

Grass Genera in Townsville

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Photographs by Chris Gardiner



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TOWNSVILLE
QUEENSLAND

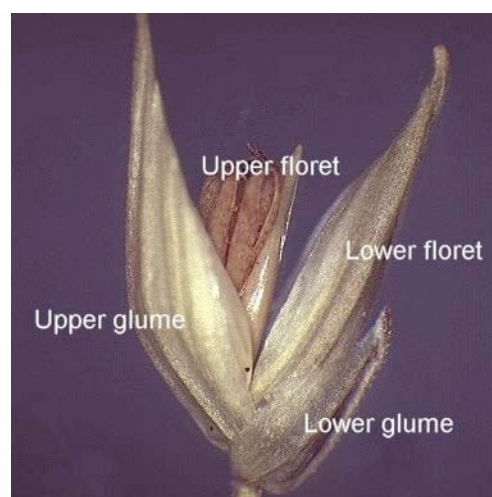
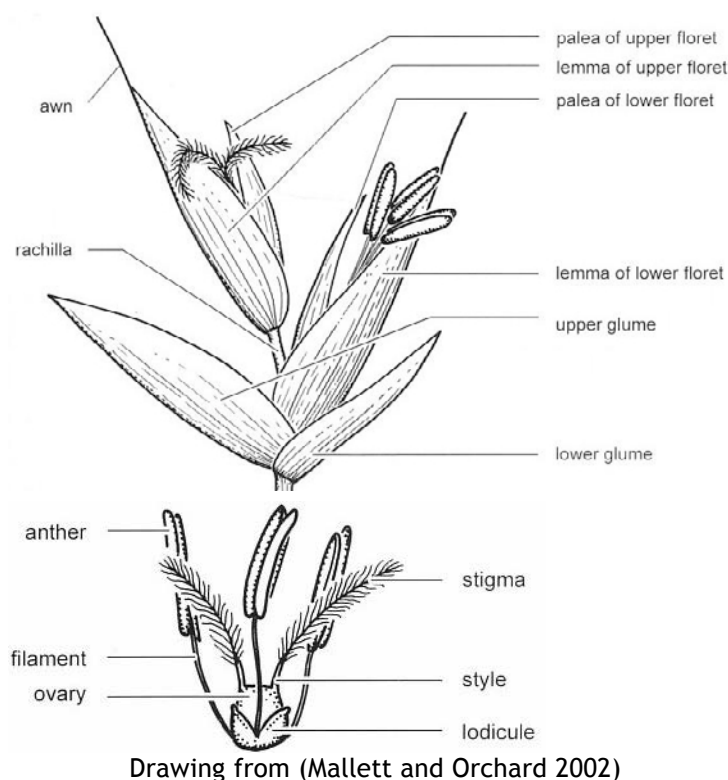
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GRASSES OF THE TOWNSVILLE AREA

Welcome to the grasses of the Townsville area. The genera covered in this treatment are those found in the lowland areas around Townsville as far north as Bluewater, south to Alligator Creek and west to the base of Hervey's Range. Most of these genera will also be found in neighbouring areas although some genera not included may occur in specific habitats.

The aim of this book is to provide a description of the grass genera as well as a list of species. The grasses belong to a very widespread and large family called the Poaceae. The original family name Gramineae is used in some publications, in Australia the preferred family name is Poaceae. It is one of the largest flowering plant families of the world, comprising more than 700 genera, and more than 10,000 species. In Australia there are over 1300 species including non-native grasses. In the Townsville area there are more than 220 grass species.

The grasses have highly modified flowers arranged in a variety of ways. Because they are highly modified and specialized, there are also many new terms used to describe the various features. Hence there is a lot of terminology that chiefly applies to grasses, but some terms are used also in the sedge family. The basic unit of the grass inflorescence (The flowering part) is the spikelet. The spikelet consists of 1-2 basal glumes (bracts at the base) that subtend 1-many florets or flowers. Each basic floret consists of 2 glumes called the lemma and palea, these enclose the male and female organs.



There are many basic variations on this basic pattern, sometimes the palea may be missing for instance or the floret may be sterile or neuter, i.e. there are no male or female organs inside. Some spikelets are bisexual (both stamens and ovary present) or unisexual (only male or female organs present). Sometimes male and female flowers are in different spikelets, then the plant is said to be monoecious, if male on one plant and female on another as for the Beach Spinifex then the plant is dioecious.

Because of the difficulties in understanding the various terms, in this book illustrations are used as much as possible. To find your way to a genus, there are two routes you can follow, the first method is 'flick till you find'. The second is to use what is called a 'key'. This is based on pairs of contrasting statements or couplets. Both statements must be read to find out which one 'fits' your plant and then you go to the corresponding number and continue like this till you find the description that fits. Diagrams have been used as much as possible to supplement the words - hence the key could also be termed a "pictorial key".

Several useful references are:

Hooker N, Jackes B (2009) Grasses of James Cook University, Townsville campus: Part A
<http://eprints.jcu.edu.au/2103/>

Jacobs SWL, Whalley RDB, Wheeler DJB (2008) 'Grasses of New South Wales (Fourth Edition).'
 (University of New England: Armidale)

Mallett K, Orchard AE (Eds) (2002) 'Flora of Australia Volume 43, Poaceae 1: Introduction and Atlas.'
 (ABRS/CSIRO Publishing: Melbourne)

Wheeler DJB, Jacobs SWL, Whalley RDB (2002) 'Grasses of New South Wales (Third Edition).'
 3rd. edn. (University of New England: Armidale)
http://www.fog.org.au/grasses_of_nsw/grasses_of_nsw.htm

There are several groups of plants which are sometimes mistaken for grasses.

Families which have grass-like species or could be mistaken for grasses are:

Sedges or Cyperaceae chiefly found in moist habitats; rushes - the families Juncaceae and Restionaceae and pipeworts or Eriocaulaceae.

The following table provides a comparison of these families, all of whom do not have typical petal-like flowers.

	Grasses and grass-like plants (and flowers without petaloid perianth)				
	Poaceae (grasses)	Cyperaceae (sedges)	Juncaceae (rushes)	Restionaceae (Australian rushes)	Eriocaulaceae (pipeworts)
Stems	Hollow or solid Round	Solid Triangular or round	Solid Round	Hollow or solid Triangular, round or flat	Solid or spongy
Leaf sheaths	Open	Closed	Open or closed	Closed	Open
Leaves	2-ranked	3-ranked	2-ranked	Much reduced rosette	Spiral
Ligules	Present	Absent	Absent or present	Absent or present	Absent
Flowers	Commonly bisexual, enclosed by a lemma and palea and subtended by sterile glumes	Bisexual or unisexual and monoecious, enclosed by a single bract (glume)	Bisexual	Unisexual and dioecious	Unisexual and dioecious
Floral formula	P0 A3 G(2)	P0 A3 G(2-3)	P 3+3 (dull- coloured) A6 G(1 or 3)	P 0 or 3 or 6 A 1 or 2 or 3 G(1 or 2 or 3)	P 3+3 A3-6 G(2-3)

Plants with petaloid perianths which are sometimes grass-like include.

Liliaceae *sensu lato* Flowers unisexual or bisexual. Perianth 3+3 or 6

Laxmanniaceae (*Lomandra*) Plants with unisexual, flowers white, cream or pale yellow
 Leaves arranged two vertical rows on opposite sides of an axis

Hemerocallidaceae (*Dianella*) Distinguished by their blue flowers and berries

Arrangement of the Book.

Pictorial Key to genera

Illustrated guide to the Subfamilies and Tribes

Descriptions of the genera

Sharp D, Simon BK (2002) AusGrass: grasses of Australia. CD-ROM, Version 1.0. In. ' (Australian Biological Resources Study: Canberra, and Environmental Protection Agency: Brisbane)

Mallett K, Orchard AE (Eds) (2002) 'Flora of Australia Volume 43, Poaceae 1: Introduction and Atlas.'
 (ABRS/CSIRO Publishing: Melbourne)

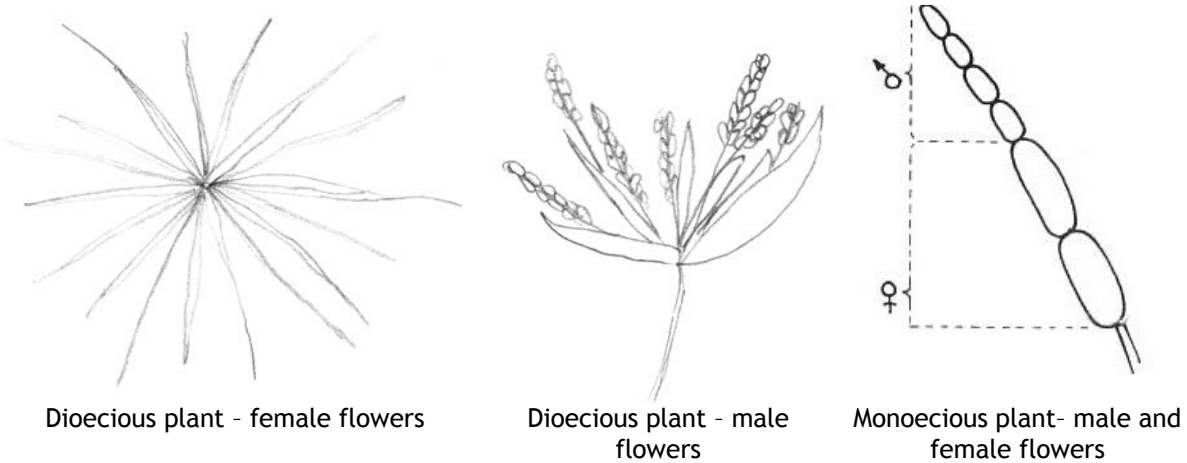
The 73 genera of grass which have been found in Townsville the area are listed here.

<i>Alloteropsis</i>	<i>Imperata</i>
<i>Ancistrachne</i>	<i>Ischaemum</i>
<i>Andropogon</i>	<i>Leersia</i>
<i>Aristida</i>	<i>Leptochloa</i>
<i>Arthragrostis</i>	<i>Lepturus</i>
<i>Arundinella</i>	<i>Megathyrsus</i>
<i>Arundo</i>	<i>Melinis</i>
<i>Axonopus</i>	<i>Mnesithea</i>
<i>Bothriochloa</i>	<i>Ophiuros</i>
<i>Brachyachne</i>	<i>Oplismenus</i>
<i>Capillipedium</i>	<i>Oryza</i>
<i>Cenchrus (Pennisetum)</i>	<i>Oxychloris</i>
<i>Chionachne</i>	<i>Panicum</i>
<i>Chloris</i>	<i>Paspalidium</i>
<i>Chrysopogon</i>	<i>Paspalum</i>
<i>Cleistochloa</i>	<i>Perotis</i>
<i>Cymbopogon</i>	<i>Phragmites</i>
<i>Cynodon</i>	<i>Pseudopogonatherum</i>
<i>Dactyloctenium</i>	<i>Pseudoraphis</i>
<i>Dichanthium</i>	<i># Saccharum</i>
<i>Digitaria</i>	<i>Sacciolepis</i>
<i>Echinochloa</i>	<i>Sarga</i>
<i>Ectrosia</i>	<i>Schizachyrium</i>
<i>Eleusine</i>	<i>Sehima</i>
<i>Elionurus</i>	<i>Setaria</i>
<i>Elytrophorus</i>	<i>Sorghum</i>
<i>Enneapogon</i>	<i>Spinifex</i>
<i>Enteropogon</i>	<i>Sporobolus</i>
<i>Eragrostis</i>	<i># Stenotaphrum</i>
<i>Eremochloa</i>	<i>Themeda</i>
<i>Eriachne</i>	<i>Thuarea</i>
<i>Eriochloa</i>	<i>Triodia</i>
<i>Eulalia</i>	<i>Urochloa</i>
<i>Hemarthria</i>	<i>Vacoparis</i>
<i>Heteropogon</i>	<i>Whiteochloa</i>
<i>Hymenachne</i>	<i># Zoysia</i>
<i>Hyparrhenia</i>	

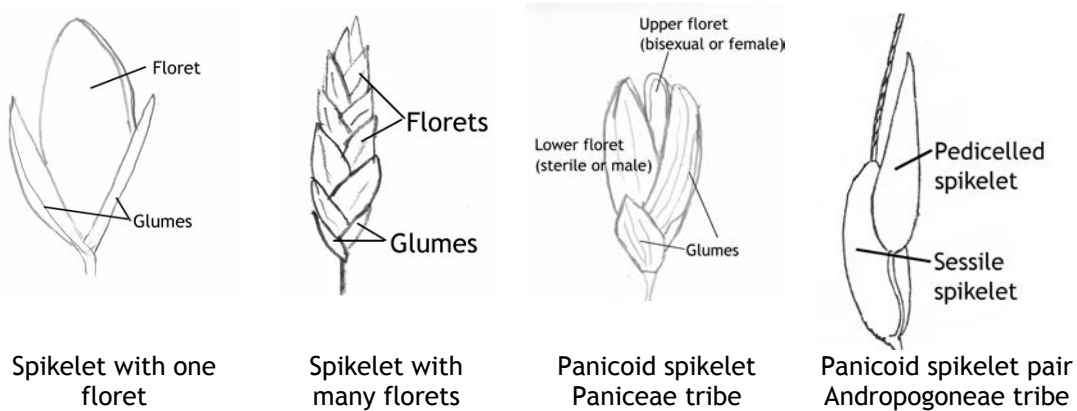
Some garden (cultivated) plants are included and are indicated by #.

KEY TO GRASS GENERA IN TOWNSVILLE

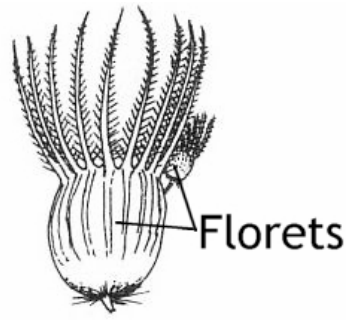
1. Spikelets morphologically or functionally unisexual go to 2
Spikelets bisexual go to 4
2. Plants dioecious i.e. with male and female spikelets on different plants, grows on sandy seashores **SPINIFEX (p86)**
Plants monoecious, i.e. with male and female spikelets on the same plant, grows on sandy seashores or creek banks go to 3



3. Plant tufted, more than 1 m tall, grows on creek banks **CHIONACHNE (p36)**
Plant prostrate, grows on sandy seashores..... **THUAREA (p90)**
4. Spikelets with one to many florets, if two-flowered both florets or lower one bisexual..... go to 5
Spikelets two-flowered, lower floret male or barren, upper bisexual or female (see PANICOIDEAE - pages 19-23)..... go to 30



5. Inflorescence a solitary, bilateral spike (almost cylindrical); spikelets solitary and partially embedded in rachis; lower glume absent or obscure; a coastal grass **LEPTURUS (p65)**
Grasses without the above combination of characters..... go to 6
6. Fertile lemmas distinctly nine-lobed..... **ENNEAPOGON (p50)**
Fertile lemmas entire, dentate or slightly lobed..... go to 7



Fertile lemmas distinctly 9-lobed

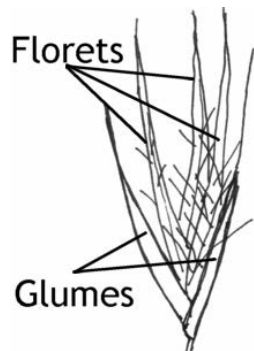


Fertile lemmas entire



Fertile lemmas dentate or slightly lobed

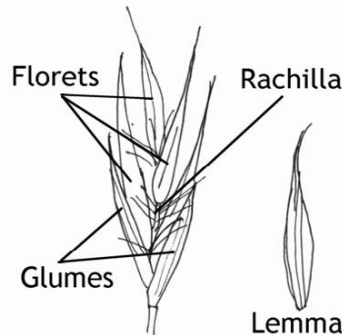
- 7. Leaf blades hard, woody, needle-like **TRIODIA (p91)**
 Leaf blades not hard, woody, needle-like go to 8
- 8. Plants tall and reed-like, usually more than 2 m tall..... go to 9
 Plants not tall and reed-like go to 10
- 9. Lemmas not hairy (glabrous); rachilla (axis of spikelet) hairy **PHRAGMITES (p77)**
 Lemmas hairy; rachilla not hairy **ARUNDO (p30)**



Lemmas hairy = Arundo

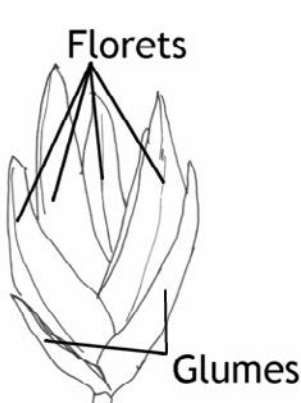


Lemma

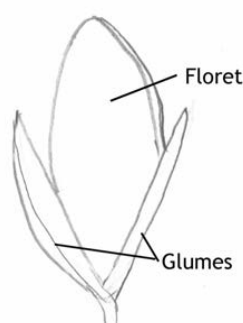
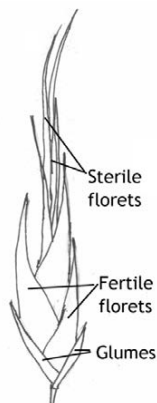


Rachilla hairy = Phragmites

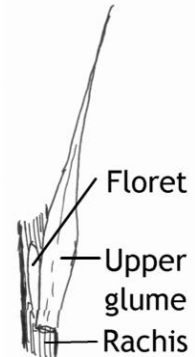
- 10. Spikelets with two or more bisexual florets, or if only one bisexual floret with sterile florets (empty lemmas) above it go to 11
 Spikelets with one bisexual floret, with no sterile florets above it go to 21



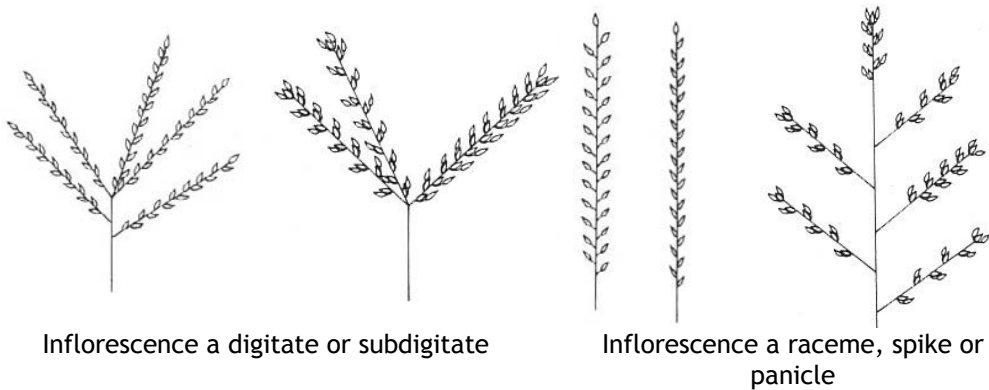
Spikelets with two or more bisexual florets, or if one bisexual floret with sterile florets above it



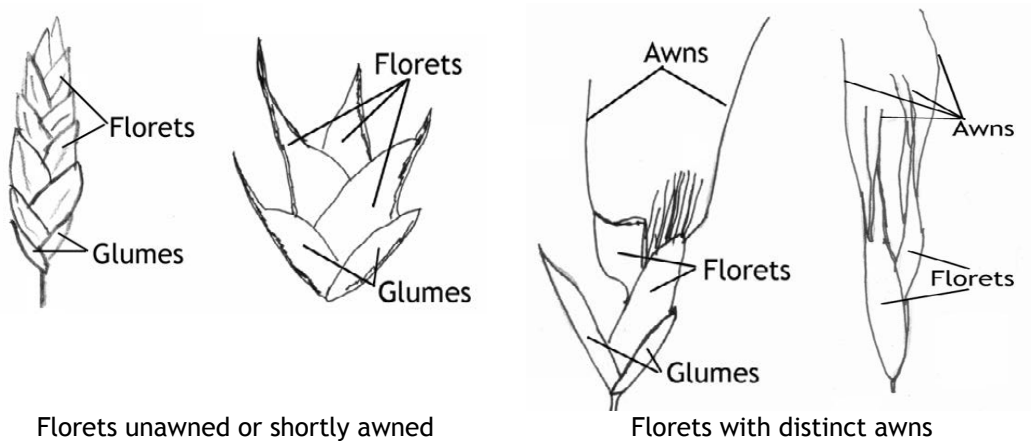
Spikelets with one bisexual floret



11. Inflorescence digitate or subdigitate..... go to 12
 Inflorescence a raceme, spike or panicle go to 16

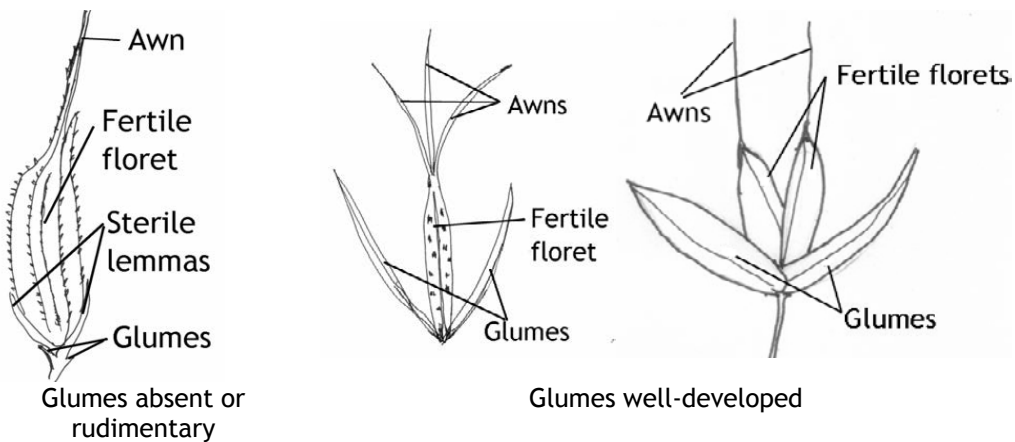


12. Florets unawned or shortly awned..... go to 13
 Florets with distinct awns..... go to 14

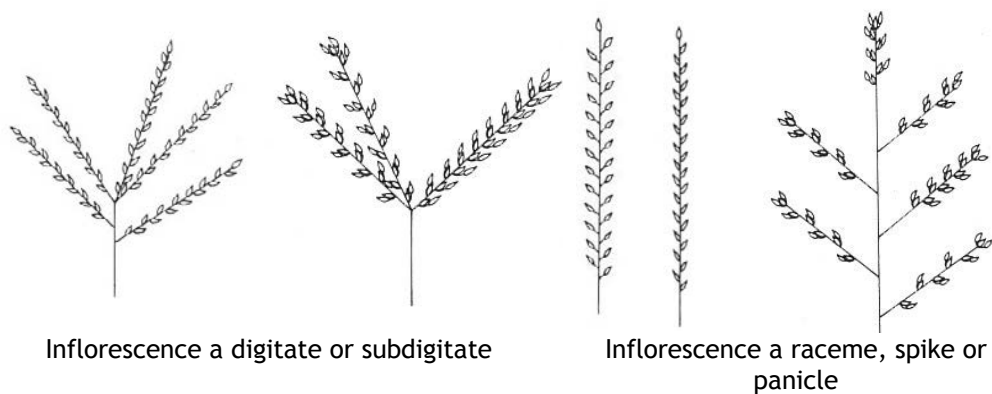


13. Axis of each inflorescence branch ending in a bristle; spikelet-bearing axis disarticulating **DACTYLOCTENIUM** (p42)
 Axis of each inflorescence branch ending in a spikelet; spikelet-bearing axis not disarticulating..... **ELEUSINE** (p47)
14. Lowest lemma dorsally compressed (lying on front or back when placed on a flat surface)..... **ENTEROPOGON** (p51)
 Lowest lemma laterally compressed (lying on the side when placed on a flat surface)..... go to 15
15. Lemmas very broad, wing-like **OXYCHLORIS** (p72)
 Lemmas not very broad, not wing-like..... **CHLORIS** (p37)
16. Spikelets awned go to 17
 Spikelets unawned go to 19
17. Inflorescence an interrupted spicate panicle **ELYTROPHORUS** (p49)
 Inflorescence an open or contracted panicle go to 18
18. Inflorescence a contracted panicle; spikelets with one or two basal bisexual flowers, with male or empty lemmas above them, the upper lemmas reduced to awns **ECTROSIA** (p46)
 Inflorescence an open panicle, spikelets with two bisexual florets only..... **ERACHNE** (p54)

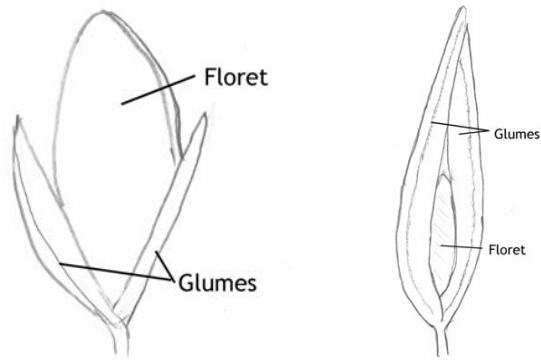
- 19. Inflorescence a once-branched open panicle (a panicle of racemes);
lemmas notched, toothed or lobed..... **LEPTOCHLOA (p64)**
Inflorescence a panicle with secondary branches; lemmas entire go to 20
- 20. Spikelets with two bisexual florets **ERIACHNE (p54)**
Spikelets with three or more bisexual florets **ERAGROSTIS (p52)**
- 21. Spikelets awned go to 22
Spikelets unawned go to 25
- 22. Inflorescence unbranched - a spike or raceme**PEROTIS p(76)**
Inflorescence branched - an open or contracted panicle go to 23
- 23. Glumes absent or rudimentary**ORYZA (p71)**
Glumes well-developed go to 24



- 24. Lemma with a 3-branched awn (very rarely 1-branched); spikelets with one floret**ARISTIDA (p26)**
Lemma with a single awn; spikelets with 2 florets (very rarely 1) **ERIACHNE (p54)**
- 25. Inflorescence digitate go to 26
Inflorescence a spike or raceme or an open or contracted panicle go to 27



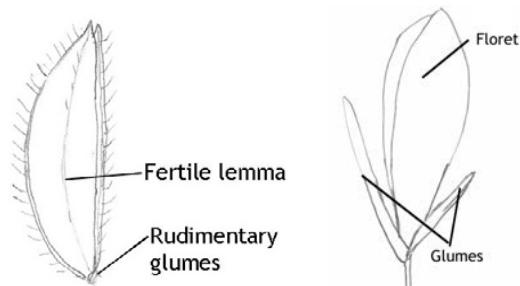
26. Glumes shorter than floret **CYNODON (p41)**
 Glumes longer than floret..... **BRACHYACHNE (p33)**



Glumes shorter than floret Glumes longer than floret

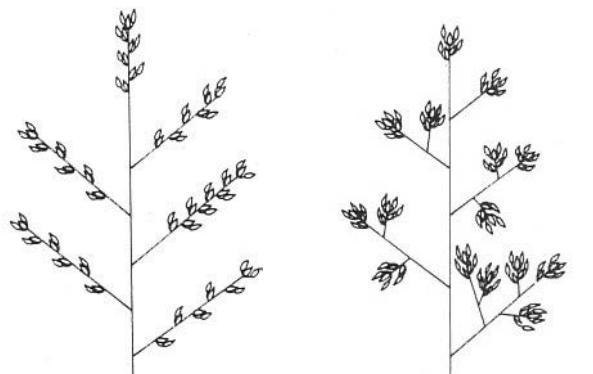
27. Inflorescence a single raceme; mat-forming plant used as an ornamental grass **ZOYSIA (p95)**
 Inflorescence an open or contracted panicle; tufted grass..... go to 28

28. Glumes absent or rudimentary **LEERSIA (p63)**
 Glumes well developed..... go to 29



Glumes absent or rudimentary Glumes well-developed

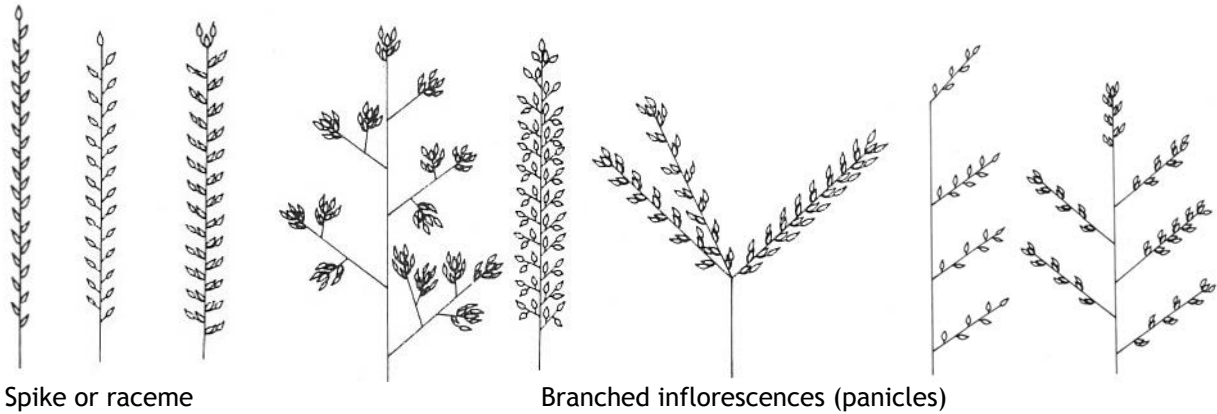
29. Inflorescence a one-branched panicle **LEPTOCHLOA (p64)**
 Inflorescence a panicle with secondary branches, open or contracted **SPOROBOLUS (p87)**



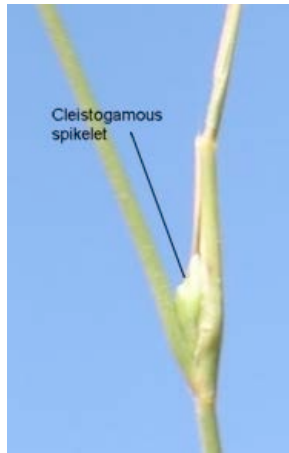
Inflorescence once-branched Inflorescence with secondary branches

PANICOID GENERA (subfamily PANICOIDEAE)

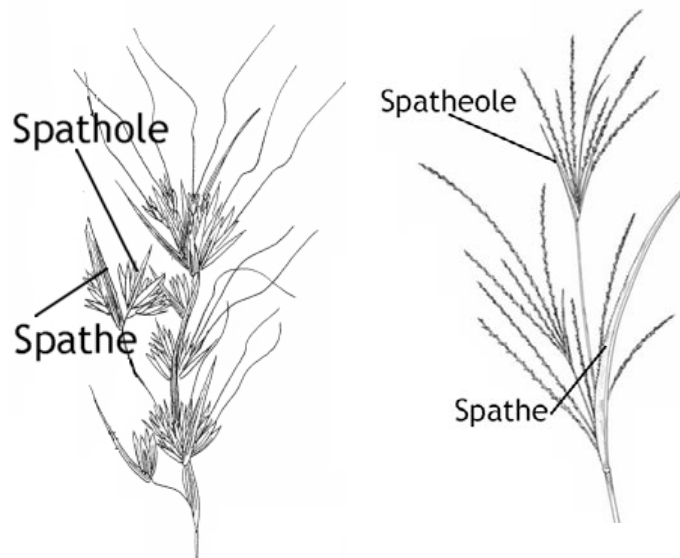
30. Inflorescence a raceme or spike (unbranched) go to 31
 Inflorescence with branches (panicle) go to 43



31. Leaves when crushed, are lemon-scented; lower glume of sessile spikelet 2-toothed **ELIONURUS (p48)**
 Leaves when crushed, NOT lemon scented; lower glume of sessile spikelet entire or notched .. go to 32
32. Spikelets sessile distinctly awned..... go to 33
 All spikelets not distinctly awned..... go to 36
33. Awns more than 4.5 cm long, intertwined with other awns at maturity **HETEROPOGON (p58)**
 Awns less than 4.5 cm long, not intertwined with other awns at maturity..... go to 34
34. Annual; inflorescence usually subtended by a leaf-like bract; spikelets usually covered with long, silky white hairs **SCHIZACHYRIUM (p82)**
 Perennial; inflorescence not subtended by a leaf-like bract; spikelets glabrous or covered with short white hairs go to 35
35. Lower glume of pedicelled spikelet slightly asymmetrical and strongly nerved; pedicels and internodes of the inflorescence densely bearded with white hairs **SEHIMA (p83)**
 Lower glume of pedicelled spikelet not asymmetrical and faintly nerved; pedicels and internodes of the inflorescence not bearded with white hairs **DICHANTHIUM (p43)**
36. Creeping or prostrate grass go to 37
 Tufted erect or semi-erect grass go to 39
37. Raceme subtended by a spathe (leaf-like bract); growing on sandy beaches **THUAREA (p90)**
 Raceme not subtended by a spathe; growing on a range of soils..... go to 38
38. Leaves broad, 4-10 mm wide, cultivated grass **STENOTAPHRUM (p88)**
 Leaves narrow 2-4 mm wide, uncultivated grass..... **HEMARTHRIA (p57)**
39. Raceme or spike with 2-6 spikelets; with a single cleistogamous spikelet in the axils **CLEISTOCHLOA (p39)**
 Raceme or spike with more than 6 spikelets, no axillary spikelets present go to 40



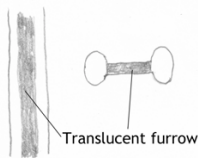
- 40. Sessile spikelets with curved spines on the lower margin **EREMOCHLOA (p53)**
 Spikelets with no spines on the margin go to 41
- 41. Raceme or spike partly or wholly enclosed by a leaf-like bract at the base **MNESITHEA (p68)**
 Raceme or spike not subtended by a leaf-like bract, spikelets fully exposed..... go to 42
- 42. Spikelets solitary; inflorescence branches ending in a bristle **PASPALIDIUM (p74)**
 Spikelets in pairs; inflorescence branch ending in a spikelet **HEMARTHRIA (p57)**
- 43. Inflorescence a spatheate panicle (leaf-like bracts arranged throughout the panicle)..... go to 44
 Inflorescence not a spatheate panicle go to 48



Spatheate panicles

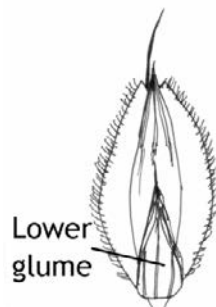
- 44. Leaves lemon-scented when crushed **CYMBOPOGON (p40)**
 Leaves not lemon-scented when crushed go to 45
- 45. Fertile spikelets within an involucre of four male or barren spikelets **THEMEDA (p89)**
 Fertile spikelets without an involucre of spikelets go to 46
- 46. Sessile spikelet awned; spikelets are covered with red hairs **HYPARRHENIA (p60)**
 Sessile spikelet awned; spikelets are covered with white or brown hairs **ANDROPOGON (p96)**
 All spikelets awnless go to 47

- 47. Spikelets in opposite neat rows on axis; spikelets often stick out at maturity..... **OPHIUROS (p69)**
Spikelets on one side of axis; spikelets erect at maturity**MNESITHEA (p68)**
- 48. Inflorescence a digitate or subdigitate panicle..... go to 49
Inflorescence an open or contracted panicle go to 57
- 49. Pedicelled spikelet distinctly awned (awn more than 3 mm long) go to 50
All spikelets awnless or shortly awned (awn 3 mm or less long)..... go to 54
- 50. Racemes 2, appressed and interlocking and only separating at maturity;
pedicels swollen **ISCHAEMUM (p62)**
Racemes 2 or more, always separate; pedicels not swollen go to 51
- 51. Delicate annual; awns intertwining at maturity; all spikelets very small, 1.5-2.5 mm long
..... **PSEUDOPOGONATHERUM (p78)**
Perennial; awns not intertwining at maturity; sessile spikelets usually more than 3 mm long.... go to 52
- 52. Pedicels of spikelets and glumes with silky brown hairs **EULALIA (p56)**
Pedicels of spikelets and glumes glabrous or with white hairs go to 53
- 53. Rachis joints and pedicels with a translucent furrow between thickened margins **BOTHRIOCHLOA (p32)**
Rachis joints and pedicels without a translucent mid-line **DICHANTHIUM (p43)**



Pedicel

- 54. Lower glume 50-70% of spikelet length; spikelet shortly awned **ALLOTEROPSIS (p24)**
Lower glume less than 50% of spikelet length or absent ; spikelet awnless go to 56

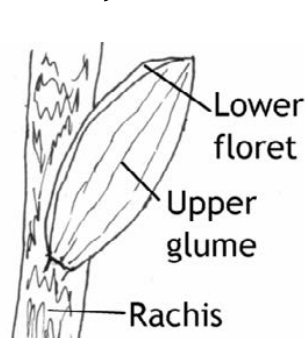


Lower glume 50-70% of spikelet length

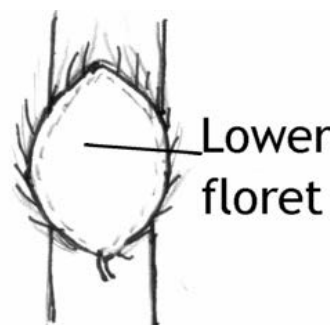


Lower glume less than 50% of spikelet length

- 55. Lower floret adjacent to the inflorescence axis **AXONOPUS (p31)**
Lower floret positioned away from the inflorescence axis go to 56

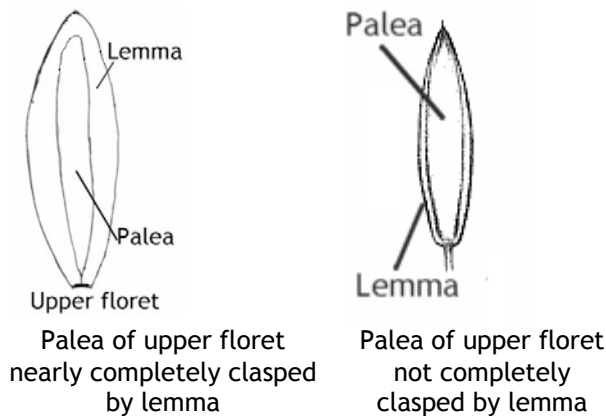


Lower floret adjacent to the inflorescence axis

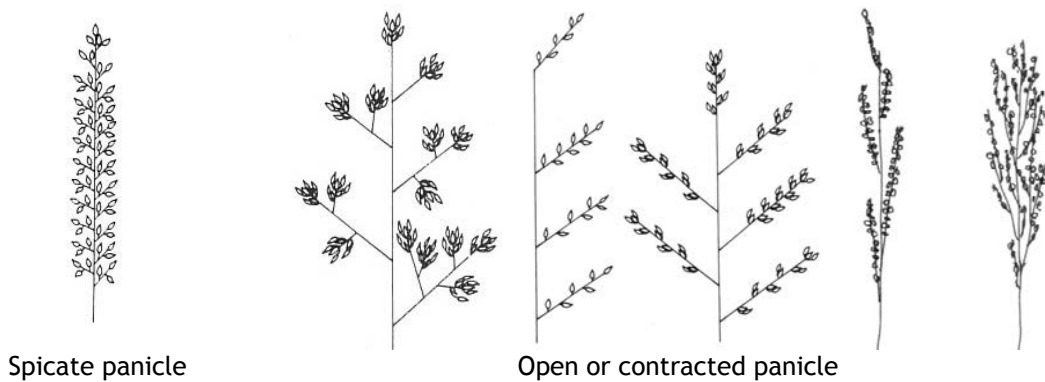


Lower floret positioned away from the inflorescence axis

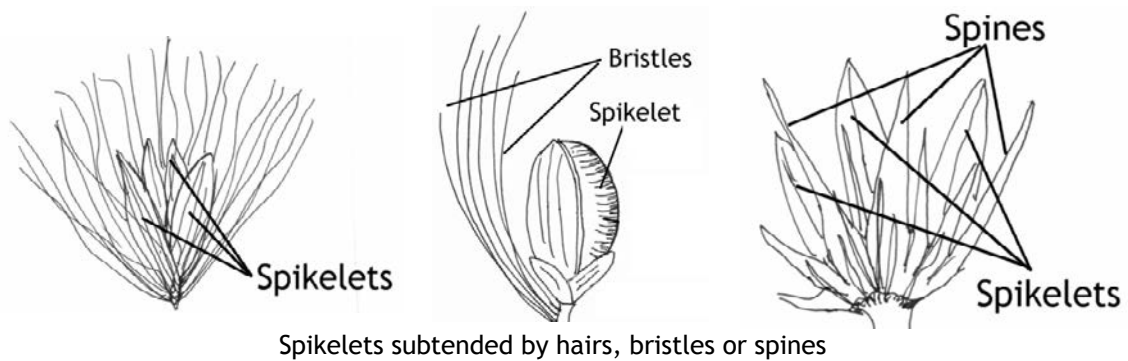
56. Palea of upper floret nearly completely clasped by lemma..... **DIGITARIA** (p44)
 Palea of upper floret not completely clasped by lemma**PASPALUM** (p75)



57. Inflorescence a spicate panicle, panicle branches short and often difficult to see)..... go to 58
 Inflorescence an open or contracted, panicle branches obvious, sometimes appressed to main axis
 go to 62

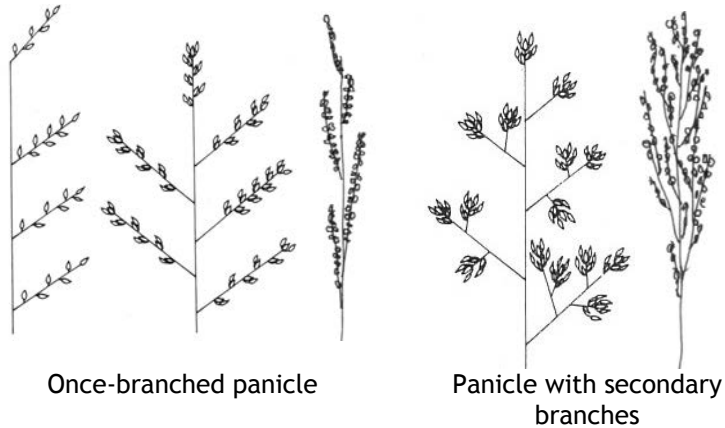


58. Spikelets covered in long, white hairs giving the inflorescence a fluffy appearance **IMPERATA** (p61)
 Spikelets not covered in long, white hairs; inflorescence not fluffy..... go to 59
59. Spikelets subtended by hairs, bristles or spines..... go to 60
 Spikelets not subtended by hairs, bristles or spines..... go to 61

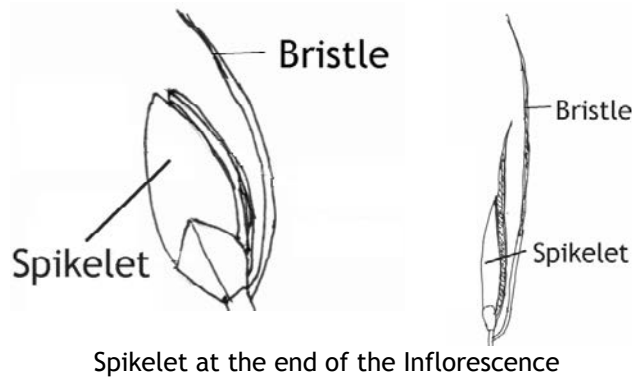


60. Spikelets falling at maturity without any bristles or spines attached.....**SETARIA** (p84)
 Spikelets falling at maturity with bristles or spines attached.....**CENCHRUS** (p35)

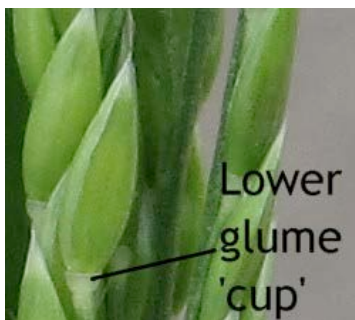
- 61. Annual 10-60 cm tall; inflorescence 1-13 cm long; spikelets hump-backed **SACCIOLEPIS** (p80)
 Aquatic perennial 50-350 cm tall; inflorescence 8-50 cm long; spikelets not hump-backed
 **HYMENACHNE** (p59)
- 62. Upper glume and lower lemma with hooked hairs **ANCISTRACHNE** (p25)
 Upper glume and lower lemma without hooked hairs go to 63
- 63. Inflorescence a once-branched panicle go to 64
 Inflorescence with secondary branches go to 72



- 64. Inflorescence terminating in a bristle (inspect carefully since it looks similar to an awn) go to 65
 Inflorescence terminating in a spikelet go to 66

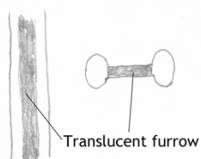


- 65. Upper lemma covered with wrinkles, as long as or longer than upper glume **PASPALIDIUM** (p74)
 Upper lemma smooth, shorter than upper glume **PSEUDORAPHIS** (p79)
- 66. Spikelet with a bead-like swelling at base (lower glume) **ERIOCHLOA** (p55)
 Spikelet without a bead-like swelling at base go to 67



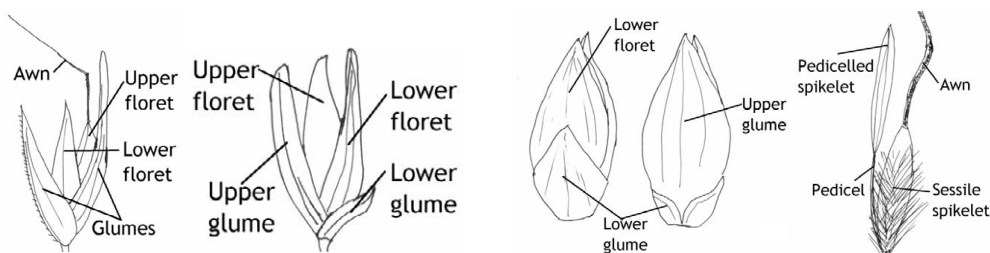
Bead-like swelling at the base of the spikelet

- 67. Spikelets distinctly awned go to 68
Spikelets awnless or mucronate..... go to 69
- 68. Glumes more or less equal and similar; decumbent grass of shaded habitats **OPLISMENUS (p70)**
Glumes very unequal and dissimilar; erect grass of wet habitats..... **ECHINOCHLOA (p45)**
- 69. Ligule absent; glumes very unequal; palea tip reflexed **ECHINOCHLOA (p45)**
Ligule present..... go to 70
- 70. Palea of upper floret completely clasped by lemma (or nearly so) **DIGITARIA (p44)**
Palea of upper floret not completely clasped by lemma..... go to 71
- 71. Lower glume present **UROCHLOA (p92)**
Lower glume absent or very much reduced..... **PASPALUM (p75)**
- 72. Inflorescence purple or red, fading to white; spikelets with awns arising from between apical lobes of upper glume and lower lemma, sometimes not obvious if spikelet covered in long hairs . **MELINIS (p67)**
Inflorescence various colours; spikelets awnless or with awn arising terminally from lemmas or glumes go to 73
- 73. Spikelets in pairs or triplets, sessile spikelet awned go to 74
Spikelets solitary or paired, awnless go to 79
- 74. Inflorescence with sweet, spicy smell when crushed; pedicels with a translucent furrow between thickened margins..... **CAPILLIPEDIUM (p34)**
Inflorescence without distinctive smell; pedicels without a translucent furrow go to 75



Pedicel

- 75. Spikelets laterally compressed go to 76
Spikelets dorsally compressed go to 77



Spikelets laterally compressed (glumes and lemmas folded or rounded)

Spikelets dorsally compressed (glumes and lemmas flat)

- 76. Spikelets all alike; spikelets breaking above glumes **ARUNDINELLA (p29)**
Pedicelled spikelets different to sessile spikelets; spikelets breaking up in spikelet pairs or triplets **CHRYSOPOGON (p38)**
- 77. Pedicelled spikelets reduced to narrow, linear glumes **VACOPARIS (p93)**
Pedicelled spikelets usually well developed go to 78

- 78. Lemma awns of sessile spikelet absent or 1-1.5 cm long if present **SORGHUM (p85)**
 Lemma awns of sessile spikelet 2-9 cm long **SARGA (p81)**
- 79. Spikelets dorsally compressed go to 80
 Spikelets laterally compressed go to 83
- 80. Panicle contracted, spikelets very closed packed go to 81
 Panicle open, spikelets widely spaced go to 82



Contracted panicle; spikelets closely packed

Open panicle; spikelets widely spaced

- 81. Spikelets hairy (sugar cane) **SACCHARUM**
 Spikelets not hairy **SORGHUM (p85)**
- 82. Fertile lemma smooth **PANICUM (p73)**
 Fertile lemma rugose (wrinkled) **MEGATHYRSUS (p66)**
- 83. Robust perennial 1.5-2 m tall; inflorescence purplish (Vetiver Grass) **CHRYSOPOGON (p38)**
 Annual or weak perennial 15-110 cm tall; inflorescence green go to 84
- 84. Plant 45-110 cm tall; grows on sandy, alluvial soils; inflorescence open or contracted, branches persistent **WHITEOCHLOA (p94)**
 Plant 17-60 cm; grows on rocky hillsides; inflorescence open; branches deciduous
 **ARTHROGROSTIS (p28)**

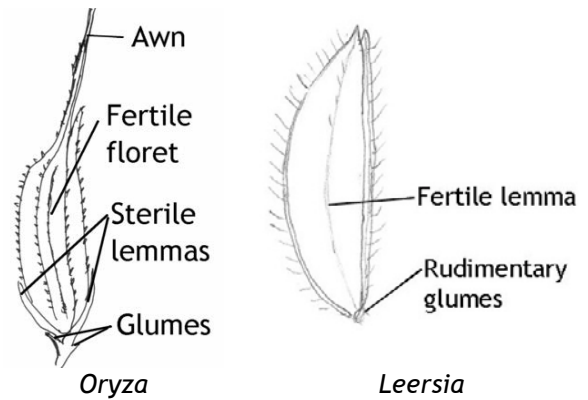
Subfamilies and Tribes of Grasses (excluding bamboos) in Townsville

There are 13 subfamilies in Poaceae. The grasses found in Townsville are represented in 6 subfamilies, the largest of which is the subfamily Panicoideae. The spikelet drawings refer to species in Townsville.

Ehrhartoideae

Tribe Oryzeae

1. Spikelets without glumes or glumes rudimentary.
 2. Spikelets one-flowered or three-flowered with the two lower florets reduced to sterile lemmas
 3. Aquatic or wetland grasses
 4. Disarticulation at the base of the lemmas
- Townsville Genera: *Leersia* (A=6 or 1-3), *Oryza* (A=6)

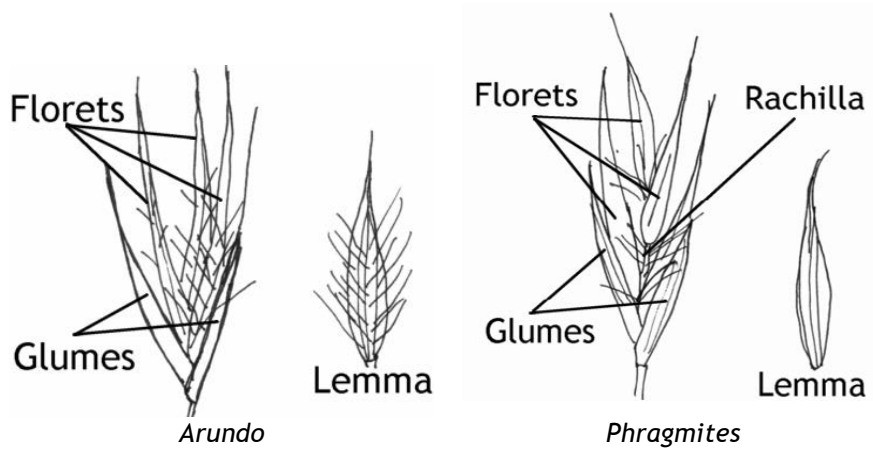


Arundinoideae

1. Common members of this taxa are robust, “reed-like” grasses with plumose panicles
2. Stems usually hollow
3. Disarticulation above the glumes and between the florets

Tribe Arundineae

Townsville Genera: *Arundo*, *Phragmites*

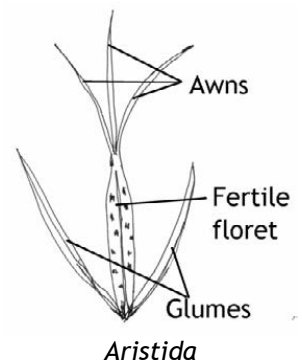


Aristidoideae

Tribe Aristideae

1. Spikelets with a single floret
2. Lemma with a 3-branched awn at the apex (though the 2 lateral awns may be reduced)
3. Callus of lemma well developed
4. Ligule a fringed-membrane or a fringe of hairs
5. Disarticulation above the glumes

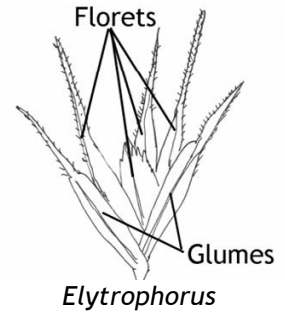
Townsville Genera: *Aristida*



Danthonioideae

1. Spikelets with multiple florets
2. Lemmas bifid at apex, an awn emerging from between the lobes
3. Glume usually \pm equal and as long as column of florets
4. Ligule of hairs
5. Disarticulation above the glumes and between the florets

Townsville Genera: *Elytrophorus*

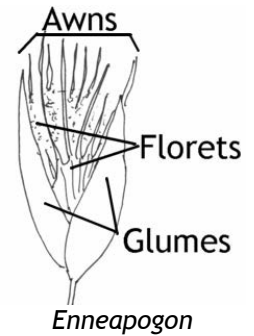


Chloridoideae

Tribe Pappophoreae

1. Lemmas with 5-13 veins, all of which extend into apical awns
2. Ligule a fringe of hairs
3. Spikelets with 3 or more florets
4. Disarticulation above the glumes but not between the florets

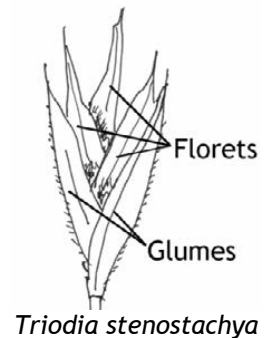
Townsville Genera: *Enneapogon*



Tribe Triodieae

1. Spikelets with one or more florets
2. Lemmas rounded on back, with 3-9 nerves
3. Leaf blades rigid, needle-like

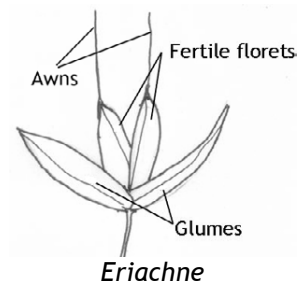
Townsville Genera: *Triodia*



Tribe Eriachneae

1. Spikelets usually with two bisexual florets, awned or unawned

Townsville Genera: *Eriachne*



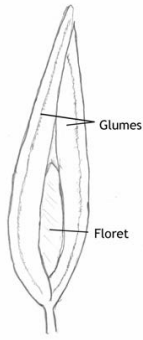
Tribe Cynodontae

Most members of the tribe possess 2 or more of the following characteristics:

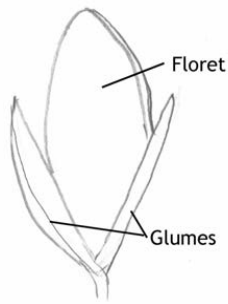
1. Laterally compressed spikelets
2. Lemmas with 1-3 veins or 7-13 veins
3. Spike-like branches of the inflorescence
4. Coarse hairs near the junction of the sheath and blade
5. Disarticulation variable (e.g. beneath fertile florets, beneath the glumes, at base of branches)

Townsville Genera: *Brachyachne*, *Chloris*, *Cynodon*, *Dactyloctenium*, *Ectrosia*, *Eleusine*, *Enteropogon*, *Eragrostis*, *Leptochloa*, *Lepturus*, *Oxychloris*, *Perotis*, *Sporobolus*, *Zoysia*.

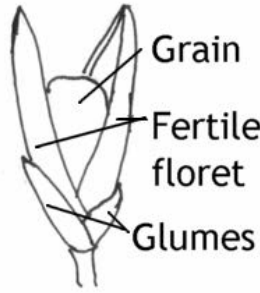
Cynodonteae spikelets



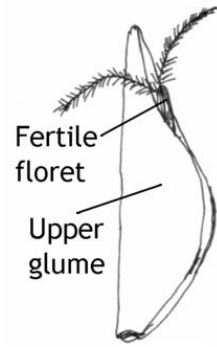
Brachyachne



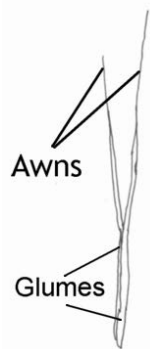
Cynodon



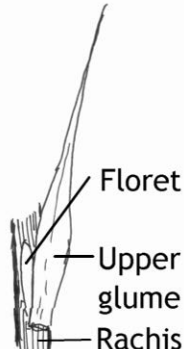
Sporobolus



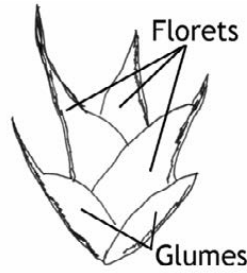
Zoysia



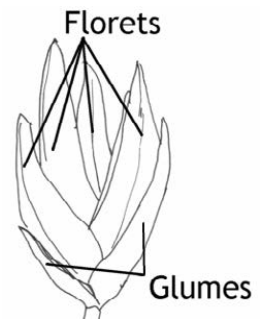
Perotis



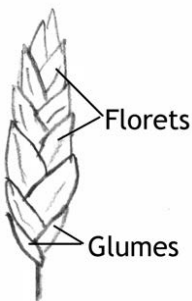
Lepturus



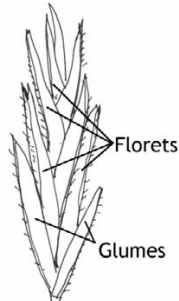
Dactyloctenium



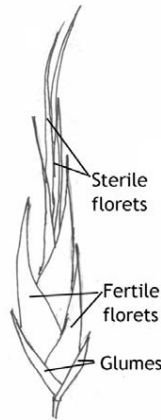
Eleusine



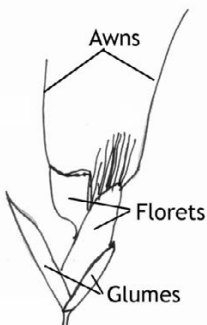
Eragrostis



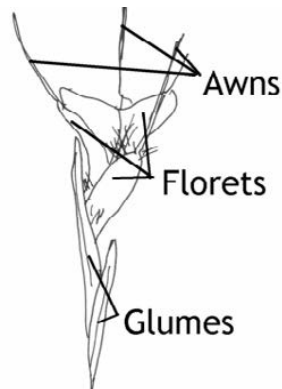
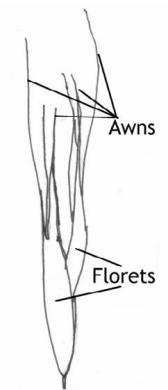
Leptochloa



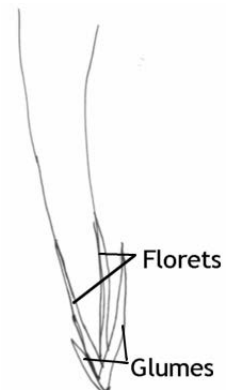
Ectrosia



Chloris



Oxychloris



Enteropogon

Panicoideae

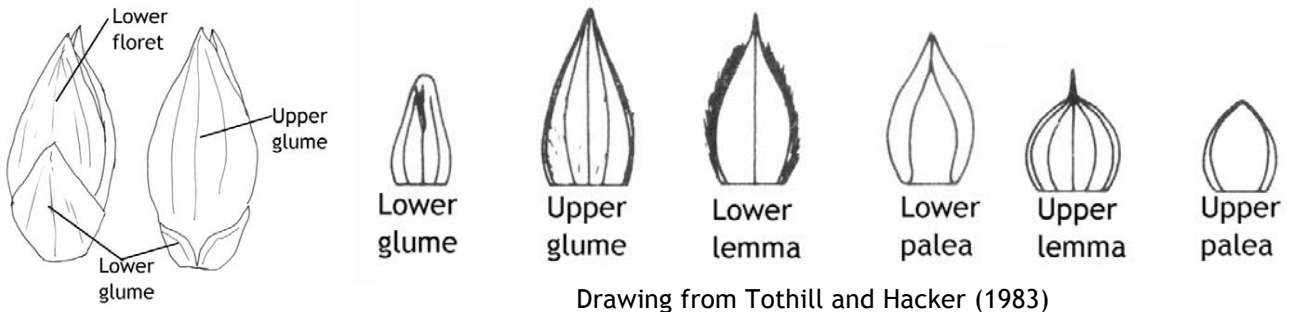
The special feature of this subfamily is the two-flowered spikelet with the lower floret male or barren, and the upper floret bisexual or female.

Of the 71 genera found in Townsville, 48 belong in this subfamily. The three tribes represented are Paniceae 24 genera, Andropogoneae 23 genera and Arundinella 1 genus.

Tribe Paniceae

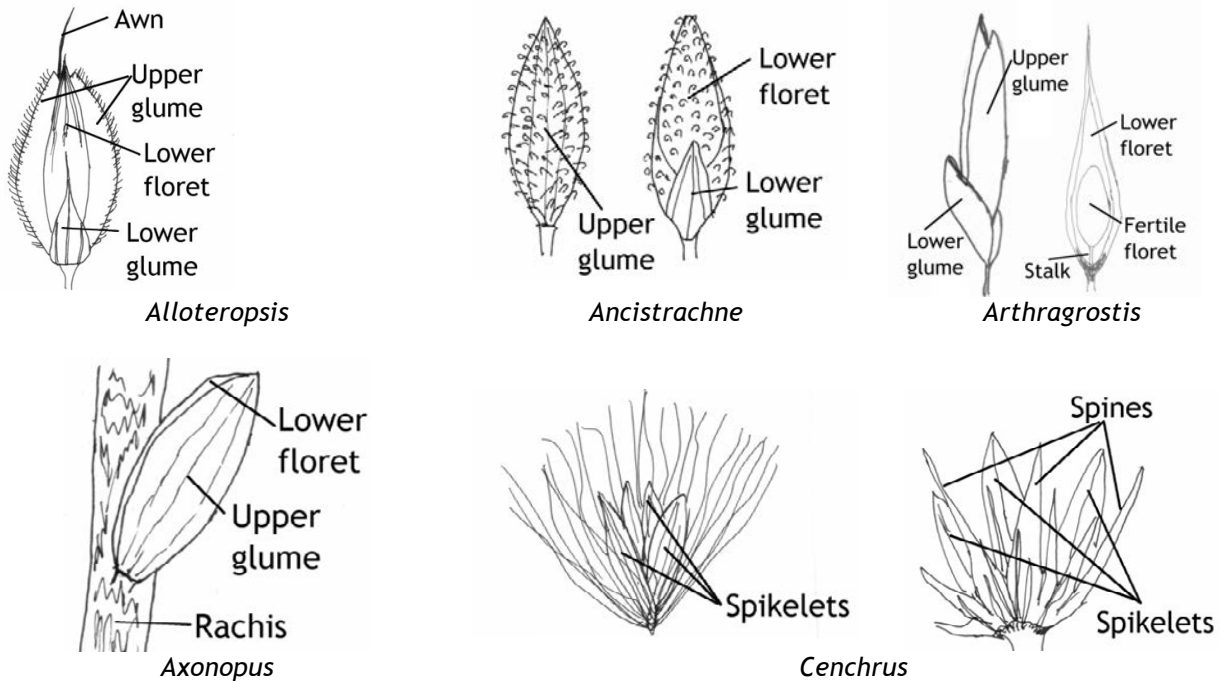
1. Spikelets 2-flowered, the lower floret sterile or male
2. Spikelets usually all alike
3. Disarticulation below the glumes
4. The lower glume is usually small or absent
5. The upper glume usually resembles the lemma of the lower floret
6. Upper lemma and palea of spikelet usually indurate (hardened)
7. Inflorescence usually a panicle (branched)

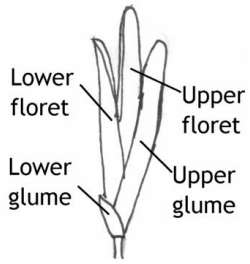
Paniceae spikelet



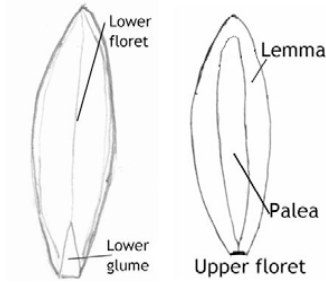
Townsville Genera: *Alloteropsis*, *Ancistrachne*, *Arthragrostis*, *Axonopus*, *Cenchrus* (*Pennisetum*), *Cleistochloa*, *Digitaria*, *Echinochloa*, *Eriochloa*, *Hymenachne*, *Megathyrsus*, *Melinis*, *Oplismenus*, *Panicum*, *Paspalidium*, *Paspalum*, *Pseudoraphis*, *Sacciolepis*, *Setaria*, *Spinifex*, *Stenotaphrum*, *Thuarea*, *Urochloa* (*Brachiaria*), *Whiteochloa*.

Panicoideae spikelets

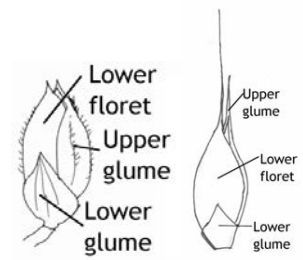




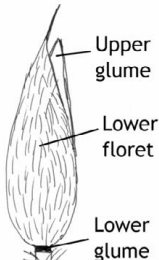
Cleistochloa



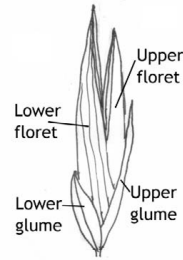
Digitaria



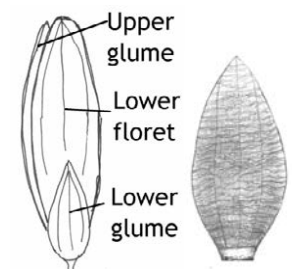
Echinochloa



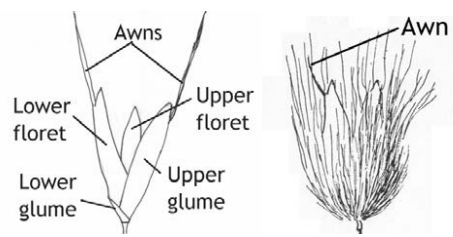
Eriochloa



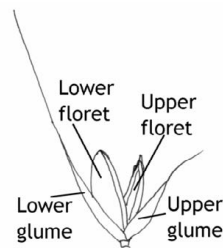
Hymenachne



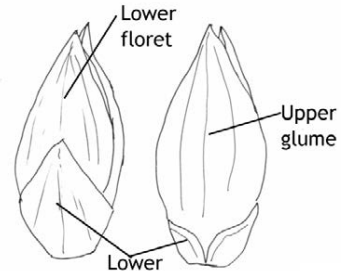
Megathyrsus



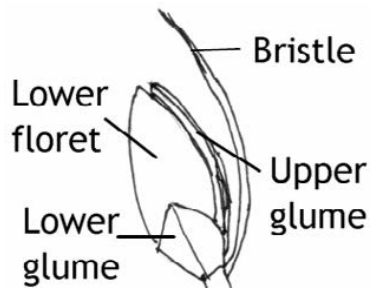
Melinis



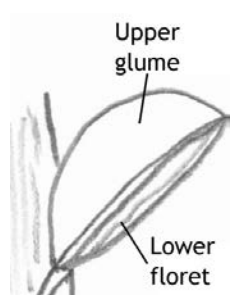
Optismenus



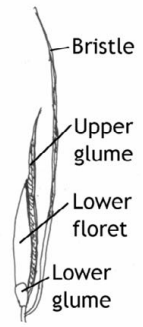
Panicum



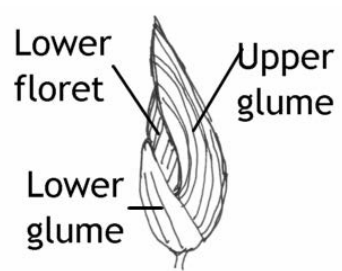
Paspalidium



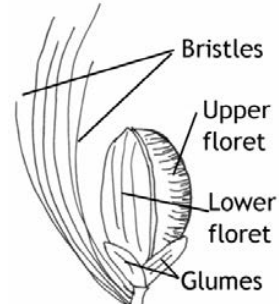
Paspalum



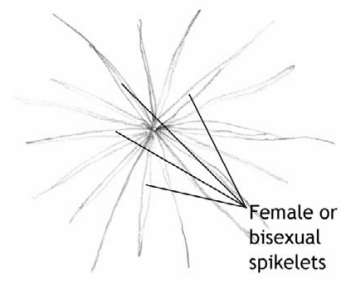
Pseudoraphis



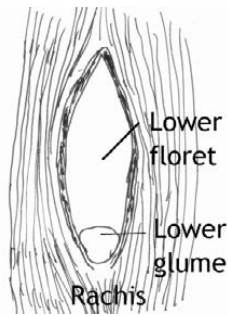
Sacciolepis



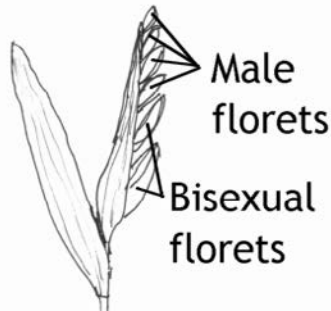
Setaria



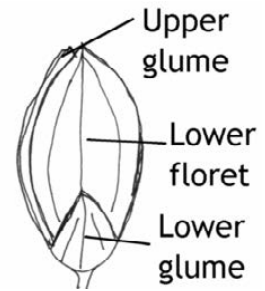
Spinifex



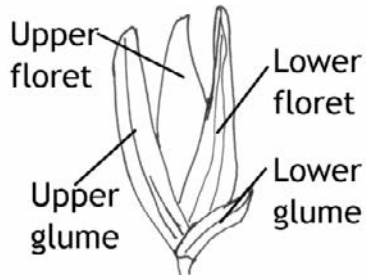
Stenotaphrum



Thuarea



Urochloa

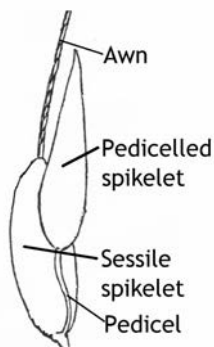


Whiteochloa

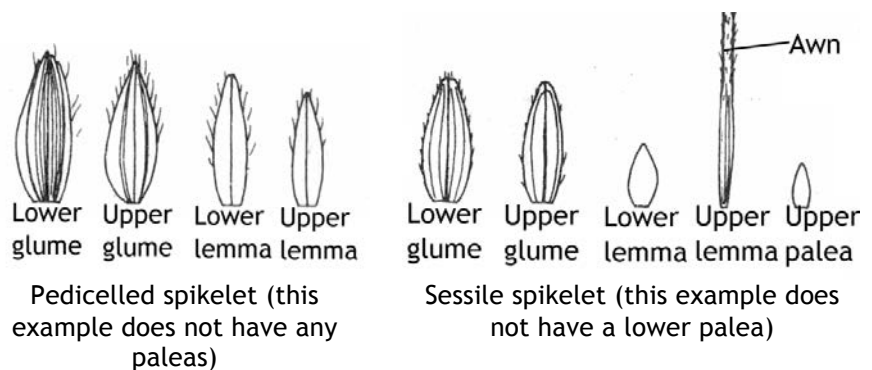
Tribe Andropogoneae

1. Spikelets 2-flowered, the lower floret sterile or male
2. Spikelets usually paired, one sessile the other pedicelled, usually dissimilar
3. Disarticulation usually in the branch axes beneath the sessile or short-pedicelled spikelet
4. Both glumes usually concealing the florets
5. Upper lemma and palea of spikelet usually of weak texture
6. Inflorescence a collection of rames (a series of paired spikelets, one sessile and one pedicellate)

Andropogoneae spikelets



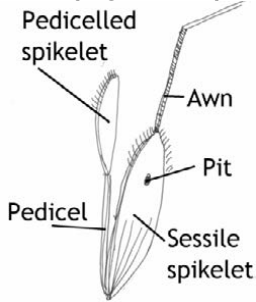
Spikelet pair, many of the genera have a triplet of spikelets (2 pedicelled and 1 sessile) at the end of the branches



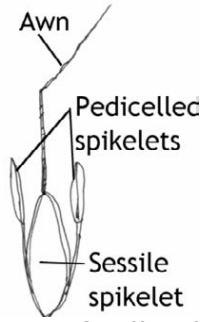
Drawings from Tothill and Hacker (1983)

Townsville Genera: *Bothriochloa*, *Capillipedium*, *Chionachne*, *Chrysopogon*, *Cymbopogon*, *Dichanthium*, *Elionurus*, *Eremochloa*, *Eulalia*, *Hemarthria*, *Heteropogon*, *Hyparrhenia*, *Imperata*, *Ischaemum*, *Mnesithea*, *Ophiuros*, *Pseudopogonatherum*, *Sarga*, *Schizachyrium*, *Sehima*, *Sorghum*, *Themeda*, *Vacoparis*.

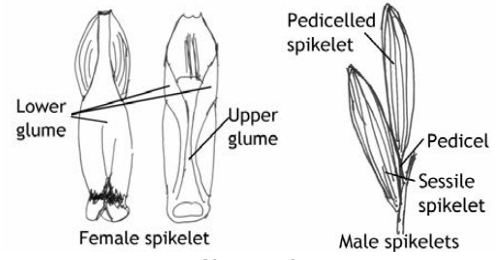
Andropogoneae spikelets



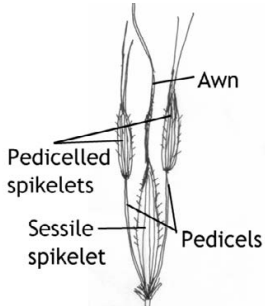
Bothriochloa



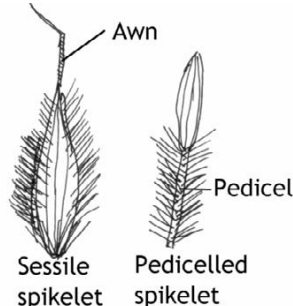
Capillipedium



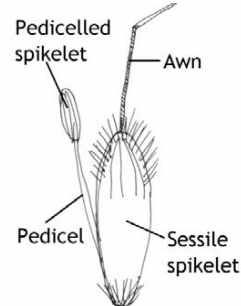
Chionachne



Chrysopogon



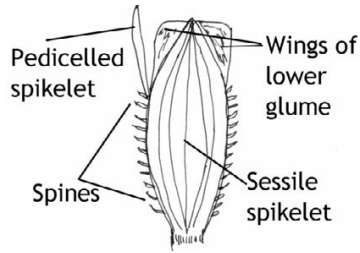
Cymbopogon



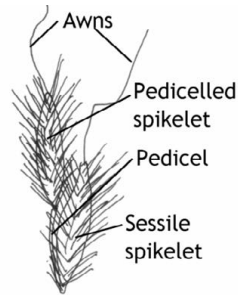
Dichanthium



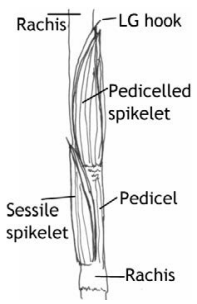
Elionurus



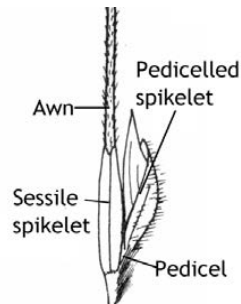
Eremochloa



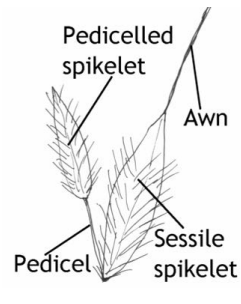
Eulalia



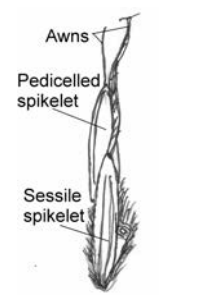
Hemarthria



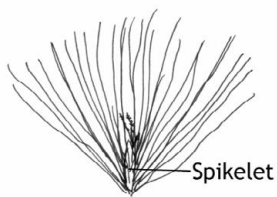
Heteropogon



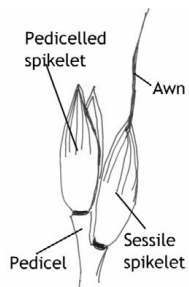
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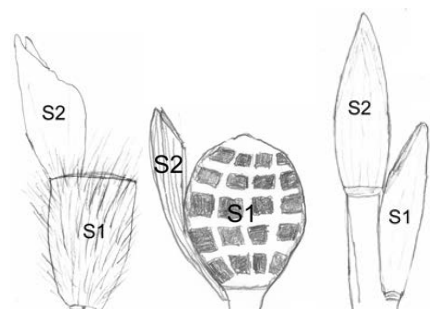
Andropogon



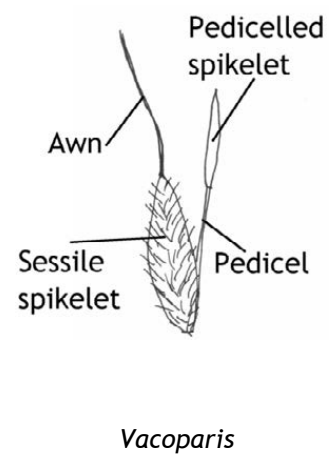
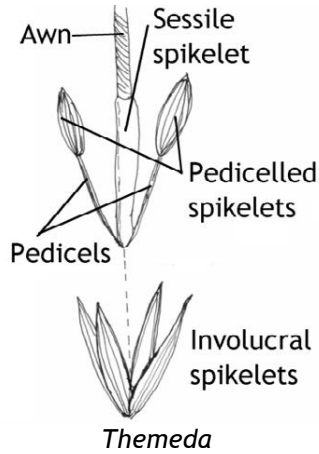
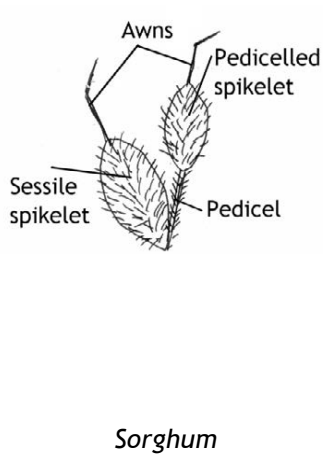
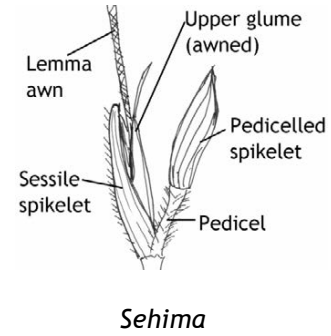
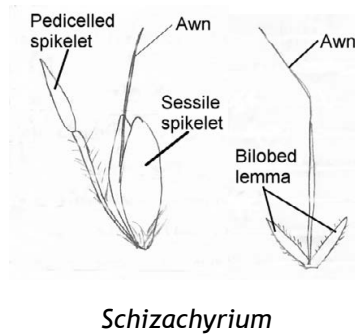
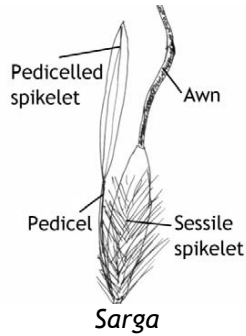
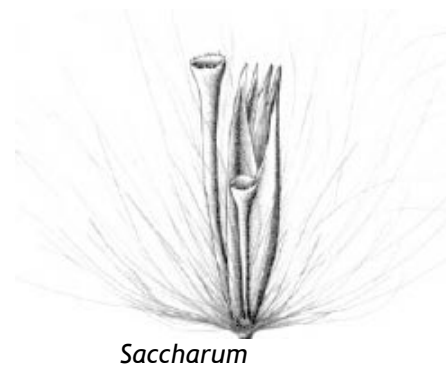
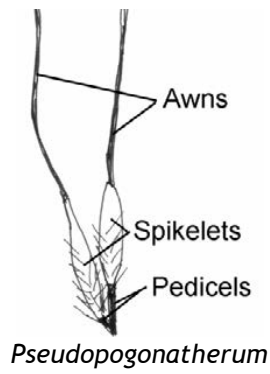
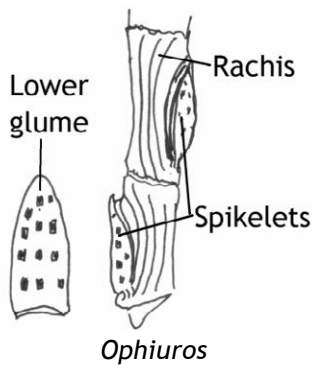
Imperata



Ischaemum

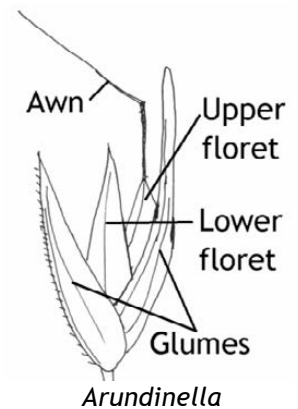


Mnesithea (S1= sessile spikelet, S2= pedicelled spikelet)



Tribe Arundinelleae

1. Spikelets 2-flowered, the lower floret sterile or male
 2. Spikelets usually not paired, all alike
 3. Disarticulation above the glumes, persistent
 4. Glumes usually unequal, the upper exceeding the florets
 5. Upper floret awned from sinus (a notch or depression in the apex)
 6. Inflorescence a panicle (branched)
- Townsville Genera: *Arundinella*



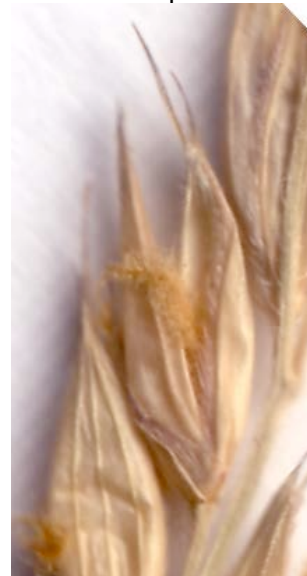
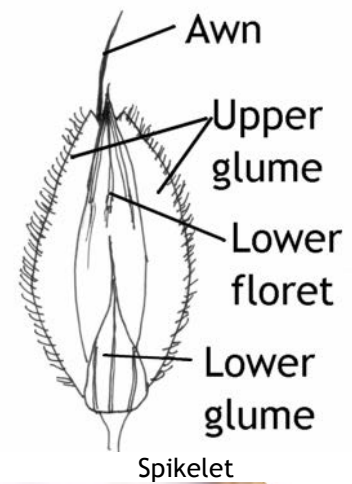
Alloteropsis

Cockatoo Grasses

Alloteropsis is from the Greek *allos* (belonging to another) and *opsis* (appearance), the spikelets and inflorescences somewhat resemble another genus of grass.

Tufted perennials or annuals, culms erect or decumbent. The inflorescence is digitate and the spikelets are usually paired and usually awned. The glumes are unequal, the lower glume 50-75% of the spikelet, the upper glume as long as the spikelet and densely hairy along the marginal nerves. The lower glume is shorter than the spikelet.

Subfamily: Panicoideae; Tribe: Paniceae
Species: World = 5-8, Australia = 2



Townsville species
Alloteropsis cimicina
Alloteropsis semialata



Inflorescence

Ancistrachne

From Greek *ankistron* (fish-hook) and *achne* (glume), referring to the often hooked hairs on the spikelet.

Tufted or scrambling perennial with wiry culms, leaves cauline (growing on stems) and usually less than 10 cm long. The inflorescence is a depauperate panicle or a single raceme. The spikelets (upper glume and lower lemma) are covered with hooked or curved spines or hairs.

Subfamily: Panicoideae; Tribe: Paniceae

Species: World = 4, Australia = 2

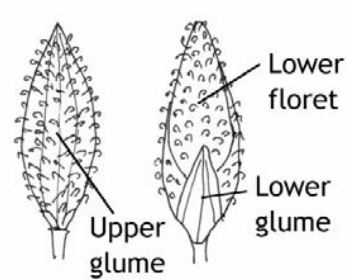
Ancistrachne uncinulata is the only Queensland species from this genus; *uncinulata* - from the Latin *uncinulus* (small hook) and *-ata* (possessing), referring to the hooked hairs on the upper glume and lower lemma.

Ancistrachne uncinulata (Hooky Grass)

A rather shrubby perennial grass, 30-200 m tall, erect or spreading. The inflorescence is a narrow panicle 2-14 cm long with few spikelets. The rigid, hooked spines on the spikelets make it a distinctive although uncommon species in Townsville. Usually grows on sandstone soils.



Spikelets



Inflorescence

Aristida

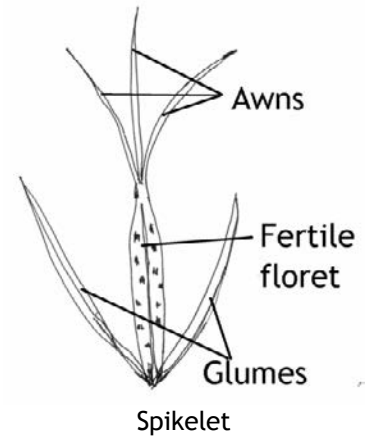
Wiregrasses or Kerosene or Threeawn Grasses

From Latin *arista* (awn or beard of a grain), alluding to the awned lemma.

Tufted annuals or perennials, usually with slender wiry stems. The inflorescence is a contracted or open panicle. The spikelets solitary. The genus is easily recognised by the lemma awns which are usually 3-branched. The callus (the hard, usually pointed base of the spikelet) is usually sharp and can become embedded into clothing. The glumes remain on the inflorescence after the mature seed falls.

Australian species of *Aristida* usually grow on poor sandy and red soils, although there are a few that prefer black soils and cracking clays.

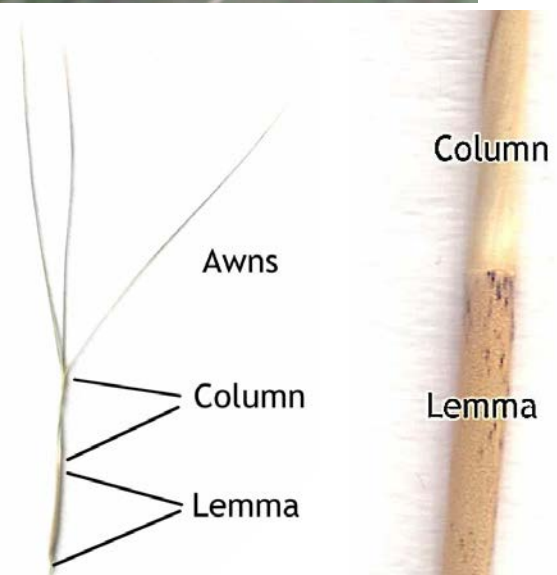
Subfamily: Aristidoideae; Tribe: Aristideae
 Species: World = 290, Australia = 59



Inflorescen

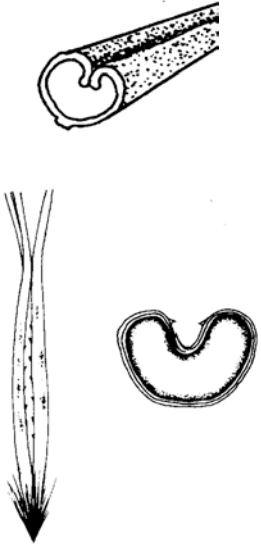
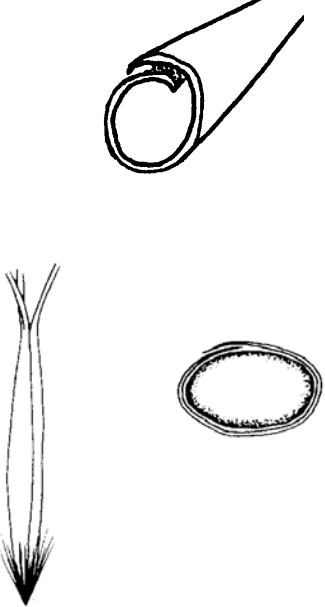
Townsville species

- Aristida acuta*
- Aristida calycina* var. *calycina*
- Aristida gracilipes*
- Aristida holathera* var. *holathera*
- Aristida latifolia*
- Aristida perniciosa*
- Aristida queenslandica* var. *dissimilis*
- Aristida queenslandica* var. *queenslandica*
- Aristida spuria*
- Aristida superpendens*
- Aristida utilis* var. *utilis*
- Aristida warburgii*



Parts of *Aristida* spikelet

Identifying *Aristida* species usually requires looking at the spikelets under magnification. The involute or convolute condition of the lemma, the presence or absence of a lemma awn column and the lengths of the lateral awn branches compared to the median awn branch are diagnostic features of *Aristida* species.

Involute lemma: with the margins rolled inwards on the upper surface but not overlapping, and with a furrow on the ventral surface of the caryopsis	Convolute lemma: rolled longitudinally with one edge inside the other
	
Drawings from (Tothill and Hacker 1983; Wheeler <i>et al.</i> 2002)	

References:

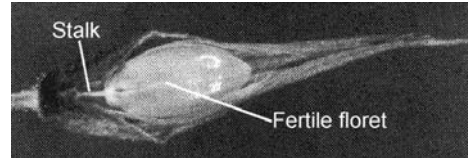
Tothill JC, Hacker JB (1983) 'The grasses of southern Queensland.' (University of Queensland Press: St Lucia)

Wheeler DJB, Jacobs SWL, Whalley RDB (2002) 'Grasses of New South Wales (Third Edition).' (University of New England: Armidale)

Arthragrostis

From Greek *arthron* (joint) and *agrostis* (grass), alluding to the disarticulation of the panicle into component parts.

Arthragrostis was segregated from a *Panicum* on the basis of a number of distinct morphological features. One of its diagnostic characters is the stalked fertile floret as per photograph to the right.



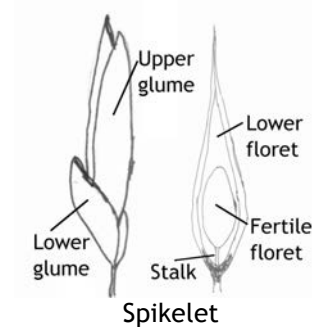
Spikelet with glumes removed, from (Lazarides 1984).

Tufted or decumbent annual grasses of open habitats. The inflorescence is an open panicle and spikelets solitary.

Subfamily: Panicoideae; Tribe: Paniceae.

Species: World = 3, Australia = 3

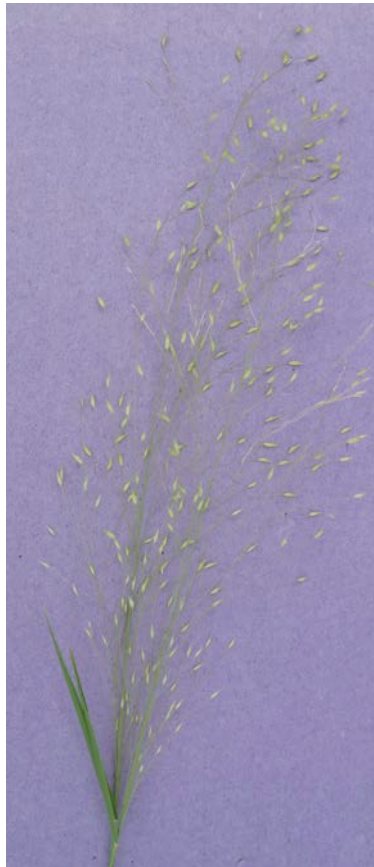
Arthragrostis deschampsioides is the only Townsville species from this genus; *deschampsioides* - name alluding to the similarity to the genus *Deschampsia*.



Arthragrostis deschampoides

Slender annual grass 17-60 cm tall. The inflorescence is 5-25 cm long by 1-5 cm wide. An uncommon species. Around Townsville it grows on rocky hillsides e.g. Castle Hill and Many Peaks Range.

This species could be confused with *Panicum* and *Whiteochloa*.



Inflorescence



Spikelets

References

Lazarides M (1984) New taxa of tropical Australian grasses (Poaceae). *Nuytsia* 5, 273-303.

Arundinella

Reed Grasses

From the Latin *arundo* (a reed) and *-ella* (diminutive suffix).

Tufted annuals and perennials, usually with erect culms, and usually growing in marshy places and along riverbanks. The inflorescence is an open or contracted panicle. The spikelets are solitary or paired, and all are alike. The upper fertile lemma is geniculate (bent like a knee) awned.

Subfamily: Panicoideae; Tribe: Arundinelleae

Species: World = 55, Australia = 4



Arundinella nepalensis



Inflorescence

Townsville species

Arundinella nepalensis

Arundinella setosa

Arundo

Reed Grasses

From Latin *arundo* (reed).

Tall perennials with thick, knotty rhizomes. Culms woody and persistent, 2 to 8 m tall. It grows in very large clumps and resembles bamboo. The inflorescence is an open panicle. The spikelets are solitary and the lemmas covered with long, soft hairs.

Subfamily: Arundinoideae; Tribe: Arundineae
Species: World = 3, Australia = 1

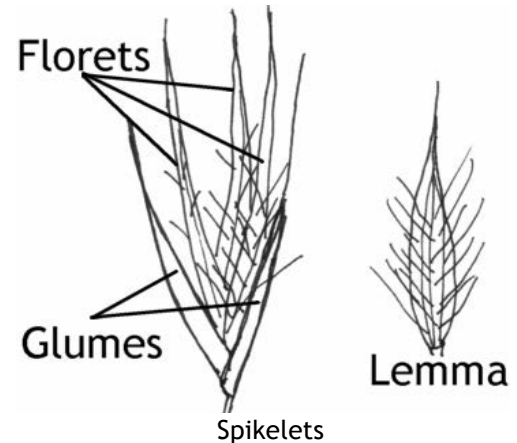
Arundo donax is the only Australian species from this genus;
donax - the Greek word for a type of reed in classical literature.

Arundo donax (Giant Reed)

A large tufted perennial, bamboo-like, 2-6 m tall, usually unbranched, with leaves arising along the stem, which is erect or bent over. The inflorescence is a large feathery panicle, 30-60 cm long and 12 cm wide. The spikelets are solitary, and comprising of numerous (2-7) florets; the rachilla is glabrous and the lemmas are covered with long silky hairs.

Closeley related and similar to *Phragmites*.

Giant reed reproduces vegetatively from rhizomes (underground stems) and can invade nearby bushland. It is now recognised as a weed in most states in Australia; it grows on vacant land, margins of rubbish tips or on roadsides where garden refuse has been tipped.



Inflorescence

Axonopus

Carpet Grasses

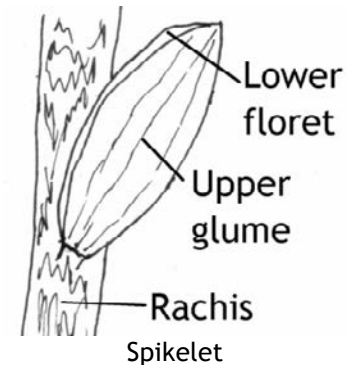
From the Greek *axon* (axis) and *pous* (foot), alluding to the racemes arising from a common point (digitate).

Stoloniferous or tufted perennials. The inflorescence is digitate or sub-digitate. The spikelets are solitary, and on one side of the rachis (the axis or branch of the inflorescence). The upper glume is abaxial (the side facing away from the rachis). The lower glume is absent or obscure.

Axonopus species are similar to some species of *Paspalum*, however this genus has the upper glume adaxial (the side facing to the rachis).

Subfamily: Panicoideae; Tribe: Paniceae
Species: World = 114, Australia = 2

Axonopus compressus is the only Townsville species from this genus; *compressus* - from the Latin *comprimo* (squeeze together), referring to the flattened culms.



Axonopus compressus (Buffalo Grass or Broadleaf Carpet Grass)

This perennial, prostrate grass is a popular lawn grass in Townsville, and is suitable for sunny and moist semi-shaded areas. This grass can grow to 60 cm tall. The inflorescence usually consists of 2 or 3 (rarely to 5) erect or spreading spikes 3-10 cm long.



Spikelets



Inflorescence



Bothriochloa

Bluegrasses

From the Greek *bothros* (trench or pit), and *chloa*, (grass), alluding either to the groove in the pedicels or to the pit in the lower glumes of some species.

Tufted, decumbent or stoloniferous perennials, often with branched culms. The inflorescence is a digitate or subdigitate, or an open panicle; and usually has a spicy smell when crushed. The spikelets are in pairs (with terminal triplets), one sessile and one pedicelled. The lower glume of the sessile spikelet of some species has a pit (circular depression). The sessile spikelet is awned and bisexual; the pedicelled spikelet can be bisexual, male or sterile.

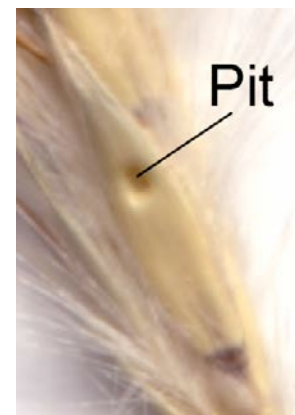
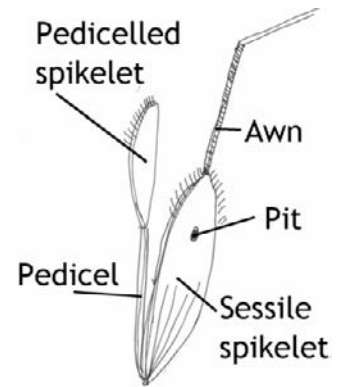
Subfamily: Panicoideae; Tribe: Andropogoneae
Species: World = 35, Australia = 9

Bothriochloa is closely related to *Dichanthium*, the difference between these two genera requires careful dissection under a microscope. The pedicels of *Bothriochloa* species have a longitudinal translucent furrow, often purple coloured; in cross section the pedicels are dumbbell shaped. The pedicels of *Dichanthium* species are rounded.

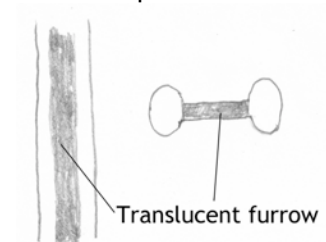
Bothriochloa bladhii subsp. *bladhii* is closely related and similar to the genus *Capillipedium*.

Townsville species

- Bothriochloa bladhii* subsp. *bladhii*
- Bothriochloa decipiens*
- Bothriochloa ewartiana*
- Bothriochloa pertusa*



Spikelet



Pedicel



Inflorescences

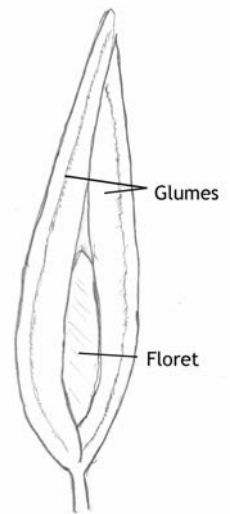
Brachyachne

Native Couches

From the Greek *brachys* (short) and *achne* (scale, chaff), alluding to lemmas shorter than glumes.

Stoloniferous or tufted annuals or perennials. The digitate inflorescence contains 3-6 racemes with the spikelets in 2 close rows on 1 side of the raceme. The glumes are much longer than the single floret.

Subfamily: Chloridoideae; Tribe: Cynodonteae
Species: World = 10, Australia = 5



Inflorescences



Townsville species
Brachyachne convergens
Brachyachne tenella



Capillipedium

Scented Tops

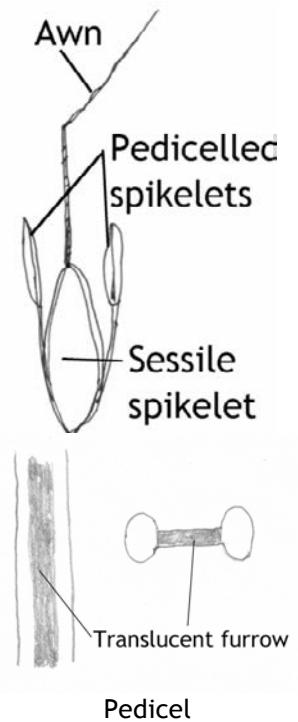
From the Latin *capillus* (hair) and *pes* (foot), alluding to the hair-like pedicels.



Tufted perennials with erect, slender culms. The inflorescence is an open panicle with secondary branching obvious. The spikelets are paired; one sessile and awned, one pedicelled and unawned. The sessile spikelet at the end of the branches is accompanied by 2 pedicelled spikelets (terminal triplet).

Subfamily: Panicoideae; Tribe: Andropogoneae
Species: World = 14, Australia = 2

Based on inflorescence colour and shape, *Capillipedium* could be confused with *Melinis* and *Chrysopogon zizanioides* however the spikelets are very different however the spikelets are very different.

Closely related to *Bothriochloa*, with the same pedicel morphology, i.e. with a longitudinal translucent furrow, often purple coloured; in cross section the pedicels are dumbbell shaped. The differences between the genera are shown in the table below.



<i>Bothriochloa bladhii</i>	<i>Capillipedium</i>
Inflorescence, usually an arrangement of racemes on a central axis	Inflorescence more than once-branched
	
Racemes with more than 8 spikelet pairs	Racemes with 1-8 spikelet pairs

Townsville species
Capillipedium parviflorum
Capillipedium spicigerum

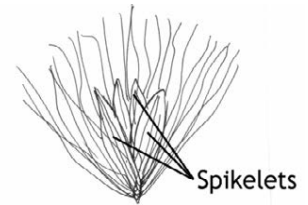


Inflorescences

Cenchrus (including *Pennisetum*)

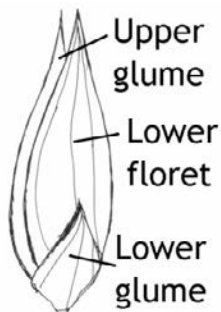
From the Greek *kenchros* (millet).

Tufted or stoloniferous or rhizomatous annuals or perennials. The inflorescence is a spicate panicle (spike-like with short branches). The spikelets are all alike and in groups of one to five and subtended by an involucre of bristles or fused to form a spiny burr. Spikelets fall from plant with bristles attached, usually leaving a bare rachis.



Cluster of spikelets subtended by soft bristles

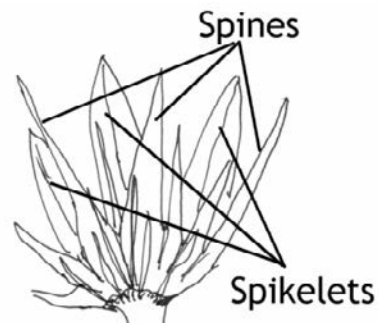
Subfamily: Panicoideae; Tribe: Paniceae
Species: World = c 102, Australia = 22



Spikelet



Cenchrus echinatus spikelet clusters, subtended by spines



Inflorescences



Townsville species

Cenchrus ciliaris (*Pennisetum ciliare*)

Cenchrus echinatus

Cenchrus elymoides (*Pennisetum elymoides*)

Cenchrus pedicellatus subsp. *unispicatus* (*Pennisetum pedicellatum* subsp. *unispiculum*)

Cenchrus pennisetiformis (*Pennisetum pennisetiforme*)

Cenchrus purpurascens (*Pennisetum alopecuroides*)

Cenchrus setaceus (*Pennisetum setaceum*)

Cenchrus setigerus (*Pennisetum setigerum*)

Chionachne

From Greek *chion* (snow) and *achne* (chaff or scale), in allusion to the pale coloured glumes of some species.

Annuals or reed-like perennials, rhizomatous or tufted. The inflorescence is subtended by a spathe. The spikelets are unisexual and segregated in different part of the inflorescence which is raceme or spike. The female spikelets are at the base and are sessile. The male flowers are at the apex, they are usually paired, one sessile and one pedicelled.

Subfamily: Panicoideae; Tribe: Andropogoneae

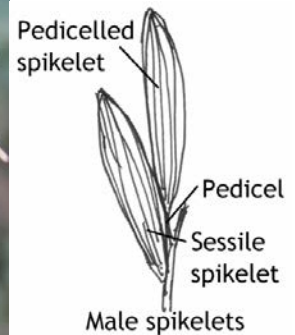
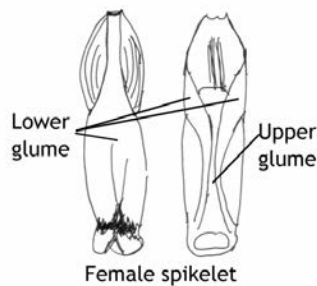
Species: World = 7, Australia = 2



Raceme showing male and female spikelets



Female spikelets



Male spikelets

Chionachne cyathopoda is the only Townsville species from this genus; *cyathopoda* - from the Greek *kyathos* (cup) and *pous* (foot) referring to the shape of the apex of peduncle.

Chionachne cyathopoda (River Grass)

A tufted perennial grass with reed-like culms, 2-4 m tall. In habit it resembles *Megathyrsus maximus*. Grows on creek banks, in sandy or loamy soils. Racemes 6-12 cm long.



Inflorescences

Chloris

Windmill Grasses

From the Greek *chloros* (green), possibly alluding to the greenish flowers and green leaves; alternatively, named for *Chloris* (The Green One), mythological Greek goddess of flowers.

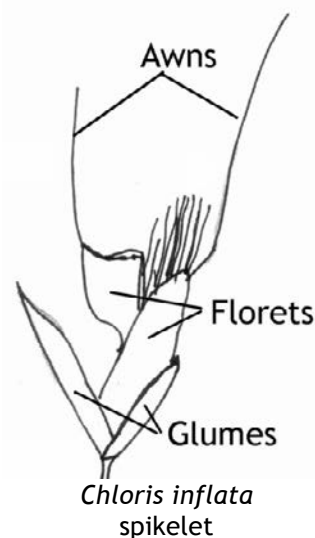
Tufted or stoloniferous perennials or annuals. The inflorescence is digitate or subdigitate, with the branches erect to spreading. The spikelets are solitary, laterally compressed, usually overlapping in 2 rows along 1 side of the slender rachis. Each spikelet consists of 2-4 florets with the basal floret bisexual and the upper florets reduced. The lemmas have 1-3 awns.

Chloris is closely related and easily confused with the genera *Enteropogon* and *Oxychloris*. The genus *Chloris* also has a superficial similarity to the genus *Pseudopogonatherum*.

Subfamily: Chloridoideae; Tribe: Cynodonteae
Species: World = c. 55, Australia = 11

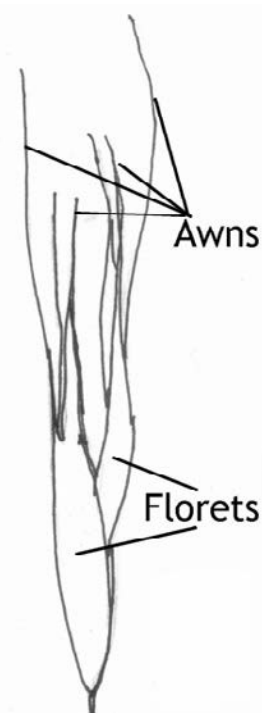


Inflorescences



Townsville species

- Chloris gayana*
- Chloris inflata*
- Chloris lobata*
- Chloris pectinata*
- Chloris pumilio*
- Chloris virgata*



Chrysopogon

Golden Beard Grasses

From Greek *chrysos* (golden) and *pogon* (beard), alluding to the golden hairs on the inflorescence.

Annuals or perennials, rhizomatous or stoloniferous or tufted or decumbent. The inflorescence is an open or contracted panicle. The spikelets are borne at the ends of the inflorescence branches. The spikelets in pairs or triplets; one sessile spikelet and 1 or 2 pedicelled spikelets. The sessile spikelet is awned or unawned. Mature spikelets are often purplish coloured.

Subfamily: Panicoideae; Tribe: Andropogoneae
Species: World = 43, Australia = 11

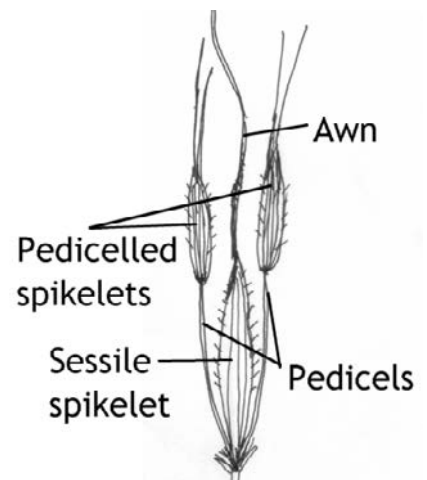
Based on inflorescence colour and shape, *Chrysopogon zizanioides* could be confused with *Melinis* and *Capillipedium* however the spikelets are very different.



Townsville species
Chrysopogon aciculatus
Chrysopogon fallax
Chrysopogon filipes
Chrysopogon zizanioides



Inflorescences



Triplet of spikelets

Cleistochloa

From the Greek *kleistos* (enclosed) and *chloe* (grass), referring to some of the spikelets being cleistogamous (flowers which do not open and are self-fertilized in the bud).

Tufted perennial grasses with wiry culms. The inflorescences are of two types, one a terminal raceme, the other is an axillary inflorescence with cleistogamous spikelets. The spikelets in each inflorescence are dissimilar. This genus is endemic to Australia and species grow on low-nutrient sandstone-derived soils.

Subfamily: Panicoideae; Tribe: Paniceae
Species: World = 3, Australia = 3

Cleistochloa subjuncea is the only Townsville species from this genus; *sub* (somewhat similar) and *juncea* (rush-like), referring to the habit.

Cleistochloa subjuncea

Erect or slightly spreading perennial grass, 30-60 cm tall. The leaf sheaths usually have erect white hairs on the back, and when the grass dries off, the leaf sheath loosens from the culm and the leaf blade breaks off at the ligule at maturity. The terminal inflorescence is 0.7-3.5 cm long with 2-6 spikelets; the axillary inflorescence is reduced to a single, spikelet that is hidden in the leaf sheaths.



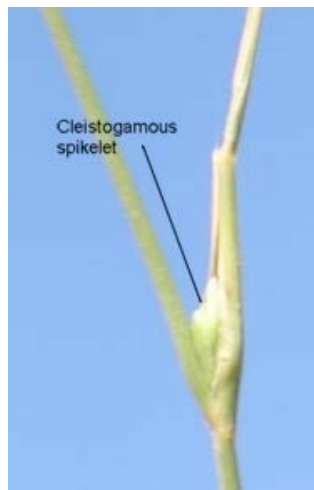
Old leaf sheath showing where the leaf blade has broken off at the ligule



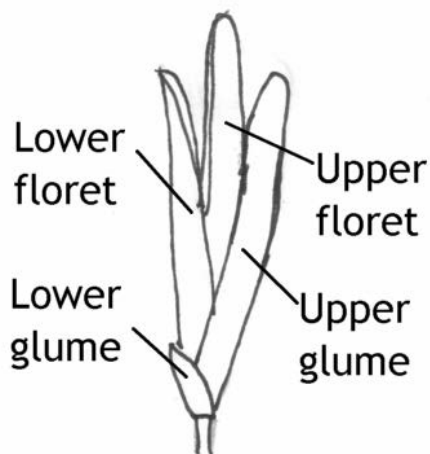
Leaf sheath showing erect white hairs



Terminal inflorescence



Axillary inflorescence



Spikelet from terminal raceme

Cymbopogon

Lemon-scented Grasses

From the Greek words *kumbe* (boat) and *pogon* (beard), referring to many-awned inflorescences and boat-shaped spathes.

Tufted perennials with aromatic (often lemon-scented) shoots and leaves when crushed. The inflorescence is a panicle of short paired racemes each subtended by a reddish spatheole. The spikelets are in pairs, one sessile and one pedicelled. The sessile spikelet is awned. Many of the species are covered with long, soft, white hairs.

The lemon-scented leaves are distinctive and make the identification of this genera easier even when the grass is not flowering. However, there is grass species in another genera in Townsville with lemon-scented leaves - *Elionurus citreus*. Once all the fluffy spikelets have fallen, this genera can be mistaken for *Themeda*.

Subfamily: Panicoideae; Tribe: Andropogoneae
Species: World = c.40, Australia = 11



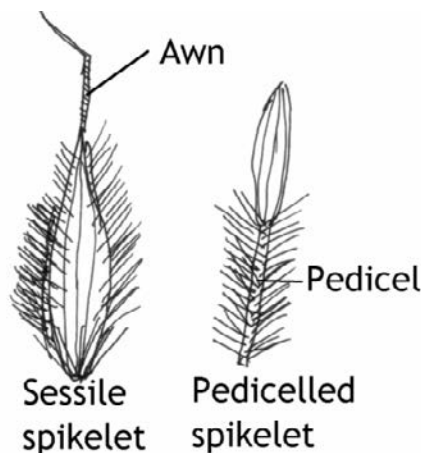
Inflorescences

Townsville species

- Cymbopogon ambiguus*
- Cymbopogon bombycinus*
- Cymbopogon obtectus*
- Cymbopogon queenslandicus*
- Cymbopogon refractus*

Cultivated species

- Cymbopogon citratus* - Lemon Grass



The pedicels and inflorescence axis are often covered with hairs making it difficult to see the spikelets

Cynodon

Couches and Star Grasses

From Greek *kynos* (dog) and *odous* (tooth), alluding to the tooth-like buds of the rhizome.

Stoloniferous and rhizomatous perennials with short, erect flowering stems. The inflorescence is digitate or subdigitate. Spikelets are solitary and on one side of the raceme. The glumes are shorter than the single floret.

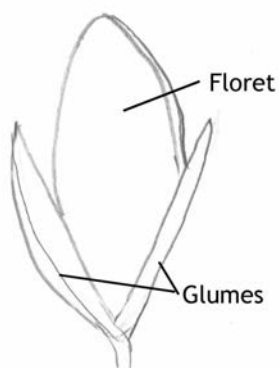
Subfamily: Chloridoideae; Tribe: Cynodonteae

Species: World = 10, Australia = 7

Cynodon dactylon is the common lawn grass (couch) in Townsville. This grass is an extremely variable species, the growth form varies according to local condition. Widely distributed and common in disturbed areas, it can grow to 30 cm tall, when frequently mown it can form a close sward with a prostrate habit.



Inflorescences



Spikelet



Townsville species

Cynodon dactylon

Cynodon nlemfuensis

Cynodon radiatus

Dactyloctenium

Button Grasses

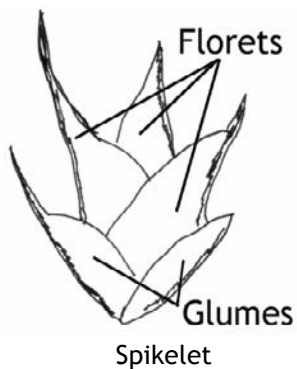
From the Greek *daktylos* (finger) and *ktenos* (comb), alluding to the digitate inflorescence in which the spikelets have a comb-like arrangement.

Annuals or perennials, rhizomatous or stoloniferous or tufted or decumbent grass, native or naturalised. The inflorescence is digitate, with 2-6 branches which are erect or spreading, the end of the branches project beyond the spikelets. The spikelets are sessile and closely overlapping in two rows on one side of the rachis. The spikelets contain 2 or more bisexual florets.

Sometimes grows in saline habitats or dunes, mostly in dry sandy soils.

Subfamily: Chloridoideae; Tribe: Cynodonteae

Species: World = 13, Australia = 5



Inflorescences

Townsville species

Dactyloctenium aegyptium

Dactyloctenium buchananensis

Dactyloctenium radulans



Dichanthium

Bluegrasses

From the Greek *dicha* (in two, apart) and *anthos* (flowers), alluding to the two kinds of spikelet pairs in the raceme.

Tufted, decumbent or stoloniferous perennials, often with branched culms. The inflorescence is digitate or subdigitate or a single raceme. The spikelets are in pairs (with terminal triplets), one sessile and one pedicelled. The sessile spikelet is awned, and in one species (*D. fecundum*), the pedicelled spikelet is also sometimes awned.

Dichanthium is closely related to *Bothriochloa*, and the difference between these two genera is described under *Bothriochloa*.

Subfamily: Panicoideae; Tribe: Andropogoneae
Species: World = c 16, Australia = 8

Townsville species

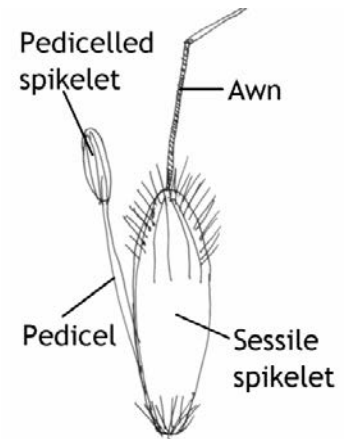
Dichanthium annulatum

Dichanthium aristatum

Dichanthium fecundum

Dichanthium sericeum subsp. *polystachyum*

Dichanthium sericeum subsp. *sericeum*



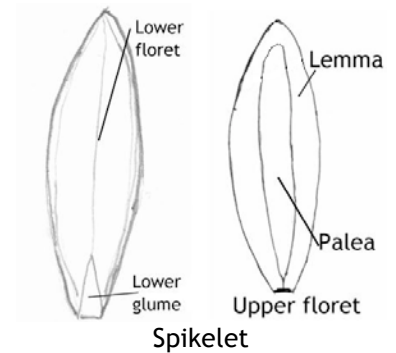
Inflorescences

Digitaria

Finger Grasses

From Latin *digitus* (finger) alluding to the digitate inflorescence and *aria* pertaining to.

Annuals or perennials, rhizomatous or stoloniferous or tufted or decumbent (sometimes sward forming). The inflorescence is digitate, subdigitate or a once-branched panicle. The spikelets are usually in groups of 2 or 3, the lower glume is absent or small and acute at the apex and the palea (the upper bract of the floret enclosing the flower) of the upper floret almost completely clasps the upper lemma (the outer bract of the floret).



Subfamily: Panicoideae; Tribe: Paniceae
Species: World = 220, Australia = 41



Spikelets



Inflorescences

Townsville species

- Digitaria ammophila*
- Digitaria brownii*
- Digitaria ciliaris*
- Digitaria eriantha*
- Digitaria gibbosa*
- Digitaria leucostachya*
- Digitaria longiflora*
- Digitaria minima*
- Digitaria nematostachya*
- Digitaria orbata*
- Digitaria parviflora*
- Digitaria violascens*



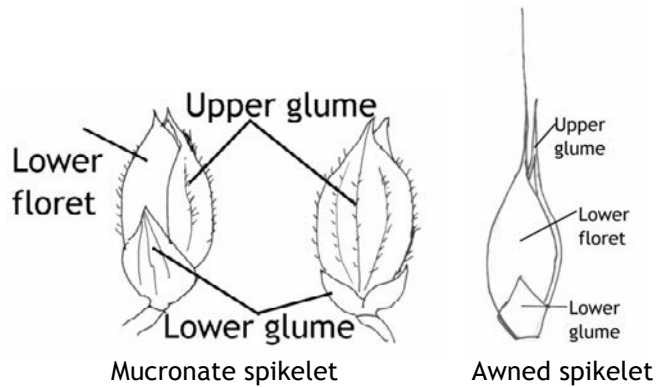
Echinochloa

From Greek *echinos* (hedgehog) and *chloe* (grass), alluding to the echinate (with prickles) inflorescence branches.

Annuals or perennials, tufted or decumbent. Ligule (an outgrowth on the inside of the leaf blade/leaf sheath junction) absent or present. The inflorescence is a once-branched or contracted panicle. The spikelets are solitary or clustered, sometimes in distinct rows, awned, mucronate (a sharp, abrupt terminal point) or awnless. The glume and lower lemma usually have stiff, bristly hairs.

Members of this genus are usually found in wet habitats and along roadsides.

Subfamily: Panicoideae; Tribe: Paniceae
Species: World = 30-40, Australia = 19



Inflorescences

Townsville species
Echinochloa colona
Echinochloa crus-galli
Echinochloa esculenta
Echinochloa polystachya



Ectrosia

From the Greek *ectrosis* (miscarriage), referring to the spikelets with only 1 or 2 basal bisexual flowers, with male or empty lemmas above them.

Tufted annuals and perennials. The inflorescence is an open or contracted panicle, sometimes reduced to a few racemes. The spikelets are solitary with 4 or more florets. This genus is readily recognised by the modification of its upper florets into a dispersal device.

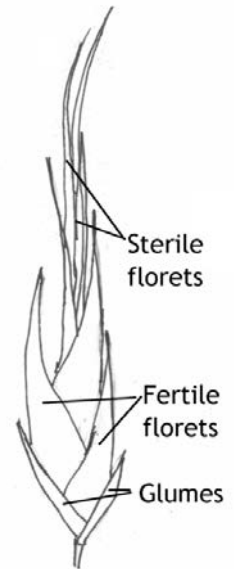
Subfamily: Chloridoideae; Tribe: Cynodonteae

Species: World = 14, Australia = 14 (including the genus *Planichloa*)

Ectrosia leporina is the only Townsville species from this genus; *leporina* - from the Latin *lepus* (hare) and *-ina* (belonging to), which refers to the Inflorescence which resembles a hare's foot.

Ectrosia leporina (Hare's Foot Grass)

This grass is a slender annual to 70 cm tall. The mature inflorescence is purple and has a "furry" appearance, hence its common name.



Spikelet, the upper sterile florets act as a dispersal device



Inflorescences

Eleusine

From *Eleusis*, the Greek town where the temple of the Corn Goddess Ceres was located.

Tufted annuals or perennials. The inflorescence is digitate or subdigitate. The spikelets are overlapping in two rows on the underside of the rachis, each spikelet contains 3 or more bisexual florets.

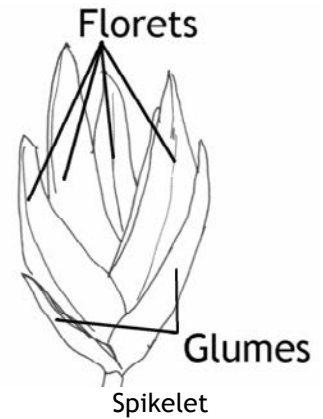
Eleusine species are mostly from Africa; the species *Eleusine coracana* (finger millet) is grown in Africa for human food and for making beer.

Subfamily: Chloridoideae; Tribe: Cynodonteae
Species: World = 9, Australia = 3

Eleusine indica is the only Townsville species from this genus; *indica* - from India.

Eleusine indica (Crowsfoot Grass)

Annual or perennial erect, prostrate or geniculate to 90 cm tall. It is distinguished by its inflorescence made up of usually 2-6 digitate racemes at the apex, usually with 1 raceme inserted lower on the culm. This species is a weed in lawns, open habitats and disturbed areas.



Inflorescence

Elionurus

From the Greek *eleuein* (to roll) and *oura* (tail) alluding to the spike-like racemes curling strongly when old.

Tufted perennials, occasionally annuals, leaves sometimes aromatic. The inflorescence is a single raceme or a series of racemes which are subtended by spathe-like leaf sheaths. The spikelets are in pairs, one sessile and one pedicelled.

Subfamily: Panicoideae; Tribe: Andropogoneae

Species: World = 15, Australia = 1

Elionurus citreus is the only Australian species from this genus; *citreus* - Latin for pure yellow, spikelets invested in yellow hairs.

Elionurus citreus (Lemon-scented Grass)

An erect, moderately slender perennial 50 to 100 cm tall. When the leaves are crushed, they give off a lemon scent. *Cymbopogon* is another grass genera with lemon-scented leaves.

The inflorescence is a raceme or a series of simple racemes covered with white hairs, the spathes below the racemes are not obvious. When the spikelets mature, the pedicelled spikelet sticks out at right angles to the raceme giving it a distinctive appearance. The lower glume of the sessile spikelet is often asymmetrical, the apex is drawn out and forked at the tip.

This grass usually grows on sandy soils.

This species could be confused with *Eremochloa bimaclata*, *Hemarthria uncinata*, *Lepturus repens* and *Mnesithea rottboelioides*.



Inflorescence -
raceme



Lower glume of
sessile spikelet



Elytrophorus

From the Greek *elytron* (sheath or husk) and *phero* (to bear), referring to the large outer glume.

Tufted annuals. The inflorescence is a panicle of dense globular clusters borne at intervals along the central axis. The spikelets are strongly laterally compressed with 2-7 bisexual florets. The lemmas are awned.

Subfamily: Danthonioideae; Tribe: Danthonieae

Species: World = 2-4, Australia = 1

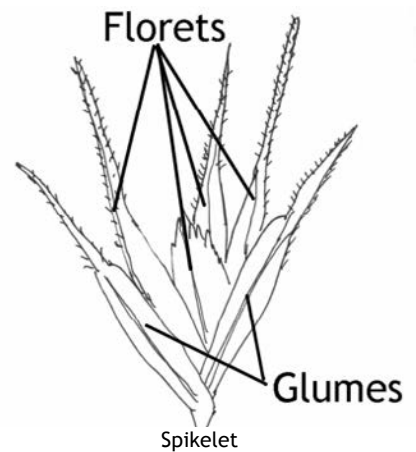
Elytrophorus spicatus is the only Australian species from this genus; *spicatus* - from the Latin *spica* (thorn) and *-ata* (possessing), referring to the inflorescence which is a spike or spicate panicle.

Elytrophorus spicatus (Spikegrass)

A short-lived, tufted annual 10-60 cm tall. The inflorescence is a distinctly interrupted, spike-like, panicle. Often growing on clay soils in areas that are drying out from seasonal flooding.



Inflorescence



Enneapogon

Nineawn Grasses

From the Greek *ennea* (nine) and *pogon* (beard), alluding to the nine, plumose lemma awns.

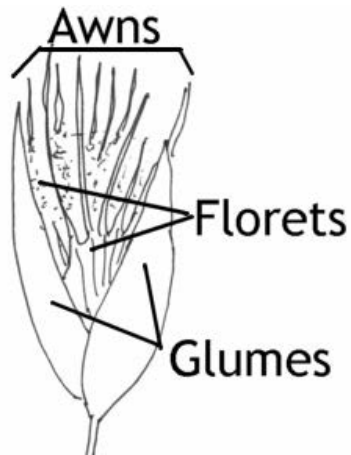
Tufted perennials or annuals. The inflorescence is a spicate panicle (a spike-like panicle with short branches). The spikelets are solitary. The genus is readily recognised by the nine-awned lemmas, and with each spikelet having 2 or more florets the spreading awns form an attractive circular arrangement.

Species from this genus grow in a variety of habitats, from river beds to rocky slopes.

Subfamily: Chloridoideae; Tribe: Pappophoreae
Species: World = 30, Australia = 16



Inflorescences



Spikelet



Townsville species

- Enneapogon lindleyanus*
- Enneapogon nigricans*
- Enneapogon polyphyllus*
- Enneapogon robustissimus*



Enteropogon

Windmill Grasses

From the Greek *enteron* (intestine) and *pogon* (a beard), perhaps alluding to the beards on the callus or in the axils of the spikes.

Tufted perennials. The inflorescence is a simple spike or many spikes arranged digitately and spreading at maturing. The spikelets are solitary, dorsally compressed with 2-3 florets and arranged on one side of the spikes. The lemmas are awned.

Enteropogon is closely related and easily confused with the genera *Chloris* and *Oxychloris*. The genus *Chloris* also has a superficial similarity to the genus *Pseudopogonatherum*.

Subfamily: Chloridoideae; Tribe: Cynodonteae
Species: World = 11, Australia = 6

Enteropogon ramosus is an uncommon species in Townsville; *ramosus* - from the Latin *ramus* (branch) and *-osa* (abundance), referring to the much branched inflorescences or culms.

Enteropogon ramosus (Curly Windmill Grass)

Robust tufted or tussock-forming perennial to 1 m tall. Inflorescence digitate or subdigitate with 2-10 branches. This grass often grows on clayey soils or sand overlying clay.



Eragrostis

Lovegrasses

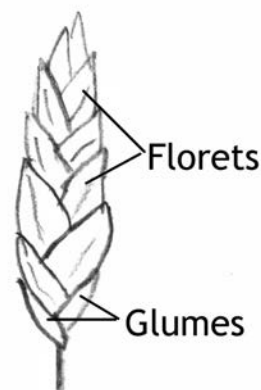
There are several possible derivations of the name of which the three following are the most common, all are from the Greek. 1. *eros* (love) and *agrostis* (a grass). 2. *er* (early), because many species are pioneer invaders bare ground. 3. *eri* (to strengthen a noun), that is a many flowered *Agrostis*.

Annuals or perennials, tufted or decumbent or stoloniferous. The inflorescence is an open or contracted panicle with secondary branching. The spikelets are solitary. The genus is characterised by its usually numerous, identical florets (3 or more), and some species have persistent paleas. The photograph to the right shows the persistent paleas at the base of the spikelet.

Although it is easy to recognise the genus *Eragrostis*, the species are considered difficult to identify. There is a large number of species and a number of species are polymorphic and intergrade. Superficially similar to *Sporobolus* and *Leptochloa* species.

Species of *Eragrostis* are commonly early invaders of arable land, are often on poor or sandy soils or disturbed ground.

Subfamily: Chloridoideae; Tribe: Cynodonteae
Species: World = c. 350, Australia = 73



Spikelet



Inflorescences

Townsville species

Eragrostis basedowii
Eragrostis brownii
Eragrostis cilianensis
Eragrostis cumingii
Eragrostis curvula
Eragrostis dielsii
Eragrostis elongata
Eragrostis exigua
Eragrostis fallax
Eragrostis interrupta
Eragrostis lacunaria
Eragrostis leptostachya
Eragrostis mexicana

Eragrostis mexicana
Eragrostis minor
Eragrostis parviflora
Eragrostis pilosa
Eragrostis schultzei
Eragrostis sororia
Eragrostis spartinooides
Eragrostis stenostachya
Eragrostis tenella (Eragrostis amabilis)
Eragrostis tenellula
Eragrostis tenuifolia
Eragrostis uniolooides

Eremochloa

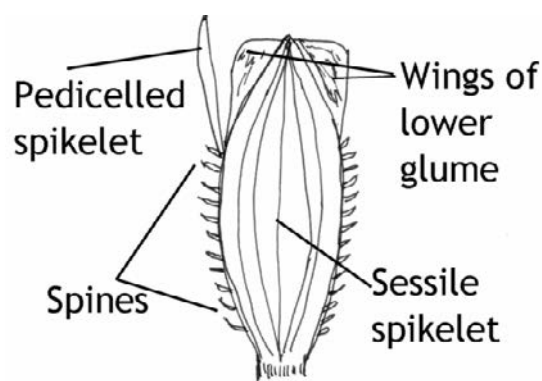
From Greek *eremos* (solitary) and *chloa* (grass), referring to the single terminal spike.

Tufted perennials. The inflorescence is a spike or raceme. The spikelets are in pairs, one sessile and one pedicelled, the pedicelled spikelet is rudimentary and often reduced to a pedicel.

Subfamily: Panicoideae; Tribe: Andropogoneae.

Species: World = 9, Australia = 3

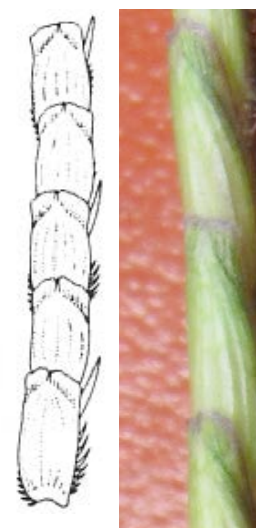
Eremochloa bimaculata is the only Townsville species from this genus; *bimaculata* - from the Latin *bi* (twice), *macula* (spot or stain) and *-ata* (possessing), i.e. possessing two spots, which appears to be rather baffling.



Eremochloa bimaculata (Poverty Grass)

An erect tufted perennial 30-80 cm tall, with basal leaf sheaths flattened and keeled. The inflorescence is a solitary terminal spike. The lower glume of the sessile spikelet has curved spines on the lower margins and wings at the apex. The pedicelled spikelet is reduced to a narrow glume or absent. Grows in open woodlands.

This species could be confused with *Elionurus citreus*, *Hemarthria uncinata*, *Lepturus repens*, *Ophiuros exaltatus* and *Mnesithea* species.



Part of inflorescence, drawing from Jacobs et al. (2008)

Reference:

Jacobs, S. W. L., Whalley, R. D. B. and Wheeler, D. J. B. (2008) Grasses of New South Wales (Fourth Edition), University of New England, Armidale.

Eriachne

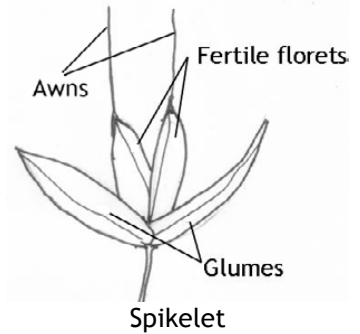
Wanderrie Grasses

From the Greek *erion* (wool) and *achne* (chaff or scale), possibly referring to the florets being hairy.

Annuals or perennials, rhizomatous or tufted. The inflorescence is an open or contracted panicle. The spikelets are solitary and the glumes spread at maturity to reveal two bisexual florets which are awned or unawned. The glumes often persist after the florets have fallen and often spread out.

Subfamily: Micrairoideae; Tribe: Eriachneae

Species: World = 48, Australia = 48



Inflorescences



Spikelets

Townsville species

- Eriachne ciliata*
- Eriachne mucronata*
- Eriachne obtusa*
- Eriachne pallescens*
- Eriachne rara*
- Eriachne triodioides*

Eriochloa

Spring or Cup Grasses

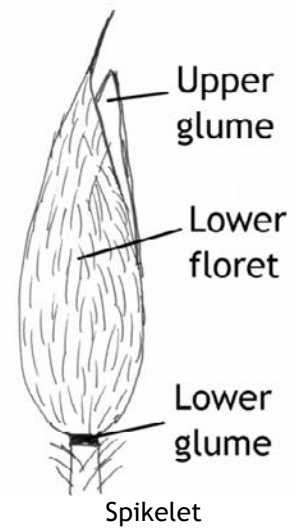
From Greek *erion* (wool) and *chloe* (grass), referring to the hairy spikelets and pedicels.

Annuals or perennials, stoloniferous or tufted to decumbent. The i

nflorescence is a once-branched panicle with racemes appressed at first, spreading later. The spikelets are solitary or in pairs. The glumes are unequal, the lower glume usually reduced to a cup-like ring at the base of the spikelet. The genus is distinguishable by this 'cup' which is formed from the lower rachilla (the axis of the spikelet) internode which becomes swollen and fused to the lower glume.

Subfamily: Panicoideae; Tribe: Paniceae

Species: World = 30, Australia = 7



Spikelet



Inflorescences

Townsville species

Eriochloa crebra

Eriochloa procera

Eriochloa pseudoacrotricha

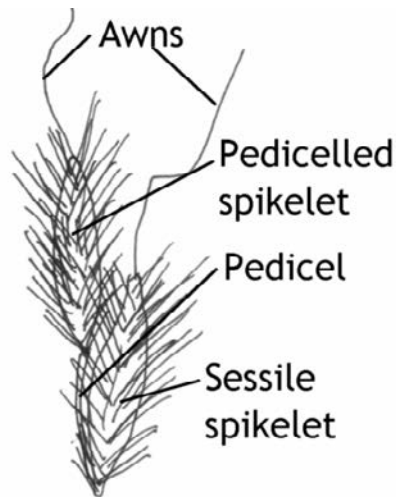
Eulalia

Named to honour Eulalia Delile, a botanical artist.

Tufted perennial grasses. The inflorescence is digitate or subdigitate, the branches are very hairy or silky, often brown or purple. The spikelets are in pairs and similar, one sessile, the other pedicelled, each with one bisexual floret, both are awned.

Subfamily: Panicoideae; Tribe: Andropogoneae
Species: World = 30, Australia = 4

Eulalia aurea is the only species in Townsville from this genus; *aurea* - the Latin for golden-yellow which refers to the spikelets or pedicels or other parts with golden-yellow hairs.



Spikelets

Eulalia aurea (Silky Browntop)

A tufted perennial grass to 100 m tall. The digitate inflorescence consists of 3-6 racemes each 2-6 cm long.

This grass is easily recognised by its fluffy, golden-yellow-brown inflorescences. However, this species could be confused with the closely-related annual grass *Pseudopogonatherum contortum*.



Inflorescences

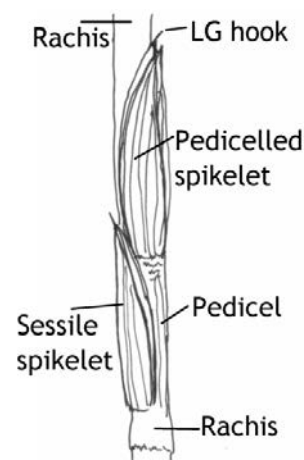
Hemarthria

From Greek *hemi* (half) and *arthron* (jointed) i.e. half-jointed, referring to the raceme internodes articulated but not breaking up.

Perennials, often with stolons and rhizomes. The inflorescence is a single flattened raceme, usually subtended by an inflated leaf sheath. The spikelets in pairs, one sessile and one pedicelled and partially embedded in the rachis, the pedicelled spikelet resembles the sessile spikelet and the pedicel is fused to the internode.

Subfamily: Panicoideae; Tribe: Andropogoneae
Species: World = 12, Australia = 1

Hemarthria uncinata is the only Australian species from this genus; *uncinata* - from the Latin *uncinus* (hook) and *-ata* (possessing), the upper glume drawn out into a hook.



Hemarthria uncinata (Mat Grass)

A tufted perennial often rhizomatous or stoloniferous, stems prostrate or erect 20-100 cm tall and often forms a coarse matted sward. This grass grows on a range of soils, usually in damp areas, swamps and near coastal estuaries.

This species could be confused with *Elionurus citreus*, *Eremochloa bimaculata*, *Lepturus repens* and *Mnesithea rottboelioides*.



Herbarium scan Botanic Gardens Trust (1999 - 2008)



Raceme drawing from Gardner (1952)

References

- Botanic Gardens Trust (1999 - 2008) PlantNET - The Plant Information Network System of Botanic Gardens Trust, Sydney, Australia (version 2.0).
- Gardner, C. A. (1952) Flora of Western Australia Vol. 1, Gramineae Part 1, Government Printer, Perth.

Heteropogon

Speargrasses

From the Greek *heteros* (different) and *pogon* (beard), referring to the difference between the awnless male and awned female spikelets.

Tufted perennials. The inflorescence is a raceme of paired spikelets. The lower paired spikelets are alike, unawned, and either male or neuter. The upper paired spikelets are dissimilar one sessile and awned and one pedicelled and unawned. The awns of the sessile spikelet are long and extend above the raceme and when the seeds mature, the awns tangle.

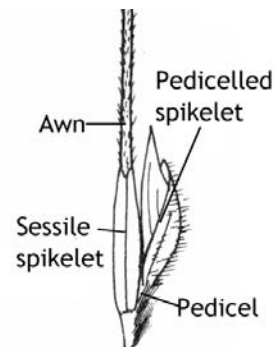
Subfamily: Panicoideae; Tribe: Andropogoneae

Species: World = 7, Australia = 2

Townsville species

Heteropogon contortus

Heteropogon triticeus



Inflorescence showing a tangled awns



Inflorescence

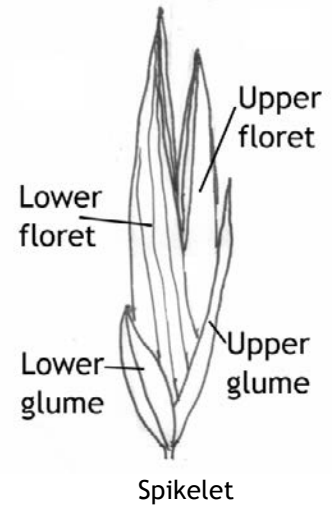
Hymenachne

From the Greek *hymen* (membrane) and *achne* (chaff or scale), alluding to membranous glumes, lemmas and paleas.

Decumbent, spreading perennial aquatic grasses. The stems produces roots at the nodes. The inflorescence is a spicate panicle (spike-like with short branches). The spikelets are solitary.

Subfamily: Panicoideae; Tribe: Paniceae
Species: World = 5, Australia = 2

The non-native species, *Hymenachne amplexicaulis* was released in Queensland in 1988 for use as ‘ponded pasture”. It has since escaped from cultivation and is now considered a Weed of National Significance (WONS). It is regarded as one of the worst weeds in Australia because of its invasiveness, potential for spread, and economic and environmental impacts. *Hymenachne* invades permanent water bodies and seasonally inundated wetlands.



Hymenachne amplexicaulis

Inflorescence

Hymenachne amplexicaulis has distinctive stem-clasping leaf bases.

Townsville species
Hymenachne acutigluma
Hymenachne amplexicaulis



Hymenachne amplexicaulis

Hyparrhenia

Thatch Grasses

From the Greek words *hypo* (below) and *arrhen* (male), referring to the pair of male spikelets at the base of each raceme.

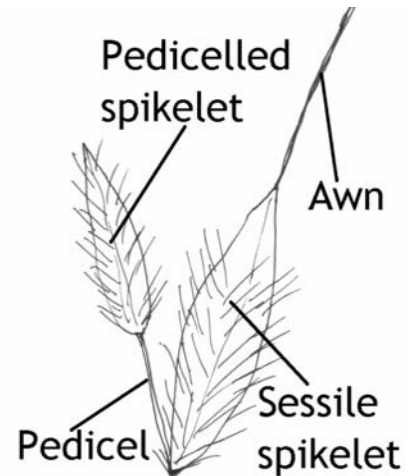
Tufted perennials or annuals. The inflorescence is composed of a few to many pairs of racemes subtended by spatheoles (small bracts or modified leaves which enclose the inflorescence). The spikelets are in pairs, one sessile and usually awned and the other pedicelled and awnless.

Subfamily: Panicoideae; Tribe: Andropogoneae
Species: World = c.55, Australia = 3

There is only one species in Townsville, *Hyparrhenia rufa* subsp. *rufa*; *rufa* - Latin for reddish, the inflorescence is purple to red.

Hyparrhenia rufa subsp. *rufa* (Thatch Grass)

Thatch grass is an erect perennial from 30 to 300 cm tall with conspicuous banded culms. The inflorescence consists of paired racemes subtended by a spathe. The spikelets are covered with red hairs and arranged in pairs (with terminal triplets), one sessile (with awn) and one pedicelled.



Inflorescence



Spikelets

Thatch grass grows mainly along roadsides and in disturbed areas. It could be confused with Grader Grass (*Themeda quadrivalvis*) and Giant Spear Grass (*Heteropogon triticeus*), especially before flowering.

These three species are tall grasses, and their increase in height before flowering is caused by a section of pale yellow culm being pushed upwards until it protrudes well above the green leaf sheath that previously enclosed it. The pale sections of the internodes alternate with the green sheaths giving these grass species a conspicuously banded appearance.

Hyparrhenis rufa is a native of Africa where it is used as a thatching grass and as a pasture, but it becomes very coarse as it matures.

Imperata

In honour of Ferrante Imperato (1550–1625), a Neopolitan naturalist/pharmacist.

Perennial grasses with rhizomes; leaves mostly basal. The inflorescence is a fluffy, spicate (spike-like with short inflorescence branches) panicle. The spikelets are solitary or paired, all alike, if paired pedicels unequal.

Subfamily: Panicoideae; Tribe: Andropogoneae
Species: World = 10, Australia = 1

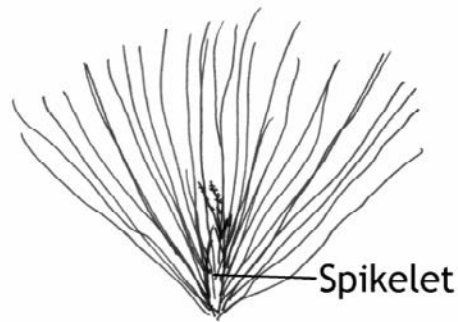
Imperata cylindrica is the only Australian species from this genus; *cylindrica* - refers to the shape of the inflorescence.

Imperata cylindrica (Blady Grass)

A tufted perennial 10-120 cm tall, with stiff, erect leaves. Often grows in damp or weedy places. After burning it rapidly resprouts from the rhizomes. The fluffy, white inflorescence is 3-20 cm long. The very small spikelets are hidden by long, silky, white hairs.



Inflorescence



Ischaemum

From the Greek *ischo* (to restrain) and *haima* (blood), as woolly seeds of the type species were reported as being used to stop bleeding.

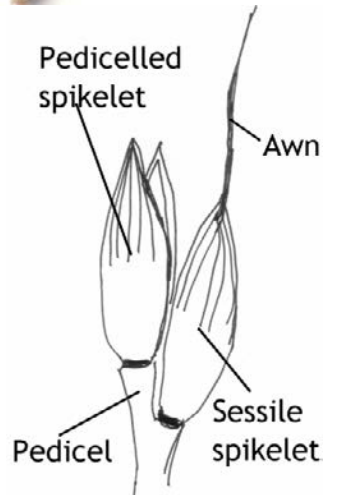
Erect or sprawling annuals or perennials. The inflorescence is usually of paired digitate appressed racemes, thus appearing spike-like. At maturity, the racemes split open. The spikelets are paired, one sessile and one pedicelled, and are partially embedded in rachis. The sessile spikelet is awned, the pedicelled spikelet is sometimes awned.

Subfamily: Panicoideae; Tribe: Andropogoneae
 Species: World = 60, Australia = 11

Species in this genus could be confused with *Sehima nervosum*.

Ischaemum species are usually found growing in damp areas, along creek banks or in swamps.

Townsville species
Ischaemum australe
Ischaemum rugosum



Inflorescences

Leersia

Named for Johan Daniel Leers, a German apothecary and botanist (1727-1774).

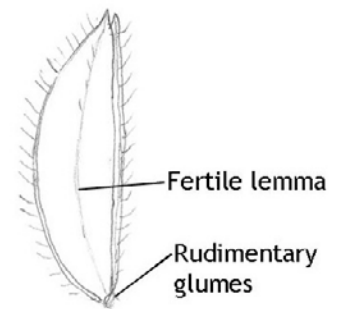
Perennials, rarely annuals usually growing in marshland, stream banks and shallow water. The inflorescence is an open or contracted panicle. The spikelets are solitary and strongly laterally compressed. Glumes are rudimentary, apparently represented by a narrow rim at the pedicel apex. *Leersia* is closely-related to rice (*Oryza*).

Subfamily: Ehrhartoideae; Tribe: Oryzeae
Species: World = 18, Australia = 2

Leersia hexandra is the only Queensland species from this genus; *hexandra* - from the Greek *hexa* (six) and *aner* (man), the florets possess six stamens.

Leersia hexandra (Swamp Ricegrass)

An erect, but weak grass to 1.5 m tall, annual or perennial, aquatic or semi-aquatic, and rooting at the lower nodes which grow in mud. The erect stems and leaves is a distinctive habit of this species. The inflorescence is a contracted to open, but narrow panicle.



Spikelet



Inflorescence

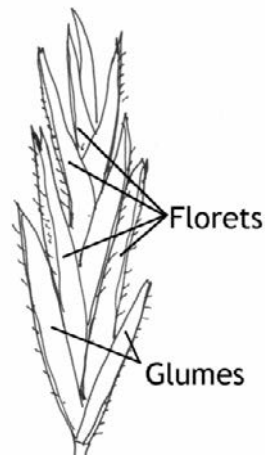
Leptochloa

From the Greek *leptos* (slender) and *chloe* (grass), referring to the inflorescences.

Annuals or perennials, tufted to decumbent, sometimes rhizomatous or stoloniferous. The inflorescence is a spike-like panicle or a racemose once-branched panicle or digitate or subdigitate. The spikelets are solitary and all similar with 1-several florets per spikelet, they are very similar to the genus *Eragrostis*. The species *Leptochloa neesii* is usually a one-flowered spikelet and can be confused with *Sporobolus* species.



Inflorescence



Spikelet



Part of a
inflorescence



Leptochloa neesii
spikelets with one
floret

Subfamily: Chloridoideae; Tribe: Cynodonteae
Species: World = c. 40, Australia = 9

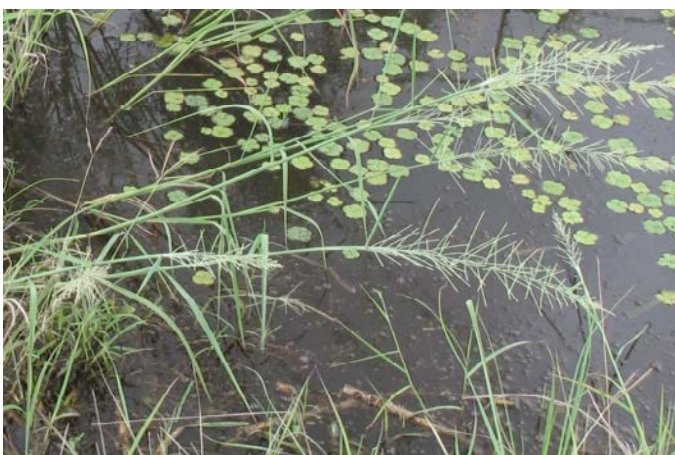
Townsville species

Leptochloa decipiens subsp. *decipiens*

Leptochloa fusca subsp. *fusca*

Leptochloa fusca subsp. *uninervia*

Leptochloa neesii



Lepturus

From the Greek *leptos* (slender) and *oura* (tail), referring to the slender inflorescence.

Annuals or perennials, tufted and stoloniferous. Grows on sandy beaches, with some species extending to coastal hinterlands. The inflorescence is a solitary, bilateral spike (almost cylindrical). The spikelets are solitary and partially embedded in the rachis. Lower glume absent or obscure.

Subfamily: Chloridoideae; Tribe: Cynodonteae

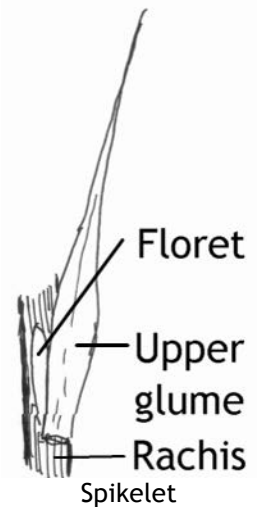
Species: World = 10, Australia = 5

Lepturus repens is the only Townsville species from this genus; *repens* - from the Latin *repo* (crawl), referring to the well-developed rhizome.

Lepturus repens

A tufted and creeping perennial grass, 10-60 cm tall. A coastal plant growing close to water in sand, especially coral sand, or in shallow soil creeping over rocks, or in *Casuarina* woodland.

This species could be confused with *Elionurus citreus*, *Eremochloa bimaculata*, *Hemarthria uncinata* and *Mnesithea rottboellioides*.



Herbarium scan Botanic Gardens Trust (1999 - 2008)



Raceme

References

Botanic Gardens Trust (1999 - 2008) PlantNET - The Plant Information Network System of Botanic Gardens Trust, Sydney, Australia (version 2.0).

Megathyrsus

Guinea Grass or Green Panic

From *mega* (large) and *thyrsus* (a dense flower cluster; much-branched indeterminate inflorescence with pedicellate flowers).

Megathyrsus maximus was previously known as *Panicum maximum* and *Urochloa maxima*, and is distinguished by its large open panicle and rugose (wrinkled) fertile floret.

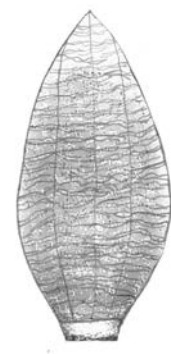
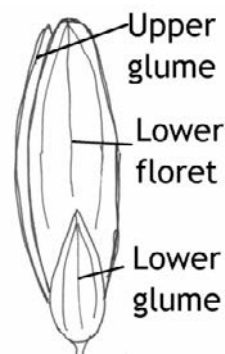
Densely tufted perennials, culms usually erect, 60-250 m tall. The panicle is 12-60 cm long and whorled at the lower nodes. The spikelets are solitary or in pairs.



Inflorescence



Spikelet



Fertile floret

Subfamily: Panicoideae; Tribe: Paniceae
Species: World = 2, Australia = 1

Megathyrsus maximus is the only Australian species from this genus; *maximus* - Latin for greatest.

Megathyrsus maximus

This species is a native of tropical Africa and is an important pasture species throughout the tropical regions of the world. A number of varieties are recognised. It has also become an environmental weed, and a common species along roadsides and in disturbed areas in north Queensland.

It can be confused with the species *Panicum mitchellii*

Townsville species and varieties

- Megathyrsus maximus* var. *coloratus*
- Megathyrsus maximus* var. *maximus*
- Megathyrsus maximus* var. *maximus*
- Megathyrsus maximus* var. *maximus* 'Hamil'
- Megathyrsus maximus* var. *pubiglumis*



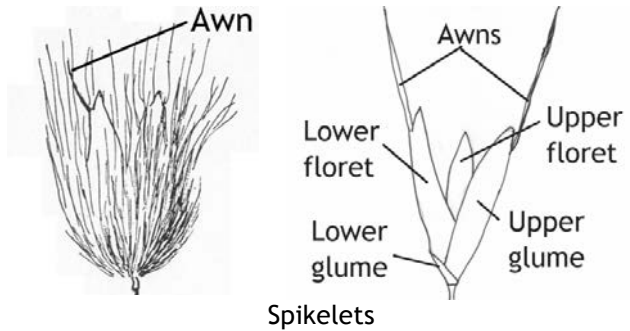
Melinis

From the Greek *meline* (a cereal, probably millet).

Stoloniferous or tufted, aromatic annuals or perennials. The inflorescence is an open panicle, red, white or purple-coloured. The spikelets are solitary; the lower glume is absent or obscure and the lower lemma has an awn arising from the apical lobes, which is sometimes obscured by hairs on the spikelet.

Subfamily: Panicoideae; Tribe: Paniceae
Species: World = 23, Australia = 2

Based on inflorescence colour and shape, *Melinis* could be confused with *Capillipedium* and *Chrysopogon zizanioides* however the spikelets are very different.



Inflorescences

Townsville species
Melinis minutiflora
Melinis repens



Mnesithea

Named after Mnesitheus (4th century BC), a Greek herbalist.

A genus of variable habit ranging from robust perennials to delicate annuals. The inflorescence is a single raceme or panicle, and subtended by a spathe. The spikelets are paired, and partially embedded in rachis, which breaks into segments at maturity. The pedicelled spikelet is sometimes different in shape and size from the sessile spikelet.

Subfamily: Panicoideae; Tribe: Andropogoneae

In 1986, based on cladistic studies, the genera *Coelorachis*, *Hackelochloa* and *Heteropholis* were included in *Mnesithea*. This broad concept (*sensu lato*) of the genus is not widely accepted.

Members of this genus could be confused with *Elionurus citreus*, *Eremochloa bimaculata*, *Hemarthria uncinata*, *Ophiuros exaltatus* and *Lepturus repens*

Mnesithea formosa could be confused with *Schizachyrium* species.

Species: Australia = 5
World: *Mnesithea* = 5, *Coelorachis* = c. 20,
Hackelochloa = 2, *Heteropholis* = 6



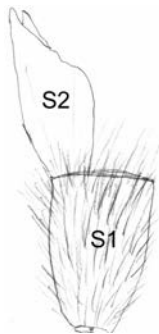
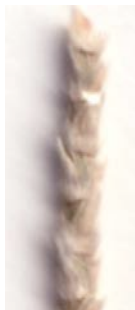
Mnesithea rottboellioides inflorescence



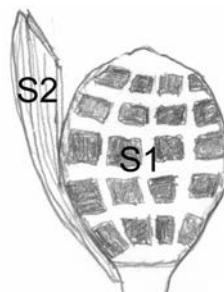
Mnesithea rottboellioides

Townsville species

- Mnesithea formosa*
- Mnesithea granularis*
- Mnesithea rottboellioides*



Mnesithea formosa



Mnesithea granularis



Mnesithea rottboellioides

S1 = sessile spikelet, S2 = pedicelled spikelet

Ophiuros

From the Greek *ophis* (serpent) and *oura* (tail), alluding to the smooth spikes with the scale-like appressed lower glumes of the spikelets.

Tufted perennials or annuals, culms woody and persistent. The inflorescence is a compound panicle composed of aggregated cylindrical racemes. The spikelets are sunken into the rachis and are borne alternately on opposite sides. The lower glume is sculptured when the spikelet is mature.

Subfamily: Panicoideae; Tribe: Andropogoneae.

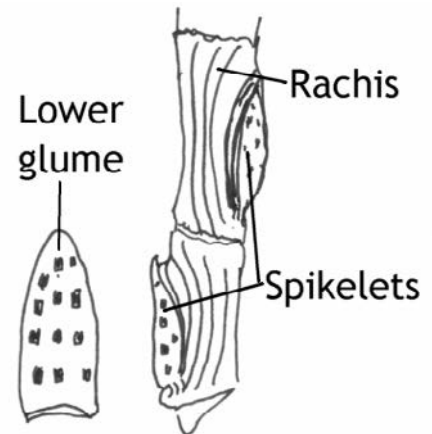
Species: World = 4, Australia = 1

Ophiuros exaltatus is the only Australian species from this genus; *exaltatus* - from the Latin for raised up, tall.

Ophiuros exaltatus (Canegrass)

A tall clumped erect perennial grass up to 2.5 m tall. The inflorescence is a clustered panicle of slender racemes, each subtended by a short spathe. This species is mostly found on clay soils in seasonally wet grasslands and open savannas.

This species resembles *Mnesithea* species, however *Ophiuros exaltatus* has spikelets that appear to be solitary and the lower glume is pitted in rows. This species may also be confused with *Eremochloa bimaculata*.



Inflorescence



Racemes showing spikelets arrangement



Drawing from Gardner (1952)

Reference:

Gardner, C. A. (1952) Flora of Western Australia Vol. 1, Gramineae Part 1, Government Printer, Perth.

Oplismenus

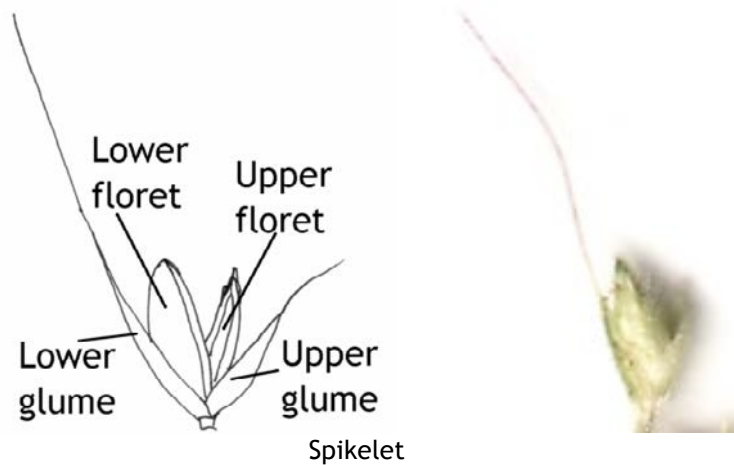
From the Greek *hoplismenus* (bearing arms), referring to the armed spikelets.

Shade-loving, decumbent annuals or perennials. The inflorescence is a once-branched panicle, with spikelets on one side of a slender axis, or branches are reduced to fascicles (clusters) of spikelets. The lower glume is awned and is often sticky at the tip, and by sticking to passing animals, acts as a fruit dispersal mechanism.

Oplismenus species are commonly found in rainforest or in damp shady places.

Subfamily: Panicoideae; Tribe: Paniceae

Species: World = 9, Australia = 5



Inflorescence

Townsville species
Oplismenus aemulus
Oplismenus compositus

Oryza

Rice

Latin from the Arabic *uruz* (rice), whence Greek *oruz* is also derived.

Tufted annuals or perennials often growing in open swamps. The inflorescence is an open or contracted panicle. The spikelets are solitary, strongly laterally compressed, usually with a long awn (the cultivated rice *Oryza sativa* is not awned). The spikelet consists two rudimentary, scale-like glumes, two basal florets reduced to lemmas and a terminal fertile (bisexual) floret. The fertile floret contains 6 stamens. Most Australian grass genera contain 1-3 stamens, *Leersia hexandra* also has 6 stamens.

Oryza species usually grow in swampy areas or seasonally inundated clay soils. During the dry season the grass dies back and the above-ground parts of the plant are not visible.

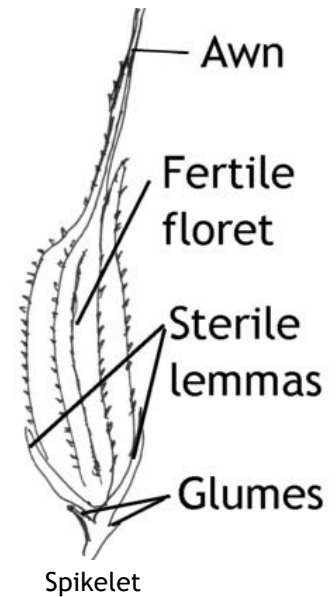
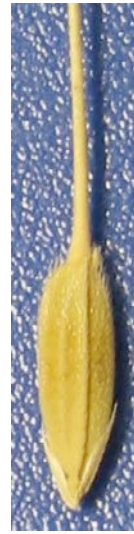
Subfamily: Ehrhartoideae; Tribe: Oryzeae

Species: World = c.25, Australia = 5

Townsville species

Oryza australiensis

Oryza meridionalis



Inflorescences

Oxychloris

Windmill Grasses

From Greek *oxys* (sharp) referring to the pungent callus, and the generic name *Chloris* (in which it was formerly included).

Tufted annuals or short-lived perennials. The inflorescence is digitate with 3-6 spikes. The spikelets are laterally compressed with 4-6 florets and arranged on one side of the rachis. The upper florets are inflated and each floret is awned, therefore each spikelet has 4-6 awns.

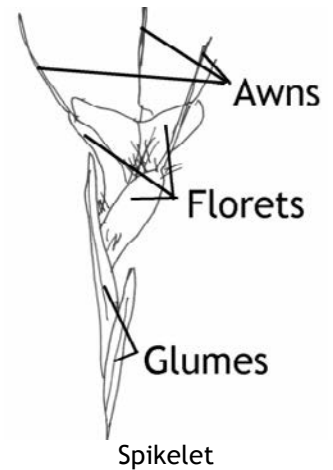
Oxychloris is closely related and easily confused with the genera *Chloris* and *Enteropogon*.

Subfamily: Chloridoideae; Tribe: Cynodonteae
Species: World = 1, Australia = 1

Oxychloris scariosa is the only species in this genus; *scariosa* - Latin for thin, referring to the texture of the glumes or lemmas.

***Oxychloris scariosa* (Winged Windmill Grass, Winged Chloris)**

Flowering culms 15-50 cm tall. The lemmas of the spikelets have awns and the upper lemmas are winged which spread outward when mature. This species grows mostly in arid areas and usually occurs on clay soils, but is also known to occur in sandy and loamy soils, especially in disturbed areas such as roadsides.



Inflorescence



Part of inflorescence

Panicum

Latin name for common millet, from Latin word *panis* (bread).

Annuals or perennials, of various habit but commonly tufted. The inflorescence is an open or contracted panicle, with secondary branches. The spikelets are solitary or in pairs, the surfaces of the fertile floret are smooth and often shiny. The lower glume varies from being very short to equal to the spikelet.

Species from this genus are from diverse habitats, including aquatic grasses.



Spikelets

Subfamily: Panicoideae; Tribe: Paniceae
Species: World = c 370, Australia = 35

Members of this genus could be confused with *Megathyrsus*, *Urochloa* and *Arthrargrostis*.

Townsville species

Panicum decompositum
Panicum effusum
Panicum laevinode
Panicum mindanaense
Panicum mitchellii
Panicum paludosum
Panicum seminudum
Panicum simile
Panicum trichoides



Inflorescence

Paspalidium

From the Greek *eidos* (shape) and *Paspalum* (another grass genus) 'shaped like *Paspalum*'; or a diminutive of *Paspalum*.

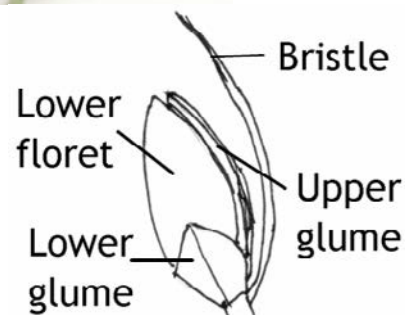
Annuals or perennials (often aquatic), rhizomatous or tufted to decumbent. The inflorescence is usually a once-branched panicle, however the racemes are appressed to the main axis or a single raceme. The rachis of each raceme extending as a bristle beyond the point of attachment of the last spikelet. The spikelets are solitary or in pairs.

Other genera with a single bristle subtending the spikelet are *Pseudoraphis* and some species of *Setaria*.

Subfamily: Panicoideae; Tribe: Paniceae
Species: World = c. 40, Australia = 23

Townsville species

Paspalidium caespitosum
Paspalidium constrictum
Paspalidium disjunctum
Paspalidium distans
Paspalidium flavidum
Paspalidium gracile
Paspalidium rarum
Paspalidium spartellum
Paspalidium udum



Spikelet at the end of the inflorescence



Inflorescences

Paspalum

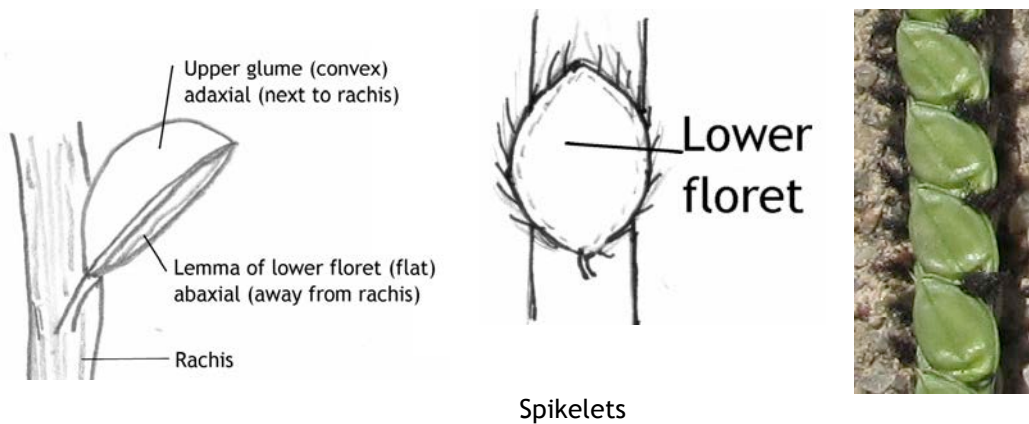
From the Greek word *paspalos* (a kind of millet).

Perennials (usually) or annuals, rhizomatous or stoloniferous or tufted or decumbent. The inflorescence is either digitate or a racemose once-branched panicle. The spikelets are solitary or paired, and arranged along one side of rachis (the axis or branch of the inflorescence). The genus is best recognised by its plano-convex spikelets with the upper glume adaxial (the side facing to the rachis), often with a hemispherical or oblong shape. The lower glume is usually absent.

Some species are similar to the genus *Axonopus*, however this genus has the upper glume abaxial (the side facing away from the rachis).

Subfamily: Panicoideae; Tribe: Paniceae

Species: World = 320 , Australia = 19



Spikelets



Inflorescences

- Townsville species**
Paspalum conjugatum
Paspalum distichum
Paspalum notatum
Paspalum scrobiculatum
Paspalum vaginatum



Inflorescence

Perotis

From the Greek *peros* (deficient, mutilated) and *ous* (an ear), the lemma is awnless.

Tufted annuals or rarely perennials. The inflorescence is a single raceme or spike. The spikelets are solitary and both glumes are long and awned. The single fertile floret is very small and held within the glumes.

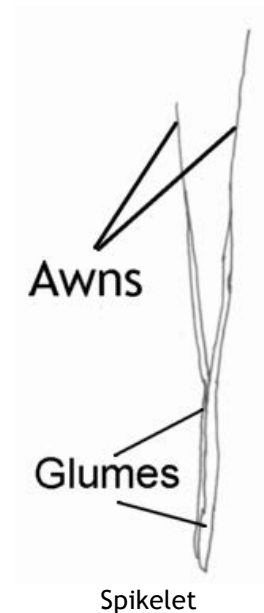
Subfamily: Chloridoideae; Tribe: Cynodonteae

Species: World = 10, Australia = 3

Perotis rara is the only Townsville species from this genus; *rara* is Latin for far apart and refers the spikelets being spaced out along the inflorescence.

Perotis rara (Comet Grass)

Perotis rara is an annual grass, flowering culms are 15-40 cm tall. The spikelets are often pointing downwards at maturity, hence the common name, Comet Grass. Grows on sandy soils.



Inflorescences



Phragmites

Reed Grasses

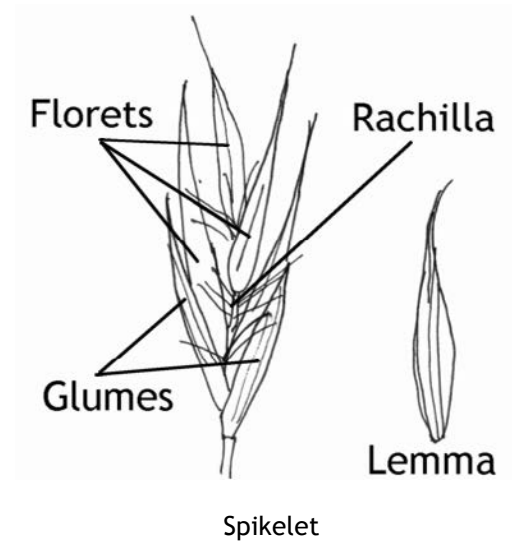
From the Greek *phragma* (a hedge or screen) and *-ites* (resembling), referring to the way in which the grass grows like a fence along a river bank.

Tall rhizomatous perennials, often forming dense stands, culms erect, reed-like, 1-3(-5) m tall. Grows in permanently wet places, especially along the banks of slow-running streams and swamps. The inflorescence is a large (10-50 cm) fairly dense feathery panicle. The spikelets are solitary, and comprising of numerous (3-12) florets; the rachilla (the axis of the grass spikelet) is covered with long silky hairs and the lemma is glabrous. Once the spikelets have fallen, the inflorescence remains on the plant and therefore does not look feathery.

Closely related and similar to *Arundo donax*

Subfamily: Arundinoideae; Tribe: Arundineae
Species: Australia = 2; World: = 3

Townsville species
Phragmites australis
Phragmites karka



Inflorescence

Pseudopogonatherum

From Greek *pseudo* (false) and *Pogonatherum*, referring to the similarity to the genus *Pogonatherum*.

Tufted, slender annuals, usually to less than 1 m tall, the thin leaves are mostly basal. The inflorescence is digitate or subdigitate and the racemes are erect. The spikelets are in pairs, similar and unevenly pedicelled. The spikelets are very small (1-2.5 mm long) and have long awns (15-30mm long), they break up at maturity making it difficult to see the pairing.

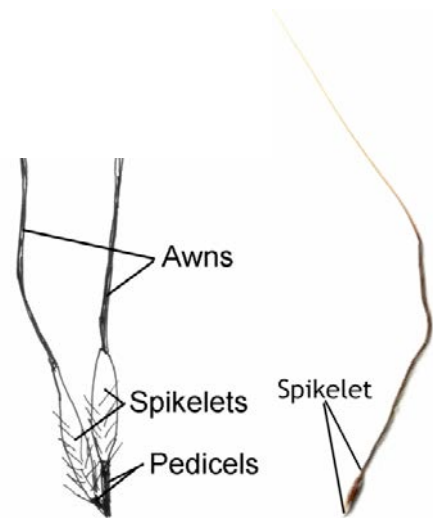
Subfamily: Panicoideae; Tribe: Andropogoneae
Species: World = 2, Australia = 2

Pseudopogonatherum contortum is the only species in Townsville from this genus; *contortum* - twisted

Pseudopogonatherum contortum

A slender, tufted, annual grass 20-110 cm tall. This species occurs sporadically in open woodland following summer rainfall. The digitate inflorescence consists of 3-20 racemes each 3-7 cm long. The spikelets and awns are dark brown and the inflorescence branches and spikelets are covered with white hairs.

This species could be confused with the closely-related perennial grass *Eulalia aurea*. The genus *Pseudopogonatherum* also has a superficial similarity to the genera *Chloris* and *Enteropogon*.



Inflorescence

Pseudoraphis

Mud Grasses

From the Greek *pseudo* (false) and *raphis* (needle), referring to the bristle-like point protruding beyond the uppermost spikelet.

Perennial aquatic or marsh grasses, culms mostly prostrate and often floating in water. The inflorescence is a racemose or contracted panicle, the slender branches are often reduced to one or two spikelets. The spikelets are solitary, narrow and awned or unawned. The apex of the spikelets are acuminate and a bristle protrudes beyond the uppermost spikelet. Other genera with a single bristle subtending the spikelet are *Paspalidium* and some species of *Setaria*.

Subfamily: Panicoideae; Tribe: Paniceae

Species: World = 7, Australia = 4

Townsville species

Pseudoraphis paradoxa

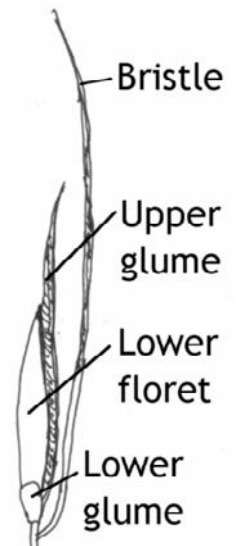
Pseudoraphis spinescens



Inflorescences



Spikelets



Spikelet at the end of the inflorescence



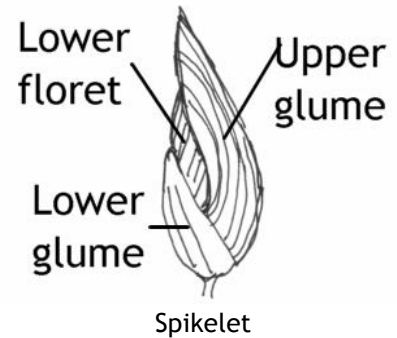
Sacciolepis

From the Greek *sakkion* (small bag) and *lepis* (scale), alluding to the shape of the upper glume.

Annual or perennial grasses. Recognised by the spiciform (spike-like panicle with short branches) inflorescences and the gibbous (hump-backed), ribbed spikelets. Species from this genus grow in or near water or in wet places.

Subfamily: Panicoideae; Tribe: Paniceae

Species: World = 30, Australia = 2



Sacciolepis indica is the only Townsville species from this genus; *indica* - from Indian

Sacciolepis indica (Indian Cupscale Grass)

Annual, erect or creeping and rooting at the nodes, 10-60 cm tall. It may be found growing among more vigorous grasses which give the plants some support and protection. The inflorescence is 1-13 cm long.

This grass is found growing in damp areas.



Inflorescences

Sarga Sorghum

The meaning of *Sarga* is not given by the author and so is obscure. Recent studies of the Australian *Sorghum* species, have suggested three distinct lineages, and these species have been divided into three genera, *Sorghum*, *Sarga* and *Vacoparis*.

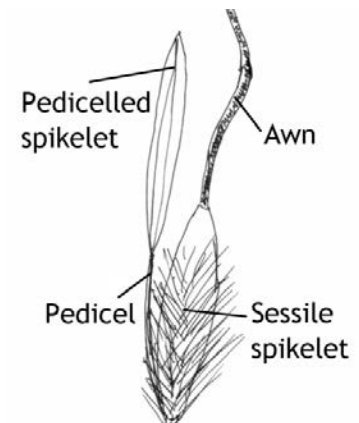
Tufted annuals or perennials. The inflorescence is an open or contracted panicle. The spikelets are in pairs (with terminal triplets), one sessile and one pedicelled. The mature sessile spikelets are dark reddish brown almost black. The sessile spikelets usually have long awns (1.5-8.5 cm long) and the pedicelled spikelet is well-developed.

Subfamily: Panicoideae; Tribe: Andropogoneae
Species: World = 8, Australia = 5

Sarga plumosum is the only species from this genus in Townsville; *plumosum* - from the Latin for feathery, referring to the long hairs giving the pedicels a feathery appearance.

Sarga plumosum (Plume Sorghum)

This species was previous called *Sorghum plumosum*. *Sarga plumosum* is a tufted, perennial grass 1-3 m tall. The stems have distinctive bearded nodes. Leaves usually have white mid-rib, and vary in colour from shiny green to blue-green. The inflorescence is usually a dense panicle 12-45 cm long, with dark red-brown spikelets. It is found on sands, red earths and heavy loams, and grows in swamps, claypans, watercourses, waterholes and valleys.



Spikelets



Bearded node

Schizachyrium

From the Greek *schizen* (to split) and *achuron* (chaff), alluding to the bilobed lemma of the sessile spikelet. *Schizachyrium* can be pronounced “shize-ah-KIR-ee-um”.

Perennials or annuals, tufted to decumbent. The inflorescence is a single raceme or a panicle with a spathe subtending each racemes. The spathe is sometimes not obvious and the inflorescence looks like a spike. The spikelets are in pairs, one sessile and one pedicelled, which is much reduced. The sessile spikelet is awned and arises from a bilobed lemma.

The spikelets are usually clothed in silky white hairs, similar to *Mnesithea formosa*, however *Schizachyrium* spikelets are awned

Subfamily: Panicoideae; Tribe: Andropogoneae

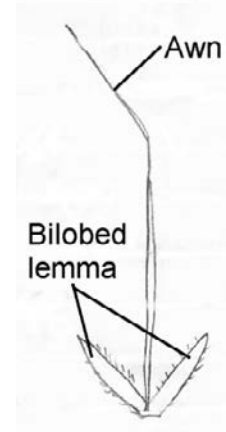
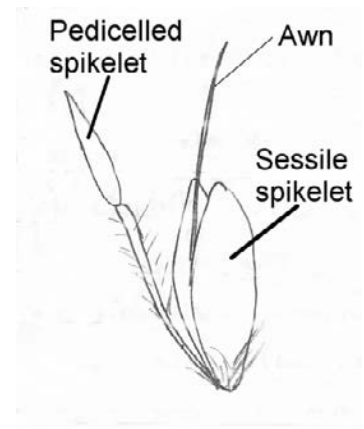
Species: World = c. 60, Australia = 8

Townsville species

Schizachyrium fragile

Schizachyrium occultum

Schizachyrium pseudeulalia



Inflorescences

Sehima

From the Arabic *Saehim* or *Sehim*, the common name for the species (*Sehima ischaemoides*) in Egypt.

Tufted annuals or perennials. The inflorescence is a single, curved raceme. The spikelets are paired, one sessile and one pedicelled, and are partially embedded in rachis. The sessile spikelet is awned.

Subfamily: Panicoideae; Tribe: Andropogoneae
Species: World = 5, Australia = 1

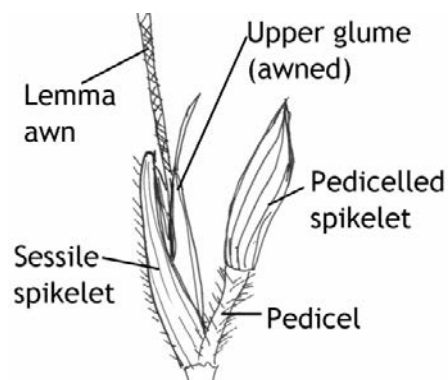
Sehima nervosum is the only species from this genus; *nervosum* - from the Latin *nervus* (nerve) and *-osa* (abundance) which refers the conspicuous nerves in the glumes or lemmas.

Sehima nervosum (Rat's Tail Grass, Whitegrass)

Sehima nervosum is a tufted perennial up to 1 m tall. The inflorescence is 3-12 cm long. The pedicels and internodes of the inflorescence are densely bearded with white hairs. This species can be recognised by the lower glume of the pedicelled spikelet - it is slightly asymmetrical and strongly nerved.

This species could be confused with *Ischaemum* species.

Sehima nervosum is usually found growing in dry areas in poor soils, often associated with *Themeda triandra*.



Spikelet pairs

Pedicelled spikelet showing asymmetric glume



Inflorescences

Setaria

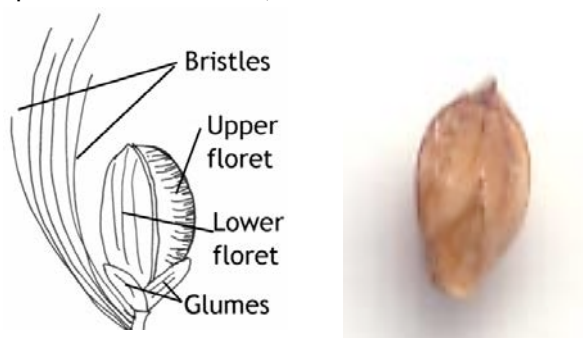
Pigeon Grasses

From Latin *seta* (bristle) to the bristly inflorescences, *aria* pertaining to.

Annuals or perennials, rhizomatous or stoloniferous or tufted or decumbent. The inflorescence is a spicate panicle (spike-like with short branches). The spikelets are solitary, usually with 1-numerous subtending bristles. The lemma of the upper floret is transversely rugose (wrinkled or with a creased surface).

Setaria species looks similar to *Cenchrus* (including *Pennisetum*), however spikelets fall from the plant without any bristle attached leaving a rachis with the bristles attached.

Subfamily: Panicoideae; Tribe: Paniceae
Species: World = c110, Australia = 16



Spikelets



Inflorescences



Inflorescences

Townsville species

Setaria australiensis

Setaria oplismenoides

Setaria pumila subsp. *subtesselata* (previously *Setaria pumila* subsp. *pallide-fusca*)

Setaria sphacelata

Setaria surgens

Sorghum

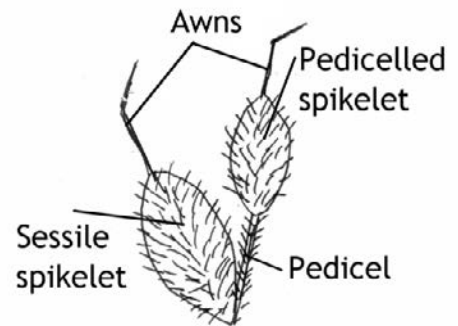
From *sorgho*, the Italian name for the genus. *Sorghum*, in the broadest sense (*sensu lato*), is a genus containing c. 30 species and is widespread in tropical and subtropical parts of the world. Grain sorghum is an important cereal being a staple food grain in west Africa and widely used for feeding livestock in western countries. It is believed to have been domesticated over 3000 years ago and many varieties have been developed.

Recent studies of the Australian *Sorghum* species, have suggested three distinct lineages, and these species have been divided into three genera, *Sorghum*, *Sarga* and *Vacoparis*.

Sorghum, in the narrowest sense (*sensu stricto*), are robust annuals or perennials. The inflorescence is an open or contracted panicle. The spikelets are in pairs (with terminal triplets), one sessile and one pedicelled. The mature sessile spikelets are usually dark reddish-brown almost black. The sessile spikelets usually have short awns (1-1.5 cm long) or are awnless, and the pedicelled spikelet is well-developed.

Subfamily: Panicoideae; Tribe: Andropogoneae

Species: World = c. 20, Australia = 3-7 (some species are considered hybrids).



Inflorescences

Townsville species

- Sorghum alnum*
- Sorghum bicolor*
- Sorghum halepense*
- Sorghum nitidum*



Spikelets

Spinifex

Beach Spinifex Grasses

Spinifex is from the Latin *spina* (a thorn) and *facere* (to make), alluding to sharp pointed leaves.

Tufted and rhizomatous, dioecious (plants are either male or female) perennials. Female plants (with female or bisexual spikelets) have globose, spiny inflorescences which fall from the plant whole and roll along the beach in the wind. The spikelets of the female plants are awned. Male plants have erect inflorescences consisting of clustered racemes. The spikelets of the male plants are not awned.

The spinifex grasses of inland Australia belong to the genus *Triodia*. Species from the genus *Spinifex* grow on the sand dunes in coastal areas.

Subfamily: Panicoideae; Tribe: Paniceae
Species: World = 4, Australia = 3

Spinifex sericeus is the only Townsville species from this genus; *sericeus* - from the Latin *sericus* (silken) and *-ea* (indicating resemblance), referring to the soft hairs on the leaves and shoots.

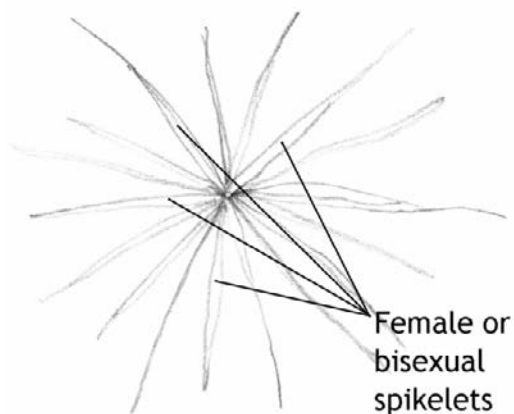


Spinifex sericeus (Hairy or Beach Spinifex)

A stout perennial grass up to 30 cm tall with strong creeping rhizomes, with new plants produced at the nodes; leaves are bluish green. This grass is an effective sand-binder in beach reclamation



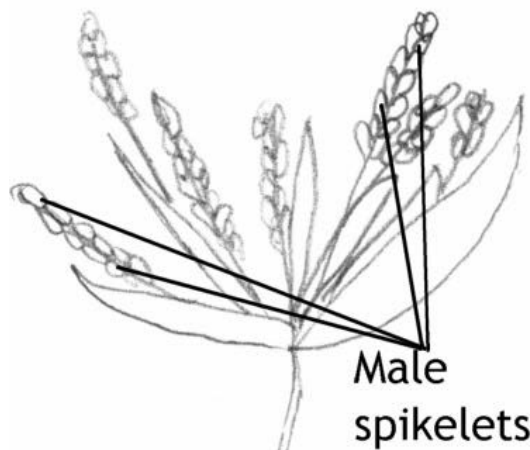
Female inflorescences



Female or bisexual spikelets



Male inflorescence



Male spikelets

Sporobolus

Dropseed Grasses & Rat's Tail Grasses

From the Greek *spora* (seed) and *bolos* (throwing), at maturity the seeds are squeezed out of the fruits.

Perennials or annuals, erect to decumbent, usually tufted. The inflorescence is an open or contracted panicle; many species of non-native *Sporobolus* with contracted panicles are becoming serious weeds. The spikelets are solitary. The mature grain becomes sticky when wet.

Sporobolus It is distinguished from *Eragrostis* by its 1-flowered spikelets and 1-nerved lemmas.

The species *Leptochloa neesii* can be confused with *Sporobolus* species.

Subfamily: Chloridoideae; Tribe: Cynodonteae

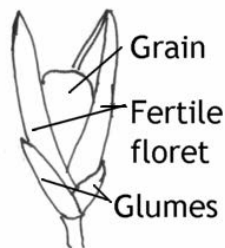
Species: World = c. 160, Australia = 24



Inflorescences

Townsville species

- Sporobolus australasicus*
- Sporobolus caroli*
- Sporobolus coromandelianus*
- Sporobolus fertilis*
- Sporobolus jacquemontii*
- Sporobolus lenticularis*
- Sporobolus natalensis*
- Sporobolus sessilis*
- Sporobolus virginicus*



Spikelet

Stenotaphrum

From Greek *stenos* (narrow) and *taphros* (trench), alluding to the cavities in the rachis.

Creeping or prostrate perennials or tufted erect annuals. The inflorescence is a spike or raceme with spikelets embedded in hollows of a broad, flattened axis

Subfamily: Panicoideae; Tribe: Paniceae

Species: World = 7, Australia = 2

Stenotaphrum secundatum is becoming popular as a lawn grass with many varieties. In Townsville is only found in cultivation, however in other parts of Australia (see map) it has become naturalised. The species name *secundatum* - is from the Latin *secundus* (bent to one side) and *-atus* (possessing), and refers to the curved fleshy axis of the inflorescence.

Stenotaphrum secundatum

A mat-forming, prostrate, perennial grass, with smooth, hairless leaves and culms. Appears to be an uncommon turf grass in Townsville. Similar to the common lawn grass Buffalo Grass (*Axonopus compressus*).

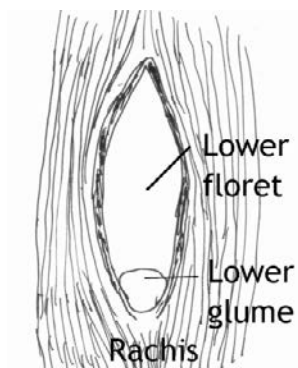


Inflorescence

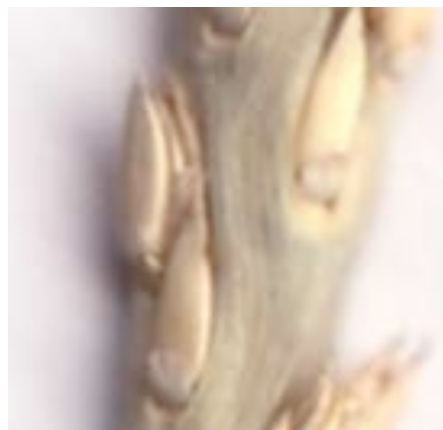


Popular varieties

Palmetto
Sir Walter
Shademaster



Spikelet



Part of inflorescence

Themeda

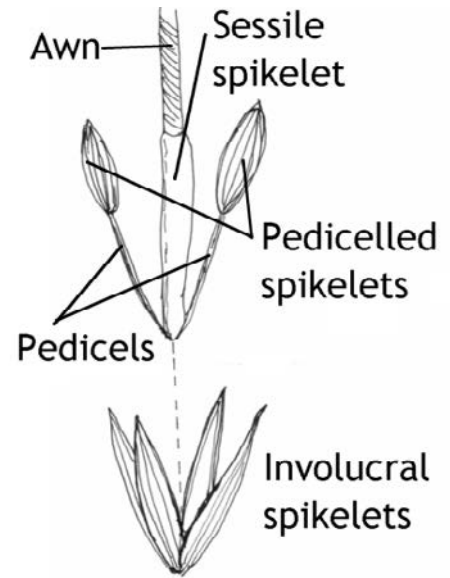
From the Arabic *thaemed* (transliterated by the author as a depression filled with water). The meaning of the choice of name is not of given by the author.

Tufted perennials or annuals. The inflorescence is a panicle of condensed racemes each subtended by spathe (leaf-like bract). The spikelets are in groups of seven which are difficult to see in the field. There are four involucral spikelets at the base, two pedicelled spikelets and a sessile spikelet which is the only one to produce a seed and is the only spikelet that is awned.

Members of this genus could be confused with *Cymbopogon* species.

Grader Grass (*Themeda quadrivalvis*) could be confused with Giant Spear Grass (*Heteropogon triticeus*) and *Hyparrhenia rufa*, especially before flowering. These three species are tall grasses, and their increase in height before flowering is caused by a section of pale yellow culm being pushed upwards until it protrudes well above the green leaf sheath that previously enclosed it. The pale sections of the internodes alternate with the green sheaths giving these grass species a conspicuously banded appearance.

Subfamily: Panicoideae; Tribe: Andropogoneae
Species: World = 18, Australia = 5



Inflorescences

Townsville species
Themeda arguens
Themeda quadrivalvis
Themeda triandra



Thuarea

Thuarea is named after Aubert du Petit-Thouars (1756-1831), the French botanist and ship's officer.

Creeping, mat-forming perennials which grows on sandy seashores. The inflorescence is a spatheate (with spathe) raceme consisting of 1-2 bisexual spikelets in the lower part and several male spikelets in the upper part.

Subfamily: Panicoideae; Tribe: Paniceae
Species: World = 2, Australia = 1

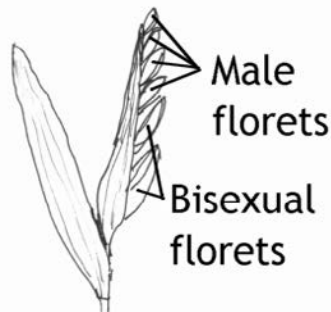
Thuarea involuta is the only Australian species from this genus; *involuta* from the Latin *involvere* (inroll), referring to the inrolled leaf blades.

Thuarea involuta (Tropical Beachgrass)

A mat-forming perennial grass with velvety-soft leaves. The inflorescence is a one-sided raceme with 1 to 2 female flowers at the base and 4 to 6 male flowers at the apex.



Inflorescence



Ripening seed

The short flowering shoots bend down as the seed ripens, and the capsules (formed by the spathe in a water-tight fold) either become buried in the sand or float away in the sea.

This prostate grass grows on sand dunes, particularly foredunes. It is an efficient sand binder and forms deep roots. It has been planted at Saunders Beach for dune stabilisation.



Triodia

Spinifex or Porcupine Grasses

Triodia from the Greek *treis* (three) and *odous* (tooth), referring to the 3-toothed or 3-lobed lemmas.

Tufted perennials, mostly hummock-forming, culms wiry. Leaf blades narrow, hard, woody needle-like. The inflorescence is a panicle or single raceme or spike. The spikelets are usually solitary with 4-15 florets. Some species are awned and some are awnless.

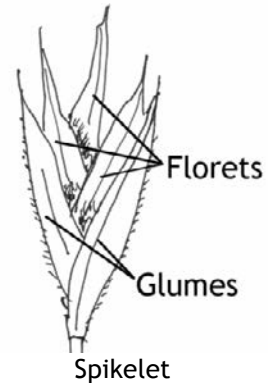
The spinifex grasses of inland Australia belong to the genus *Triodia*. Species from the genus *Spinifex* grow on the sand dunes in coastal areas.

Subfamily: Chloridoideae; Tribe: Triodieae
Species: World = 65, Australia = 65

Triodia stenostachya is the only Townsville species from this genus; *stenostachya* - from the Greek *stenos* (narrow) and *stachys* (ear of corn), referring to the inflorescence which is a narrow spike or spike-like panicle.

Triodia stenostachya

A tufted, stoloniferous perennial forming dense hummocks, 30-100 cm tall. The culms and leaves are highly resinous. The inflorescence is a contracted panicle. Grows on rocky hillslopes and ridges in shallow soils; found on Castle Hill. The spikelets of this species is awnless or shortly awned.



Urochloa

Arm Grasses or Signal Grasses

From Greek *oura* (tail) and *chloe* (grass), alluding to the muricate (with short sharp point) lemma of the upper floret. *Brachiaria* (excluding *Brachiaria eruciformis*) species are now included in *Urochloa*, these species do not have a muricate fertile lemma.

Annuals or perennials, rhizomatous or stoloniferous or tufted or decumbent. The inflorescence is a once-branched panicle. The spikelets are solitary, in pairs or clustered. The fertile lemma rugose (wrinkled).

Members of this genus could be confused with *Echinochloa*, *Eriochloa* or *Paspalum* species.

Subfamily: Panicoideae; Tribe: Paniceae
Species: World = c 111, Australia = 27



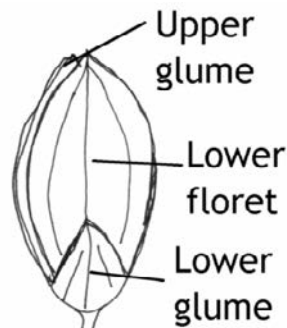
Fertile floret showing rugose lemma



Inflorescences

Townsville species

- Urochloa distachya*
- Urochloa holosericea* subsp. *holosericea*
- Urochloa mosambicensis*
- Urochloa mutica*
- Urochloa oligotricha*
- Urochloa panicoides*
- Urochloa piligera*
- Urochloa polyphylla*
- Urochloa pubigera*
- Urochloa reptans*
- Urochloa subquadripara*



Spikelets

Vacoparis Sorghum

From Latin *vaco* (empty) and *paris* (companion), referring to the greatly reduced pedicelled spikelets. Recent studies of the Australian *Sorghum* species, have suggested three distinct lineages, and these species have been divided into three genera, *Sorghum*, *Sarga* and *Vacoparis*.

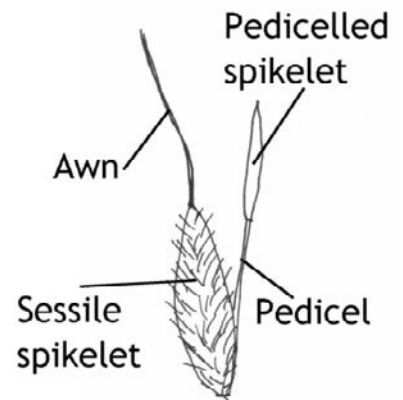
Tufted annuals. The inflorescence is an open or contracted panicle. The spikelets are in pairs (with terminal triplets), one sessile and one pedicelled. The mature sessile spikelets are dark reddish brown almost black. The awn of the sessile spikelet 2.5-5.2 cm long, the pedicelled spikelet is reduced to narrow, linear glumes.

Subfamily: Panicoideae; Tribe: Andropogoneae
Species: World = 2, Australia = 2

Vacoparis laxiflorum is the only species from this genus in Townsville; *laxiflorum* from the Latin *laxus* (loose) and *flos* (flower), referring to open panicle.

Vacoparis laxiflorum (Red Sorghum)

This species was previous called *Sorghum laxiflorum*. *Vacoparis laxiflorum* is an annual grass 1-3 m tall. The nodes of the culms are glabrous, pubescent or bearded. The inflorescence is an open panicle 5-20 cm long, which hangs to one side. The sessile spikelets are with white or pale brown hairs. Usually found on heavy clays and alluvial soils along river flats and flooded areas.



Inflorescence

Whiteochloa

Whiteochloa is named after the Cyril Tenison White, Queensland Government botanist 1917-1950.

Annual, or short-lived perennials, tufted to decumbent. The inflorescence is an open or contracted panicle. The spikelets are solitary.

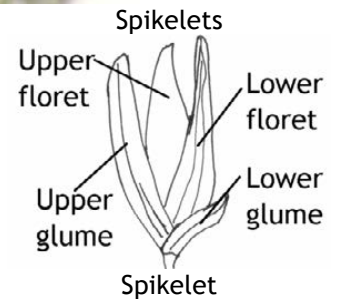
Subfamily: Panicoideae; Tribe: Paniceae
Species: World = 6, Australia = 6

Whiteochloa airoides is the only Townsville species from this genus; *airoides* - the inflorescences resemble those of genus *Aira*.

Whiteochloa airoides

A tufted perennial tussock grass 45-110 cm tall, with basal leaf sheaths pubescent. The inflorescence is an open or contracted panicle 7-25 cm long, 1-10 cm wide, contracted about primary branches. This grass grows in sandy alluvial soils.

This species could be confused with *Arthrargrostis*, *Panicum*, and *Urochloa* species.



Inflorescences

Zoysia

Zoysia Grasses

Named for Baron Karl von Zois, 1756-1800, Austrian botanist.

Mat-forming perennials, rhizomatous. The inflorescence is a single raceme with spikelets arranged on all sides. The spikelets have one fertile floret and one glume, the lower glumes is absent or obscure.

Zoysia grasses are native to southeast Asia, Australia and New Zealand and are cultivated for lawns and ornamental plants. There are three principle species which have been used to develop varieties and hybrids:

Zoysia japonica - Japanese Lawngrass, Korean Lawngrass

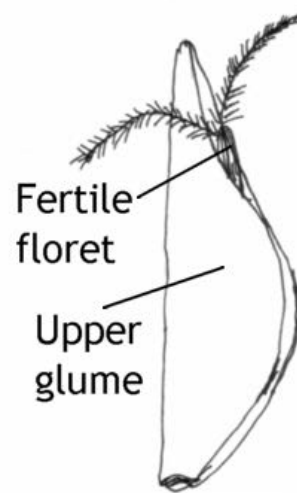
Zoysia matrella - Manila Grass

*Zoysia pacifica*¹ - Korean Lawngrass, No Mow Grass

The Australian endemic species *Zoysia macrantha* (Prickly Couch Grass), grows in coastal areas between north of Yeppoon, and Port Lincoln, South Australia.

Subfamily: Chloridoideae; Tribe: Cynodonteae

Species: World = 11, Australia = 1 (plus 3 cultivated species)



Spikelet

Reference

Gilliland, H. B., Holttum, R. E., Bor, N. L. and Burkill, H. M. (1971) A Revised Flora of Malaya Volume III Grasses of Malaya, Government Printing Office, Singapore.

¹ Recent research has identified the improper application of the name *Z. tenuifolia*. *Z. tenuifolia* is endemic to Mauritius, is not represented in *Zoysia* breeding collections, and has not been used in the development of zoysia grasses. The specimens collected in Pacific Rim countries belongs to the species *Z. pacifica*.

Andropogon

From the Greek words *aner* (man) and *pogon* (beard), alluding to the awns or to the long hairs on the raceme internodes and pedicels.

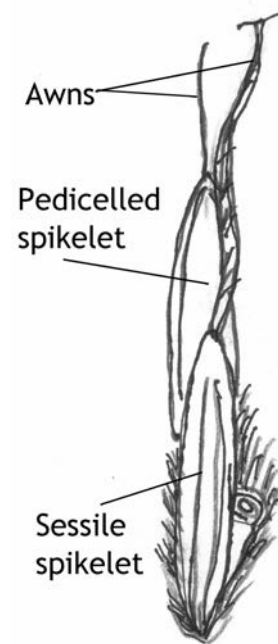
Tufted perennials or annuals. The inflorescence of spicate main branches or paniculate (usually with paired or digitate racemes. The spikelets are in pairs, one sessile and the other pedicelled.

Subfamily: Panicoideae; Tribe: Andropogoneae
Species: World = c.120, Australia = 3

There is only one species in Townsville, *Andropogon gayanus*; *gayanus* in honor of Claude Gay (1800-1873) French and - *ana*, indicating connection

Andropogon gayanus (Gamba Grass)

Gamba grass is an erect perennial that can grow to 4 m. The inflorescence is composed of racemes in pairs which contain about 17 spikelet pairs. Sessile spikelet is fertile and the companion sterile spikelet is well-developed and male. Both spikelets often with awns.



Inflorescences