

Best Practice
Management Guide

Serrated Tussock

Current control and management for
serrated tussock (*Nassella trichotoma*)

Serrated Tussock Impacts

Agriculture

Serrated tussock is an invasive weed of pastures, having the potential to infest entire properties. It causes a greater reduction of pasture and grazing carrying capacity than any other weed in Australia. Its high fibre content and low protein content makes serrated tussock indigestible to stock and if livestock are forced to graze pastures containing only serrated tussock, the leaves can form indigestible balls in the rumen, causing a loss of condition and eventual death.

Native Grasslands

Serrated tussock is a key threat to native grasslands that are one of Australia's most threatened ecosystems. Less than one per cent of their original extent remains in various stages of degradation throughout south-east Australia. Serrated tussock is invading these rare indigenous grassland remnants and its presence is a serious threat to many critically endangered native flora and fauna species within these grasslands. While serrated tussock is mostly a problem reducing the biodiversity values of native grasslands, it can also invade other environmentally significant areas such as dry coastal vegetation, grassy woodlands and sclerophyll forests. Common native grassland species being displaced include kangaroo grass (*Themeda triandra*), wallaby grasses (*Austrodanthonia* spp.), spear grasses (*Austrostipa* spp.) and native tussock grasses (for example, *Poa* spp.).

Serrated tussock is an aggressive weed that affects agriculture, conservation and urban areas.

Urban situations

Serrated tussock can be commonly found invading roadsides, parks, neglected areas, railways, power line easements, reserves and sporting grounds of cities and towns. These areas can be a source of serrated tussock seed invasion to agricultural and environmental grasslands. Large build-ups of serrated tussock can also create increased fire hazards and its presence around Geelong in Victoria has increased the fire season by at least a month at each end of the season. The increased fire risk hazard is due to:

- Mature serrated tussock plants produce lots of dry highly combustible leaf material that can burn at extremely high temperatures. Serrated tussock fires have been known to create their own "fire wind storms", sending combustible material high up in the air to begin further spot fires.
- The tumbling nature of serrated tussock seed heads can lead to massive build up of wind blown combustible serrated tussock material under the eaves of homes creating fire hazards.

Serrated tussock can also become an undesirable grass invading sporting ovals and golf courses.



Serrated tussock can invade grazing land, reducing carrying capacity.

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Native grasslands are at risk of serrated tussock invasion.

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Serrated tussock infesting an urban road side.

Simon Bonwick



Serrated tussock can be a fire risk in situations such as this.

Trevor Prowd

Distribution in Australia

Serrated tussock originates from South America and was first recorded in NSW in 1935, Victoria in 1954 and Tasmania in 1956. It has now spread to infest 860,000 ha of NSW (medium to high density) with scattered infestations over an additional 1.2 million ha. Victoria has 235,000 ha infested by serrated tussock but 45,000 ha of this area is now under long term control through a concerted control program facilitated by the Victorian Serrated Tussock Working Party and implemented by Agricultural Victoria. Tasmania has approximately 4,000 ha of infestations.

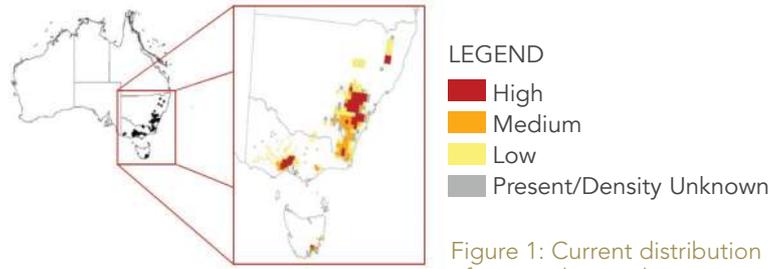


Figure 1: Current distribution of serrated tussock in Australia.

Potential distribution in Australia

Using the climate modelling system CLIMATE®, the potential distribution of serrated tussock, based on the climatic parameters of current infestations in Australia, has been estimated at 32 million ha.

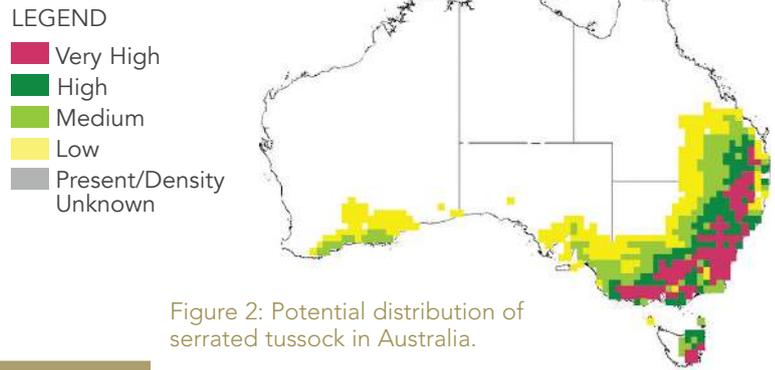


Figure 2: Potential distribution of serrated tussock in Australia.

Life Cycle and Preferred Habitat

Key features of serrated tussock life cycle include:

- it is C₃ (winter active/summer dormant) perennial drought tolerant exotic tussock grass that can grow on all soil types and will often be found in soil where there is little nutrition and/or moisture.
- readily invades bare areas of ground such as overgrazed pastures and cultivated situations.
- only reproduces by seed - producing tens of thousands of small seeds on large structural panicle stalks dispersed mostly by wind but seed also spread by animals, vehicles/machinery, water, soil movement, fodder and by other human activities.
- once flowering is initiated, seed-set will occur within 8-10 weeks with most seed germinating during Autumn.
- seedlings are slow growing and vulnerable to competition by other more vigorous growing species
- individual plants can live for many years
- able to quickly respond to changing environmental conditions. For example, may flower and set seed within 12 months (known in Victoria) or may take as long as 3 years in drought and low fertility situations.
- seeds can decay rapidly in the seedbank providing land managers some comfort knowing that if you prevent serrated tussock from seeding, the viability of the seeds in the soil are also declining rapidly.

A general indication of the lifecycle and growth pattern of serrated tussock throughout the year is shown in table below. Please note that the timing of different stages can vary, being earlier or later, depending on rainfall, temperature and soil fertility.

State		SPRING			SUMMER			AUTUMN			WINTER		
		Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	July	Aug
All	Germination												
All	Bleaching due to frost												
Vic / Tas	Flowering												
Vic / Tas	Seed formation												
Vic / Tas	Seed drop												
NSW / ACT	Flowering												
NSW / ACT	Seed formation												
NSW / ACT	Seed drop												

 = general pattern of growth;  = growth pattern under favourable conditions#.

= Favourable conditions generally mean high soil fertility and following periods of significant rainfall or soil disturbance.

Identifying Serrated Tussock

Identification of grasses can be difficult, especially when the seed head is not present. Serrated tussock can be confused with a number of native tussock grasses as well as other introduced *Nassella* species. Serrated tussock is easy to misidentify, so if in doubt, seek expert advice.

Key identifying features of serrated tussock:

- Tussocky grass to 60 cm tall
- Once the seed ripens in late summer, flower heads change to a golden brown colour with a light green tussock base.
- Plants remain green during summer, when other grasses have usually browned off.



Serrated tussock is a plant that changes colour with the seasons. Plants appear purple when flowering in late spring / early summer.



Key identifying features of serrated tussock:

- tussocky grass to 60 cm tall
- thin, tightly rolled, hairless leaves with very fine serrations
- white hairless ligule
- white swollen leaf bases
- purple tinge to flower heads, later turning golden as the seeds ripen
- weeping flower heads that break off at maturity
- difficult to pull from the ground, even when small



- Some older leaves may die and remain beige on the plant for several years. Younger plants are a bright green colour while older plants may be a light green colour when recovering from burning or slashing.



In frost prone areas, the tussocks are bleached a golden yellow colour by frost during late autumn and winter.



Serrated tussock in full seed has a purple tinge

Identifying Serrated Tussock

- The flowering stems weep over almost touching the ground. Weeping flower heads break off at maturity and are easily dispersed by wind tumbling along the landscape.



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- The leaves are thin and roll smoothly between your thumb and index finger. They are hairless with very fine silica serrations that can be felt if the finger and thumb carefully pulled along the leaves from the tip towards the base in a downwards motion.



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Chelsea Wardrope



Peter Fullerton

Serrated tussock has a dense fibrous root system and is difficult to pull from the ground, even when small.

- Serrated tussock has small (1 mm long) white hairless ligule. The ligule is a membranous or hairy appendage that occurs at the junction where the leaf separates from the stem. To find the ligule, trace down a leaf to its junction with the stem. Carefully separate and bend the leaf back. If the grass has a ligule, a small, membranous or hairy flap will protrude. The ligule of serrated tussock has a rounded tip, never hairy and protrudes vertically at the junction of the leaf blade and the leaf sheath and is continuous with the leaf sheath margin. Similar native grasses have smaller, differently shaped or hair-fringed ligules.



DPI Victoria

- Its seeds are 1.5-2 mm long and enclosed in two reddish brown or purple bracts (glumes), 6-10 mm long which taper gradually to a point. The seed has a tuft of short white silky hairs at one end and a long, twisted awn at the other end. The awn is attached to the seed off centre and its length varies. In NSW, ACT and Tasmania, the awn length is about 25 mm long. In Victoria the awn cane can be up to 35 mm long in length.

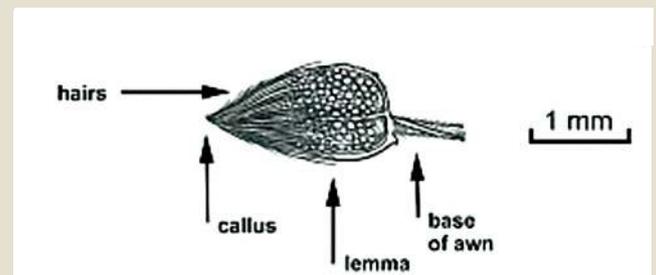
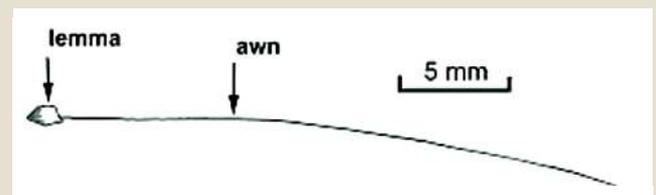


Figure 3. Seed and awn of serrated tussock.

If you are still unsure about the identification of Serrated Tussock please contact the VSTWP for further assistance

Serrated Tussock Management

Integrated weed management using combinations of chemical, mechanical and physical techniques are critical for long-term control of serrated tussock.



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Strategic grazing (rotational) is important to maintain good competition to out-compete serrated tussock. Overgrazing is a primary cause for serrated tussock invasion and spread.

Shelterbelts / Windbreaks Rabbit / Mesh Fencing



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Charles Grech

Strategic placement of tree shelterbelts

Prevention of Spread



Michael Moerkerk

The most cost effective form of control is preventing the invasion and spread through vehicle hygiene and sourcing weed free fodder and stock.

Spot Spraying



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Careful spot spraying is an excellent serrated tussock control technique for most situations.

Broadacre Spraying (boom and/or aerial)



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Suitable for medium to dense infestations. Ensure a calibrated rate controller is used. Be careful of off-target impacts.

Reduce the risk of serrated tussock herbicide resistance by practicing integrated weed management and by rotating herbicides with different modes of action (ie. flupropanate and glyphosate).

Serrated Tussock Management

Chipping/Hoeing



Natasha Baldyda

Suitable for all situations for light to medium infestations.

Cultivation/Cropping



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Suitable for rehabilitation of serrated tussock infestations on arable land.

Slashing



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Strategic slashing can be used to prevent serrated tussock from seeding but will not kill the plant. Please note serrated tussock must be slashed prior to seeding.

Biological control



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Research into natural enemies (Pathogens) to control serrated tussock is still under investigation.

Afforestation/Native bush



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Tree or native bush regeneration can be used to shade out and out-compete serrated tussock in steep or non-arable situations.



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Regrowth smothering serrated tussock.

Working together - consider your neighbours
serrated tussock like your own!

Seed can enter your property through a variety of ways

- Seed heads of serrated tussock are easily dislodged by the wind and can be blown up to 20 kilometres away, spreading seed across the landscape.
- Vehicles and machinery can carry seed over great distances. Operating vehicles in areas with serrated tussock can lead to seeds becoming caught on tyres, mudguards, radiators, and slashers.
- Gravel, sand, soil or mulch brought in for landscaping or track maintenance can contain serrated tussock seeds.
- Livestock and feed for stock can contain serrated tussock seeds, if acquired from an unknown source or an infested area.

Watch out for serrated tussock!

For more information go to www.serratedtussock.com



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