

## New Zealand mountain grasses – an ID guide to common genera

### Introduction

In the indigenous grass flora, the three Tribes, Aveneae (61 spp.), Poae (58 spp.) and the Danthoieae (49 spp.), account for 86% of the total 168 species. The largest genera are *Poa* (39 spp.), *Chionochoa* (23 spp.) and *Rytidosperma* (21 species).



*Rytidosperma setifolium*, Gillespie Pass, Otago

### Basic grass morphology

Grasses are herbaceous (bamboos an exception). The aerial stems of grasses are called **culms**, and consist of solid joints or **nodes** separated by short or long segments, the **internodes**. Culms are rounded or flattened (but never three-angled like in the sedges). Leaves are composed of three parts: a tubular **sheath** which surrounds the culm and has overlapping margins, the green **blade** and the **ligule**. Florets (flowers) in grasses are aggregated into groups enclosed between a pair of glumes (scale leaves); there are no petals or sepals. Each such package (glumes plus florets) is termed a spikelet. The types of **inflorescences** (flowering heads) in grasses are due to various arrangements of the spikelets.

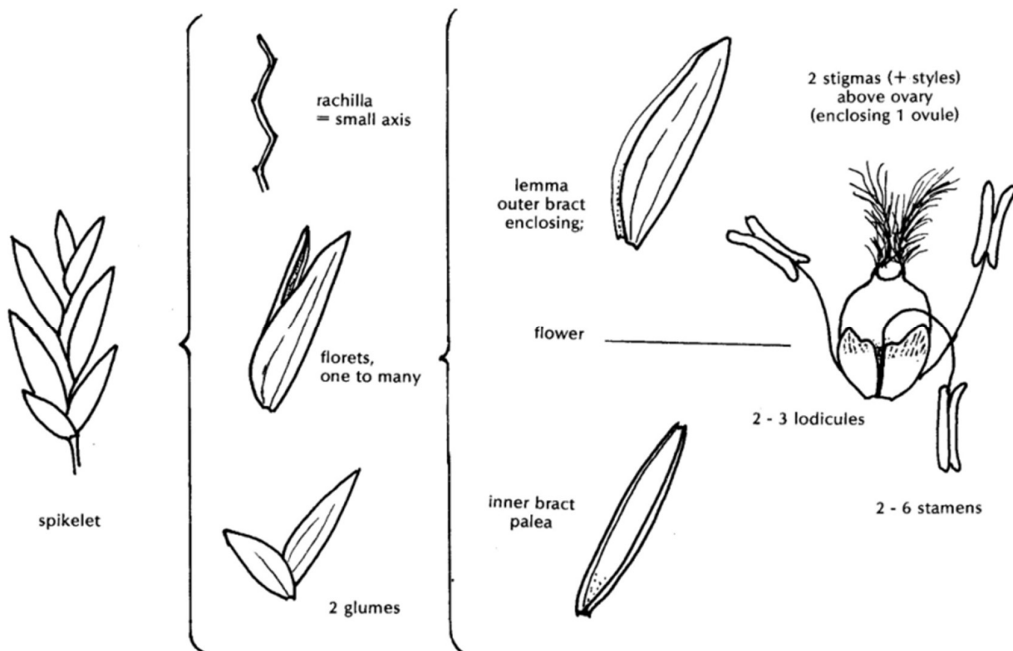
## The spikelet

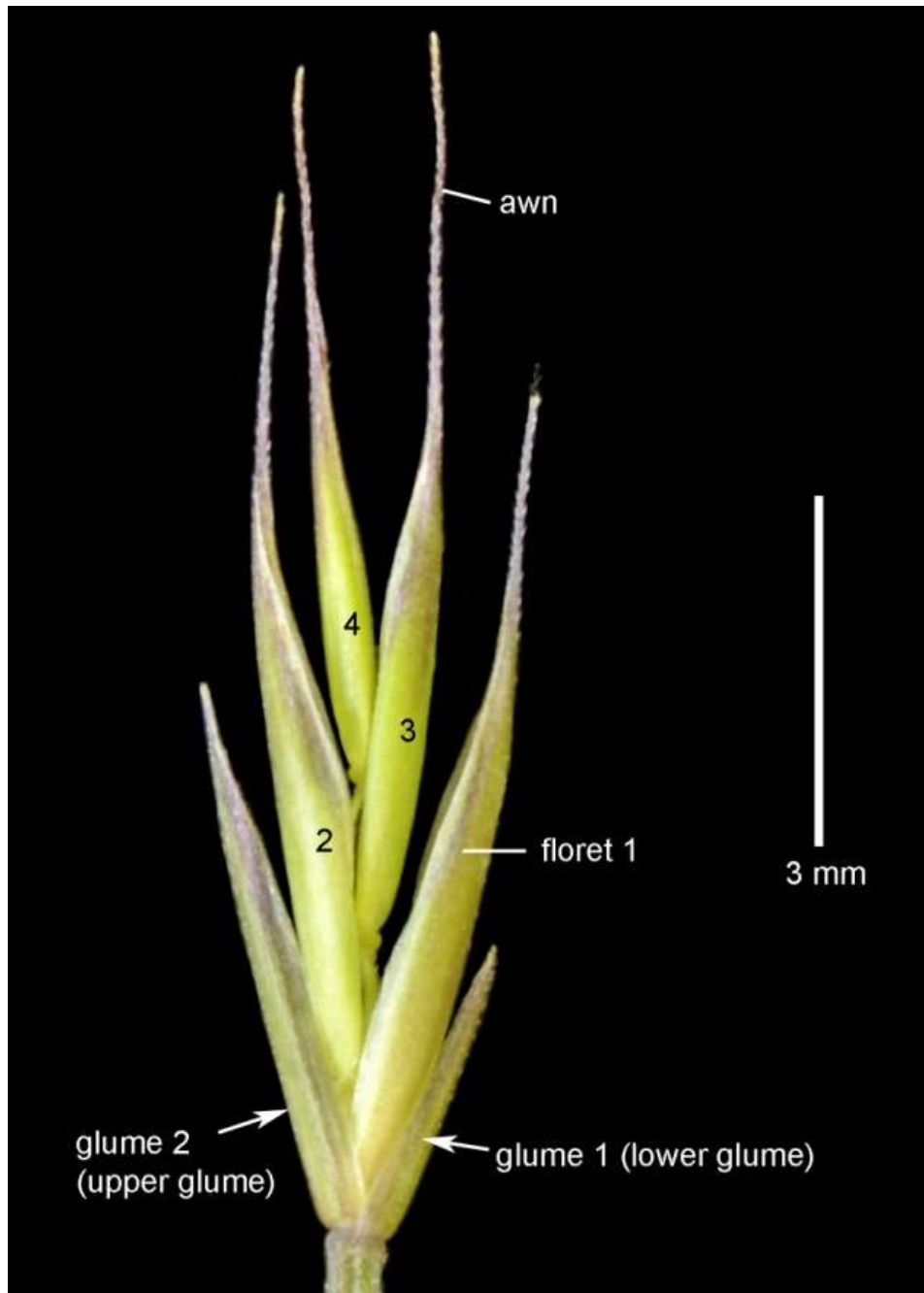
The spikelet contains the flowers and consist of two sterile **glumes** (lower & upper or G1 & G2), and a **rachilla** (central axis or stalk), which bears one to many florets, alternately attached along the rachilla.

A floret is made up of a **lemma**, **palea**, two (or three) **lodicules**, and the male and female parts. The male part, usually consists of three **stamens**, and the female part, a single **ovary** with two feathery **stigmas**. The ovary after fertilization develops into a fruit (grain, caryopsis).

Note: It is not easy to identify grasses without a magnifying lens, preferably a dissecting microscope, but you might scrape by when using the interactive key if you have a ×10 lens. If you want to identify grasses for yourself, you must have some magnification and learn some morphology and terminology.

Spikelet = glumes + floret(s) + rachilla

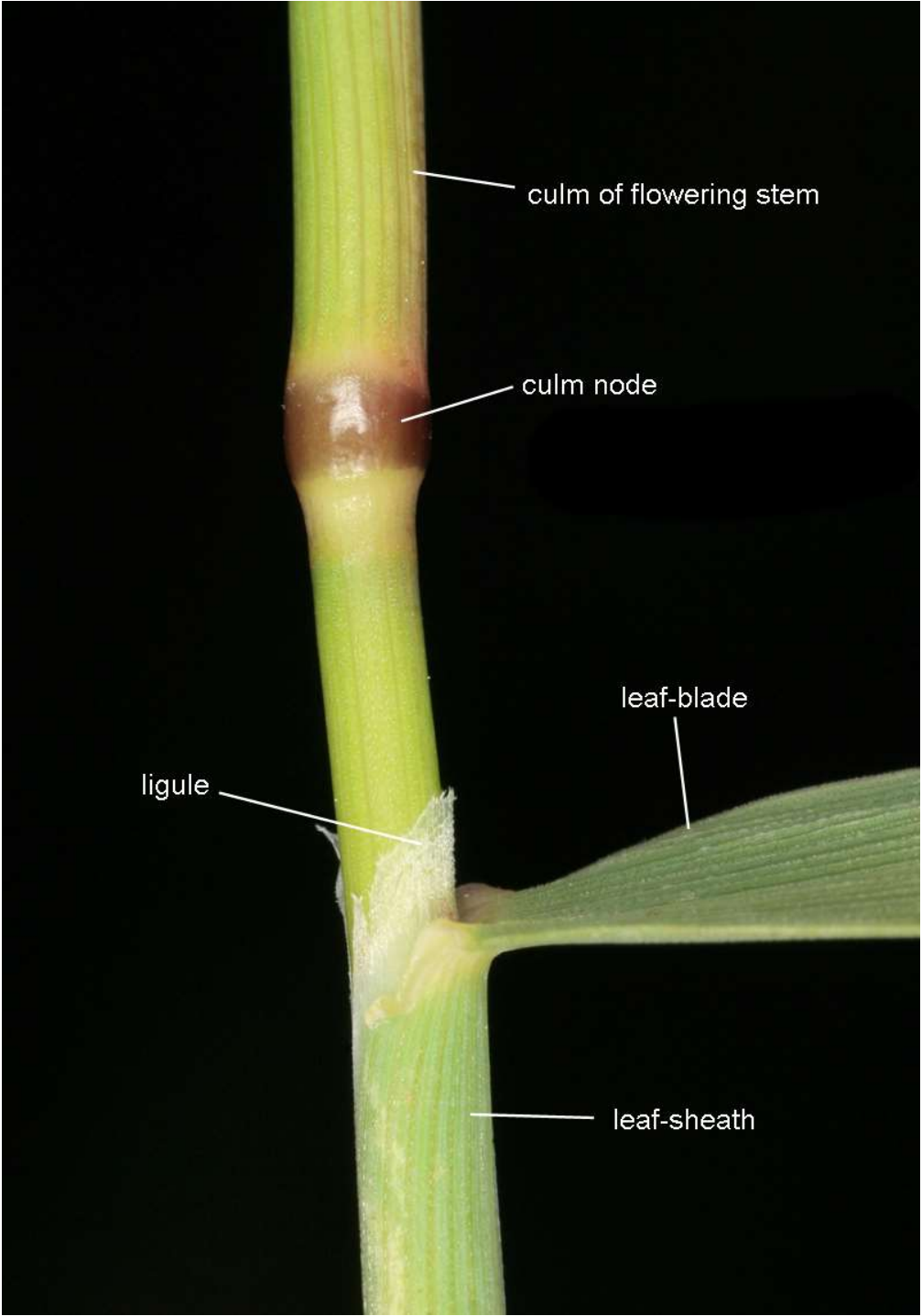




Spikelet with 5 florets that are closed – only the lemmas are visible (*Festuca* sp.)



Spikelet with 7 florets, 6 of which are open to show both lemma and palea and exerted stigmas and anthers. Note the axis of the floret, the rachilla, is clearly visible (but not the ovary or lodicules). There are usually 3 anthers and 2 stigmas.



## Recognising grasses in the mountains – the common genera

*Agrostis*, *Chionochloa* & *Rytidosperma*, *Festuca*, *Poa*, (and a few other genera).

Grassland and mosaics of grass and scrub cover nearly 60% of New Zealand (Wardle 1991). The tribes most represented in the upland native grass flora of both tussock and tuft form are from the Aveneae (*Agrostis*, *Lachnagrostis* etc...), Danthoniaceae (*Chionochloa*, *Rytidosperma*), Poeae (*Festuca* & *Poa*), Triticeae (wheat grasses – *Anthosachne*, *Stenostachys*) and Ehrharteae (*Microlaena* & *Zotovia*). Generally, the higher altitudes and upper parts of inland basins are dominated by native species of tussock-form (*Chionochloa*, *Festuca*, *Poa* and *Rytidosperma*).

Coastal and lower altitudes are dominated by sward-forming naturalised grasses, mostly by species in the same tribes with the addition of *Bromus* (Bromeae), naturalised *Rytidosperma* (danthoids) and the stipoids (Stipeae). These naturalised species are mostly from the northern hemisphere temperate region, or in the case of the danthoids and stipoids, from Southeast Australia and southern South America respectively. Temperate grasses in these tribes (with a C<sub>3</sub> photosynthetic pathway) including both native and naturalised species, make up c. 61% of the New Zealand grass flora. These are also the tribes in which the species all have laterally flattened spikelets.

The rest of the flora is mostly made up of naturalised 'panicoids' (Paniceae - with dorsally flattened spikelets and dominated by species with a C<sub>4</sub> photosynthetic pathway adapted to tropical climates) about 50 species (in genera such as: *Cenchrus*, *Digitaria*, *Paspalum* and *Setaria* etc...). There are only three native panicoid species they are: *Cenchrus caliculatus*, *Oplismenus hirtellus* and *Spinifex sericeus*. This tribe and the 15 other tribes with small numbers of species (e.g., Andropogoneae - *Miscanthus*, *Sorghum* *Themeda*; Eragrostideae - *Eragrostis*, *Sporobolus*) are mostly restricted to warm coastal areas, many of them just reaching as far south as the Nelson Region.

**AGROSTIS** spikelet with 1 floret (=flower) (10 indigenous species, 4 naturalised) - Tribe Aveneae

**Species of *Agrostis* always have 'one floret per spikelet'**

*The Tribe Aveneae is characterised by a membranous ligule, mostly 1 to 3 florets per spikelet, glumes totally enclosing the floret (i.e., glumes = spikelet in length excl. awns) and a membranous ligule.*

*The Tribe Stipeae also has 1 floret/spikelet and glumes enclosing the floret, but all except for two naturalised species, *Piptatherum miliaceum* and *Piptochaetium depressum*, have very long awns, 20 mm and more (up to 50 mm even). The former species has a distinctive whorled inflorescence and the latter is just recently naturalised and found so far only in one locality on Banks Peninsula it has an awn about 10 mm (see photos in NZgrass key). Both are coastal or lowland.*

### **common native species:**

*Agrostis dyerii*

*A. imbecilla*

*A. muscosa* (a cushion plant)

*A. pallescens*

*A. personata*

*A. petriei*



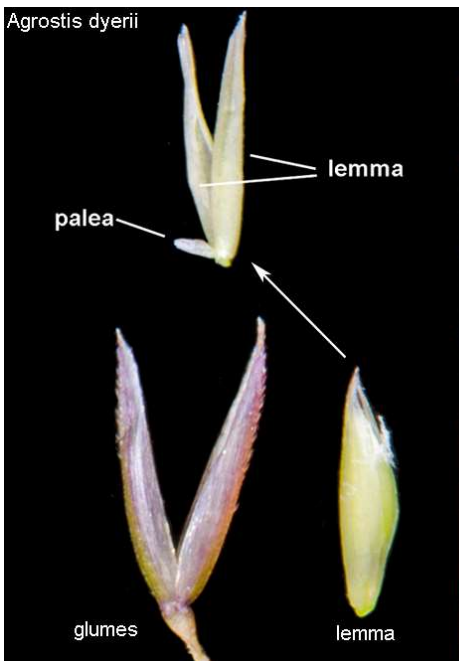
**Common naturalised species:**

**\**Agrostis capillaris* (browntop)** - lowland to subalpine habitats (**very common!**)

The first thing is to tell the difference between native and naturalised – most often this is a check to determine whether you have *Agrostis dyerii* or *A. personata* (both native) VS the very common and variable naturalised browntop (*Agrostis capillaris*) - other native species of *Agrostis* you are unlikely to confuse with browntop (but the rule applies to all species of native *Agrostis*).

The check involves looking at whether the floret has a tiny palea *much* < half the length of the lemma. The palea in the native species is non-distinct, membranous and very reduced - so if you have difficulty finding it, you probably have a native species of *Agrostis*. This test is difficult because all the floret parts are so small in *Agrostis*. (note you need some reasonable magnification).

native *Agrostis*



Similar 1-flowered genera to *Agrostis* (from the same tribe Aveneae) and the species you are most likely to come across:

e.g., native species

*Lachnagrostis lyallii*, *L. pilosa*



Technically the genus most likely to be confused with *Agrostis* is the closely related ***Lachnagrostis*** which also has a diffuse panicle (long panicle branches) and a weak awn or awn absent altogether. The main difference is that *Lachnagrostis* has a hairy lemma whereas in species of *Agrostis* they are glabrous. Also, if you see whole panicles breaking away from the plant then you can be sure that you have a species of *Lachnagrostis* (this gives them the name 'wind grasses'). In reality once you have your eye in you will rarely confuse these two genera.

The other 1-flowered Agrostid genus commonly found in the mountains, ***Deyeuxia***, has a more or less contracted panicle (almost a spike in *D. aucklandica*) and the species in this genus also have a stiff lemma (not membranous) which is relatively strongly awned (& distinctly bent when mature). Common species are *Deyeuxia aucklandica* and *D. avenoides*.

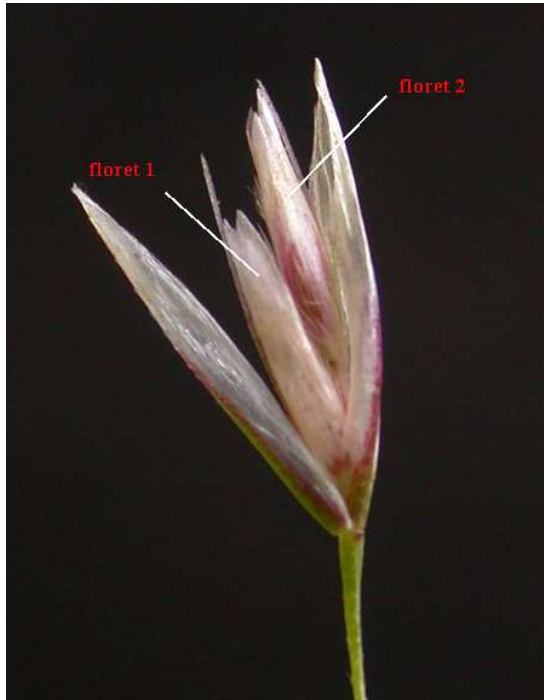


Deyeuxia avenoides



<i>1-flowered agrostids</i> <i>differences</i>	<b>lemma</b>	<b>callus hairs</b>	<b>awn</b>
<b>Agrostis</b>	membranous & glabrous	mostly glabrous or a few weak hairs	weak or absent
<b>Lachnagrostis</b>	membranous with soft hairs	well developed	weak
<b>Deyeuxia</b>	stiff, hairy or glabrous	well developed	strong, geniculate when mature

Other genera similar to *Agrostis*, *Lachnagrostis* & *Deyeuxia* (from the same tribe Aveneae) you are most likely to come across, **always have 2 or more flowers/spikelet**: *Deschampsia*, *Hierochloe*, *Koeleria* and *Trisetum* (all indigenous – Aveneae Tribe)



*Deschampsia caespitosa*, *D. chapmanii*, *D. tenella* (mostly 2-fl, occ. 3)

Species of *Deschampsia* also have **distinctly long tapered ligule and the spikelets are often small but shiny or silvery**. Look out for *D. tenella* on the track, an erect dark glossy grass - you are likely to meet it in damp shady spots in montane to subalpine areas.



Holy grasses: *Hierochloa cuprea*, *H. recurvata*, *H. redolens*, *H. novae-zelandiae* (mostly 3 fld), **notice the distinctive fringe on the two lower male lemmas, and awn short or absent in the third or uppermost floret (which is perfect, i.e., both male & female); flowering heads always a lax panicle.**



*Koeleria cheesemanii*, *K. novozelandica* (2 or 3 florets, occ. more than 3 florets; all are at high altitudes, **(Notice the short straight awns coming from the apex of the lemma, and flowering heads are spikes or spike-like in all three species)**). Note: *K. cheesemanii* is easy to confuse with *Trisetum spicatum*, but also possibly spp. of *Poa*.



*Trisetum lepidum*, *T. spicatum*, *T. youngii* (sometimes 2, often 3, occ. more) – notice the dorsal awns (coming from the mid-vein on the back of the lemma rather than from the apical or sub-apical position) strongly recurved when mature (this genus has species with both spike-like and or lax flowering heads).

naturalised species in the Aveneae you are most likely to come across

Closely related to the native genus *Hierochloa* is sweet vernal (*\*Anthoxanthum odoratum*) it also has three florets, and like the holy grasses the uppermost floret is perfect, but unlike *Hierochloa* the lower two florets are sterile and very reduced in size) (this species is very common in our modified mixed native/exotic grasslands!)



*\*Anthoxanthum odoratum*, L. inflorescence spikes young and old. R. the three florets (one fertile, two awned sterile).



*\*Aira caryophylla* (silvery hair grass) another common naturalised grass, at right showing a spikelet with equal sized glumes completely enclosing the 2 florets with the lemma awns and one anther (partly) visible only.

\**Holcus lanatus* (Yorkshire fog) montane, rarely subalpine (2 florets) – has distinctive pyjamas stripes on the leaf-sheaths



Sweet vernal, silvery hair grass & Yorkshire fog, like browntop, are very common in a wide range of montane habitats throughout New Zealand.

### **Chionochloa & Rytidosperma (danthoids - Danthonieae)**

#### **More than two florets (2 - many)**

Lemmas have distinctive lobes which are drawn out into awns in addition to a longer, twisted & bent awn projecting between the lobes. **The ligule is always a line of hairs.**

Three genera: *Chionochloa* (all native), *Danthonia* (1 naturalised species), *Rytidosperma* (native & naturalised).

The species of *Chionochloa* and *Rytidosperma* are well illustrated in the NZgrass key found on the Landcare Research website, and a separate subset of specialist characters for each of these genera has been recently added.

### **CHIONOCHLOA (snow tussocks) – all species are endemic**

#### **Mostly large tussocks with either rush-like or graminoid leaves**

Those discussed below are the common species. The species not mentioned either have restricted geographic distributions and/or are easily identified by habit or other distinctive features, e.g., *C. teretifolia* has a distinctive narrow, hairy sheath and lamina and is restricted to Fiordland and Southland, and *C. lanea* has a distinctive mop of hairs on the sheath apex (hence *lanea* = woolly) and is restricted to Stewart Island.

There is a total of 23 species eight of which are widespread.

Most species are in the South Island with Fiordland being a bit of a 'hotspot' with 11 species, four of which are endemic, including the newly described *Chionochloa nivifera* restricted to the south-east part of Fiordland.

(Note that in *Vegetation of New Zealand* Wardle's (1991) tagnames *Chionochloa* "Westland" and *C.* "Fiordland" = *C. rigida* ssp. *amara*, and *C.* "robust" = *C. flavescens*).

Often more than one species will be present at a locality, e.g., *C. flavescens*, *C. pallens* and *C. rigida* (any many other combinations as well). The most difficult pairs of widely co-occurring species to tell apart are *Chionochloa flavescens* and *C. rigida*, and *C. pallens* and *C. macra*.

How to tell *Chionochloa* from tussock-form *Rytidosperma*:

- 1) The hairs on the lemma are evenly spread in *Chionochloa* and not in horizontal bands or tufts on the margin as in *Rytidosperma*:



2) Large & medium tussocks (*Chionochloa*) vs. small tussocks and tufts (*Rytidosperma*):



*Rytidosperma thomsonii* with *Chionochloa rigida* behind at Lindis Pass.



- 3) Generally, the spikelets of *Chionochloa* are larger than *Rytidosperma* (and in *Rytidosperma* the awn column more tightly twisted when mature):



Chionochloa

Rytidosperma

Species of *Chionochloa* like *C. australis* (carpet grass), *C. crassiuscula* and *C. oreophila* (snow-patch grass) are small sward-forming patches rather than tussocks, but differences in ornamentation on the lemma and the size of the spikelet should help you tell the difference (also the curly leaves of *C. crassiuscula* are unlike any *Rytidosperma*).

Generally, the axial ranges of the North Island are covered in *Chionochloa pallens* above the bushline with *C. flavescens* present within these grasslands (and associated with heath-shrublands). *Chionochloa pallens* is also dominant and widespread in the penialpine zone along the main divide to the west especially, but is less common in the rain-shadow areas of the east and on the granite mountains of the south (read Wardle 1991 Chapter 9).

*Common species of the east & west of the main divide (except Chionochloa macra) South Island:*

- C. conspicua* (forest & shrubland, clearings & river sides)
- C. flavescens* (**wide shoots & lamina**, sheaths fracturing into short segments)
- C. macra* (**only east of the divide**, to 1700m; sheaths & leaves entire, **no mid-vein**)
- C. pallens* (sheaths & leaves entire, breaking at or near ligule, **pale yellow mid-vein prominent**)
- C. rigida* (sheaths fracturing into short segments, **relatively narrow shoots & lamina**)
- C. rubra* (red tussock, bogs, poorly drained gullies)

*Common species at high altitudes (above 1500m) along the main divide, South Island:*

- C. australis (a distinctive dense mat, absent south of Arthurs Pass)
- C. crassiuscula (distinctive curly leaves, north to the Lewis Pass area)
- C. oreophila (mat - grows in snow hollows and banks on ridge tops, especially)
- C. pallens
- C. rigida

*Chionochloa flavescens* and *C. rigida* are the only two species characterised by leaf-sheaths fracturing into short segments. Generally, *C. rigida* has narrower leaf-sheaths & leaf-blades than *C. flavescens*. *Chionochloa rigida* is the dominant species of the eastern mountains south of the Rakaia (it is entirely absent north of the Rakaia River) - it is also present over on the west side of the divide and *C. rigida* subsp. *amara* extends into Fiordland and Stewart Island.



*Chionochloa rigida*



*Chionochloa pallens*



*Chionochloa flavescens* (Porters Pass)

(If you are going over Porters Pass see the population of *Chionochloa flavescens* subsp. *brevis* directly above the road close to the Pass on the east side, and then remnants of *C. rubra* in the gully on the left heading west down over the pass.

## RYTIDOSPERMA (danthoid grasses)

Paradoxically in *Chionochloa* features of the leaf-sheath and lamina are most useful in distinguishing species, whereas in the related *Rytidosperma* it is features of the lemma, particularly the hairs and the proportions of the lemma parts. Use the NZgrass key to identify species as they are nearly all illustrated, including close-up photos of the lemmas (the exception is *R. tenue* which is probably a hybrid).



*Rytidosperma nigricans* (inflorescence & tillers)

*Rytidosperma gracile* and *R. setifolium*, are the two most common and widespread native species, found throughout the mountains in both N.I. & S.I. *Rytidosperma gracile* is found in grassland, shrubland and forest, from lowland to alpine and is a tall lax (tufted) grass with a distinctly hairy sheath and extra-vaginal tiller growth. *Rytidosperma setifolia* is found in grassland and rocky places from montane to alpine and is a tussock with intra-vaginal tiller growth. These species roughly represent two common growth forms.

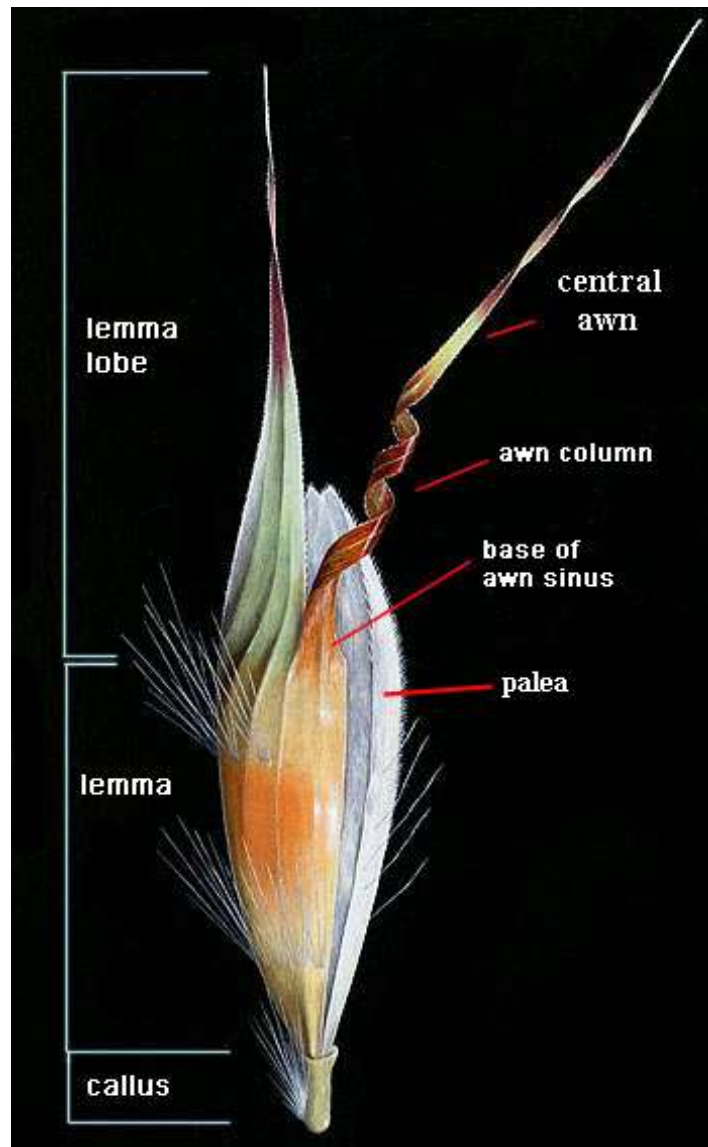
'The tufted or laxly tillered grass vs. the caespitose tussock form'



tufted & lax form



tussock form (with disarticulated leaf-blades)



## How to measure a *Rytidosperma* lemma

(note: don't include the callus length when measuring the lemma)

### Distribution of common native species

*Rytidosperma gracile* and *R. setifolium* (yellow-green bristle grass) are the most conspicuous and widespread species in the N.Z. mountains.

Widespread & common North & South Island:

*R. buchananii*

*R. clavatum*

*R. gracile*

*R. setifolium*

*R. unarede*

Common in the E.S.I. grasslands:

*R. buchananii*

*R. clavatum*

*R. corinum* (diff. to tell apart from *R. setifolium*)

*R. thomsonii*

*R. pumilum*

*R. setifolium*

Common on the West Coast and Tararua Mtns:

*R. gracile*

*R. nigricans*

**Common naturalised species:** *Rytidosperma racemosum* is widespread in modified grasslands and very common in eastern coastal areas of both N.I. & S.I. and in Nelson. It has a distinctively long narrow callus (the lower part of the floret drawn out to a point, **note not incl. in the measurement of the lemma**), the longest of any species except for *\*R. caespitosum*. Because of this, noticeably in these two species, the callus hairs do not overlap or touch the lower row of lemma hairs. To tell them apart, inspect the rows of lemma hairs; in *R. racemosum* the two upper rows are about the same length whereas *R. caespitosum* the upper row is distinctly longer than the lower, and the inflorescence is generally larger. See the photos below and compare with *R. gracile* and *R. clavatum* which have a short callus.





## Festuca & Poa (Tribe Poeae)

Mostly 3 or more florets (2 in some spikelets of high alpine or depauperate plants)

These two genera belong to the **Poeae tribe** which is characterised by having **a membranous ligule (sometimes with a minute ciliate fringe = many native Poa), many flowered spikelets, and glumes < spikelets**. There are 10 genera in this tribe and *Festuca* and *Poa* have by far the largest number of species (62 of 86 species) – *Festuca* has **10 native spp., 3 naturalised**; *Poa* has **39 native spp., 10 naturalised**.

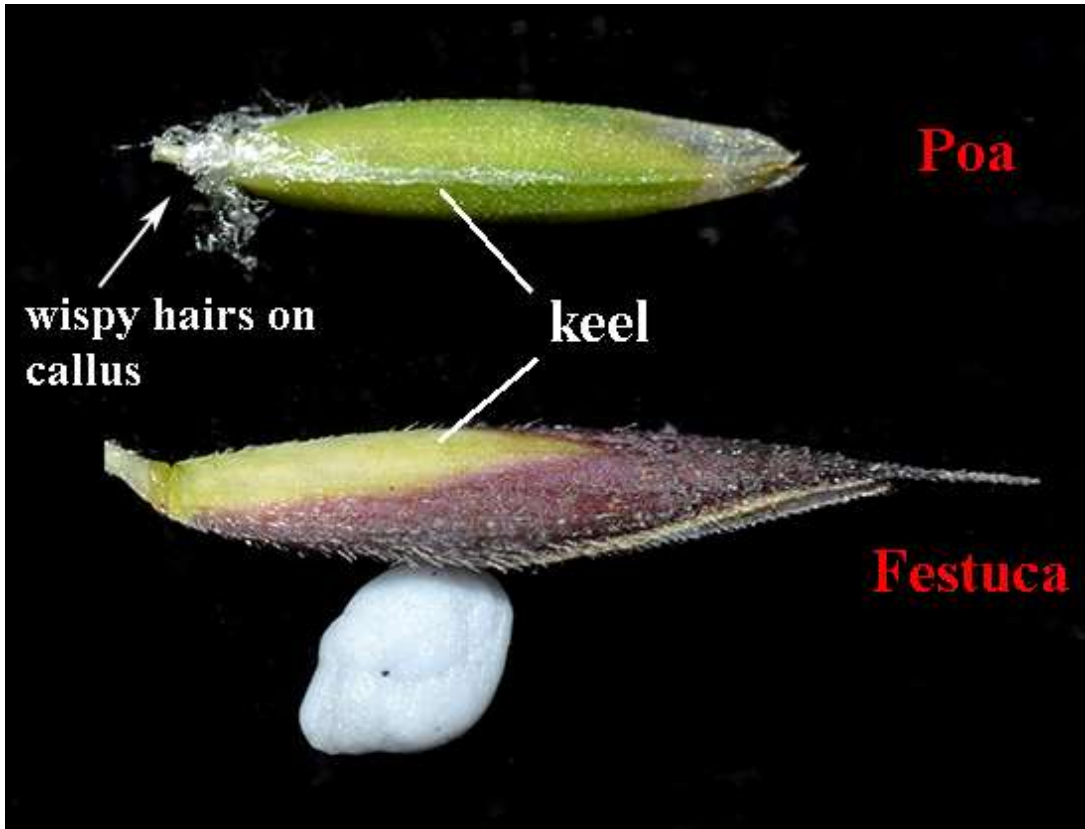
With the exception of 3 species of native *Puccinellia* (salt grasses) all other species (33 species) are **naturalised** (they are *Briza*, *Catapodium*, *Cynosurus* (crested dogstail), *Dactylis* (cocksfoot), *Lolium*, naturalised *Puccinellia*, *Schedonorus* (tall fescue) and *Vulpia* (hair grass)).

## Telling the difference between Festuca and Poa

- 1) \*The lemma of species of *Festuca* are rounded on the back but slightly keeled below the terminal awns, and those of *Poa* are keeled the full length; think ocean boat keel (*Poa*) vs. riverboat keel (*Festuca*).
- 2) Also, many (not all) lemmas of *Festuca* spp. are awned or very shortly awned (e.g., *F. filiformis*) whereas, **species of *Poa* are never awned**.
- 3) Many species of *Poa* (not all) have long **wispy or crinkled hairs** at the base of the lemma, *Festuca* never do.
- 4) Species of *Festuca* do not have a strong mid-vein on the top surface of the leaf-lamina (impossible to see with tightly convolute leaves) whereas species of *Poa* have a distinctive sunken mid-vein with the lamina terminating into a canoe tip. The **canoe tip in *Poa*** is a reasonably reliable character even in 'skinny leaved' species.



\*This is not so easy, as some native poa have fairly rounded lemma keels, e.g., *P. breviglumis*, and it's hard to tell in pressed specimens.



Spikelets: *Festuca mathewsii* (L), *Poa colensoi* (R)



*Festuca* leaf-blades– no distinctive mid-vein, auricles & sometimes a thickened collar, and a very short truncate ligule, often shortly fringed with hairs.

*Poa* leaf-blades – look for a sunken mid-vein (tram-tracks) and a canoe tip. The ligules are variable but are often with a noticeable membranous ligule which is sometimes shortly fringed with hairs.



*P. cita* has a short ciliate truncate ligule whereas *Poa anceps* is long-ciliate



Two species of native *Festuca* are very common: *F. novae-zelandiae* and *F. mathewsii* (with 4 subsp.).

Two species of native *Poa* dominate in tussock grasslands, *Poa cita* (silver tussock, a moderately sized smooth leaved tussock) and *Poa colensoi* (small to moderate sized green or blue tussock with disarticulating leaves showing a clear fracture zone across the top of the leaf-sheaths). There is regional and habitat variation in blue tussock – see illustrations in NZgrass key.



*Festuca mathewsii* (L),



*Poa colensoi* (R)



**Common naturalised species** in the Poeae Tribe are: *Dactylis glomerata* (cocksfoot), *Festuca rubra* (red-fescue), *Lolium perenne*, *Poa annua*, *P. pratensis*, *P. trivialis*, and the two species of *Vulpia*. All are very common throughout N.Z. and throughout the mountains. Naturalised species of *Poa* and *Festuca rubra* are common around hut clearings, along valley tracks and in river valleys generally.



*Festuca rubra*



*Poa trivialis*

*Festuca rubra* (red fescue) is very common in mountain grasslands and is a densely-tufted grass (often with red spikelets) – this habit differs from *F. mathewsii* and *F. novae-zelandiae* which are **tussock-form**.

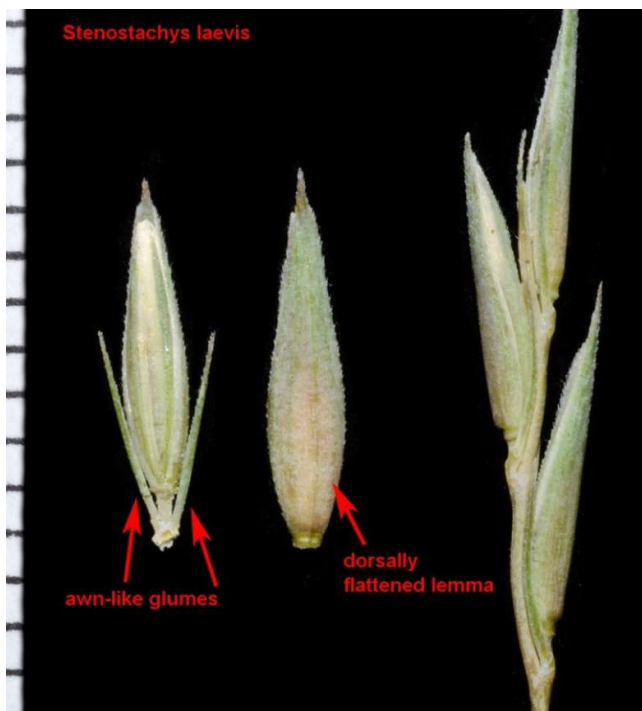
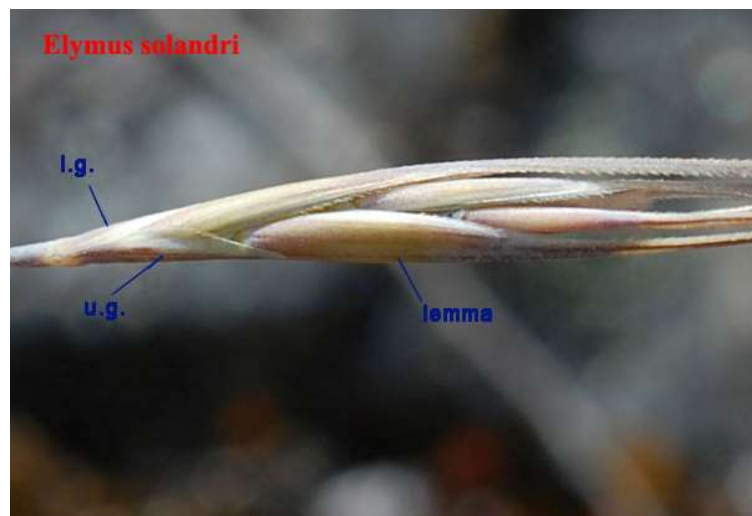
## WHEAT GRASSES – Triticeae

(Spikelets 1–many florets (mostly 3 to 10 in native species))

Main native genera: *Anthosachne* (= *Elymus*) 5 species & *Stenostachys* (4 species)

Of the wheat grasses in New Zealand only the naturalised barely grasses, *Critesion* & *Hordeum*, consistently have 1 floret/spikelet—the native genus *Stenostachys* does vary from 1–3 florets/spikelet. Most of these genera are long-awned (often the awns are curved) but in *Australopyrum* and *Stenostachys* the awns are relatively short. The members of this tribe have **solitary and sessile spikelets placed flatwise at each joint of the rachis**. The spikelets can be crowded or spread out along a greatly elongated rachis. **The glumes are narrow and short and in some species even awn-like.**

Like the genus *Festuca* members of the Triticeae have a lemma with a flat keel, are awned, and often have many florets/spikelet. You can only potentially confuse the short-awned species of native Triticeae with species of *Festuca*. In reality the native Triticeae are distinctive looking, **with alternating sessile florets that are broadside to the rachis (spike or raceme)** and when young and fresh the leaf-blades are flat (often with clasping auricles).



### Common native species

You are likely to meet species from the genera *Anthosachne* (*Elymus*) and *Stenostachys*. Species from these genera are often striking with long culms and looping glaucous-blue flowering heads.

*Anthosachne solandri* (*Elymus solandri*) is common and widespread and often stands out as a tufted blue grass in grasslands along rivers and creeks, and on screes and bluffs (occasionally not blue but still striking).

*Stenostachys enysii* and *S. laevis* (also standing out as a tufted blue grass with looping heads, found in the mountains in upper montane and subalpine habitats). Keep an eye out for the rare, *Australopyrum calcis*, in dry eastern grasslands, riverbeds, shrubland, rocky outcrops and screes. *Anthosachne apricus*, the only tussock-forming wheat grass is found in short-tussock grassland in inland basins of Central Otago.



*Stenostachys enysii*



*Australopyrum calcis*

### Common naturalised species

*Anthosachne scabra* is a very common species in drier grasslands particularly east of the divide (rare in the Waikato, Westland and Southland). You could mistake this species for *A. solandri*, but *A. solandri* is often glaucous whereas *A. scabra* is never glaucous. Also *A. scabra* has a distinctive coarsely hairy leaf-blade. *Critesion murinum* (barley grass) is frequent where sheep camp.



*Anthosachne scabra*



*Critesion murinum* var. *murinum* (barley grass common around sheep camps)



## RICE GRASSES – Ehrharteae

### (Spikelets 3–florets)

Two native genera *Microlaena* and *Zotovia*

Characterised by having two lower awned sterile florets and an un-awned upper fertile floret. They are similar in floret arrangement to the Aveneae genus *Hierochloa* except that the lower two florets are sterile rather than male and the lemmas are not hair fringed. Also, both *Microlaena* and *Zotovia* differ from *Hierochloa* in the glumes which are unequal and much shorter than the lemmas and species of *Microlaena* have long hairs on the auricles. The widespread *Zotovia colensoi* has a distinctive nodding inflorescence. *Microlaena* has four native species of forest and forest margin habitats and *Zotovia* has three species of subalpine and alpine habitats (their spikelet parts are of much shorter and reduced dimensions).

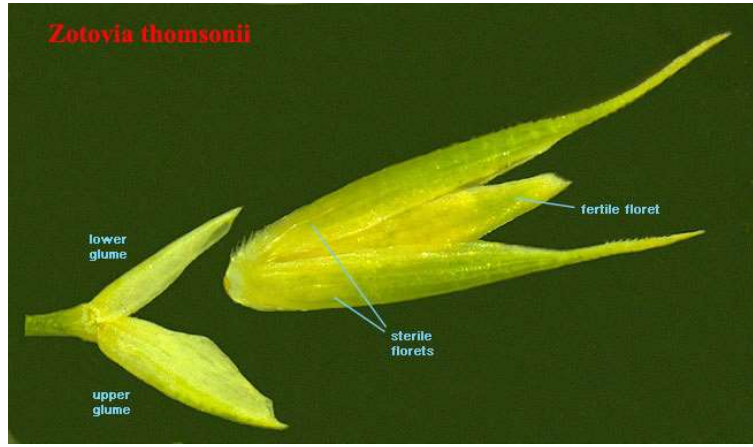
### Common native species

*Microlaena avenacea* (bush rice grass, forest floor N.I. & S.I.)

*Microlaena stipoides* (bush rice grass, open forest & shrubland, ruderal, N.I. & S.I.)



*Zotovia thomsonii* (subalpine and alpine bogs N.I. & S.I.) Denniston Plateau, Westland



*Zotovia colensoi*, Mt Haast, South Nelson.



*Zotovia acicularis*, Merrie Range, Fiordland.

#### \***BROMUS** – brome (Bromeae)

##### **Spikelets, mostly 4 to 10 florets**

All species of this genus are naturalised, about 18 species, 8 of which are common and widespread. They often have soft hairy leaf-sheaths but no red pyjama stripes as in *Holcus lanatus* (Yorkshire fog). The group as a whole is distinctive and easily recognised once you get your eye in. Vegetative material could however, surprisingly, be confused with *Koeleria cheesemanii* (the latter is a true high alpine however but it can be found lower down in valleys).

Most species are awned near the apex of the lemma (between two tiny lobes). The lemma keels are both rounded like *Festuca* and keeled like *Poa*, but most spikelets are **bigger and longer than nearly all species in the Poeae Tribe**. Only one species of *Poa* has a spikelet anywhere near 20 mm long (*Poa billardierei* at 16 mm). The spikelets of nearly all the species of *Bromus* are greater than 15mm. Most species of *Bromus* have spikelets greater than 20 mm.

##### **Common & widespread naturalised species**

- Bromus diandrus (rippgut brome)
- Bromus hordeaceus (soft brome)
- Bromus lithobius (Chilean brome)
- Bromus stamineus (spikey brome)
- Bromus sterilis (barren brome)
- Bromus tectorum (downy brome)
- Bromus willdenowii (prairie grass)

Most species of *Bromus* listed above are present predominantly in the lowlands, both coastal and inland, but not reaching into higher altitudes. You are most likely to meet *Bromus hordeaceus*, *B. diandrus*, *B. sterilis* and *B. tectorum* in the river beds and terraces.



The technical character that distinguishes the bromes tribe is **a terminal, fleshy, 2-lobed, hairy appendage on the ovary apex** (separate from the feathery stigmas) – easy to see at anthesis, but not when specimens are well past the pollinating stage.



## **Internet resources**

Checklist of the New Zealand Flora: Seed Plants (2016):

<https://datastore.landcareresearch.co.nz/dataset/checklist-of-the-new-zealand-flora-seed-plants-2016>

Flora of New Zealand Volume 5. Gramineae:

<http://floraseries.landcareresearch.co.nz/pages/Book.aspx?fileName=Flora%205.xml>

New Zealand eflora: <http://www.nzflora.info/>

[Flora of New Zealand | Taxon Profile | Gramineae \(nzflora.info\)](#)

NZgrass: [Key to the grasses » Manaaki Whenua \(landcareresearch.co.nz\)](#)

NZ virtual herbarium:

<http://www.virtualherbarium.org.nz/home;jsessionid=ED6D062E970C6E50C9D6AC017765B43E>

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**\*Note that in *Vegetation of New Zealand* Wardle's (1991) tagnames:**

*Chionochloa* "Westland" and *C.* "Fiordland" = *C. rigida* ssp. *amara*

*Chionochloa* "robust" = *C. flavescens*