

# Holistic Planning for Horse & Land owners

## Pastures for Horses

### Part 4: Australian Native Grasses



As horse owners, and even on the smallest of properties, we sometimes forget that we are grass and forage farmers for our horses. Whether you manage grazing pastures or agist your horses, it helps to know more about

grasses and legumes. The different types, how they develop and grow, the effect of grazing pressure, what leaf area should remain after grazing and their recovery, all affect pasture management and the health of your horses.

When European settlers first arrived in Australia, grasslands and grassy woodlands covered much of the continent. Many of the explorers referred to grasses as the dominant plants in the landscape. For thousands of years, grasslands and grassy woodlands were periodically burned, either as the result of lightning strikes, or by the firestick farming of aboriginal Australians. As a result, shrub and tree growth was suppressed, and grasses — mostly tussocky, persistent perennials — flourished.

Since then, altered land management (land-clearing for European-style cropping, intensive grazing, and the introduction of 'improved' pastures) has changed these grasslands. Now, less than 1% of the original temperate grasslands and grassy woodlands remains intact. Yet many grasslands are resilient systems with considerable capacity for recovery.

Better knowledge about, and changing attitudes to, their management offer great potential for their improvement over time.

Many of the native grasses are perennials. Identifying types of grasses is easiest when they are flowering, in the spring and summer months.

In this article, part 4 of the series on Pastures for Horses, I will first discuss a few of 226 varieties of native grasses and later in the article I will talk about the role and the potential of native pastures in horse properties.

#### C3 (Temperate) Native grasses

##### Wallaby grass (*Austrodanthonia spp.*)

Commonly called wallaby grass or white top, *Austrodanthonia* appears in approximately fifty species in Australia. Wallaby grass is a C3 perennial and a fine-leaved tussocky plant, which remains green throughout the year. It flowers from spring through to autumn.

Wallaby grasses are some of the most valuable native grasses in the pastoral areas of Australia due to their persistence, palatability, and productivity.<sup>4</sup>

The leaf component is high quality (crude protein of 10–25%) throughout the year and approaches that of tall fescue and phalaris.

Wallaby grass withstands drought and frost. The component of wallaby grass in pasture increases with increased stocking rate and increasing soil fertility.

Wallaby grasses prefer well-drained soils. Sowing in autumn allows for the best establishment; however, seed can be sown at all times of the year as long as soil moisture is available. Germination can be expected within fourteen to twenty-one days in autumn and spring, but may take up to sixty days in winter.

The cleaned seeds are very small and need to be sown just below the surface (5–8 millimetres). If sowing in a dry-land situation, use fluffy (uncleaned) seed. The seeds of wallaby grass are fairly small with a quantity of 1 to 1.5 million per kilogram. A sowing rate of 1–2 kilograms per hectare for cleaned seed and 5–10 kilograms per hectare for fluffy seed is recommended.

##### Weeping grass (*Microlaena stipoides*)

Weeping grass is a temperate (C3) grass that remains green throughout the year. The common name is based on the weeping shape of the seed head.

It has a rhizomatous habit and flowers over the summer-autumn period. Weeping grass is drought-tolerant and frost-hardy.

Weeping grass is persistent under grazing and is highly productive and nutritious. It is reported to be as productive as tall fescue and phalaris. It grows well with subterranean clover on naturally acidic soils and under conditions of moderate to high soil fertility.

The seeds of weeping grass are fairly large; each dispersal unit weighs approximately 0.005 grams. Autumn sowing is preferable. Sow seed 10–15 millimetres below the soil surface. Germination may take from ten to fourteen days. Weeping grass should be sown at 5–10 kilograms per hectare.

##### Speargrass (*Austostipa spp.*)

There are approximately sixty species of speargrass, five of which are introduced.

Speargrass is a C3 perennial. It is coarsely tufted and has a tussocky habit. Flowering occurs from spring through to autumn.

While potentially a desirable species because of the amount of green leaf material it produces, speargrass's sharp awns are a major contaminant of fleece and carcasses.

Speargrass is highly tolerant of frost and drought but declines under increasing grazing pressure and soil fertility.

#### C4 (tropical) native grasses

##### Red grass (*Bothriochloa macra*)

Red grass is a C4 perennial, sometimes known as redleg grass. It forms a prostrate tuft with basal leaves and numerous wiry stems. The base of the stems and the leaves are often reddish or purplish.

Red grass flowers in summer and autumn. It can be found in Queensland, New South Wales, Victoria, and South Australia. It grows on a variety of soil types in humid areas but is restricted in drier areas to run-on areas on clay or loamy soils.

It has a low to moderate frost-tolerance, high drought-tolerance, can re-sprout after fire, and has a life span of five to twenty-five years.

Its roots grow rapidly and have been found up to 1.5 metres below the soil surface! Red grass produces moderate amounts of spring-summer growth, and its stem-to-leaf ratio is high. Stems are of low acceptability and digestibility, but the high quality leaves are readily eaten by grazing animals.

Red grass can grow and persist under low fertility conditions but its response to fertiliser is similar to that of ryegrass. Red grass is one of the native grasses that benefits from livestock grazing and is widespread in overgrazed pastures.

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#### Botanical definitions

**Perennial:** A perennial plant or simply perennial (Latin *per*, "through", *annus*, "year") is a plant that lives for more than two years.

**Annual:** An annual plant is a plant that usually germinates, flowers, and dies in a year or season.

**Inflorescence:** An inflorescence is a group or cluster of flowers arranged on a stem that is composed of a main branch or a complicated arrangement of branches.

**Spike:** A spike is a group of flowers arising from the main stem, without individual flower stalks (sessile).

**Spikelets:** A small spike, which is part of the characteristic inflorescence of grasses and sedges.

**Florets:** A grass spikelet consists of one or more florets (reduced flowers).

**Rachis:** In plants a rachis is the main axis of a compound structure. It can be the main stem of a compound leaf, such as in Acacia or ferns, or the main stem of the inflorescence.

**Ligule:** The ligule is part of the leaf, and is found at the junction of the blade and sheath of the leaf.

**Panicle:** A branched cluster of flowers in which the branches are racemes (type of inflorescence that is unbranched).



**Plant description**

**Red Grass**  
(*Bothriochloa macra*):

A low-growing, perennial tussock grass. Slender, reddish flowering stems up to 100 centimetres high are produced during summer and early autumn, giving it the common name

of Red grass or redleg grass. The sparsely hairy leaves are 5–30 centimetres long, 2.5–5.5 millimetres wide, green with some maroon colouring at the tips and margins during warmer months. Inflorescence subdigitate, with ramose branches.

It is considered to be an increaser species and an indicator of degraded sites. Although reported as being an uncommon component of the original woodland pastures, *Bothriochloa macra* is often associated with kangaroo grass in lightly grazed grasslands.

October to November is the preferred time for sowing; mulching increases emergence (probably because of moisture conservation). The spreading of seed-bearing hay appears to be a reliable method for establishing red grass.

**Windmill grass** (*Chloris truncata*)

The characteristic windmill-shaped seed head gives this grass its common name (see picture). Windmill grass is a short-lived (two to three years) perennial and makes rapid growth in early spring. The plants are tufted or prostrate with small fibrous leaves that have moderate palatability. Windmill grass responds positively to both increasing soil fertility and grazing. It is moderately tolerant of drought but its frost-tolerance is low. In some drier situations, it can act as an annual grass, but its rapid germination and growth after summer rainfall allows it to use excess water from out-of-season rainfall. It is distributed widely throughout Australia on a range of soil types.

Windmill grass commonly occurs in disturbed areas such as firebreaks or paddocks under crop, which has led to it often being considered a weed, although growth over spring and after summer rain can provide valuable out-of-season forage.

Windmill grass is a warm-season (C4) grass, growing rapidly during spring and summer when moisture is available. It is dormant in winter and begins flowering four to six weeks after growth starts or germination. Flowers can appear from late winter through to autumn.

Windmill grass seed should be sown on or just below the surface, no deeper than 3–5 millimetres. It is best to sow in the early spring, when soil moisture is available. Recommended sowing rate varies between 5–15 kilograms per hectare.

Windmill grass has been reported to cause hepatopathy and secondary photosensitisation in sheep and cattle.

**Kangaroo grass** (*Themeda triandra*)

Kangaroo grass is a C4 perennial, which probably dominated all Australian grasslands before European settlement. It is still one of Australia's most widespread species, extending from the arid interior to the alps.

It is a drought-resistant, deep-rooted, warm-season perennial grass with a tussocky habit. The leaves are long and thin and turn from green to red/brown/purple as they mature. Kangaroo grass flowers throughout summer and has attractive rusty-red seed heads on 30–50-centimetre-long inflorescences with dark nodes. The seed heads have a distinctive shape. Kangaroo grass becomes dormant during winter. Its forage value is considered moderate.

This grass is very common, especially in areas that are not heavily grazed, such as cemeteries, on the side of roads, and railway lines. Kangaroo grass decreases under grazing. While it responds to increasing soil fertility, it does not maintain its dominance under these conditions.

Kangaroo grass seed requires shallow sowing, 5–10 millimetres deep. The seed needs to stay moist for about a week for it to germinate. Seed germinates readily in spring and summer when the air temperature is above 25° Celsius and soil temperature is above 20° Celsius. A sowing rate of 5 kilograms per hectare for pasture is recommended. When collected or harvested on-farm, seed stored for twelve months has a higher germination rate than fresh seed.

**Queensland bluegrass**

(*Dichanthium sericium*)

Queensland bluegrass is a warm-season (C4) perennial grass that is palatable to grazing animals. It is widespread in eastern and central Australia.

Where it occurs throughout Queensland and New South Wales, it is considered one of the most productive native grasses. This grass is susceptible to frosts. Queensland bluegrass prefers heavier clay soils or areas that capture a lot of moisture. It is tolerant of moderate grazing. It also provides good quality feed when young and green. Quality drops on maturity to low levels in winter, especially when tops are killed by frost.

In high rainfall years, Queensland bluegrass is a high-yield species, at least in terms of biomass production. In Queensland, it can be baled for hay.

This species is also considered one of the easiest native grasses to establish from seed and has a high rate of seedling recruitment. It is not particularly drought-tolerant, and in drier times, restricts itself to the wetter parts of the landscape.

The natural areas of Queensland bluegrass are self-regenerating, establishing readily from seed. Not all seed establishes immediately when wetted, which prevents loss of soil seed reserves.

**Plant description**

**Weeping grass**  
(*Microlaena stipoides*)

An erect to prostrate grass that grows to 50 centimetres high with short rhizomes.

The leaves are soft, slightly rough to touch, with a distinctive crimp at leaf tip.

A slender seed bearing stems to 70 centimetres with the inflorescence portion weeping.

The seeds are quite large — up to 15 millimetres.



**Plant description**

**Windmill grass** (*Chloris truncata*)

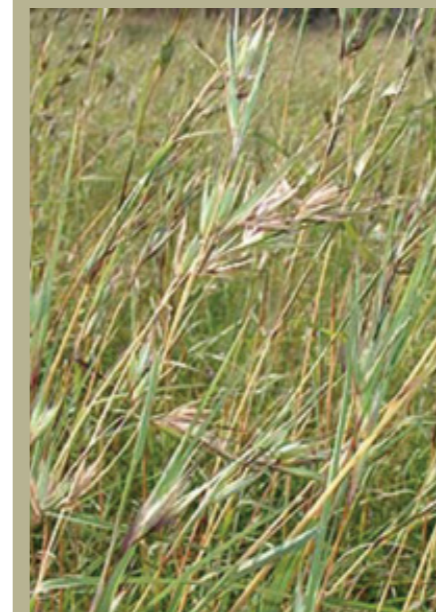
Erect, hairless perennial to 50 centimetres high, forming a dense, low crown, sometimes with short, branched stolons. It has long leaves, approximately 10–15 centimetres long with a distinctive blunt tip and flattened leaf sheath at the base. It is light green in colour with a prominent central vein. Spikes usually six to nine, digitate, radiating horizontally, 4–20 centimetres long. Spikelets rather distant, arranged alternately in two rows on the underside, two- or three-flowered, upper empty, florets black when mature.



**Plant description**

**Kangaroo grass** (*Themeda triandra*)

A tufted perennial that can grow to 1.5 metres tall and 0.5 metres across. Its leaves are 10–50 centimetres long and 2–5 millimetres wide, green to grey, drying to an orange-brown in summer. The flowering period is from December to February. It has a long (up to 50 centimetres) inflorescence with distinctive seed heads, and produces distinct, large red-brown spikelets, which occur on branched stems. Spikelets have long distinguishing spathes at their base and bare florets with black awns 4–7 centimetres long, which remain with the seed when it falls. The older leaves have a red-brown tinge.



**Plant description**

**Wallaby grass** (*Austrodanthonia spp.*)

Fine-leafed, tufted, yearlong green, perennial grasses to about 1 metre tall. Leaves are grey-green to dark green and often hairy.

All species have a hairy fringe at the junction of the leaf blade and leaf sheath.

Seed head is a contracted-to-open panicle. Spikelets are green with pink tinges along the edges of the glumes in early flowering, becoming fluffy white when mature. Flowers in spring and autumn.



**Plant description**

**Speargrass**  
(*Austostipa spp.*)

Perennial, tufted (mostly) or rhizomatous and tufted (and two shrubby species). Culms are woody and persistent (subgenus *Bambusina*, with persistent, bamboo-like

canes), or herbaceous. Leaf blades are narrow. Ligule is an unfringed or a fringed membrane. Inflorescence is paniculate, open or contracted.



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**Plant description**

**Queensland bluegrass**  
(*Dichanthium sericium*)

A tufted, erect perennial, 30–80 centimetres tall, generally rather slender. Tufts are never very large, generally 10–15 centimetres in diameter and with a fairly weak root system.

Culms are densely branched at the base and often from the upper nodes. The stems are smooth and hairless but the nodes bear a ring of long (1.5 millimetre), erect, white hairs. Leaves are flat, 8–15 centimetres long, 2–4 millimetres wide, often bluish-purple, typically without hairs, although some forms are hairy.

Leaf sheaths are round, close to the stem, and may be almost as long as the internodes. Short ligules are membranous and ragged.

The inflorescences generally have two to four stalkless erect racemes with paired spikelets crowded into two ranks.

On the other hand, partially germinated seed can return to dormancy (hydropedesis) when exposed to moisture stress during germination. These seeds survive and resume germination when moisture becomes available.

Where commercial seed is available, it can be difficult to spread because the fluffy awned seed does not flow through conventional machinery. De-awning and/or pelleting may improve flow.

**Pastures for horses**

The increased incidence in horses becoming overweight and obese can be attributed to improved pastures and husbandry practices.

The reasons for horses developing obesity and metabolic syndrome are generally similar to those attributed to obesity in humans. Modern-day husbandry practices are characterised by an imbalance between energy intake (energy-rich feeds) and energy expenditure (inactive horses).

An imbalance can lead not only to weight problems but can initiate other disorders, such as insulin resistance and laminitis.

Due to all these factors, interest is increasing concerning the use of grass species to create lower sugar pastures ('diet-pastures').

*Native grasses need to be managed carefully, because they are more sensitive to over-grazing. If your grazing planning is inadequate, you will see the weeds and introduced grass species return because they can handle more grazing pressure.*

**Native grasses and non-structural carbohydrate content**

The native grasses of Australia tend to be lower in NSC than the naturalised species from Europe or Africa, when grown under the same conditions.

Grasses in Australia co-evolved with relatively smaller marsupials that have soft feet and different grazing techniques from cattle and horse species. This means that the Australian grasses never had to adapt to enormous herds of heavy animals with sharp, destructive feet that eat grass close to the ground.

Furthermore, native grasses never had to adapt to long periods of freezing temperatures. The most predominant plant stressors in Australia are heat and drought. Even in temperate Australia, the temperature is never as cold as that which northern hemisphere adapted grasses must withstand. In the northern hemisphere, grasses accumulate fructan



Cristina Wilkins

as a defence for short-term drought, but it is often not enough to allow grasses to survive the long droughts that are common in Australia.

There are a number of Australian native grasses, such as weeping grass, speargrass, and wallaby grass, that are of the C3 type, but produce starch and little fructan.

Native grasses are naturally better adapted to the unpredictable rains and long-term droughts that characterise Australian climates. Many Australian native grass species go dormant under drought, and have tough seed coats that can seal precious resources away until better times. They do not accumulate NSC under stress like grasses from Africa or Europe - there is no benefit in trying to store excess carbohydrates for a drought that can last for many years.

**The use of native grasses**

There is now an increased interest in the use of native grasses to enhance biodiversity of grasslands for conservation purposes. However, native grasses are also supported in sustainable livestock production.

Graziers who are interested in maximum production of meat animals or breeding/growing horses probably preserve a focus on improved or introduced grass species, but horse owners needing to maintain mature ponies and horses have an unused resource in the species of grasses native to Australia.

Even though grass research has predominantly focused on the exotic 'improved' species, an adequate amount of information is now available concerning management systems for long-term sustainable grazing of native grasses in Australia (of course, more research, particularly regarding horses, would be welcome). This information is valuable for horse owners seeking to adapt feeding systems for horses, particularly for metabolically challenged horses.

Greater interest in biodiversity and sustainable grazing systems inevitably leads to re-evaluation of the importance of native grasses for soil stabilisation, improved hydrology (which may help to prevent salinisation of soils), and sustainable grazing over long-term drought. Native grasses considered worthy of commercial improvement include Wallaby grass (*Austrodanthonia* spp.), Red grass (*Bothriochloa macra*), wheatgrass (*Elymus scaber*), Weeping grass (*Microlaena stipoides*), Mitchell grass (*Astrebala* spp.), and Kangaroo grass (*Themeda triandra*).

**Native grasses and grazing: balance and biodiversity**

Because these native species have a lower sugar content, they may be less palatable than 'sweet' grasses or weeds.

Creating paddocks that have a good cover of a mix of native grasses reduces the growth of introduced temperate or tropical grasses.

At the same time, we shouldn't become preoccupied with creating pastures from lower-NSC grass species exclusively.

It is difficult to select solely for low-NSC species, partly due to the impact that horses have on grasslands (they are heavy animals that can eat grasses close to the ground).

If you have horses on small acreage, you will generally see that the grasses that can resist continuous (set-stock) grazing tend to dominate.

Native grasses need to be managed carefully, because they are more sensitive to over-grazing. If your grazing planning is haphazard or inadequate, you will see those grass species return that can deal with this pressure (most likely your introduced ones).

**Pasture management**

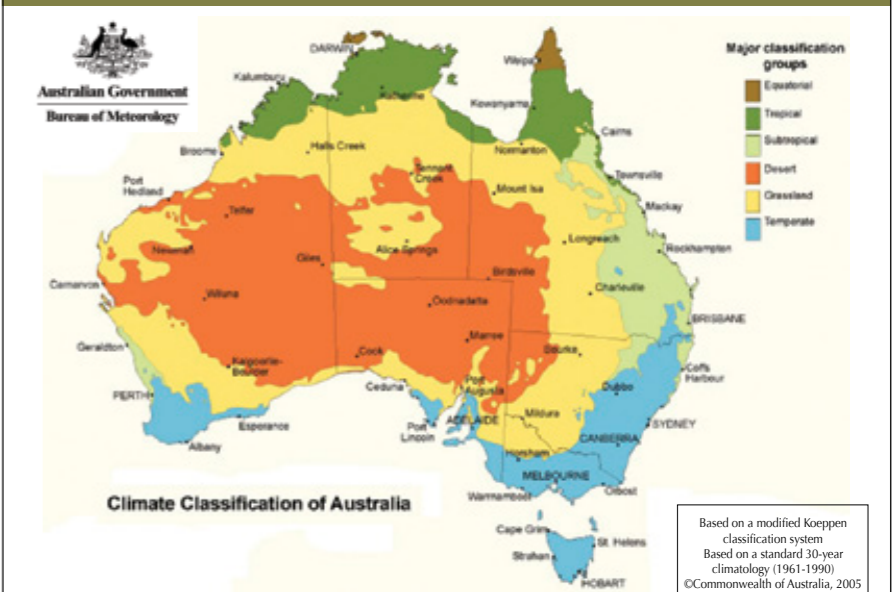
It is therefore important to examine your pastures and to identify species. What you would like to grow largely depends on your goals and the nutrient requirements of your horses (which can vary).

If you already have a mixture of naturalised and native grasses, you can continue to encourage this by using proper grazing and pasture improvement strategies.



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**Vegetation zones of Australia**



To get a general idea where temperate and tropical grasses can grow it is always useful to identify which climate zone you are located in (see map above). This classification takes into account rainfall, temperature, season and the effects on plant growth. However, there will be local differences caused by microclimates which means that although you may be in a temperate area, you may still be able to successfully grow tropical grasses and vice versa.

“ *The most important objective with pasture management for horses is to create biodiversity and to avoid monocultures. To accomplish this, you need to integrate a proper pasture management plan, grazing plan, and general horse management plan that work towards this goal.* ”

If you want to favour native grasses and reduce seeding of the naturalised species, you might want to look into tools that can promote succession.

Tilling pastures and re-sowing may seem like the most logical step towards quickly establishing 'new' grass species; however, by exposing soil, you actually reduce both the moisture content and the microbiological activity of your soil workers.

Using mulch supports a renewal process by retaining moisture in the soil. As an alternative to mulching, you can also review minimal tillage strategies, such as Keyline ploughing, to re-sow pastures and promote succession.

Commercial (native) grass mixes for horses are available on the market. Property owners should review whether the grass species (mixes) are suitable for their environments and climate.

The most important goal with pasture management for horses is to create biodiversity and to avoid monocultures.

To accomplish this, we need to utilise proper pasture management plans, grazing plans, and general horse management plans.

For smaller horse properties that cannot make enough subdivisions for cell/paddock grazing, you may need to consider sacrifice areas, a central point, and slow-feeding laneway design systems to take horses out of pastures for adequate recovery periods.

A referenced version of this article can be found at: <https://www.horsesandpeople.com.au/article/australian-native-grasses-horse-pastures>