# Managing Tasmanian Native Pastures

a technical guide for graziers

K. Mokany, D. Friend, J. Kirkpatrick and L. Gilfedder

A collaboration between: Tasmanian Institute of Agricultural Research Land, Water & Wool University of Tasmania Department of Primary Industries & Water





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#### **AUTHORS**

Karel Mokany, Tasmanian Institute of Agricultural Research

**Doug Friend,** Tasmanian Institute of Agricultural Research

Jamie Kirkpatrick, School of Geography and Environmental Studies, University of Tasmania

Louise Gilfedder, Department of Primary Industries and Water

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#### **GRAZIER VIEWPOINTS**

Sarah Ackland & Steve Barrington, 'Apsley Park', Apsley

Richard Bennett, 'Ashby', Ross

Major Ralph Cameron (deceased), 'Kingston', Nile

Julian Cotton, 'Kelvedon', Swansea

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**Henry Foster,** 'Fosterville', Campbell Town

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#### **INTRODUCTION**

Native pastures underpin the longterm productivity, profitability and sustainability of grazing activities on many Tasmanian properties, particularly fine wool grazing properties. They are also a significant vegetation community for conserving native plants and animals, and maintaining stable and healthy soils.

This guide provides information about managing native pastures in Tasmania. It has been written with input and involvement from Tasmanian graziers. It also includes the findings of relevant scientific Tasmanian field experiments, studies and surveys.

This guide was written in response to concerns from land managers who wanted to learn more about best management practices for native pastures in Tasmania. However, there are no fixed recipes for managing native pastures. In fact, adopting different and diverse management practices is the most useful approach, particularly for conserving biodiversity.

The aim of this guide is to provide information that will help you manage native pastures. The emphasis is on the conservation and sustainable management of these semi-natural ecosystems in the context of a productive farm enterprise. Sheep grazing on native pastures can maintain and enhance biodiversity values. Therefore, good grazing management will provide benefits for you *and* the broader community. The first two chapters provide background information on native pastures in Tasmania, and describe the attributes of the key plant species.

The third chapter covers property planning, which forms the basis of all decision making. Management decisions concerning native pastures inevitably involve grazing management, which is covered in the fourth chapter.

A range of other issues associated with managing native pastures is addressed in subsequent chapters. These include using fertiliser, controlling weeds, using fire, maintaining conservation values, promoting tree and shrub regeneration, managing riparian and wetland areas, and managing native pastures during drought.

The guide concludes with information about monitoring native pastures, so you can assess the effect of your management practices on your pastures.

'Grazier viewpoints' and quotations from unnamed graziers have been included throughout the book to complement the main text. They highlight Tasmanian graziers' experiences of managing native pastures. The quotations have been taken from meetings and interviews. Quotations taken from published works have been cited.  Native grasslands are Australia's most poorly conserved ecosystems.
Graziers with native grasslands have a unique asset. 
David Kemp, 2002

## Tasmania's Native Pastures



#### **KEY POINTS**

- » Tasmania has several different types of native pasture.
- » Native pastures provide reliable and valuable low-input production.
- » Native pastures provide benefits for livestock health and wool quality.
- » Native grasses help maintain healthy soils and ecosystems.
- » Native pastures have high value for biodiversity conservation.
- » Some of Tasmania's most threatened plant and animal species are found in native pastures.

#### Chapter 1 Tasmania's Native Pastures

#### WHAT IS NATIVE PASTURE?

The terms 'native pasture', 'natural pasture' and 'native grassland' are all terms used to describe grazing environments dominated by native grasses. Native pastures may contain other native herbs as well as introduced plants, such as clovers, broadleaf weeds and annual grasses. Native pastures also occur in areas with scattered trees and shrubs. Tasmanian graziers often refer to these pastures as bush runs or run country, while ecologists refer to them as grassy woodlands. Native pastures are generally found on hilly, stony or wooded country where it has not been possible to sow introduced grasses, such as perennial ryegrass and cocksfoot.

There is a gradation in the composition of native pastures, from native pastures with many native species and few introduced species, to sown pastures containing few native species. Some native pastures have been top dressed and aerially seeded with pasture species, and may be referred to as semiimproved pastures. Others have been ploughed in the past, and have reverted to native species and may be referred to as 'degraded' or 'run out' pastures. Other native pastures were previously wooded country, but the trees have been lost through ringbarking and rural tree decline. The point at which a native pasture is no longer native is arbitrary. However, in general, if native grasses dominate the vegetation cover, it is called a native pasture. To determine whether a pasture is native or not, it is necessary to identify the main grasses present to determine whether they are native species. (See Chapter 2 for descriptions of species.)



Native pastures in good condition have a high native plant cover and comprise a variety of species.

condition are characterised by high biodiversity. These pastures contain a mixture of native grass species, including kangaroo grass, wallaby grasses, weeping grass, tussock grasses, speargrasses and wheatgrass. The inter-tussock spaces (gaps between the grass tussocks) provide habitat for a variety of wildflowers, including peas, daisies, lilies and orchids, as well as sedges and rushes. Clovers and weedy introduced species are also likely to occur, but, in pastures in good condition, their cover and biomass are low. Scattered trees and shrubs may also be present. Cryptogams (lichens, algae and mosses) cover the bare areas of soil, and help to protect the soil from erosion.

Healthy native pastures in excellent

Sustainable and hence profitable production will only be achieved through better management of native grassland communities, not through their destruction. Christine Jones, 1995

#### VALUE OF NATIVE PASTURES

As many as half the sheep in Tasmania graze on native pastures. Native pastures are important for many fine wool enterprises and are valued for being low-input pastures. They produce strong, fine wool due to their relatively even growth and minimal variation in nutritional value through the year compared with sown pastures. Sheep grazed on native pastures have fewer worm infestations and need less frequent drenching than those on sown pastures. Sheep fly strike is also far less common on native pastures than sown pastures. Native tussock grass (Poa spp.) and sagg (Lomandra longifolia) provide shelter for livestock. Native pastures usually carry less sheep per hectare than sown pastures, but require less time and cost inputs, such as resowing. In addition, graziers see them as aesthetically pleasing landscapes in which to live and work.

The grasses in native pastures are adapted to the Tasmanian environment, being both drought and frost tolerant. Native grasses, like wallaby grasses and weeping grass, are productive, highly palatable and responsive to increased soil fertility. They are resilient to pasture pests, such as corbies (Oncopera spp.) and pasture cockchafers (Aphodius spp.). Most of Tasmania's native grass species are perennial, so they play an important role in maintaining soil health. During summer and autumn, they protect the soil from erosion and reduce the risk of salinisation by using water from deep in the soil profile.

Native pastures are a high priority for conservation. Approximately 750 native species occur in Tasmania's native pastures, and the most diverse sites have as many as 60 species per 10 m<sup>2</sup>. Over 20 grassland species are listed as threatened, including the grassland paperdaisy (Leucochrysum albicans), leafy greenhood (Pterostylis cycnocephala) and grassland candles (Stackhousia gunnii). Many grassland animals are also threatened, including the glossy grass skink (Pseudemoia rawlinsoni), Ptunarra brown butterfly (Oreixenica ptunnara) and the large flightless beetle (Catadromus lacordairei).

K Native pastures provide feed with a constant nutritional value through the year, and so you can grow wool on it with a very even fibre diameter.



Native pastures are important for conservation of threatened species, including these grassland paperdaisies.

#### Chapter 1 Tasmania's Native Pastures

#### WHAT WERE NATIVE PASTURES LIKE ORIGINALLY?

Today's native pastures are derived from the grasslands and grassy woodlands present at the time of European settlement (Figure 1). Extensive lightly wooded, grassy plains were common along the valley floors and river flats of the Midlands and Derwent Valley. With their productive soils, these areas were readily suited to settlement and agriculture. Early colonial paintings and old survey maps reveal the original landscape, and place names, such as Ellinthorp Plains, Henrietta Plains and Wyldes Plain, tell us where the grasslands and grassy woodlands occurred.

The early settlers' descriptions of the grasslands and grassy woodlands indicate that the native grasses were taller and lusher, wildflowers were more prolific, and soils were richer and more friable than today. The decline in small mammals, absence of Aboriginal digging for edible roots, introduction of domestic hard-hooved livestock, altered fire regimes, and establishment of introduced plants since settlement are all factors that help explain the changes seen in native pastures in the last 200 years.

#### **TYPES OF NATIVE PASTURE**

We can identify several types of native pasture in Tasmania. The two main types are lowland native pastures, which occur below 700 m altitude, and highland native pastures, which occur above 700 m altitude. This guide is primarily concerned with lowland native pastures. Broad descriptions of each lowland pasture type follow.

C The feed native pastures provide isn't conducive to scouring, so you can put sheep on native pasture and know that they're not going to get dirty.



Figure 1. Distribution of grasslands and grassy woodlands in Tasmania in 1800 (from Kirkpatrick et al. 1988).



Native wildflowers will persist in native pastures under favourable management.

#### Kangaroo grass pastures

Kangaroo grass pastures are dominated by kangaroo grass (*Themeda triandra*), but contain other native grasses and wildflowers. They are quite distinctive and have a reddish colour in autumn. Pastures dominated by kangaroo grass have not been sown with introduced grasses or clovers, and have received little or no fertiliser.

Kangaroo grass pastures are stocked at low stocking rates (e.g. 1–2 DSE/ha) or rested regularly. Kangaroo grass grows during the warm season, so it complements the cool season grasses, such as wallaby grass (*Austrodanthonia* spp.) and weeping grass (*Ehrharta stipoides*), and provides an alternative food source for livestock in summer.

#### **Tussock grass pastures**

Tussock grass pastures are the easiest native pastures to identify because of the obvious presence of the tussock grasses (*Poa* spp.). The pasture between the tussocks can be made up of native grasses and other herbs, or introduced clovers, grasses and broadleaf weeds.

Tussock grass is the main type of riparian vegetation on moist soils along rivers and their adjacent floodplains. Many graziers value tussock grass pastures as shelter for lambing ewes or newly shorn sheep.

#### Wallaby grass pastures

Wallaby grass pastures are dominated by wallaby grasses, but may also contain native tussock grasses or kangaroo grass. Other native grasses may also be present, including weeping grass, rough wheatgrass (*Elymus scaber*) and native speargrasses (*Austrostipa* spp.). Wallaby grass pastures often contain clovers, annual grasses and broadleaf weeds.

Wallaby grass pastures have usually been subjected to heavier stocking rates, and have often been fertilised in the past. They are considered to be the most productive native pastures for grazing.



Kangaroo grass pastures display a distinctive reddish colour in autumn.



Many graziers value tussock grass pastures as shelter for lambing ewes.



Wallaby grass pastures are the most productive native pastures for grazing.

#### Chapter 1 Tasmania's Native Pastures





#### **Bush runs**

Bush runs, also referred to as 'run country' or 'rough grazing country', are treed areas dominated by shrubs, native grasses, saggs, sedges, lilies, daisies and other native herbs. The most common trees are white gum (Eucalyptus viminalis), cabbage gum (*E. pauciflora*) and black gum (*E. ovata*). The main native grasses present include kangaroo grass, wallaby grasses and native speargrasses. Bush runs are the most extensive type of native pasture. They are usually found on shallow stony soils in hilly areas too steep and rough to develop.



Bush runs are the most extensive type of native pasture.

## Key Native Pasture Species in Tasmania

#### **KEY POINTS**

- » Identifying the key species in native pastures is essential for good pasture management.
- » Healthy native pastures contain a mixture of dominant native grasses and a variety of wildflowers.
- » Native grasses recover well if allowed adequate time to recover after grazing.
- » Kangaroo grass declines in response to overgrazing and fertiliser.
- » Wallaby grasses and weeping grass are the most productive and nutritious native grasses.

#### IMPORTANCE OF IDENTIFYING SPECIES IN NATIVE PASTURES

Being able to recognise the important species and knowing how to maintain and encourage desirable species is essential for good native pasture management. Knowing the species present enables you to determine the condition of your pasture, and allows you to implement management practices that encourage desirable species and discourage undesirable species.

This chapter provides basic information on the more important species in Tasmanian native pastures. More detailed information can be obtained from *Common grasses of Tasmania: an agriculturalists' guide* by P. Lane, D. Morris and G. Shannon, 1999 and *The glove-box guide to grass and legume identification in Tasmanian pastures* by J. Knox, 1998.

Table 1 (overleaf) lists the species found in a native pasture at Nile in northern Tasmania. It gives a good indication of the range of species found in native pastures.

#### NATIVE PERENNIAL GRASSES

Native perennial grasses are the most important component of native pastures. They are adapted to the Tasmanian environment, so they can survive during periods of low and unreliable rainfall. They also play an important role in maintaining ground cover. High (more than 70%) perennial plant cover can reduce soil erosion, and limit or prevent invasion of annual grasses and broadleaf weeds.

Some perennial native grasses, such as wallaby grasses and weeping grass, can produce similar quantities and quality of herbage as sown pastures when grown under the same conditions.

Although native grasses are generally palatable and productive, they are vulnerable to overgrazing. If allowed adequate time to recover after grazing, they regenerate well. However, continuous grazing reduces their capacity to recover and they may be eliminated. Native grasses are slow to recolonise an area when greatly diminished in number, because they generally produce few seeds and have limited soil seed banks. Table 2 (Friend *et al.* 1997a) shows the size of the soil seed banks of native grasses compared with those of introduced grasses (mainly annual species) and other species in a native pasture at Nile, Tasmania.

Some native grasses, such as kangaroo grass and tussock grasses, which were abundant in the pasture at Nile (Table 1), produced few seedlings for recruiting new plants (Table 3). The wallaby grasses in the pasture at Nile produced more seedlings than the other grasses (Table 3), but these seedlings were under considerable stress due to competition from other plants, low soil moisture, grazing and trampling, so many died before maturation.

Native grass seedlings in established pastures need bare areas created by grazing and other disturbances to survive. In the absence of disturbance, native grasses rely on the survival of established plants to maintain their populations.

Table 2. Soil seed banks in a kangaroo grass pasture at Nile, Tasmania.

Species group	Number of seeds/m <sup>2*</sup>
Native grasses	350
Introduced grasses	5,460
Native broadleaf species	380
Introduced broadleaf species	3,530
Native and introduced sedges, rushes and other monocots	9,060

\* Average of estimates for 1994 and 1995

### **Kangaroo grass** (Themeda triandra, formerly Themeda australis)

Kangaroo grass is the first of the prominent native grass species to disappear when grazing intensity and soil fertility increase. As a result, it is found mainly in ungrazed areas, such as along roadsides, and in pastures that have been rested regularly or stocked lightly, particularly in summer.

Kangaroo grass grows mainly in late spring to early autumn. It is drought resistant, and its deep roots allow it to reach deep into the soil profile. The young leaves are palatable and have moderate to high forage value. However, the mature leaves have low palatability and low forage value. Therefore, it is most suited to less nutritionally demanding production systems such as merino wethers. Kangaroo grass is dormant over winter, because it is sensitive to frost. However, New South Wales researchers have reported that heavy grazing before winter makes the regrowth more frost resistant, allowing it to remain green well into winter. Kangaroo grass may decrease in abundance following the application of fertiliser, because it does not compete well with clovers and other grasses when soil fertility is high.

See page 47, 'Year-round management of kangaroo grass pastures' for more specific grazing management guidelines.



Kangaroo grass (above), with flower head (top).

		New seedlings		Percentage survival of seedlings to			
Species	Year	establishing (No./m <sup>2</sup> )	Sept. 1995	Sept. 1996	Sept. 1997	Sept. 1998	
Kangaroo grass	1994	0.33	50	50	50	50	
	1995	0.16	-	0	0	0	
	1996	0.08	-	-	0	0	
Wallaby grasses	1994	7.83	47	37	29	23	
	1995	3.75	-	47	21	21	
	1996	26.87	-	-	26	19	
Weeping grass	1994	0.92	27	18	18	18	
	1995	0.50	-	74	42	34	
	1996	0.50	-	-	50	0	
Rough wheatgrass	1994	0.25	68	68	34	34	
	1995	1.17	-	68	25	11	
	1996	2.92	-	-	9	1	
Tussock grasses	1994	0.00	-	-	-	-	
	1995	0.00	-	-	-	-	
	1996	0.00	-	-	-	-	

Table 3. Establishment and survival of seedlings of five species of native grass in a kangaroo grass pasture at Nile, Tasmania.

Species group	Species	Common name	Relative abundance <sup>1</sup>
Native g	rasses		
	Austrodanthonia spp.	Wallaby grasses	А
	Austrostipa spp.	Speargrasses	R
	Dichelachne spp.	Plume grasses	R
	Ehrharta stipoides	Weeping grass	А
	Elymus scaber	Rough wheatgrass	С
	Pentapogon quadrifidus	Five-awned speargrass	0
	Poa labillardierei	Silver tussock grass	А
	Poa rodwayi	Velvet tussock grass	С
	Poa spp.	Tussock grasses	R
	Themeda triandra	Kangaroo grass	А
Perennia	Il grass weeds		
	Agrostis capillaris	Browntop bent	R
	Anthoxanthum odoratum	Sweet vernal grass	А
	Holcus lanatus	Yorkshire fog	R
	Lolium perenne	Perennial ryegrass	R
Annual g	grass weeds		
	Aira caryophyllea	Silvery hairgrass	А
	Briza minor	Lesser quaking-grass	С
	Bromus hordeaceus	Soft brome	С
	Hordeum murinum	Shortflower barley grass	R
	<i>Vulpia</i> spp.	Squirrel- & rats-tail fescues	С
Clovers			
	Trifolium repens	White clover	R
	Trifolium spp.	Clovers	А
	Trifolium subterraneum	Subterranean clover	С
Native li	lies and broadleaf species		
	Acaena echinata	Shiny sheepburr	0
	Arthropodium minus	Small vanilla lily	R
	Asperula conferta	Common woodruff	R
	Bossiaea prostrata	Creeping bossia	R
	Bulbine bulbosa	Golden bulbine-lilly	R
	Chrysocephalum apiculatum	Common everlasting	R
	Convolvulus angustissimus	Blushing bindweed	R
	Crassula sieberana	Rock stonecrop	R
	<i>Diuris</i> sp.	Donkey orchid	R
	Dichondra repens	Kidneyweed	R
	Drosera spp.	Sundew	0
	Eryngium vesiculosum	Prickfoot	R
	Euchiton spp.	Cudweeds	С
	Galium spp.	Bedstraw	R
	Geranium solanderi	Southern cranesbill	0
	Glycine latrobeana	Clover glycine	R
	Gonocarpus spp.	Raspworts	R
	Hibbertia spp.	Guinea flowers	0
	Hypericum gramineum	Small St Johns-wort	R
	- Hypoxis hydrometrica	Golden weather-grass	0

Table 1. Species recorded in a 1 hectare area of a kangaroo grass pasture at Nile, Tasmania

Species group Species	Common name	Relative abundance <sup>1</sup>
Native lilies and broadleaf species continued		
Leptorhynchos squamatus	Scaly buttons	С
Lissanthe stigosa	Peachberry heath	R
Microtis unifolia	Common onion-orchid	R
Oxalis perennans	Grassland woodsorrel	0
Pimelea humilis	Dwarf rice flower	0
Plantago varia	Variable plantain	0
Poranthera microphylla	Small poranthera	R
Ranunculus spp.	Buttercups	R
Solenogyne dominii	Smooth flat-herb	А
Veronica spp.	Native speedwells	0
Wahlenbergia spp.	Bluebells	0
Wurmbea dioica	Early nancy	0
Sedges and rushes		
Carex spp.	Sedges	С
Juncus bufonius	Toad rush	R
Juncus capitatus	Rush	R
Juncus spp.	Rushes	0
Lomandra nana	Dwarf mat-rush	R
Luzula densiflora	Dense woodrush	R
Luzula sp.	Woodrush	R
Schoenus absconditus	Hidden bog-sedge	А
Schoenus apogon	Common bog-sedge	R
Broadleaf weeds		
Acetosella vulgaris	Sheep sorrel	R
Aphanes arvensis	Parsley piert	R
Arctotheca calendula	Capeweed	R
Carduus spp.	Slender thistle	R
Centaurium erythraea	Common centaury	R
Cerastium glomeratum	Mouse ear chickweed	0
Cirsium vulgare	Spear thistle	R
Hypochoeris alabra	Smooth cats-ear	0
Hypochoeris radicata	Cats-ear	A
Leontodon taraxacoides	Hawkbit	A
Moenchia erecta	Erect chickweed	0
Myosotis discolor	Forget-me-not	R
Parentucellia latifolia	Broadleaf glandweed	R
Plantago corononus	Bucks-horn plantain	R
Plantago lanceolata	Ribwort plantain	R
Rumex son	Docks	R
Sagina apetala	Annual pearlwort	R
Silvhum marianum	Varienated thistle	R
Taraxacum officinale	Dandelion	R
Woody weeds	Durideiton	11
	Gorse	R
0.00.0000000	00.00	1.1

Table 1 (cont). Species recorded in a 1 hectare area of a kangaroo grass pasture at Nile, Tasmania

 $^{1}$  A = abundant, C = common, O = occasional, R = rare

#### Tussock grasses (Poa spp.)

Silver tussock grass (*Poa labillardierei*) is the most common native tussock species in Tasmania, and it forms large coarse tussocks. It favours damp situations, such as drainage lines, but is also found on drier hillsides. Velvet tussock grass (*Poa rodwayi*) is common but less abundant than silver tussock grass. It is softer and less coarse than silver tussock grass. Other tussock grasses comprise only minor components of native pastures. Tussock grasses are valuable pasture grasses in Tasmania. They provide shelter and drought fodder for livestock, and help maintain healthy soils. They respond well to fertiliser, and can take up nutrients and grow at the expense of other native grasses, such as kangaroo grass.

Tussock grasses have high growth rates, and are highly drought and frost tolerant. They have low palatability and digestibility. However, after mob stocking, slashing or fire, the new growth is grazed readily. Velvet tussock grass is more palatable than silver tussock grass, but does not tolerate overgrazing. Overgrazing of tussock species, especially during drought, can reduce their abundance or eliminate them entirely. Many Tasmanian graziers value tussock grasses for the shelter they provide for lambs and newly shorn sheep. Tussocks are also valued along watercourses, where they provide shelter for aquatic animals and protect the stream banks from erosion.

> Cussocks provide great shelter for ewes and lambs at lambing time, and for sheep off shears, so we really value them at these times of the year. ??



Silver tussock (above and right), with flower head (top).



#### Wallaby grasses (Austrodanthonia spp., formerly Danthonia spp.)

Twenty-two species of wallaby grass occur in Tasmania, and they are among the most valuable native grasses due to their persistence, palatability, high forage value and productivity.





Wallaby grass (above and right), with flower head (top).

Wallaby grass pasture is the most widespread and abundant of the native pastures in the Midlands, Derwent Valley and East Coast of Tasmania. However, they were probably only a minor component of the original pastures in these regions. Six species of wallaby grass are common in these regions (Austrodanthonia caespitosa, A. carphoides, A. penicillata, A. pilosa, A. racemosa, A. setacea).

Wallaby grasses grow throughout the year when soil moisture is adequate. The common wallaby grasses tolerate heavier grazing than kangaroo grass and tussock grasses. They can become dominant in closely grazed swards, and can reestablish in sown pastures when the sown species fail to persist. Despite their tolerance of heavy grazing, they respond well to strategic grazing and resting (see page 47 'Year round management of wallaby grass pastures'). Wallaby grasses tolerate low fertility soils, but also respond well to added fertiliser. However, under high fertility conditions, the abundance and cover of wallaby grasses may be reduced by increased competition from introduced species, such as clovers, annual grasses and broadleaf weeds.



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

Weeping grass was probably only a minor component of pre-settlement pastures, but has become more common due to increased grazing and soil fertility.





Weeping grass (above), with flower head (top).

Weeping grass tolerates shade, and is commonly found beneath tree canopies and in lightly timbered areas. It also commonly occurs in heavily grazed, high fertility situations, such as on the edges of sheep camps. It can grow throughout the year, and has high forage value, high drought resistance and moderate frost tolerance. It can also grow in relatively acidic soils. Weeping grass tolerates a range of grazing regimes, but responds well to periodic resting.



Careful management has maintained the dominance of wallaby grasses and weeping grass in this fertilised native pasture.

#### Rough wheatgrass (Elymus scaber)

Rough wheatgrass is a common but usually minor component of native pastures. It provides very palatable and high quality forage. However, it does not tolerate grazing as well as wallaby grasses and weeping grass due to its upright growth habit. Rough wheatgrass is a relatively short-lived perennial grass. Most of its growth occurs in autumn, winter and spring. It is unaffected by frost, and is moderately drought tolerant. Rough wheatgrass declines under intensive grazing, so is likely to benefit from rotational grazing.

#### Native speargrasses (Austrostipa spp., formerly Stipa spp.)

Thirteen species of native speargrass occur in Tasmania. They are not usually major components of native pastures, even though several species are common, including Austrostipa nodosa, A. stuposa and A. mollis. Austrostipa spp. provide moderate to low value stock feed. Like the other native perennial grasses, they are highly frost and drought tolerant. Native speargrasses decrease in abundance in response to grazing, although tolerance to grazing varies between species. They seed freely, recruit well and can be good colonisers. The awned seeds can cause livestock damage and wool contamination, but heavy grazing during early flowering reduces the production of seed heads.



Native speargrass (above), with flower head (top).



Rough wheatgrass (above), with flower head (top).



Speargrass dominant native pasture.

#### NATIVE LILIES AND BROADLEAF SPECIES

Common native lilies include vanilla lilies (Arthropodium spp.), golden bulbine-lily, spreading flaxlily (Dianella revoluta) and early Nancy. Common native broadleaf species include grassland woodsorrel, native flat-herbs (Solenogyne spp.), scaly buttons, blue bottledaisy (Lagenophora stipitata), common everlasting, cudweeds, variable plantain, blushing bindweed, kidneyweed, sundew, buzzy (Acaena spp.), creeping bossia, native cranesbill (Geranium spp.), small St Johns-wort and pussytails (Ptilotus spathulatus).

Many native lilies and broadleaf species are selectively grazed due to their high palatability compared with the dominant grasses, so they often disappear from heavily grazed native pastures. However, some native broadleaf species are most abundant in grazed pastures, where they colonise areas of bare ground.

Native lilies and broadleaf species are generally less common in fertilised native pastures, where they are replaced by introduced annual grasses and clovers.



Glycine clover (Glycine latrobeana)



Vanilla lily (Arthropodium sp.)



Golden bulbine lily (Bulbine bulbosa)

#### SAGG, SEDGES AND RUSHES

Sagg (Lomandra longifolia), sedges (Schoenus spp., Isolepis spp.), sword-sedges (Lepidosperma spp.), woodrushes and rushes are often associated with damp, poorly drained and wooded areas. Sagg and rushes are coarse and unpalatable, but are grazed for roughage. Some sedges are readily grazed, and may be difficult to distinguish from grasses in native pastures.

Sagg and rushes can provide shelter for livestock, and may protect regenerating trees and shrubs. They may also invade native pastures, increasing their abundance at the expense of more productive pasture species. Unfortunately, little research has been conducted into the control of invasive sagg and rushes in Tasmanian native pastures.



Sagg, sedges and rushes commonly occur in poorly drained areas of native pasture.

#### **SOWN PERENNIAL GRASSES**

Sown perennial grasses include the pasture grasses commonly sown in Tasmania, such as perennial ryegrass and cocksfoot (*Dactylis glomerata*). Attempts to sow pastures in unsuitable areas are unlikely to succeed, and may lead to accelerated erosion or a change in dominance from perennial to annual species. Your property plan should highlight the areas on the property that are not suitable for sowing perennial grasses (see Chapter 3).

Once a pasture has been cultivated or direct drilled with sown grasses, it is no longer considered a native pasture.

Perennial ryegrass is the most common sown grass present as a volunteer species (not deliberately sown) in fertilised but uncultivated native pastures. Sown perennial grasses may compete strongly with native grasses on moist, fertile sites. However, native grasses often outlive sown perennial grasses during drought. Sown pastures are often invaded by native species, particularly if sown in unsuitable areas.

#### UNDESIRABLE PERENNIAL GRASSES

Common undesirable perennial grasses include browntop bent, sweet vernal grass, Yorkshire fog, crested dogstail (*Cynosurus cristatus*) and bulbous meadowgrass (*Poa bulbosa*). Undesirable perennial grasses provide poor fodder because livestock find them unpalatable.

Undesirable perennial grasses often invade fertilised native pastures, and can compete strongly with native grasses. However, they are common only on deeper soils in moist situations or higher rainfall areas. Intensive grazing reduces animal selectivity and forces livestock to graze these undesirable introduced species. Providing adequate rest increases the competitive ability of desirable species.



Sown perennial grasses, such as cocksfoot, may occur in native pastures as self sown species in moist, fertile situations.



Perennial grass weeds, such as sweet vernal grass, Yorkshire fog and browntop bent, can invade fertilised native pastures.

#### INTRODUCED ANNUAL GRASSES

Annual grasses are grasses that germinate in autumn and die off in spring after flowering and setting seed. Common introduced annual grasses in native pastures include silvery hair-grass, squirrel-tail and rat's-tail fescue, lesser quaking grass, rough dog's tail (Cynosurus echinatus) and soft brome. Annual grasses can produce large amounts of seed that germinate after rains in autumn and winter. The emergence of seedlings is greatest on bare soil in the gaps in the perennial grass cover or when perennial grasses are less dominant.

Although common in native pastures, annual grasses are major components of native pasture only when soil fertility has been increased by fertiliser or on stock camps. In these situations, annual grasses can provide useful forage for livestock, and may provide short-term ground cover to resist soil erosion. However, they become unpalatable at maturity in spring, and compete strongly with valuable native grasses.



Annual grasses, such as rat's-tail fescue, can compete strongly with native grasses where soil fertility is high

#### INTRODUCED ANNUAL CLOVERS

Annual clovers occur as volunteer species in most lowland native pastures in Tasmania. The common annual clovers are introduced species, and include subterranean clover, cluster clover (Trifolium glomeratum), suckling clover (T. dubium), knotted clover (T. striatum) and hop clover (T. campestre). Perennial clovers, such as white clover, do not usually occur in Tasmanian native pastures, because they need more than 700 mm annual rainfall to survive as a perennial plant and cannot withstand summer drought.

Annual clovers form a major component of native pastures only when soil fertility has been increased. In these situations, they can provide valuable winter and early spring forage, and they play a key role in increasing soil fertility by fixing nitrogen.

However, production from annual clovers is highly seasonal and unreliable, being heavily dependent on soil moisture. If not controlled by grazing, annual clovers can become dominant in fertilised native pastures during high rainfall years, causing a decline in the abundance of native grasses (see page 53 'Grazing strategies to reduce abundance of clover in native pasture'). In poor years, pastures dominated by clovers remain bare, exposing the soil to erosion and invasion by undesirable plants.

#### INTRODUCED BROADLEAF WEEDS

Introduced broadleaf weeds may be annual or perennial species. Species commonly found in native pastures include flatweeds (Hypochoeris spp., Leontodon taraxacoides), plantains (Plantago spp.), chickweeds (Cerastium spp., Moenchia erecta), heronsbill (Erodium spp.) and thistles (Cirsium spp., Carduus spp.). Broadleaf weeds generally have low palatability, but some species, such as flatweeds, are quite palatable and nutritious. Most species only become a problem when perennial grasses have been overgrazed or perennial ground cover is reduced. As with many introduced species, this usually occurs following increased soil fertility and inappropriate grazing management.



Thistles, such as slender thistle, can invade sheep camps and other high fertility sites.

#### **TREES AND SHRUBS**

Scattered native trees and a range of native shrubs are a natural component of native pastures. They are valued for their role in providing stock shelter and enhancing biodiversity. However, some graziers consider native species such as eucalypts (*Eucalyptus* spp.), wattles (*Acacia* spp.) and prickly box (*Bursaria spinosa*) to be weeds in some situations.

Native species are more likely to be a problem as woody weeds in overgrazed pastures. Bare ground created by overgrazing can encourage invasion by native trees and shrubs due to reduced competition from the perennial grasses.

Prickly box, in particular, can spread in open areas in native and sown pastures. In the past, hot fires were used to prevent woody species establishing, but in many areas this is no longer a realistic management option because of the danger from wild fires.



Prickly box can be invasive in some situations.

#### **INTRODUCED SHRUBS**

#### Gorse

Gorse is an invasive introduced shrub that can grow to a height and diameter of 2-3 m in 5 years. It forms dense infestations in the Midlands, and can reduce productivity by invading large areas of productive pasture. Gorse does not spread vegetatively. However, it does shoot back from the stem and roots if cut back or burnt. Gorse seeds can be thrown about 3 m from the parent plant when the seed pods burst, which occurs frequently in hot dry weather. The seeds can remain dormant in the soil for more than 20 years. They germinate when existing bushes are burnt or removed mechanically, causing a flush of seedlings to appear.



Gorse can be a major problem in native pastures.