NSW DPI

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JULY 2007 PRIMEFACT 383 (REPLACES AGNOTES DPI-415 AND DPI-416)

Perennial brome grasses

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Introduction

Perennial brome grasses are short-lived, highly palatable perennial grasses, native to areas of central and southern South America. In their environments of origin, they are regarded as a high-quality component of grassland systems, with the capability to produce high-quality herbage throughout the year. They are particularly valuable for producing winter forage.

While individual plants are relatively short-lived (2–3 years), perennial bromes are prolific seeders and recruit strongly, maintaining density in a pasture mix if they are well managed.

Several species of perennial brome have been introduced into Australia. These include prairie grass (*Bromus wildenowii*), grazing brome (*Bromus stamineus*), pasture brome (*Bromus valdivianus*) and coloured brome (*Bromus coloratus*). While these species differ slightly morpohologically, they have similar agronomic characteristics.

In medium-high and high rainfall areas of south-eastern Australia, or areas with reliable irrigation, perennial brome grasses have considerable potential as high-quality, high-performance pastures when used in combination with suitable annual and perennial legumes.

Adaptation

Perennial brome grasses have been successfully grown in areas receiving 600 mm average annual rainfall (AAR) in southern NSW, and 750 mm in northern NSW. They have been grown in areas receiving lower rainfall, but tend to behave as annuals in such situations. Moderate rainfall over summer is required in order for adult plants to perenniate.

Perennial bromes will grow in a variety of soils from light to heavy texture, with pH ($CaCl_2$) of 4.8–7, providing they are well-drained. Perennial bromes do not tolerate waterlogging.

Perennial bromes evolved in soils with relatively low fertility, but perform best under moderate to high fertility conditions.

This group of grasses has been used widely in coastal areas of northern and southern NSW, particularly by the dairy industry. Recent research has shown that they are also very suitable as a specialist pasture for tablelands areas of NSW.

Description

Perennial brome grasses are densely tufted and relatively shallow-rooted. Appearance differs slightly between species. Prairie grass is the most robust type, with broader leaves (up to 10 mm wide and 30 cm long) and a more upright growth habit. The other species generally have finer leaves (6–8 mm wide and 20 cm long) and a more prostrate habit.

The seed head is open and branched, measuring

Figure 1. Perennial brome

up to 20 cm long. It tends to droop to one side, due to the weight of the seeds. Seeds are large and flattened, measuring approximately 5 mm wide and 20 mm long. Plants can grow 60–80 cm tall, including the seed head.

Varieties

Prairie grass

Grasslands Matua was developed in New Zealand, from germplasm originating in South America and provided by Australia. It was released in the mid-1970s. Grasslands Matua was the first variety of prairie grass commercially available in Australia.

Atom was developed from naturalised populations found in the Canterbury region of New Zealand. It is slightly finer leaved than Matua. It was released in 1998.

Grazing brome

Grasslands Gala[Φ] was developed in New Zealand, from germplasm collected in the Santiago region of Chile. It was released in the early 1990s. Grasslands Gala[Φ] was selected for vigorous vegetative growth, rapid recovery from grazing and increased seed yield. It is finer leaved and more densely tillered than prairie grasses.

Pasture brome

Bareno was developed in New Zealand and released in 1998. It was selected for persistence under grazing and high summer forage production.

Coloured brome

Exceltas[Φ] was developed in Tasmania by Eric Hall and Andrea Hurst of the Tasmanian Institute of Agricultural Research (TIAR), from material originally collected in Chile in the 1950s. It was selected for seedling vigour, herbage productivity, high tiller density, uniform flowering time and prostrate growth habit.

Establishment and management

Sowing

Paddocks in which perennial brome grasses are sown should be managed in preceding years to minimise weed burdens. This strategy is not specific to perennial brome grasses, and should be used when considering sowing any pasture species.

Perennial brome grasses can be sown into a conventional seed bed, or direct drilled to a depth of no more than 25 mm. They may also be surface broadcast.

They can be sown as a monoculture, or in a mix with other pasture species. If sown as a monoculture, rates of 20–25 kg/ha (dryland) and 40–60 kg/ha (irrigated pastures) should be used. Suitable companion species to sow with perennial brome grass include ryegrass, subterranean clover, lucerne, white clover and red clover.

When sowing as a component of a mixture, rates will need to be adjusted, depending on the desired target density of each pasture component. Contact your local agronomist for further information.

Perennial brome grasses should not be sown with slow-establishing species such as phalaris (*Phalaris aquatica*), cocksfoot (*Dactylis glomerata*) or tall fescue (*Festuca arundinacea*), as the early vigour of the brome grasses will result in poor establishment of these other grass species.

Fertiliser

Fertiliser must be applied to new sowings of perennial brome grasses, to enhance seedling vigour and promote dense establishment. Phosphorus (P), nitrogen (N) and sulphur (S) should be applied at sowing. Trace elements such as molybdenum (Mo) may also be required in some areas.

Perennial brome grasses that have been sown as a monoculture or in combination with another grass, such as perennial ryegrass (*Lolium perenne*), will require regular N application to maintain production.

If perennial bromes have been sown with a suitable companion legume and the legume content is maintained at reasonable levels, annual applications of P and S should be sufficient, as legumes will provide N for grass production. The rate of fertiliser required will depend on grazing intensity, soil type and past fertiliser history. Contact your local agronomist for further information.

Grazing

Perennial brome grasses require rotational grazing for persistence and optimum productivity. In general, animals should not be allowed to graze plants with fewer than four tillers.

So that pasture density can be maintained, it is critical that perennial brome grasses are regularly allowed to set sufficient seed for recruitment. Pastures, therefore, should not be grazed excessively at this time. Similarly, grazing pressure should be reduced after significant autumn rainfall, when recruitment events are likely.

Maintaining low weed burdens, particularly in summer and autumn, is also critical to the success of recruitment events.

Pests and diseases

Prairie grass is susceptible to head smut (*Ustilago bullata*). When establishing new pastures, treat seed with an appropriate seed dressing prior to sowing. The main insect pest of prairie grass is army worm. It is also susceptible to attack by Argentine stem weevil at the seedling stage, but has good resistance once established. It has good tolerance of pasture scarabs.

Pasture brome is tolerant of Argentine stem weevil once established, but its tolerance of army worm and pasture scarabs under Australian conditions is not yet known. Head smut has not been recorded in this species.

Grazing brome is resistant to head smut. It is tolerant of pasture scarabs. Grazing brome can be damaged by Argentine stem weevil at the seedling stage, but has good resistance once established.

Coloured brome has not yet been evaluated widely in NSW; however, no diseases have been recorded here, or in Tasmania, where it was developed. It is tolerant of pasture scarabs.

Pastures, particularly newly sown pastures, should be monitored for attack by red-legged earth mite, blue oat mite and lucerne flea. Appropriate management strategies should be employed as necessary to avoid and/or control these pests. Consult your local agronomist for further information.

Seed production

Pasture bromes are very prolific seed producers, with up to 1,000 kg seed/ha being recorded in seed crops in Tasmania. Seed can be harvested using a conventional header.

Herbage production and quality

Herbage production

In medium-high to high rainfall areas, where summer rain allows adult plants to remain productive, perennial brome grasses can produce large quantities of herbage (Table 1).

At the Holbrook and Burraga experimental sites, rainfall of up to 50 mm and 100 mm respectively was received over summer. This allowed adult plants to survive and remain productive. At Bookham, no rainfall was received in summer, causing the adult plants to die. Second year production depended entirely on recruitment, resulting in lower cumulative production.

Table 1. Cumulative herbage production (t/ha) of several perennial brome grass species compared with perennial ryegrass over an 18 month period in 2005-2006 at three locations in southern NSW.

	Holbrook	Bookham	Burraga
Average annual rainfall (mm)	600	620	750
pH	4.2	4.7	4.3
Exchangeable aluminum (%)	5	5	25
	Herbage production (t/ha)		
Matua	13.8	3.3	
Atom	15.7	3.3	10.8
Bareno	11.1	2.5	2.9
Grasslands Gala	13.5	2.6	7.3
Exceltas	8.7	1.6	7.2
Kangaroo Valley[1]	5.5	3.8	9.3

[1] Perennial ryegrass

Herbage quality

Perennial brome grasses produce highly palatable forage with feed value similar to perennial ryegrass. To date, no comparative data is available on feed quality differences between species of perennial brome, as most research in Australia has focused on prairie grass, which, until recently, was the main perennial brome species available.

Research by Lowe *et al* (1999) found that prairie grass digestibility peaked at 79% in winter and declined to 57% in summer in irrigated pasture systems in northern NSW.

Data provided by Eric Hall (TIAR) indicates that peak digestibility of coloured brome was very similar to prairie grass (80%), with crude protein of 25% and metabolisable energy of 11.7 MJ/kg DM.

Perennial brome grasses contain no known anti-nutritional factors. However, as with other pasture grasses, the balance of minerals in the leaf – particularly potassium (K) – can change significantly with climatic conditions, stage of pasture growth and fertiliser input. The balance of K, calcium (Ca) and magnesium (Mg) is very important for livestock health. Sudden increases in the concentration of K in the leaf can lead to a decrease in the absorption of Ca and Mg, which results in conditions such as grass tetany and milk

fever. Consult your local livestock officer or veterinarian for further information.

Acknowledgements

Eric Hall and Andrea Hurst, Tasmanian Institute of Agricultural Research (TIAR).

Jeff Lowien (District Agronomist, Glen Innes), co-author of the previous Agnote on pasture brome.

Harry Kemp (former District Agronomist) and Bill Fulkerson (Principal Research Scientist, Wollongbar), authors of the previous Agnote on grazing brome and prairie grass.

The authors wish to acknowledge the assistance of Richard Hayes, Craig Rodham, Craig Lihou and Gabrielle Dyce (formerly Technical Officer NSW DPI) for the management and maintenance of field trials associated with information contained in this Primefact.

Further reading

Lowe KF, Bowlder TM, Casey ND & Moss RJ 1999, 'Performance of temperate perennial pastures in the Australian subtropics 1: Yield, persistence and pasture quality', *Australian Journal of Experimental Agriculture,* no. 39, pp. 663-676.

Warnings

Pasture improvement may be associated with an increase in the incidence of certain livestock health disorders. Livestock and production losses from some disorders are possible. Management may need to be modified to minimise risk. Consult your veterinarian or advisor when planning pasture improvement.

Legislation covering conservation of native vegetation may regulate some pasture improvement practices where existing pasture contains native species. Inquire through your office of the Department of Natural Resources for further information.

ISSN 1832-6668

Replaces Agnotes DPI-415 and DPI-416

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Job number 7812