Nassella Ute Guide 2016

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

Facilitating sustainable development in the Canterbury region
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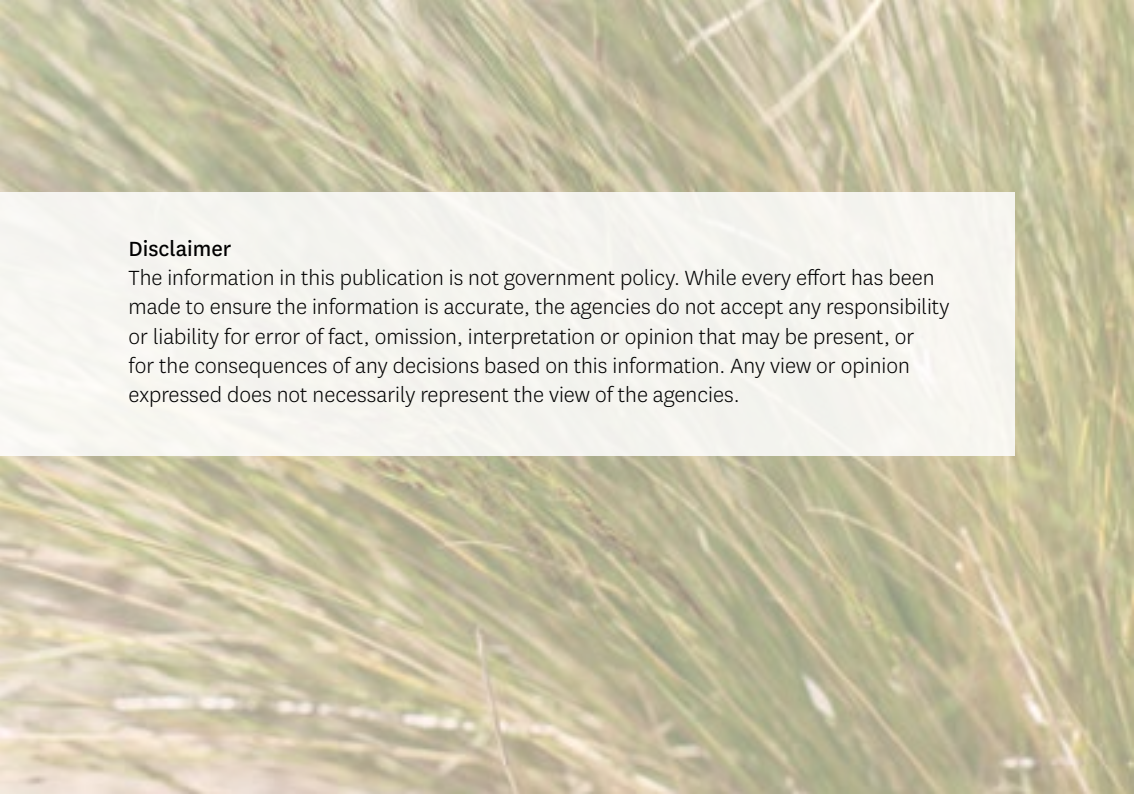

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- Nassella tussock overview -

Historic image of a nassella infestation

Nassella tussock *(Nassella trichotoma)* originates from South America. It was first reported in New Zealand in 1905 in the Waipara River bed in North Canterbury, but had probably been present in New Zealand for some time. Because it is unpalatable and invasive, it was recognised as a serious pastoral weed during the 1940s and became subject to various control programmes and an Act of Parliament over proceeding decades.

In the 1950s nassella tussock became so prevalent and at such high densities in parts of Canterbury and Marlborough that farmers were forced off their land. Through the efforts of a single purpose board, various councils and individual land occupiers, nassella tussock was contained to much lower and more manageable densities.

Nassella tussock is now reasonably widespread throughout New Zealand's east coasts. The Marlborough and Canterbury regions are worst affected.

Nassella tussock is declared a pest in Pest Management Plans in the regions where it is found. Pest Management Plans contain rules which require land occupiers to control nassella tussock.

In addition to regional control requirements, the sale, propagation, distribution, and commercial display of nassella is prohibited by sections 52 and 53 of the Biosecurity Act 1993.

- Impacts of nassella tussock -

Left uncontrolled nassella is able to dominate low-producing grasslands. Pastoral farming on New Zealand's dry east coast is most vulnerable to nassella invasion.

Nassella tussock's impacts include:

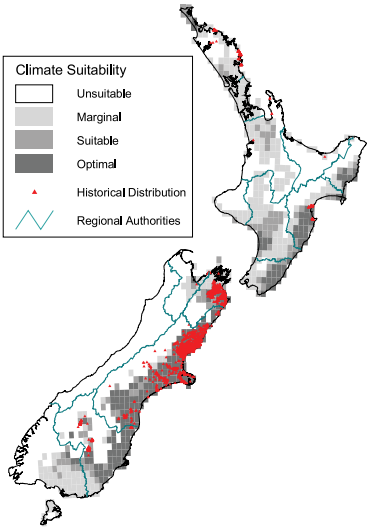
- Reduced pasture yields
- Reduced livestock carrying capacity (up to 90% loss in heavily infested pastures)
- Stock welfare issues. If sheep and cattle are forced to eat nassella tussock, they may die due to the rumen becoming blocked by undigested leaves
- Potential for decreased property values for heavily infested properties
- Increased emotional stress and financial burdens on farmers

Walking contours 5 - 15 metres apart

- Current and potential distribution of nassella tussock in New Zealand -

Nassella tussock currently occupies approximately 648,000 hectares but has the potential to infest 12 million hectares[2].

Climate modelling indicates a large portion of east coast New Zealand is climatically suitable for nassella tussock[1]. Although not indicated on this map, warmer microsites along the western Canterbury foothills to the Southern Alps should be considered at risk of invasion by nassella tussock[1]. Vast tracts of climatically suitable land in southern Canterbury and Otago are currently unoccupied by nassella and need protecting.



Map of potential nassella climatic distribution[1]. Image: Darren Kriticos

- Where nassella tussock is most likely to occur -

The most likely places for nassella tussock to establish:

- Arid land (dry plains and riverbeds), hill country - especially faces with a northern aspect - and any land with reduced pasture competition
- Areas where contractors have been working, especially where earthmoving activities have been undertaken
- Alongside waterways, particularly after flooding
- Fence lines, hedgerows, around power poles and anywhere else where seed panicles may get caught when blown by the wind
- Driveways, stock yards, and around woolsheds and hay barns
- Vehicle access tracks, parking areas and roadsides, particularly where stock have been moved or where there is room for vehicles to pull over.

Seeding nassella - pink/purple hue

Nassella seed. Photo Graeme Bourdôt

- How nassella spreads and invades -

Nassella tussock seed panicles are well adapted for wind dispersal, which is the main pathway of spread. Other ways nassella tussock can spread are people (footwear and clothing), animals (including stock), vehicles, machinery and equipment, soil, mud, plant matter and water.

Nassella is a perennial tussock. It produces large amounts of seed annually. Left to seed, nassella tussock can increase in density over time and spread to neighbouring land.

While most seed lasts only one to two years in the soil, some seeds can last much longer, especially in continuously dry soil (in pine plantations for example). It can take three to four years after a seed has germinated for a nassella tussock plant to grow large enough to be detectable.

Nassella is tolerant of a wide variety of environmental conditions (including drought), and will establish quickly on bare ground after fire or application of a non-residual knockdown herbicide due to lack of competition.

Is your feed weed free?

- How to protect your property -

People, animals, vehicles, machinery, soil and contaminated feed and seed can all carry pest plant seeds. By implementing some simple farm biosecurity practices on your property you can minimise the risk of pest plants like nassella tussock establishing.

- **Limit entry points** and lock gates to restricted access areas
- **Display biosecurity signs** with clear instructions at property entry points
- **Keep vehicles clean**, and only allow visitors and contractors to enter your property if their vehicles, machinery, equipment and footwear are clean and free of soil and seed

Limit entry points

Keep vehicles clean

- **Ask before you buy** whether any stock, feed or seed you purchase has come from an infested property. If in doubt, contact your regional authority.

If you are concerned about nassella tussock on neighbouring land, talk to your neighbour about it. Alternatively speak to a Biosecurity officer at your regional authority.

For more information about On Farm Biosecurity, see the Environment Canterbury website: www.ecan.govt.nz/onfarmbiosecurity

Talk to your neighbour

Ask before you buy

- What to do if you find nassella tussock -

If you are the landowner, report potential finds to your regional authority. Biosecurity Officers will assist with advice on the management of nassella tussock including training on how to identify it and control it in future.

If you are not the landowner, make the landowner or land occupier aware of the situation.

Nassella seeding plant. Photo Graeme Bourdôt

- How to control nassella tussock -

Plan ahead

If you do the control work yourself, aim to finish well before your region's compliance due date to allow for unexpected delays. If you use a contractor, book early, because their workload increases later in the season. Learn what acceptable control is by talking with a local Biosecurity officer. This will help you find out whether your property's control has been done to a satisfactory standard.

Be thorough and methodical
Carry out "beats" and systematically walk land to ensure thorough coverage. On hillsides, walk contour beats 5–15 metres apart depending on scrub cover and nassella tussock density.

Complete your work by the required compliance date
Dates are set in your region's Regional Pest Management Plan to allow the property to be inspected and any issues remedied before plants produce viable seed.

Learn about the infestation on your property
Create a nassella tussock incidence map of your property. Make sure all of your land is searched each year. You could count plants grubbed annually, compare numbers to gauge progress and identify hot spots. If you use a contractor, work with them to get a greater understanding of the problem and ask them to provide plant numbers and a map of what they have found.

Walking contour beats 5 - 15 metres apart

Always carry a grubber with you
As you move around your property always carry a grubber to pick up any isolated plants; relying on your memory to get you back to the spot later is not always effective.

- Control methods -

Grubbing

Physically remove nassella plants by grubbing with a hand tool. Remove all tillers of grubbed plants from the ground and shake off excess soil. Un-grubbed tillers continue to grow and plants with soil remaining can reattach to the ground and keep growing and produce seed. Grubbing is a common and effective method for controlling nassella tussock.

Chemical

Various herbicides will control nassella tussock. Most commonly used are herbicides with the active ingredient glyphosate (short-term knockdown herbicide) or sodium flupropanate (root-absorbed residual herbicide). These chemicals are effective for spot or broadcast spraying.

Currently 'Taskforce' herbicide is the only sodium flupropanate active ingredient herbicide registered in New Zealand to control nassella.

Both herbicides may damage desirable pasture species. Broadcast spraying of herbicides should be in conjunction with an overall management programme for best results. Please read the labels of any herbicide before application and follow label instructions. Check your chemical application will be compliant with your Regional Plan(s) (eg Land and Water Plan).

Mechanical

In the past machinery (e.g., bulldozers, discs, ploughs) were used extensively to remove scrubby vegetation to improve pasture competitiveness and exclude nassella tussock. If considering this method think about any negative effects it may have on indigenous species. Is this the best method for your property? Are there better alternatives? If you choose mechanical control make sure any relevant legislation is adhered to.

Grubbing

- Nassella tussock Identification -

Nassella tussock is easy to confuse with native New Zealand tussocks and sedges. It can therefore go unnoticed in pastures and grasslands for many years until a significant infestation has developed.

Habitat

Nassella tussock is more likely to establish on land where there is less competition from desirable pasture such as steep, dry, north-facing hill country, low rainfall areas with light soil and heavily-grazed pasture.

Risk increases markedly where there are potential pathways for the movement of nassella tussock seed on to at risk land where no vehicle hygiene or farm biosecurity practices are in place.

Small erect nassella

Small erect nassella in seed

Medium sized nassella

Characteristics

- A tufted grass, erect when small, drooping leaves when large
- Leaves can be dark green when young, lighter green when mature, grey/straw colour when old
- Leaves are tough, tightly rolled and thin (0.2–0.6mm wide). They will not break when pulled and feel rough when you run your fingers down the leaf
- Stems are a creamy colour and swollen just above ground level – like a shallot
- Flower panicles (late October through to January) are droopy and have a purple tinge due to the seed colour
- Seeds are purplish and have bent or twisted awns 15–35mm long.

Nassella base and root

Nassella seed. Photo Graeme Bourdôt

- Plants often confused with nassella tussock -

Fescue tussock (*Festuca novae-zelandiae*)
Common names: fescue tussock, hard tussock, sheep's fescue, tawny tussock

Festuca novae-zelandiae is indigenous to New Zealand. It is common in low tussock grasslands in both islands where it is dry and windy.

Distinguishing fescue tussock from nassella tussock:

- Leaf sheath circular in cross section
- Unequal auricles 0.4 – 1.5mm (nassella has no auricles)
- Grows to a height of 100cm and a spread of 0.4m
- Leaf blades are dark green to bluish, turning pale yellow or white with age

Fescue tussock. Photos Kerry Ford

- Leaves are 15-60cm long and 0.5-1mm wide and a tawny colour
- Flowering stems grow up to 100cm tall with an erect, narrow, tawny coloured flowering panicle 5-25cm long
- Individual tillers can be pulled out of the ground.

Common needle grasses

(*Austrostipa nodosa and A. scabra*)

Distinguishing common needle grass from nassella tussock:

- Leaves are 1mm wide and rolled or sometimes up to 3mm wide when open
- Ligules are a hair-fringed membrane
- Spikelets are 1–130mm long
- Awns are 0–85mm long
- Leaf sheathes are dark brown and papery. Individual tillers can be pulled out of the ground.

Common needle grasses. Photo Kerry Ford

Longwood tussock (*Carex comans*)

Common names: sedge, longwood tussock, Tokanui tussock, maurea, bronze New Zealand hair sedge

Carex comans is a New Zealand native sedge. It grows from the coast to sub-alpine environments throughout New Zealand except in Fiordland. It tolerates wet and dry soils, and can be found in the open or under scrub or tall forest, or on river flats in open, sparsely vegetated land. It often naturalises in urban areas.

Distinguishing *Carex comans* "green form" from nassella tussock:

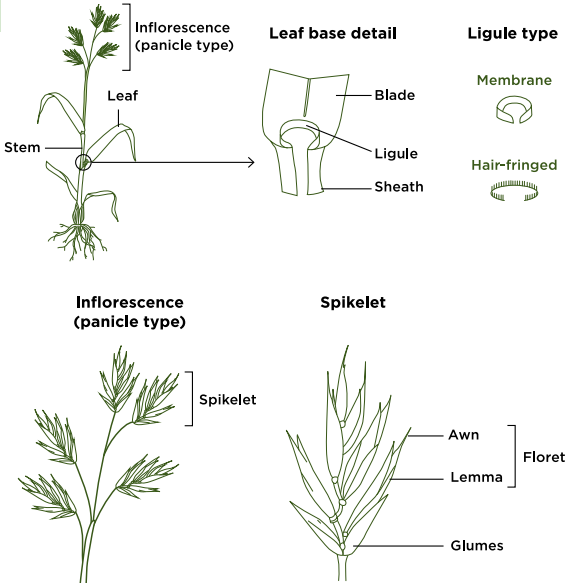
- Flowers throughout the year
- Flowers are inconspicuous and appear on short spikes
- Grows approximately 30cm tall with a similar spread
- Leaves are narrow, linear and arch up and outwards
- Leaves are 25-40cm or more long and range from 1-1.5mm wide with distinctively curved tips
- Occurs in damp places in tussock grassland.

Longwood tussock. Photos: Jeremy Rolfe

	Common Australian needle grasses *Austrostipa nodosa and A. scabra*	Fescue/Hard tussock *Festuca novae-zelandiae*	Nassella tussock *Nassella trichotoma*	Longwood tussock/sedge *Carex comans*
LEAF BLADE WIDTH	0.5-1 mm	0.4-0.7-(1.0) mm diam	0.2-0.6 mm	0.5-1.5 mm
LEAF BLADE SHAPE	Inrolled	Inrolled	Inrolled	narrow concave
LIGULE	Hair-fringed membrane or membrane	Fine hair-fringed membrane	membrane	membrane
NO. OF FLORETS PER SPIKELET	1	4-8	1	many per spike
SPIKELET LENGTH, INCLUDING AWNS	1-130 mm	8-15 mm	15-40 mm	spike 0.5-2.5 cm
AWN LENGTH	50-85 mm	0-3 mm	15-35 mm	n/a
AWN STYLE	Bent or twisted	Straight	Bent or twisted	n/a

- Features of grasses -

The following diagrams provide a generalised representation of some of the features of grasses that have been mentioned within this Ute Guide.



- Definitions -

Awn: An awn is either a hair- or bristle-like appendage on a larger structure (e.g., coming off a seed head).

Floret: One of the small flowers making up a composite flower head

Ligule: Structure at the top of the sheath of the leaf and below the blade. Pull the blade away from the flower stem to see it.

Panicle: Any branched cluster of flowers arranged in a characteristic way on a stem

Perennial: Living three or more years

Sheath: A tubular structure encircling the stem and forming the base of a leaf.

Spikelet: In grasses and sedges, a spikelet is the unit of a flower group, usually with two bracts (glumes) at the base, and consisting of one to many florets (individual tiny flowers) which produce seeds or are sterile.

Tiller: A shoot, especially one that sprouts from the base of a grass or sedge.

- Nassella ecology research results -

In December 1998, AgResearch began a research programme in North Canterbury to discover the mechanisms that control the population dynamics of *Nassella trichotoma*. The programme results give us the science to help in the current management of nassella tussock as well as information for planning and management.

Nassella pegged for research

Nassella research plots

AgResearch studies have revealed:

- The number of seeds on an individual plant can be calculated by squaring the basal diameter, so, for example, 50mm basal diameter can have 2500 seeds and 100mm plant can have 10,000 seeds.[4]
- Some seed is viable as early as the emergence of the panicle.[3]
- The viability of seed on the plant increases as the flowering process progresses.[3]
- There is very little nassella tussock seed in the soil as 90 percent rots, dies, or is consumed within three months.[4]
- Annual plant numbers are dictated more by quality and time of grubbing in the previous season than by seed already in the soil.[1,4]
- Most people do not recognise nassella tussock plants until they are about three or four years old.[4]

Nassella base and roots. Photo Graeme Bourdôt

Nassella in seed

- Acknowledgements -

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- Further information -

1. **Kriticos D, Lamoureaux S, Bourdôt G, Pettit W 2004.** Nassella tussock: current and potential distributions in New Zealand. New Zealand Plant Protection 57: 81-88.
2. **Watt MS, Kriticos DJ, Lamoureaux SL, Bourdôt GW 2011.** Climate change and the potential distribution of serrated tussock (*Nassella trichotoma*). Weed Science 59: 538-545.
3. **Lamoureaux S, Bourdôt GW 2002.** Fruit viability on grubbed *Nassella trichotoma* (Nees) tussocks. Australian Journal of Experimental Agriculture 42: 1057-1061.
4. **Lamoureaux SL, Bourdôt GW, Saville DJ 2011.** Population growth of *Nassella trichotoma* in grasslands in New Zealand slower today than in the past. Acta Oecologica 37: 484-494.

- Notes -

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Manaaki Whenua

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