to erosion, so it is important to avoid overgrazing or ground disturbance.

Typical native pasture species on this country are *Microlaena*, wallaby, spear grass and kangaroo grass. *Microlaena* tends to be the most productive species as it stays green all year round and forms a carpet which reduces erosion. In the past, this area of the farm was used for wool production through the running of Merino wethers. They have been unprofitable, so we now graze these areas with dry ewes and occasionally cows.

Five years ago we received grant money from the Upper Macquarie Catchment Management Authority to split a 300 ha paddock into four paddocks, so that we could better manage them. They are now grazed on a rotational basis to better maintain ground cover. I try not to let ground cover get below 70% and to allow them to reseed over summer at least every second year. Since subdivision there has been a slight increase in ground cover, but there has also been an increase in the presence of the weed biddy bush (*Cassinia arcuata*). This will be controlled with the use of chemicals. Because of the elevation and the species present in this part of the landscape, grass growth in winter is very low, and hence not much grazing happens during this time of the year.

With careful grazing management there is no reason why these pastures cannot be sustained indefinitely. The soil type here is poor and it doesn't justifying spending money on soil fertility or pasture improvement, as the return would be little. An additional problem to managing these areas is that there are also large populations of kangaroos here.

Red basalt soils

These represent about two-thirds of the farms area (1800 ha), and in the past have been sown down to introduced pasture species, mainly phalaris, cocksfoot and subterranean clover. There is also a lot of spotted medic found in pastures throughout this region of the landscape. Elevations range from 850 to 900 m. This part of the landscape has had a good history of single superphosphate application with phosphorus (P) levels ranging from 15 to 50 ppm Colwell. The Phosphorus buffering index (PBI) is around 70, which means we need to get our P levels above 30 ppm Colwell. Pastures on these soils respond quickly to rainfall, providing temperature is not limiting. Grazing management of these areas follow a pattern of being set stocked during calving and lambing, which occurs in winter and spring, respectively. For the remainder of the year, stock are moved according to feed availability. Because of the kinder environment of the Tablelands, the persistence of pastures has been very good, with some pastures sown 40 years ago and still as good, if not better than when they were sown.

Even though we have had ten fairly dry years, I have tried to maintain at least 50% ground cover by resting and reducing stocking pressure. Now that we have had a good rainfall year the pastures have responded very well, in fact pasture growth has been too good and phalaris pastures have got out of control. They have received some heavy grazing over summer and autumn to get the fresh new growth to come through for this growing season.

Heavy black basalt

The area covered by heavy black basalt soils is about 300 ha and is restricted to the lower areas of the farm at about 800 m elevation. About 100 ha is sown to lucerne which is used for finishing or value adding lambs. The rest is dominated by phalaris, cocksfoot and subterrenean clover. These areas are very productive, especially in spring and summer. They are capable of carrying around 30 dry sheep equivalents (DSE)/ha at this time, with growth rates up around 80 kg/ha/day. However, the soils do take a lot of rain to really fire up, but once wet they hold on well. In wet years, it is important not to let these areas get out of control as the pastures become rank and of little value. Disadvantages of this area include that it is slow to respond to rainfall, and in winter, are subject to severe frosts with temperatures frequently down to –10°C.

One of the best ways to control pastures in this area of the landscape is through fodder conservation. We attempt to make at least 500 big square bales of silage and 300 round bales of hay each year. The silage is stored in underground pits as long term drought reserves.

To maintain stocking rates there is usually some supplementation required during winter. Cattle are fed hay or silage and sheep grain, which is brought in from the Cootamundra property.

Stocking rates

In the early 2000s, our average June stocking rate was around 9 DSE/ha, but has reduced to around 7 DSE/ha over the past decade. Stock numbers have changed over the past few years due to three main factors. Firstly, a change in the enterprises running on "Dunns Plains" from Merino wethers to increasing cattle numbers and first-cross ewes (both of which require a higher condition score to be maintained). Secondly, a run of drier than usual years forced us to reduce stock numbers. Thirdly, a move to finishing more lambs on "Dunns Plains" rather than selling as stores. In combination, these changes have caused a reduction from a peak of over 23,000 (June) DSEs down to the current level of around 18,000 DSEs (Figure 2).

Even though 2010 was a very wet year we have not had a chance to build up our numbers and we chose not to buy in stock, due to the narrow margins available with trading. Even though stock numbers have been down, an increase in livestock prices has compensated for reduced production and the business has still been very profitable. If the seasons trends back to normal, we will increase stock numbers, but not to the detriment of the pastures.

Summary of grazing management

Native pastures on the high country and lighter soils are grazed rotationally to a point where there is not less than 70% ground cover. Pastures are then rested in late spring and early summer, and allowed to seed at least every second year. They are usually grazed with dry stock and very little fertiliser has been applied on this country. This management still seems to be maintaining a good cover of valuable natives without the invasion of too many weeds.

The improved pastures on the red country receive at least 125 kg/ha of single superphosphate every second year, with molybdenum applied with the superphosphate every fifth year. This program has maintained good clover content at around 40%, which is crucial to good grass growth. Grazing in these areas varies according to livestock needs and ground cover, but tends to be set stocked over calving and lambing and then rotational for the remainder of the year. There is no set rotation; stock movements are adjusted according to stock needs, feed availability, and ground cover. Rotations are carried out on a simple basis with only minor subdivision and water improvements being undertaken.

The lower country management is similar to the red country, except where lucerne has been sown. Lucerne requires special management if you want it to persist. It likes to be grazed hard for short periods and then rested. The rest period will depend on regrowth, which in turn depends on rainfall and temperature. This basic principle of lucerne grazing management is applied at

Figure 1. Typical landscape diversity on "Dunns Plains". Foreground shows typical native pastures on light shale, mid-ground shows areas of intensive production on heavy black basalts and background shows areas of intermediate to high production on red basalts.

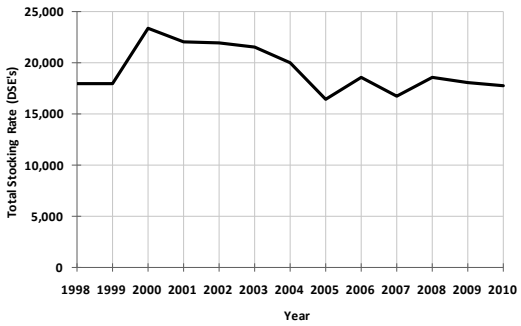

Figure 2. Change in total stocking rate (total June DSEs) on "Dunns Plains".

"Dunns Plains", with lucerne pastures lasting at least 10 years.

Conclusions

I think our grazing management must be working as the pastures on "Dunns Plains" are in a good state despite the fact we have had 10 years of lower than average rainfall. The key management factor I think is that you have to be flexible and have a plan to cope with the variability of seasons. A wise man once said to me that you should always have some animals on the farm you don't like, that way, if the season dries off, you do not have trouble selling these animals. In our case, it now tends to be the older animals.

The future challenges faced by "Dunns Plains" are dominated by rainfall and its timing. This will always be a major factor affecting the decisions made. However, government policy may play an important role, in particular, with the introduction of a carbon tax.

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Todd Jones
0428 255 753
t.jones@seedmark.com.au

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