

MAKING THE MOST OF YOUR EXISTING PASTURE.

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Grazing management

All too often grazing management appears to be primarily related to the effect of a particular strategy on animal production, the consequence in terms of pasture components appears to be incidental. I believe the emphasis should be on the effect of management on pasture composition and quality; if these are right then optimum animal production will follow. Pasture species which have large differences in seasonal production are probably the most difficult to manage to maintain quality throughout the year. So an ideal pasture species is one with moderate production potential throughout the year and able to cope with extreme variability of the Australian climate. Unfortunately on the Tablelands some of our more productive pasture species are the introduced so called winter perennials which are extremely productive when conditions are ideal but are also heavy users of soil moisture so that between season production is usually very variable, making ideal grazing management very difficult. On the other hand, although our native species are often less productive they are adapted to the climate so they are able to maintain production longer into dry spells and with ideal composition have the potential to provide good quality herbage for a greater proportion of average years.

Native and natural pastures.

It may appear trite to say that you must know your pastures before you can manage them. However, native pastures have been largely ignored over many years and it is not surprising that few people are able to recognise our most common native grasses and then to classify them according to their desirability. On the Northern Tablelands for example, native pastures are a complex community which can contain any of over 160 herbaceous species. In their typical state, native pastures are dominated by summer perennial grasses which are susceptible to frost. Early work comparing native and sown species (Begg 1959) showed that sown fertilized pastures were much more productive than unfertilized native pastures and so it has been recommended that the "ultimate objective should be to establish improved sown pastures on all areas of the Tableland now used in an unimproved condition" (Anon 1964).

Subsequent experience and work (eg Robinson and Lazenby 1976) has shown that fertilized natural pastures containing white clover are capable of high levels of animal production. It has been found that the botanical composition of these more productive pastures is considerably different from the original native pastures. Closer study of these pastures show that they contain a higher proportion of species that remain green throughout the year. Not only do these species improve the quality of pastures during the winter but they have usually proved more persistent at higher stocking rates and are generally responsive to increasing levels of fertility.

Pure swards of selected species sown at Glen Innes have shown that many of the native grasses are highly productive and often rival the productivity of recommended introduced sown pasture grasses, in fact native species have given the greatest seasonal production in all seasons of the year (Table 1.)

These data were obtained from unselected population of the native grasses which showed a wide range of variability within each plot. There is no doubt that better levels of production could be achieved from swards of selected individuals. This would require a programme of domestication which will be discussed later.

Table 1. Average seasonal production (kg/ha) of selected sown and native grasses at Glen Innes for 3 years from 1980 to 1983.

<u>Grasses</u>	<u>Spring</u>	<u>Summer</u>	<u>Autumn</u>	<u>Winter</u>
<u>Sown species</u>				
<i>Sirosa phalaris</i>	3050	2032	1763	881
<i>Demeter fescue</i>	3084	1243	1704	579
<u>Native (year-long green)</u>				
<i>Danthonia linkii</i>	3450	2438	1254	368
<i>Poa seiberana</i>	3292	2452	1815	1378
<i>Microlaena stipiodes</i>	3031	2306	1304	267
<u>Native (summer perennial)</u>				
<i>Sporobolus elongatus</i>	2484	4071	2095	-
<i>Bothriochloa macra</i>	3289	4682	1672	-
<i>Themeda australia</i>	2828	2859	2313	-

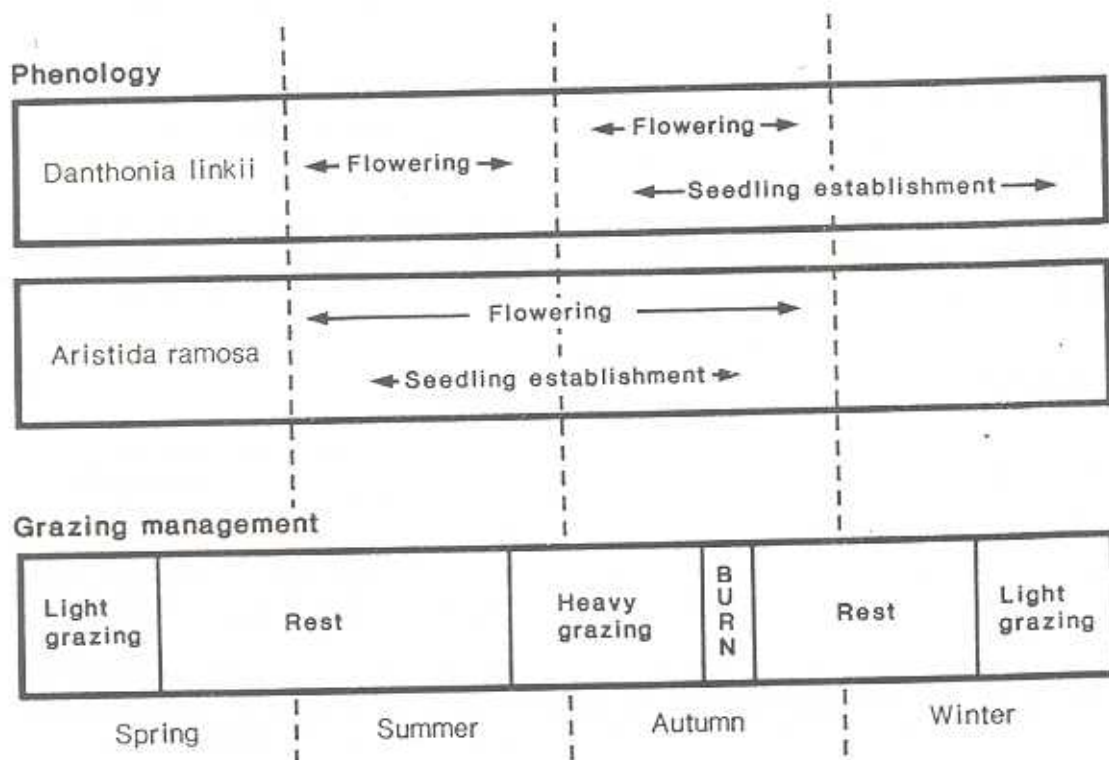
Management of natural pastures

On the Tablelands both superphosphate and increased grazing pressure appear to be important in promoting the change towards the more valuable yearlong green native grasses as the experiences of John Fleming will no doubt illustrate. These experiences have stimulated interest in the manipulation of botanical composition by grazing management to improve both

pasture and animal production. Pasture grasses can be weakened by grazing them when they are most susceptible to damage. They are most susceptible a) at flowering and seed set and b) when seedlings appear and plants are establishing. They can also be affected when growth starts in spring and when root reserves are being laid down in autumn. Because these critical periods occur at different times for different species, a knowledge of the phenology of each species can be used to bring about changes in pasture composition. As an example, Lodge, Whalley and Robinson. (1984) devised a grazing management system which aimed at reducing the abundance of the undesirable grass *Aristida ramosa* (wiregrass) and increasing the proportion of the desirable grass *Danthonia linkii* (wallaby grass) and demonstrated the principles necessary to achieve this change (Fig. 1).

Figure 1.

The phenology of *Danthonia linkii* and suggested grazing strategy to favour *Danthonia* and reduce *Aristida*. The length of grazing and rest periods whether to graze in early spring or to burn in autumn would depend on seasonal conditions.



The principles used in this system are applicable to many pasture communities but their implementation on a broad scale depends on the species involved and many details may need further refinement. Anyone trying such a management system would I believe need to start on a small scale to gain expertise.

Domestication

The Australian environment is typically one of violent changes from floods to drought and any plant (usually native) that has survived until the present day must be well adapted to these conditions. One of the most important requirements for successful pasture plants is adaptability. In spite of the adaptability and potential of some of our native species we still appear to spend more money on plant exploration, introduction and development of introduced species than we do on selection and improvement of the more promising native grasses.

Most native grass species exhibit a wide range of variability in agronomic characteristics; the first stage of any development program would be the selection of those plants with the more desirable characteristics.

Most native grasses release the seed from the parent plant when it becomes mature. The presence of seed release mechanisms in these plants means that harvesting of seed can be very difficult. Before a pasture plant can be easily used in agriculture it is necessary to study and devise a strategy to overcome the seed release mechanisms in a program of domestication. Other factors of importance in this stage are seed viability, seed dormancy, seed and seedling characteristics to enable machine harvesting and successful establishment of new stands.

Proposals for the domestication of some native grasses have been prepared and initial work is in progress on some programmes. Species included in these proposals are:-

Danthonia linkii, *Danthonia racemosa*, *Microlaena stipoides*, *Agropyron scabrum* and *Astreblla lappacea*. There are probably many more species worthy of domestication but time and personnel are unavailable.

References

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