

THE ROLE OF NATIVE GRASSES IN THE SYSTEM:

NATIVE GRASS PASTURES - A GRAZIER'S PERSPECTIVE

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Abstract: Without ploughing out, the native grass species have been allowed to adapt to the improved fertility on "Pomeroy" and to produce low cost productive sustainable pastures. Grazing management has been used to manage the pastures by using relatively high density stocking to eat out the less desirable species, whilst allowing the more desirable and better species to seed and regrow. A knowledge and understanding of the different grass species and being able to identify their various growth stages is an inherent part of any attempt to influence the composition of the better native perennial root grasses in a pasture sward. Another problem is having the flexibility in the number and type of livestock to enable grazing management to be used effectively.

INTRODUCTION

Pomeroy is a 660 ha grazing property located north west of Goulburn on the Southern Tablelands of NSW. The property is currently running merino sheep and beef cattle in the ratio of about 3:1 on a DSE basis. It was originally the homestead block on "Pomeroy Station" which covered about 4100 ha.

Physical Features

The property is gently undulating to rolling, well-watered country on the Wollondilly River, 800 m above sea level. It is subdivided into 23 paddocks. The farm has ample natural trees and planted belts for shade and shelter.

Annual rainfall averages 700 mm. There are about 80 days per year on which rain is received. The rainfall distribution is fairly even with a monthly average of about 50 mm. Records over a 90 year period highlight the rainfall variability which ranges from 235 mm in 1944 (driest year on record) to 1341 mm in 1950 (the wettest year).

Table 1: Soil tests of transects at "Pomeroy", March 1990.

Paddock	pH (CaCl ₂)	Avail. P ¹	Ca/Mg ratio	% Exchangeable cations				
				Ca	Mg	K	Na	Al
A	4.23	9	3.61	56.5	15.6	5.9	9.2	12.6
B	4.26	7	2.92	55.2	18.8	8.8	10.1	6.8

Notes: ¹P measured in mg/kg using the Bray No 1 test.

Soils are of a granite duplex type and are highly acid (Table 1). Aluminium accounts for 7 to 12% of the exchangeable cations, and sodium for about 10% (Table 1).

Fertiliser History

Before 1963, superphosphate and some lime was spread on limited areas of the property. During the 1960's superphosphate was applied annually by air at the rate of 125 kg/ha (Table 2).

PASTURE DEVELOPMENT

Pasture furrows

During 1946/47 contour pasture furrows were established with the aid of a Caterpillar D2 crawler and grader. These gave greater water retention rates and increased pasture growth.

Seed and super

In the early sixties with aerial spreading of super-

Table 2: Fertiliser application at "Pomeroy", 1963-1993.

Year	Rate (kg/ha)
pre-1963	1250 over about 30 years
1963	125
1964	125
1965	250
1966	125
1969	125
1979	125

phosphate, subclover was often broadcast as well. This broadcast "seed + super" program constituted the first phase of pasture development at "Pomeroy". The superphosphate allowed large areas to benefit from an injection of nitrogen from subclover.

Chisel ploughing on the contour and disc seeding of subclover, perennial rye and super was the procedure used in the second phase of pasture development which was undertaken in the mid- to late-1960's. Some Australian phalaris was sown when the seed bed and climatic conditions were favourable.

This two stage program was devised to develop better pastures at minimal cost and at the same time meet the following objectives:

- retain the native/natural grasses;
- maintain soil cover;
- reduce water run-off;
- increase water infiltration; and,
- reduce soil disturbance.

Grazing management

Prior to 1963, grazing on "Pomeroy Station" followed the standard Australian pattern, *ie.* basically set stocked with low numbers in large paddocks. In 1963, a 'whole farm approach' which used farm maps and aerial mapping enabled an overall strategy to be developed which incorporated the following components:

- pasture development;
- grazing management;
- paddock subdivision;
- trees and shelter plantings; and
- erosion control.

From an analysis of the information collected, it was realised that many of the paddocks were *understocked* but selectively *overgrazed* and were in a poor productive state. The only means available to control and/or reverse these undesirable changes which were taking place in our pastures was to use heavy grazing with large mobs. For example, in one paddock of 130 ha where wire grass (*Aristida ramosa*) was the dominant species, 4500 wethers were grazed over three months (35 sheep/ha). Strategic grazing became a cheap and valuable 'tool' to control, manage and maintain species for a better pasture.

In another paddock of 60 ha where there was a bulk of rank grasses and shrub-type growth, 3000 wethers were used as a 'knock-down' treatment for two to three month periods over a two year cycle (50 sheep/ha). Again, the productivity in this paddock was greatly improved by strategic grazing. Prior to this treatment 200 sheep set stocked would lose condition as soon as they had eaten out the camp sites in the paddock.

These relatively high density stockings were used with the aim to:

- eat as much rank growth as possible;
- knock down and break up the remainder;
- return it in the form of animal manure;
- eat out the undesirable species; and,
- open up the sward to light for better growth of the 'sweeter' species.

The outcomes from this grazing regime over a period of two to five years were:

- better pasture utilisation;
- better types of pasture species; and,
- increased carrying capacity.

The carrying capacity increase over 1960/61 to 1969/70 was:

- Sheep - shearing 9000 to 15000
- Cattle - from 100 breeders to 500 breeders.

PASTURES

Today the pastures on "Pomeroy" range from 'undisturbed' native species through to mixtures of natives with introduced species of perennial ryegrass, phalaris, cocksfoot and subclovers.

The native/natural pastures consist of weeping grass, (*Microlaena stipoides*) and *Danthonia* spp. (at least 11 different species), together with corkscrew grasses (2 *Stipa* species), wheat grass (*Elymus scabrus*), *Eragrostis* spp., red grass (*Bothriochloa macra*), pidgeon grass (*Setaria* spp.), Parramatta grass (*Sporobolus elongatus*), yorkshire fog (*Holcus lanatus*), kangaroo grass (*Themeda australis*), wire grass (*Aristida ramosa*) and annuals of barley grass (*Horedum leporinum*), *Vulpia* spp., soft brome (*Bromus molliformis*) and hair grass (*Aira* spp). Subclover and a range of forgotten clovers and medics were also present.

Table 3: Botanical composition (%) of pastures at "Pomeroy", 1990.

Species	Paddock A	Paddock B
Subclover	4	17
Phalaris	0	21
Vulpia	2	5
Weed	3	7
Bare ground	12	7
Danthonia	3	3
Microlaena	71	36
Eragrostis	4	3
Setaria	0	2
Bothriocloa	2	0

Notes: Paddock A - no mechanical disturbance; Paddock B - chisel ploughed, two disc ploughings and sown in 1997 with phalaris.

The diversity of pasture type and paddock history is shown in Table 3 from transects analysed March 1990 by Dianne Munich. Interestingly, very little phalaris was seen over eight years until 1980 during the 1979-83 drought in paddock B.

CARRYING CAPACITY

Carrying capacity varies considerably within and between years due to the amount and timing of effective rainfall (Table 4). At present, "Pomeroy" carries, on average, 10 - 12 DSE/ha.

In a major trial of native grasses established using paddock A, extremely high DSE levels (Table 5) have been achieved (Garden and Eddy, *pers comm*).

COMMENTS AND CONCLUSIONS

Since 1963, I have aimed to let at least one paddock seed out each year. The grazing is based on the concept of using livestock to manage the pastures - not the pastures to manage the livestock. Over time, we believe that this produces better pastures and increased livestock production.

Table 4: Carrying capacities at "Pomeroy", March 1992-March 1993.

Paddock	Stocking rate	
	DSE/ha	DSE/ac
A (native)	9.45	3.78
B (sown)	13.28	5.38

Notes: Basis for DSE calculation: Dry ewes and wethers = 1 DSE; Ewe with lamb = 2 DSEs; Dry cow = 12 DSEs; and Cow and calf = 17 DSEs.

Table 5: Carrying capacity of Paddock A (native grasses), "Pomeroy" over period of June and July

Year	Animals carried (DSE/ha)
1988/89	14.9
1989/90	15.3
1990/91	14.3
1991/92	19.0
1992 to March 1993	13.0
	Average 15.9

Notes: Basis for DSE calculation: Wethers (60-65 kg LW) = 1.5 DSEs; Wethers (35 kg fast growth, not rams) = 1.8; Dry ewe (50-55 kg LW) = 1.3 DSEs; Ewes with lambs = 2.5 DSEs; Hoggets = 1.5 DSEs; Heifers = 13 DSEs. Ewes shorn July to lamb in August.

Flexibility is a very important component of good management because under the influence of variable climatic conditions, it is unlikely that rigid strategies will enable livestock needs to be balanced with pasture growth. The aim is to move livestock when the pasture or components of the pasture have responded to management in the desired way. This may mean eating out a species or moving stock to allow better species to seed, germinate or regrow.

During the 1979-83 drought, many changes were noted on "Pomeroy". At the beginning of this drought a decision not to feed was taken and a destocking program was implemented to take advantage of the relatively high sheep prices which prevailed at that time. This strategy was quite different from that adopted by most producers who decided to feed. A good cover of grass remained, most of which was native perennials and the soil did not 'blow'. In parts of the Goulburn district, many of the improved areas had 'soil drifts' to the tops of netting fences.

In fact, the perennial grasses (including phalaris, in paddock B, which had not been seen since it was sown eight years previously), allowed sheep and cattle to be taken on agistment together with the 'home' stock.

Over the last few years there has been a reduction in the annual species of barley grass, *Vulpia* spp, capeweed and soft brome with a marked increase in the amounts of *Microlaena* and *Danthonia* spp. There have been 11 species of *Danthonia* identified in paddock A.

Why the interest in the native/natural grasses and a deliberate policy of 'not destroying' them back in

1963? This interest is due to the following attributes of native pastures:

- Provide feed of reasonable type;
- Already present;
- Tolerant to drought;
- Soil holding ability;
- Seed available without sowing;
- Ability to grow when sown grasses were difficult and costly to establish;
- Year long growth (some species);
- Feed production/quality;
- Sustainability;
- Less fertiliser requirements (than sown

grasses);

- Adaptability across paddock microclimates; and,
- Acid soil tolerant.

There are some disadvantages. The seed of some species may cause damage to livestock (especially to the eyes) and contaminate wool. The levels of seed fault in the "Pomeroy" wool clip is well within the average of the district (below 1%). However, weaner sheep do need watching for grass seeds in their eyes, especially with *Microlaena*.

The native grasses have a tendency to rapidly go to seed and become unpalatable unless their growth is well managed with grazing pressure.
