The role of native pastures in the Mid North Coast landscape

CM Rose

NSW Department of Primary Industries, Kempsey, 2441 carol.rose@dpi.nsw.gov.au

Abstract: *Native pastures supported the development of the grazing industry on the Mid North Coast, but their importance was reduced by widespread introduction of exotic species. However, native pasture species still form the major component of pasture biodiversity of the Mid North Coast. Their distribution depends on a number of landscape factors as well as past and present management practices. The major production role for native pastures is where soil limitations are greatest. In the future, economic pressures on farmers, especially increasing fertiliser costs may increase our dependence on native pastures, which are adapted to low/reduced inputs. Increased climatic variability will favour the most adaptable species.*

Introduction

Native pasture is often underrated in the coastal environment despite the range of species providing valuable roles for grazing, ground cover and biodiversity. In the 1800s, native species formed the basis of the grazing industries on the Mid North Coast. However, over the last century there has been intensive development of grazing land with introduced species being extensively sown. These now dominate most of the better soils of the region.

In 2005 an intensive pasture survey (Rose *et. al.* 2005) of 120 randomly selected sites in the Macleay Valley covering the coast to 100 km inland, showed that 62% of the biomass was made up of kikuyu (*Pennisetum clandestinum*), paspalum (*Paspalum dilatatum*) and carpet grass (*Axonopus fissifolius*). Yet natives are still an important yield component with 33% of sites dominated by natives. The survey also found that native species occurred in every survey site and made a significant contribution to biodiversity, with 66% of all species being native.

Native pastures position in the landscape

The distribution and abundance of native pasture species at the regional and local level are largely driven by the original vegetation, historical development and management and the limitations of soils and landscapes. For instance, in areas where large areas of rainforest were cleared for farming (e.g. Comboyne Plateau) there are few native pasture species providing only a minor contribution to pasture yield. In other areas, where cultivation for maize and other crops led to destruction of native pastures, there is a tendency for introduced species and the pioneer native species such as red grass (*Bothriochloa* spp.) to dominate. In many paddocks a sudden increase in kangaroo grass (*Themeda australis*) and other natives can be seen when passing from previously cultivated to uncultivated areas, even when cultivation was conducted decades earlier.

Natives are well adapted to coastal soil and landscape limitations. For instance, on many of the grassy headlands on the coast, where salt laden winds make for a harsh environment, kangaroo grass still thrives as a dominant species. In the freshwater swamps of the flood plains most areas are dominated by native species including water couch (*Paspalum distichum*), mud grasses (*Psuedoraphis* spp.) and numerous non-grass species. Dry matter (DM) production from water couch, in a ponded swamp, has been measured in excess of 100 kg DM/ha/day during summer and producing high quality forage (Rose & Rose 2005). Not only do such pastures provide a valuable source of feed, biodiversity and wildlife habitat, but they also play a major role in acid sulfate soil management.

Higher in the catchment there are extensive areas of low productivity soils (e.g. leached, acid, and infertile) with significant subsoil limitations (e.g. aluminium, low infiltration rates and waterlogging at the topsoil/subsoil interface during summer). These soils often

favour the use of adapted, low input, native pasture systems. Steep rocky country, which is widespread in many mid to upper catchments, also favours the presence of native pastures, as pasture development is often uneconomic. The survey indicated that where native pastures are dominant, red grass, barbed wire grass (*Cymbopogon refractus*), kangaroo grass and paddock lovegrass (*Eragrostis leptostachya*) make the greatest contribution to pasture biomass (see table 1). Wire grass (*Aristida* spp.) and Wiry Panic (*Entolasia* spp.) are commonly found on the very poorest soils. Wallaby grass (*Danthonia* spp.) can also occur in these areas in the Macleay, but is more common south of Taree.

In shady areas of paddocks, the yearlong green weeping grass (*Microlaena stipoides*) can be abundant. Casuarina trees are very commonly associated with this grass. Other common but less abundant grasses include tambookie grass (*Hyparrhenia filipendula*), bunch spear grass (*Heteropogon contortus*), Brown's lovegrass (*Eragrostis brownii*), scented top (*Capillipedium spicigerum*) and hairy panic (*Panicum effusum*) (see Table 1). Native legumes, (*Glycine* and *Desmodium* species) are common in paddocks, though more often seen where resting is part of the grazing management.

Blady grass (*Imperata cylindrica*) often dominates Mid North Coast pasture where the practice of spring burning to produce a green pick has been overused. Blady grass is very fire tolerant, giving it a competitive edge over other native species, leading to extensive areas of blady grass monocultures. This practice has declined due to spring fire bans and awareness of the detrimental effects of fires on soils, ground cover and biodiversity.

Table 1: Native grasses contribution to pasture biomass and frequency of occurrence in the Macleay valley, results from a survey of 120 randomly selected pasture sites. (Biomass contribution estimated using the modified dry weight rank method of Haydock and Shaw (1975) and presence/ absence of all species was recorded

Species	Contribution to Biomass (rating)	Frequency of occurrence (rating)
Red Grass (*Bothriochloa decipiens/macra*)	1	1
Blady Grass (*Imperata cylindrica*)	2	7
Barbed Wire Grass (*Cymbopogon refractus*)	3	6
Kangaroo Grass (*Themeda australis*)	4	13
Water Couch (*Paspalum distichum*)	5	15
Paddock Lovegrass (*Eragrostis leptostachya*)	6	2
Wiregrass (*Aristida ramosa/vagans*)	7	12
Weeping Grass (*Microlaena stipoides*)	8	4
Slender Rat's Tail Grass (*Sporobolus elongatus*)	9	3
Queensland Bluegrass (*Dichanthium sericeum*)	10	11
Brown's Lovegrass (*Eragrostis brownii*)	11	5
Scented-top Grass (*Capillipedium spicigerum*)	12	18
Tambookie Grass (*Hyparrhenia filipendula*)	13	19
Bunch Speargrass (*Heteropogon contortus*)	14	16
Slender Mudgrass (*Pseudoraphis paradoxa*)	15	36
Shot Grass (*Paspalidium distans*)	16	9
Ditch Millet (*Paspalum orbiculare*)	17	17
Matgrass (*Hemarthria uncinata*)	18	21
Wiry Panic (*Entolasia stricta/marginata*)	19	22
Buffalo Grass (*Stenatophrum secundatum*)	20	35

Strengths and weaknesses of native pastures

Native grasses have adapted to survive Australia's variable climate. To varying degrees this has led to drought tolerance in perennial species. The upside of this adaptation is the ability to maintain high levels of ground cover during drought and rapidly recover following rainfall. The downside is that natives shut down early with drought conditions, so producing less feed for the grazier. Adaptation is also reflected in the extended maturity pattern of native grass seeds. This is an advantage for survival but is a disadvantage for plant breeders and seed harvesters. This is one of the main hurdles for the native grass seed industry and one of the reasons native seed is relatively expensive.

Many native species are adapted to the low fertility soils, putting them at a disadvantage compared to introduced pasture species where higher rates of fertiliser are used. However, a number of native species do respond to increased fertility. In fertiliser trials in the Macleay, native glycine has been observed to increase in abundance under higher phosphorus fertiliser treatments (Rose & Rose 2009 – see poster paper, these proceedings).

Native grasses are more genetically and morphologically diverse than most introduced pasture species, with many ecotypes occurring locally and regionally. This diversity adds to the ability of native species to cope with increased climate variability. The biodiversity of native pastures is usually higher than introduced pastures, potentially reducing the risk from pests and diseases.

Future of native pastures on the Mid North Coast

Native pastures are often still dominant in the lowest fertility, harshest environments. In drought years, species such as red grass were seen to reinvade 'improved' pastures. With shrinking margins in farming, it makes economic sense to use highly productive introduced species and higher inputs on the best land. This leaves native pasture systems to do what they do best, survive, grow and produce economic returns under low input systems. Land managers can help maintain pastures in optimum condition by, firstly, getting to know what species they have and what they indicate about the soils, landscapes and past management. Secondly, they can use grazing management with rest periods to allow desirable species to flower and set seed. In return, native pastures will provide a low cost feed resource that conserves the soil and makes a significant contribution to the biodiversity of a region.

Acknowledgements

The survey of the Macleay Valley was undertaken by Harry Rose, supported by the University of New England and NSW DPI.

References

Haydock, M & Shaw, N 1975, The comparative yield method for estimating dry matter yields of pastures, *Aust. J. Exp. Agric. Animal. Husb*. 15, 663-70.

Rose, C & Rose, H 2005, Productivity and forage quality of water couch (*Paspalum distichum*): an important native species in grazed coastal wetlands, *Proceedings of the 4th National Conference of the STIPA Native Grasses Association, Grassland Conservation and Production, Both Sides of the Fence, Burra, South Australia, October 2005*

Rose, H, Rose, C, Reid, N, Kahn, L & Whalley, W 2005, Pastures of the Macleay *Proceedings of the 4th National Conference of the STIPA Native Grasses Association, Grassland Conservation and Production, Both Sides of the Fence, Burra, South Australia, October 2005*