Grasses of James Cook University, Townsville Campus

Part B: Generic descriptions and key to species

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Chris Gardiner, who is always willing to go on botanical walks around Townsville; he also loaned me his camera and provided photographs for the book.

[1] Her books include: Plants of Magnetic Island; Plants of the tropics, rainforest to heath, an identification guide; A guide to the plants of the Burra Range; Field guide to the eucalypts Porcupine Gorge, White Mountains to Moorrinya area; A 'pictorial' key to some grass genera found between Charters Towers and Hughenden.

Introduction

Background

Early in 2004, Chris Gardiner and myself decided to cultivate a grass garden as a resource to teach students how to identify grasses. Grass identification was an integral part of the subject "Structure and Dynamics of Tropical Savannas". We decided to collect plants and seeds from the plants found on the Townsville campus for the garden. Between 2004 and 2008, we have explored many areas of the campus and other sites in Townsville, and this is the early stages of this book.

There are virtually no books on the flora of Townsville, however Betsy Jackes has written many books on the flora of north Queensland. Her books are easy to use and are popular with university staff and students. One of these books, "A 'pictorial' key to some grass genera found between Charters Towers and Hughenden", on which this work is based, has received numerous positive comments.

This book is intended as a valuable reference for the identification of grasses of the Townsville (Douglas) Campus of James Cook University.

Douglas Campus, James Cook University

The Douglas Campus is a 386-hectare site comprising of parkland and natural bushland in the surrounding area.

The bushland is classified as Regional Ecosystems 11.3.30 and 11.3.35, that is, eucalypt woodland with a grassy ground layer. The dominant tree species are *Eucalyptus platyphylla, E. crebra/drepanophylla, Corymbia clarksoniana* and *C. tessellaris*. The dominant grass species are *Heteropogon contortus, Themeda triandra* and in disturbed areas *Megathyrsus maximus*.

Aerial photograph of Douglas Campus, 2005 from http://www.jcu.edu.au/office/centralservices/aerialphotos/townsville.jpg

There are 100 grass species on Douglas campus, 67 natives and 33 non-natives (includes cultivated plants in the parkland, excluding bamboos).

These grass species are listed below according to habitat, this should help with their identification by limiting the number of species to be considered. The asterisk (*) refers to non-native species.

Grasses of open woodlands

Alloteropsis cimicina
Alloteropsis semialata
Aristida calycina var. calycina
Aristida holathera var. holathera
Aristida latifolia
Aristida perniciosa
Aristida queenslandica var. dissimilis
Aristida utilis var. utilis
Aristida warburgii
Arundinella nepalensis
Bothriochloa bladhii subsp. bladhii
Bothriochloa decipiens
Bothriochloa ewartiana
Brachyachne convergens
Capillipedium parviflorum
Capillipedium spicigerum
Chloris lobata
Chloris pumilio
Chrysopogon fallax
Cymbopogon ambiguus
Cymbopogon bombycinus
Dactyloctenium radulans
Dichanthium fecundum
Dichanthium sericeum subsp. polystachyum
Dichanthium sericeum subsp. sericeum
Digitaria ammophila
Digitaria longiflora
Digitaria nematostachya
Ectrosia leporina
Enneapogon lindleyanus
Eragrostis cumingii
Eragrostis elongata
Eragrostis exigua
Eragrostis schultzii
Eragrostis spartinoides
Eriachne ciliata
Eriachne mucronata
Eriachne obtusa
Eriachne rara
Eriochloa pseudoacrotricha
Eulalia aurea
Heteropogon contortus
Heteropogon triticeus
*Melinis repens
Mnesithea formosa
Mnesithea granularis
Mnesithea rottboellioides
Panicum effusum
Panicum laevinode
Panicum seminudum var. cairnsianum
Paspalidium distans
Paspalidium rarum
Pseudopogonatherum contortum
Pseudopogonatherum irritans
Sarga plumosum
Schizachyrium fragile
Sehima nervosum
Setaria surgens
Sporobolus australasicus
Sporobolus lenticularis
Themeda arguens
Themeda triandra
*Urochloa oligotricha
Urochloa polyphylla
Urochloa pubigera
Urochloa subquadripara
Vacoparis laxiflorum

Grasses of disturbed areas and roadsides
*Bothriochloa pertusa
Brachyachne convergens
*Cenchrus echinatus
*Chloris gayana
*Chloris inflata
*Cynodon dactylon var. dactylon
*Dactyloctenium aegyptium
Dactyloctenium radulans
*Dichanthium annulatum
*Dichanthium aristatum
*Echinochloa colona
*Echinochloa esculenta
*Eleusine indica
*Eragrostis amabilis
*Eragrostis cilianensis
Eragrostis cumingii
*Eragrostis pilosa
*Eragrostis tenuifolia
*Hyparrhenia rufa subsp. rufa
*Megathyrsus maximus var. maximus
*Megathyrsus maximus var. pubiglumis
*Melinis repens
*Paspalum conjugatum
*Pennisetum ciliare (Cenchrus ciliaris)
Perotis rara
Sporobolus australasicus
*Sporobolus coromandelianus
*Sporobolus jacquemontii
Themeda arguens
*Themeda quadrivalvis
*Urochloa mosambicensis

Ornamental grasses or grasses in lawns
*Arundo donax
*Axonopus compressus
*Bothriochloa pertusa
*Chrysopogon acicularis
*Cynodon dactylon var. dactylon
*Digitaria didactyla
*Eleusine indica
*Eragrostis tenuifolia
*Sporobolus jacquemontii
*Zoysia sp.

Riparian Grasses
Arundinella nepalensis
Mnesithea rottboellioides
Oplismenus aemulus
*Paspalum conjugatum
*Urochloa mutica

Grass groups and genus information
The grass species included in this book are placed into one of ten groups based mainly on the type of inflorescence, and on certain features of the spikelet. This is not a natural key, therefore species in the same genus may key out into different groups.

The following information is given under each genus:

- Derivation of the genus name
- Description of the genus, including habit, inflorescence and spikelet morphology, and any other distinguishing features
- Subfamily and tribe – more information about grass classification is given in the Part A
- World and Australian species numbers
- Key to species when there is more than one species

Group 1 – Spatheate inflorescence

Cymbopogon
- *C. ambiguus*
- *C. bombycinus*

Hyparrhenia
- **H. rufa* subsp. *rufa*

Mnesithea
- *M. formosa*
- *M. granularis*
- *M. rottboellioides*

Schizachyrium
- *S. fragile*

Themeda
- *T. arguens*
- **T. quadrivalvis*
- *T. triandra*

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. Inflorescence a panicle of short paired racemes each subtended by a reddish spatheole. Spikelets in pairs, one sessile and one pedicelled.

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

There are 2 species on campus, they grow in the open eucalypt woodlands surrounding the university.

Key to campus species:

1 Densely tufted perennial to 1.2 m tall; spikelets densely covered with white silky or woolly hairs giving the inflorescence a fluffy appearance ....*Cymbopogon bombycinus*

1: Narrowly erect perennial to 1.5 m tall; inflorescence greenish; spikelets not completely covered with dense woolly hairs .....*Cymbopogon ambiguus*

Cymbopogon ambiguus
Scentgrass

Cymbopogon bombycinus
Silky Oil Grass

Cymbopogon bombycinus

Hyparrhenia
Thatch Grasses

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

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

There is only one species on campus, which grows mainly along roadsides often in association with Grader Grass (*Themeda quadrivalvis*), and it also occurs in disturbed areas. It 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.

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

Hyparrhenia rufa **subsp.** *rufa*

Mnesithea

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

A genus of variable habit ranging from robust perennials to delicate annuals. The inflorescence is a single raceme or panicle, with spikelets solitary or paired, awnless, and partially embedded in rachis, which breaks into segments at maturity.

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.

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

There are 3 species on campus,

1 Robust, erect perennial 1-3 m tall; inflorescence several finger-like branches crowded within spathe; occurs along creek banks or in depressions .....*Mnesithea rottboellioides*

1: Erect annuals, 5-70 cm tall; inflorescence exserted or embraced at the base by subtending leaf **2**

2 Inflorescence a spike-like raceme 2-8 cm long; apex of rachis joints with a fringe of silky hairs; sessile spikelets not globose; lower glume of sessile spikelet pubescent and smooth .... *Mnesithea formosa*

2: Inflorescence a series of spike-like racemes to 2.5 cm long; apex of rachis joints glabrous; sessile spikelet globose; lower glume of sessile glume glabrous and latticed or rugose..... .....*Mnesithea granularis*

Mnesithea formosa

Silkytop Grass

Mnesithea granularis

Mnesithea rottboellioides

Northern Cane Grass

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”.

There is only one species on campus; *Schizachyrium fragile.*

This native species is a tufted annual to 75 cm with erect, slender culms. The inflorescence is a spike-like raceme, at first entirely enclosed by a spathe, but often exserted at maturity, the rachis is fragile and breaks into segments at maturity. The spikelets are clothed in silky white hairs, similar to *Mnesithea formosa*, however *Schizachyrium* spikelets are awned. Spikelets in pairs, one sessile and one pedicelled. The leaves and spathes become reddish with age.

Usually grows on sandy often shallow soils often in open habitats.

Subfamily: Panicoideae;
Tribe: Andropogoneae
Species: World = c. 60, Australia = 8

Schizachyrium fragile

Fire Grass or Red Spathe Grass

Themeda

From the Arabic *thaemed* (a small quantity of water preserved in a ditch against a time of need) - the allusion is obscure, but possibly referring to the habitat of the type specimen.

Tufted perennials or annuals. Inflorescence a panicle of condensed racemes each subtended by spathe. The spikelets are in groups of seven which are difficult to see in the field. There are 4 involucral spikelets, at the base (S3), 2 pedicelled spikelets (S2) and a sessile spikelet (S1) which is the only one to produce a seed.

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

There are 3 species on campus

1 Annual up to 3 m tall; spikelets with dark-coloured, robust awn, 5-10 cm long; often growing in disturbed areas .... *Themeda arguens*

1: Annual or perennial; spikelet with awn less than 7 cm long ... **..... 2**

2 Erect annual to 2 m tall; mature plant has reddish-brown appearance; hairs on glumes with a distinct bulbous base; common along roadside ..... *Themeda quadrivalvis*

2: Perennial to 1.5 m tall; mature plant brown; glumes glabrous or with simple hairs; found in open woodlands around campus ..... *Themeda triandra*

Themeda arguens

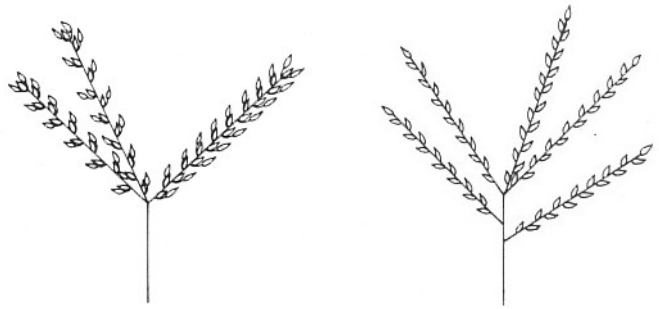
Themeda quadrivalvis

Grader Grass

Themeda triandra

Kangaroo Grass

Group 2 – Inflorescence digitate or subdigitate



These genera are split into two groups

(a) Awns absent or indistinct

Axonopus
- **A. compressus*

Brachyachne
- *B. convergens*

Cynodon
- **C. dactylon*

Dactyloctenium
- **D. aegyptium*
- *D. radulans*

Digitaria
- **D. didactyla*
- *D. longiflora*
- **D. ciliaris*

Eleusine
- **E. indica*

Paspalum
- **P. conjugatum*

(b) Awns present

Alloteropsis
- *A. cimicina*
- *A. semialata*

Bothriochloa
- *B. decipiens*
- *B. ewartiana*
- **B. pertusa*

Chloris
- **C. gayana*
- **C. inflata*
- *C. lobata*
- *C. pumilio*

Dichanthium
- **D. annulatum*
- **D. aristatum*
- *D. fecundum*
- *D. sericeum* subsp. *sericeum*
- *D. sericeum* subsp. *polystachyum*

Eulalia
- *E. aurea*

Pseudopogonatherum
- *P. contortum*
- *P. irritans*

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. Spikelets solitary, on one side of the raceme. Lower glume absent or obscure.

There is 1 species on campus: *Axonopus compressus* (broadleaf carpet grass) which is a cultivated lawn grass which is suitable for sunny and moist semi-shaded areas. This prostrate grass is a popular plant for garden lawns because it has broad, shiny leaves. In north Queensland it is known as buffalo grass, however there are two other lawn grasses with this common name.

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

Axonopus compressus
Broadleaf Carpet Grass

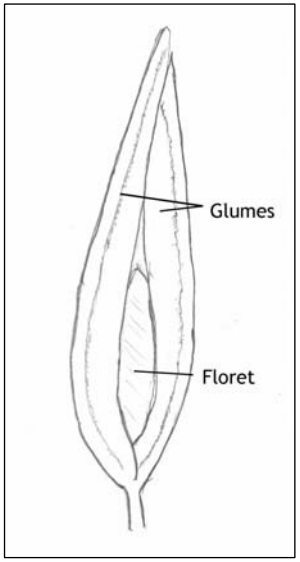
Brachyachne
Native Couch

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.

There is 1 species on campus: *Brachyachne convergens*, a tufted, annual 20–60 cm tall

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



Brachyachne convergens
Common Native Couch

Cynodon

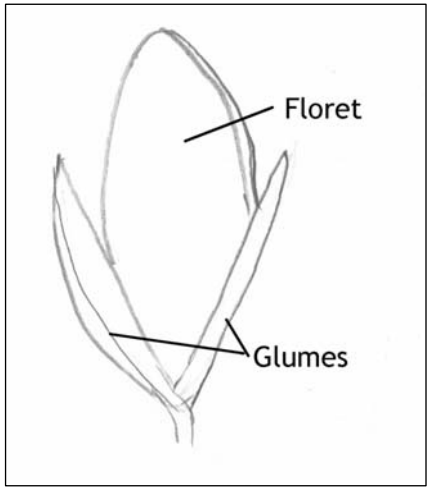
Couch and Star Grasses

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. Spikelets solitary, on one side of the raceme. The glumes are shorter than the single floret.

There is 1 species on campus: *Cynodon dactylon,* this is the common lawn grass 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. The inflorescence consists of 2–7 racemes with the spikelets in 2 close rows on 1 side of the raceme axis.

Subfamily: Chloridoideae; Tribe: Cynodonteae
Species: World = 10, Australia = 7



Cynodon dactylon

Couch Grass or Green Couch or Bermuda Grass

Dactyloctenium
Button Grasses

From 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. Sometimes in saline habitats or dunes, mostly in dry sandy soils. The upper glume is shortly awned. Button grasses produce a prolific number of small, (c. 1 mm long) distinctive seeds.

Subfamily: Chloridoideae; Tribe: Cynodonteae
Species: World = 13, Australia = 5

There are two species on campus.

1 Ephemeral tufted grass to 40 cm tall; racemes numerous, usually 3-6, occasionally more, up to 1.5 cm long ....*Dactyloctenium radulans*

1: Slender to moderately robust annual or perennial, tufted and stoloniferous (rooting at nodes), up to 70 cm tall; racemes usually 2-4, 1–5 cm long ..... *Dactyloctenium aegyptium*

Dactyloctenium aegyptium
Coastal Button Grass

Dactyloctenium radulans

Native Button Grass

Digitaria

Finger Grasses

From Latin *digitus* (finger), alluding to the digitate inflorescence.

There are also a number of species in this genus with once-branched panicles (see Group 9).

Annuals or perennials, rhizomatous or stoloniferous or tufted or decumbent (sometimes sward forming). The genus is extremely variable, however the features of the spikelet are distinctive. The spikelets are in groups of 2 or 3, the lower glume is small or absent, and the palea of the upper floret completely clasps the upper lemma.

	
Spikelet showing lower glume	Upper fertile floret (with glumes and lower floret removed)

Digitaria
Finger Grasses

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

There are 5 species of **Digitaria** on campus; 3 with a digitate or subdigitate inflorescence and 2 with once-branched panicles (see Group 9).

Key to digitate/subdigitate species:

1 Inflorescence usually with 4 or more racemes; racemes 6-22 cm long; leaf blade 3-10 mm wide; a variable annual grass to 1 m tall; a common weed on campus, tends to grow in disturbed and open areas.....*Digitaria ciliaris*

1: Inflorescence with 2-3 racemes; racemes 1-10 cm long; leaf blade 1-6 mm wide **2**

2 Mat-forming perennial, with stolons; used in south-east and central Queensland for golf courses, bowling greens, and as a lawn grass; simalar to Green Couch (*Cynodon dactylon*), but with blue-green leaves; grows in the lawn area west of the library; spikelets in groups of two ... *Digitaria didactyla*

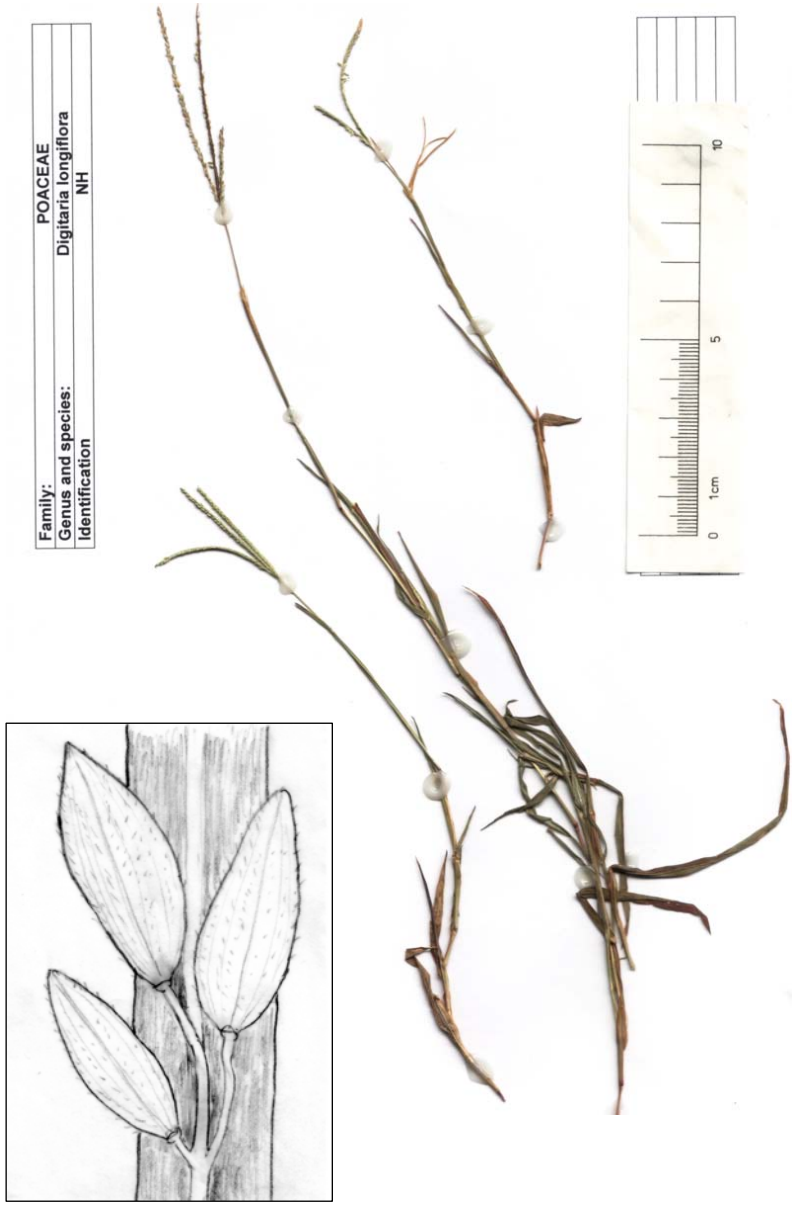
2: Stoloniferous annual or perennial, to 60 cm tall; uncommon on campus, growing in open woodland; spikelets in groups of three .....*Digitaria longiflora*

Digitaria ciliaris
Summer Grass

Digitaria didactyla

Queensland Blue Couch

Digitaria longiflora



Eleusine

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

Tufted annuals or perennials. Spikelets overlapping in two rows on the underside of the rachis. 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 (non-natives)

There is only 1 species on campus, a weed in lawns, open habitats and disturbed areas. 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.

Eleusine indica

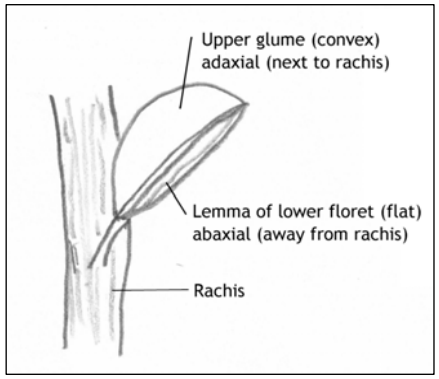
Crowsfoot Grass

Paspalum

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

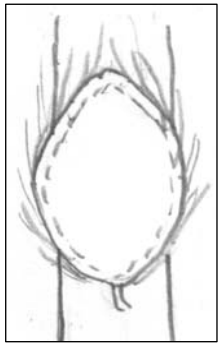
Perennials (usually) or annuals, rhizomatous or stoloniferous or tufted or decumbent. The inflorescence is either digitate or a racemose once-branched panicle (Group 9). Spikelets solitary or paired.

The genus is best recognised by its plano-convex abaxial spikelets, often with a hemispherical or oblong shape. The lower glume is usually absent.



Subfamily: Panicoideae; Tribe: Paniceae
Species: World = 320 , Australia = 19

There is only one species on campus: *Paspalum conjugatum*, the inflorescence usually consists of a pair of racemes on a slender peduncle. The upper glume has long ciliate margins. This grass is a creeping perennial with long leafy stolons rooting at the nodes and erect or ascending culms 20-100 cm tall. This species grows in wet areas, is spread by stolons; grows in the creek bed near the bridge to the north-west of the library.



Paspalum conjugatum

Sour Grass

Alloteropsis

From the Greek *allotrios* (belonging to another) and *opsis* (appearance) - the spikelets somewhat resemble those of genus *Panicum*.

Tufted perennials or annuals, culms erect or decumbent. 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.

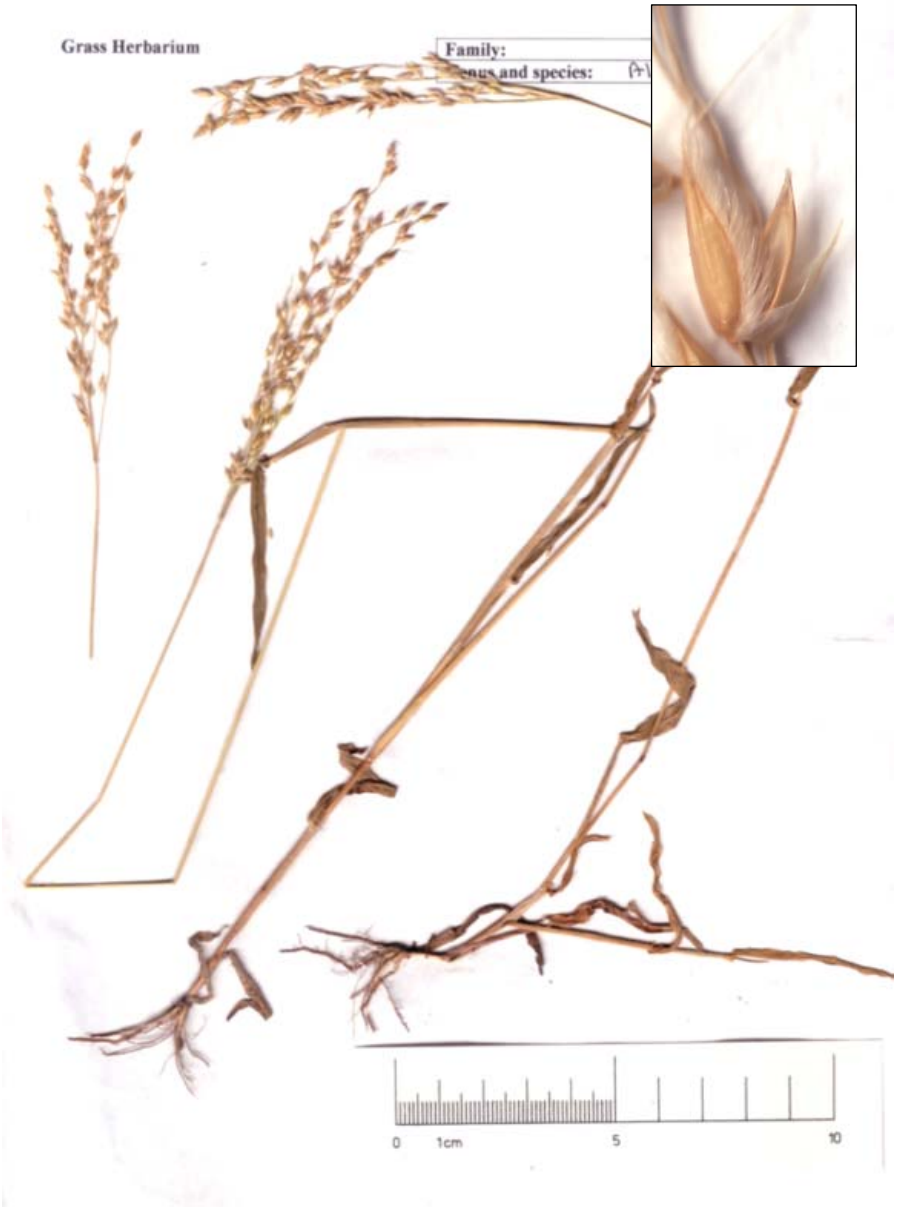
Subfamily: Panicoideae; Tribe: Paniceae
Species: World = 5-8, Australia = 2

Both Australian species occur on campus

1 Perennial; racemes 2-5 (commonly 2-3); spikelets c. 6 mm long ..... *Alloteropsis semialata*

1: Annual; racemes 4-11; spikelets 3-4 mm long .... *Alloteropsis cimicina*

Alloteropsis cimicina



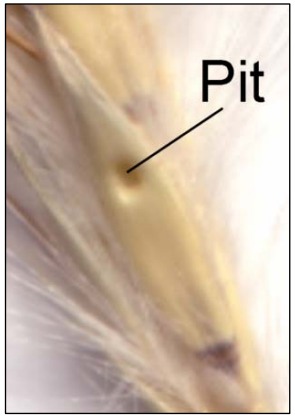
Alloteropsis semialata

Cockatoo Grass

Bothriochloa

Bluegrasses

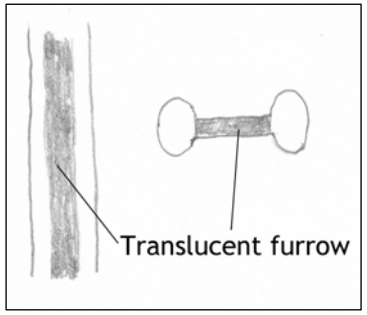
From the Greek *bothros* (trench or pit), and *chloa*, (grass), alluding either to the groove in the pedicels or to the pit in the lower glumes of some species.



Tufted, decumbent or stoloniferous perennials, often with branched culms. The inflorescence has a spicy smell when crushed. Spikelets in pairs (with terminal triplets), one sessile and one pedicelled. The lower glume of the sessile spikelet of some species has a circular depression (pit).

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 are have a longitudinal translucent furrow, often purple coloured; in cross section the pedicels are dumbbell shaped. The pedicels of *Dichanthium* species are rounded.



Since these genera are difficult to differentiate, a key to species is combined (see *Dichanthium*).

Bothriochloa decipiens

Pitted Bluegrass

Bothriochloa ewartiana

Desert Bluegrass

Bothriochloa pertusa
Indian Bluegrass

Chloris
Windmill Grasses

From 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 spikelets are solitary, 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.

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

There are 4 species on campus

1 Erect robust perennial to 1.2 m tall; racemes 6-18 .... **Chloris gayana**

1: Annual or short-lived perennial usually less than 80 cm tall; racemes usually less than 12 ..... **2**

2 Inflorescence usually purple; upper florets of spikelet inflated; a very common grass often found growing around many campus buildings and along footpaths ... **Chloris inflata**

2: Inflorescence not purple; upper florets of spikelet not inflated; grasses of cleared areas areas of open woodlands, e.g along the firetracks **3**

3 Inflorescence branches usually ascending or spreading; lemma awns subequal, the central one slightly longer .... **Chloris lobata**

3: Inflorescence branches erect; lemma awns very unequal ..... **Chloris pumilio**

Chloris gayana
Rhodes Grass

Chloris inflata
Purpletop Chloris

Chloris lobata

Chloris pumilio

Dichanthium
Bluegrasses

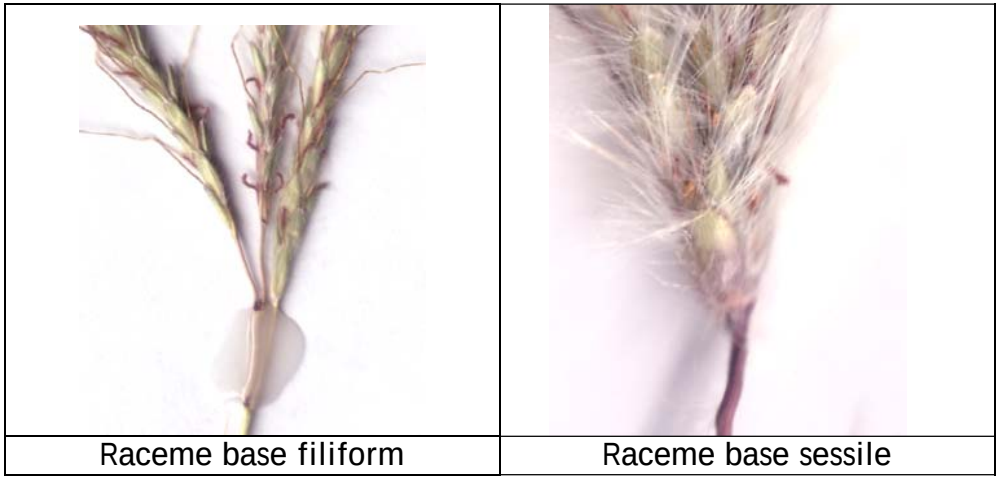
From the Greek *dicha* (in two, apart) and *anthos* (flowers), alluding to the two kinds of spikelet pairs in the raceme.

Tufted, decumbent or stoloniferous perennials, often with branched culms. Spikelets in pairs (with terminal triplets), one sessile and one pedicelled. Closely related to *Bothriochloa*.

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

Key to *Dichanthium* and *Bothriochloa* species on campus:

1 Inflorescence a panicle of racemes (see Group 5) .... **Bothriochloa bladhii subsp. bladhii**
1: Inflorescence digitate or subdigitate or a single raceme **2**
2 Lower glumes pitted **3**
2: Lower glumes not or rarely pitted **4**
3 Culms erect or ascending 30-200 cm tall; nodes glabrous and purple; pedicelled spikelet reduced to lower glume .... **Bothriochloa decipiens**
3: Culms erect, ascending or prostrate 15-70 cm tall and with stolons; nodes glabrous or bearded; pedicelled spikelet similar to sessile spikelet, male or sterile..... ..... **Bothriochloa pertusa**
4 Upper nodes glabrous or pubescent (hairs short or appressed) **5**
4: Upper nodes bearded (hairs long, erect) **6**
5 Peduncle below inflorescence covered in downy hairs .... **Dichanthium aristatum**
5: Peduncle below inflorescence glabrous .... **Bothriochloa ewartiana**
6 Racemes bases sessile; lower glume of sessile spikelet with a distinct sub-apical arch of long, fine, simple hairs **7**
6: Raceme bases filiform or sub-sessile; lower glume of sessile spikelet without a sub-apical arch of simple hairs, tubercle-based hairs sometimes present; **8**
7 Lower glume of pedicelled spikelet obovate with sub-apical arch conspicuous, hairs erect from surface; racemes usually 10 or more ..... **Dichanthium sericeum subsp. polystachyum**
7: Lower glume of pedicelled spikelet linear to narrowly ovate, hairs not erect from surface; racemes usually 6 or less..... ..... **Dichanthium sericeum subsp. sericeum**
8 Spikelets acute; pedicelled spikelets bisexual or male and sometimes awned; stigmas distinctly protruding at maturity . ..... **Dichanthium fecundum**
8: Spikelets obtuse or truncate; pedicelled spikelets sterile; stigmas not distinctly protruding at maturity .... **Dichanthium annulatum**



Raceme base filiform | Raceme base sessile

Dichanthium annulatum

Sheda Grass

Dichanthium aristatum

Angleton Grass

Dichanthium fecundum

Curly Bluegrass

Dichanthium sericeum **subsp.** *polystacyum*

Queensland Bluegrass

Dichanthium sericeum **subsp. *sericeum***

Queensland Bluegrass

Eulalia

The genus was named to honour the botanical artist Eulalia Delile.

Tufted perennial grasses. Inflorescence of main branches 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

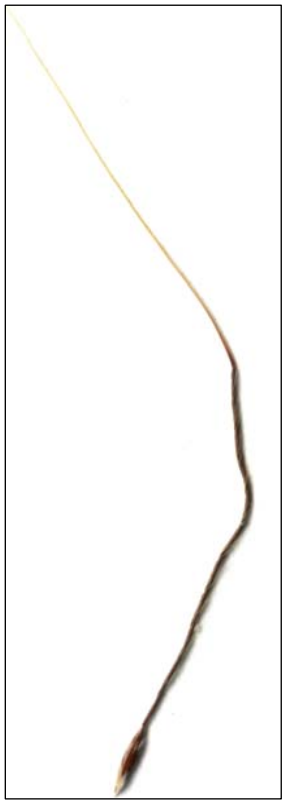
There is one species on campus, *Eulalia aurea.* This grass is easily recognised by its fluffy, brown inflorescence. It grows to 100 cm tall in a variety of habitats.

Eulalia aurea

Silky Browntop

Pseudopogonatherum

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



Tufted annuals to 1.5 m tall, but usually much shorter, leaves mostly basal. Inflorescence is dark brown, is closely related to *Eulalia*, however the paired spikelets are unequally pedicelled.

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

There are two species on campus. Occur sporadically in open woodland following summer rainfall.

1 Spikelets 2.5- 3 long; awn 1.5-3 cm long.....
.....**Pseudopogonatherum contortum**

1: Spikelets 3.5-4 cm long; awn 3-5 cm long.....
.....**Pseudopogonatherum irritans**

Pseudopogonatherum contortum

Pseudopogonatherum irritans

Group 3 – Florets with 3 or more obvious awns

Aristida
- *A. calycina*
- *A. holathera*
- *A. latifolia*
- *A. perniciosa*
- *A. queenslandica*
- *A. warburgii*

Enneapogon
- *E. lindleyanus*

Aristida

Wiregrasses or Kerosene or Threeawn Grasses

From Latin *arista* (awn), alluding to the awned lemma.

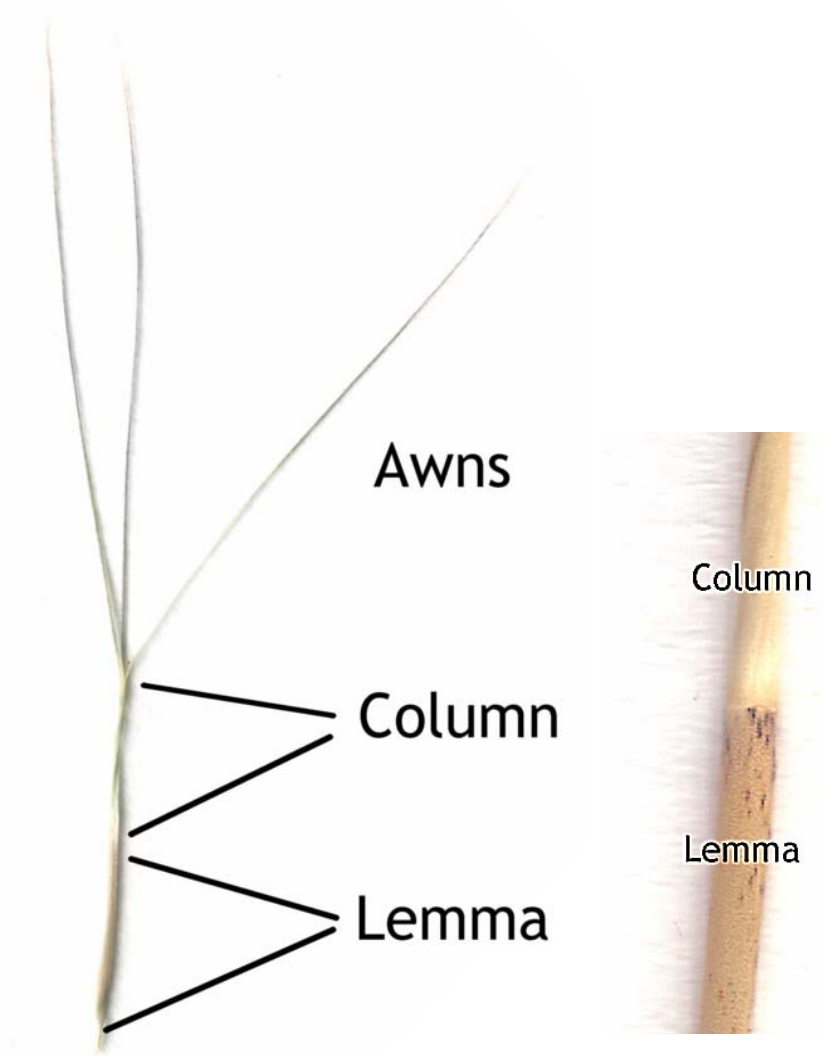
Tufted annuals or perennials, usually with slender wiry stems. Inflorescence a contracted or open panicle. Spikelets solitary. The genus is easily recognised by the lemma awns which are usually 3-branched. The callus (the hard, usually pointed base of the spikelet) is usually sharp and can become embeded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

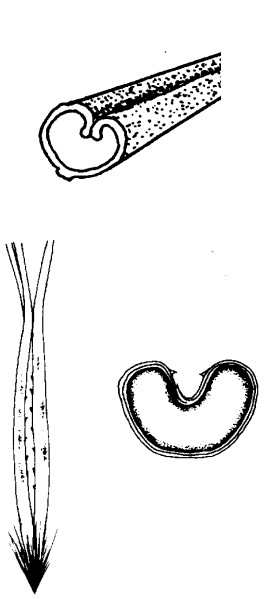
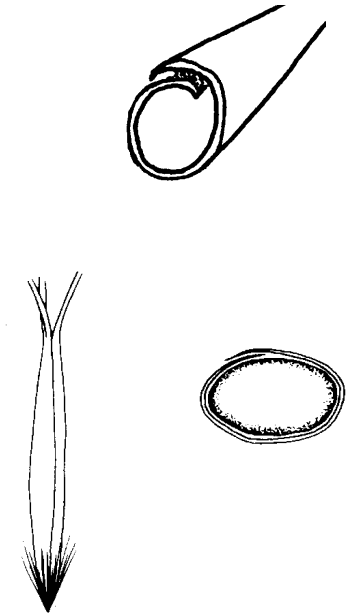
Subfamily: Aristidoideae; Tribe: Aristideae
Species: World = 290, Australia = 59

Identifying 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.

There are seven species on campus.

The *Aristida* floret



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) & *et al.* Wheeler (2002)	

Summary of *Aristida* species			
***Aristida* species**	**Lateral lemma awns**	**Lemma**	**Lemma awn column**
A. calycina	equal or subequal to median awn	involute	absent
A. holathera	equal or subequal to median awn	convolute	present
A. latifolia	equal or subequal to median awn	convolute	present
A. perniciosa	shorter than median awn	involute	present
A. queenslandica	1/3 to 2/3 as long as median awn	involute	absent
A. utilis	absent or very short	involute	present
A. warburgii	equal or subequal to median awn	convolute	present

Key to species on campus:

1 Lateral awns of lemma less than two-thirds the length of the median awn or absent **2**

1: Lateral awns of lemma equal or subequal in length to the median awn **4**

2 Lateral awns less than one-third the length of the median awn or absent (see Group 5) ..... **Aristida utilis**

2: Lateral awns one-third to two-thirds the length of the median awn **3**

3 Lemma awn column absent ..... **Aristida queenslandica**

3: Lemma awn column present ..... **Aristida perniciosa**

4 Lemma awn column absent; inflorescence usually a very open panicle; a tufted erect plant to 1.3 m tall (commom species) ..... **Aristida calycina**

4: Lemma awn column present; inflorescence an open or contracted panicle **5**

5 Lemma involute; awns slightly but visibly unequal .... **Aristida perniciosa**

5: Lemma convolute; awns equal or slightly unequal **6**

6 Lower glume 3-7 nerved; mature spikelets with central awn strongly recurved and thicker than lateral awns .... **Aristida warburgii**

6: Lower glume 1-3 nerved; awns of mature spikelets with central awn straight and not noticibly thicker than lateral awns **7**

7 Mature leaves usually flexuose at maturity; lemma awn (including column) more than 50 mm long, deciduous (breaking off at the base of the column) .. **Aristida holathera**

7: Mature leaves usually coiled at maturity; lemma awn (including column) 50 mm or less long, persistent .... **Aristida latifolia**

Aristida calycina

Dark Wiregrass

Aristida holothera

Erect Kerosene Grass

Aristida latifolia

Feathertop Wiregrass

Aristida perniciosa

Threeawn Grass

Aristida queenslandica

Threeawn Grass

Aristida warburgii

Threeawn Grass

Enneapogon

Nineawn Grasses

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

Tufted perennials or annuals, the inflorescence is a spike-like panicle. Spikelets 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.

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

There is only one species on campus, *Enneapogon lindleyans*. This species is highly variable but is characterised by is small (less than 5 cm long), compact and globular or oblong inflorescence. Often grows on stony hillsides.

Enneapogon lindleyanus

Conetop Nineawn or Purple-headed Nineawn

Group 4 – Inflorescence a spike or raceme, spikelet with 1 or 2 obvious awns

Dichanthium
(see Group 2)

Heteropogon
H. contortus
H. triticeus

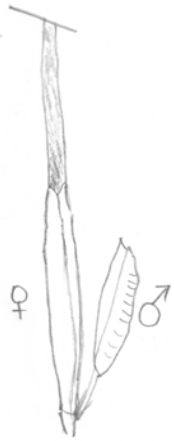
Perotis
P. rara

Sehima
S. nervosum

Heteropogon
Spear Grasses

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

Tufted perennials. Inflorescence 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

Key to campus species:

1 Plant usually more than 1 m tall, commonly clearly visible above other grass when flowering, up to 2 m tall; with racemes more than 9 cm long..... *Heteropogon triticeus*

1: Plant usually less than 1 m tall; racemes less than 6 cm long .....*Heteropogon contortus*

Heteropogon contortus

Black Spear Grass

Heteropogon triticeus

Giant Spear Grass

Perotis

From the Greek *peros* (deficient) and *ous* (an ear), referring to the minute palea.

Tufted annuals or rarely perennials. Spikelets solitary. Both glumes are long and awned.

Subfamily: Chloridoideae; Tribe: Cynodonteae
Species: World = 10, Australia = 3

There is one species on campus. *Perotis rara* is an annual grass, flowering culms 15–40 cm tall. The spikelets are often pointing downwards at maturity, hence the common name, Comet Grass.

Perotis rara

Comet Grass

Sehima

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

Tufted annuals or perennials. The spikelets are paired, one sessile and one pedicelled, partially embedded in rachis.

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

Sehima nervosum is a strongly tufted perennial up to 1 m tall. 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 asymmetical and strongly nerved.

Sehima nervosum

Rat's Tail Grass or White Grass

Group 5 – Inflorescence an open panicle, spikelet with 1 or 2 obvious awns

Aristida
- *A. utilis*

Arundinella
- *A. nepalensis*

Bothriochloa
- *B. bladhii* subsp. *bladhii*

Capillipedium
- *C. parviflorum*
- *C. spicigerum*

Chrysopogon
- **C. acicularis*
- *C. fallax*

Echinochloa – see Group 9

Eriachne
- *E. ciliata*
- *E. rara*

Oplismenus
- *O. aemulus*

Sarga
- *S. plumosum*

Vacoparis
- *V. laxiflorum*

Aristida

Wiregrasses or Kerosene or Threeawn Grasses

See Group 3 for full description of the genus.

The genus is easily recognised by the lemma awns which are usually 3-branched, however there are 3 species whose lateral awns are absent or very short; one of these species occurs on the campus.

Aristida utilis is a tufted perennial 50–130 cm tall, the flowering culms are long and weeping, and when mature are often flat along the ground. The inflorescence can be up to 50 cm long.

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

Aristida utilis

Arundinella
Reed Grasses

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

Tufted annuals and perennials, usually with erect culms, usually growing in marshy places and along riverbanks. The inflorescence is an open or contracted panicle. Spikelets are solitary or paired, and all alike.

Subfamily: Panicoideae; Tribe: Arundinelleae
Species: World = 55, Australia = 4

Arundinella nepalensis is an robust perennial with reedy culms to 2 m tall.

Arundinella nepalensis
Reed Grass

Bothriochloa
Bluegrasses

See Group 2 for full description of the genus.

Bothriochloa bladhii subsp. *bladhii* is a robust, tussocky perennial 50 – 150 cm tall. The inflorescence is highly variable. The lower glumes of the spikelets are usually not pitted.

Closely related and similar to the genus *Capillipedium* (see next page). The differences between the genera are shown in the table below:

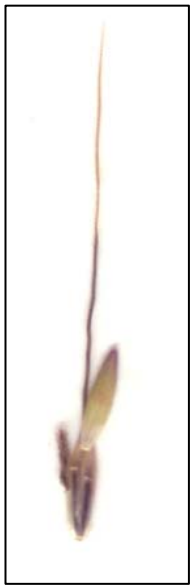
Bothriochloa	**Capillipedium**
Infloresence, usually an arrangement of racemes on a central axis	Inflorescence more than once-branched
Racemes with more the 8 joints (more than 8 spikelet pairs)	Racemes with 1-8 joints (1–8 spikelet pairs)
	

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

Bothriochloa bladhii subsp. bladhii
Forest Bluegrass

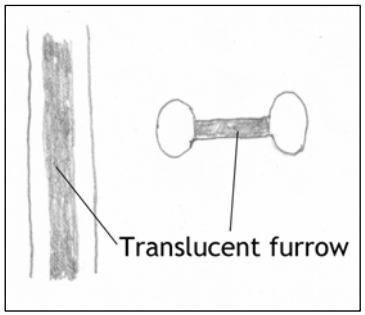
Capillipedium
Scented Tops

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).

Closely related to *Bothriochloa* (see Group 2), with the same pedicel morphology, i.e. with a longitudinal translucent furrow, often purple coloured; in cross section the pedicels are dumbbell shaped.



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

Key to species:

1 Racemes 1-2 jointed with few spikelets .... *Capillipedium parviflorum*

1: Racemes 3–8 jointed with numerous spikelets **.....** .....*Capillipedium spigerum*

Capillipedium parviflorum
Scented Top

Capillipedium spicegerum
Scented Top

Chrysopogn
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 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. Mature spikelets are often purplish coloured.

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

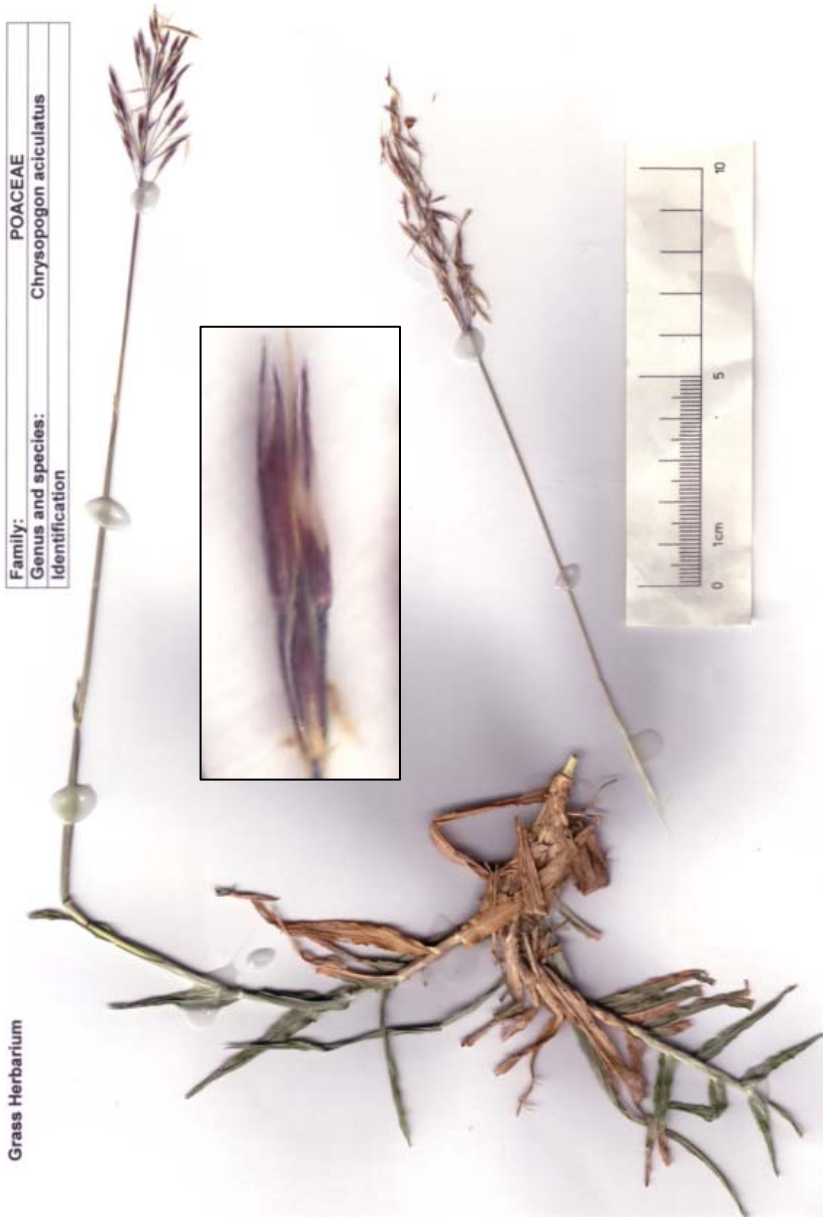
Key to the two campus species:

1 Plant stoloniferous, mat-forming, usually less than 30 cm tall; a weed in lawns; awns less than 7 mm long .... *Chrysopogon aciculatus*

1: Plant tufted, 30-120 cm tall, found in open woodland; awns usually more than 7 mm long .....*Chrysopogon fallax*

Chrysopogon aciculatus

Mackie's Pest



Chrysopogon fallax

Golden Beard Grass

Chrysopogon fallax – Golden Beard Grass

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. Spikelets solitary. The glumes spread at maturity to reveal two bisexual florets. The glumes often persist after the florets have fallen.

Subfamily: Micrairoideae; Tribe: Eriachneae
Species: World = 48, Australia = 48

Key to the 4 species of *Eriachne* on campus:

1 Lemma with a distinct (although sometimes short) awn 1.5-30 mm long..... **2**

1: Lemma unawned or sometimes mucronate (a sharp, abrupt terminal point), mucro to 0.6 mm long ..... **Go to Group 8**

2 Awn 1.5-3 mm long, straight ..... *Eriachne ciliata*

2: Awn 12-30 mm long, curved or wavy ..... *Eriachne rara*

Eriachne ciliata

Slender Wanderrie Grass

Eriachne rara

Wanderrie Grass

Oplismenus

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

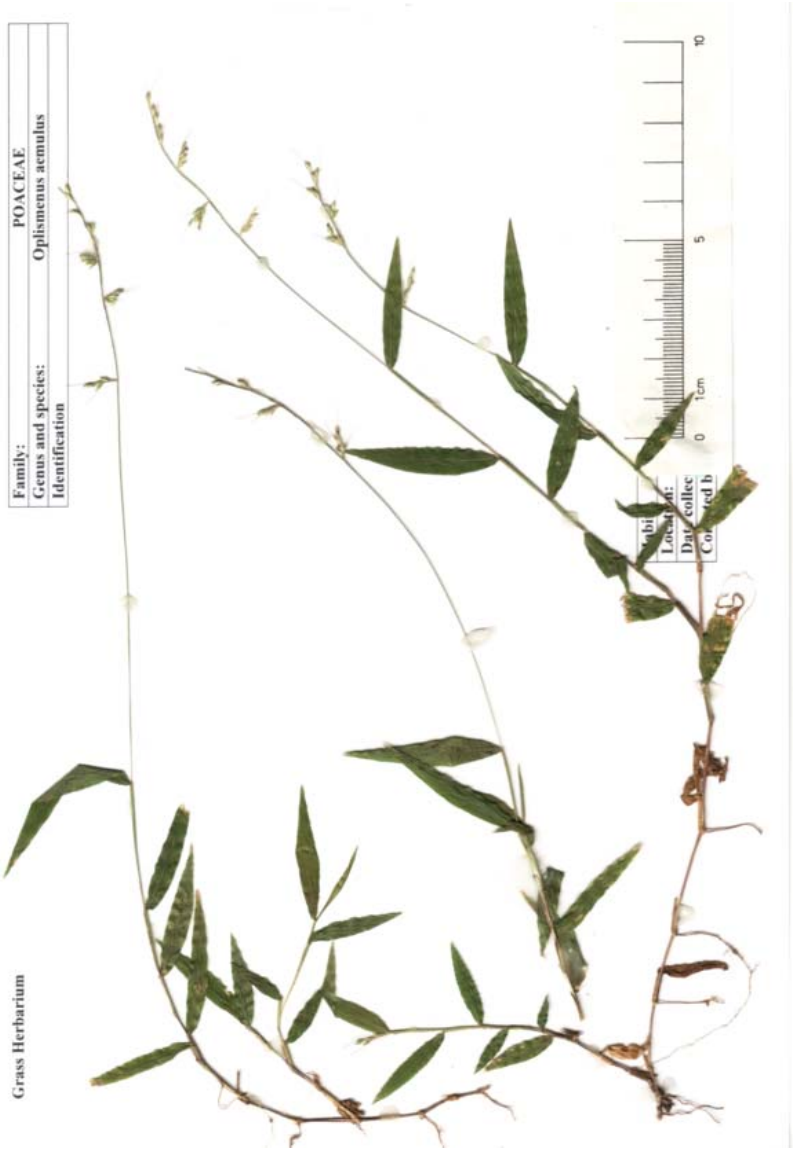
Shade-loving, decumbent annuals or perennials. Inflorescence of short racemes with spikelets on one side of a slender axis, or branches reduced to fascicles (clusters) of spikelets. The lower glume is awned and is often sticky at the tip, and by sticking to passing animals, acts as a fruit dispersal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

Subfamily: Panicoideae; Tribe: Paniceae
Species: World = 9, Australia = 5

Oplismenus species are commonly found in rainforest or in damp shady places. *Oplismenus aemulus* is a weak trailing perennial that grows in the irrigated area of Campus Creek.

Oplismenus aemulus

Australian Basket Grass, Creeping Beard Grass



Sorghum, Sarga and Vacoparis

Sorghum

Sorghum, in the broadest sense (*sensu lato*), is a genus containing c. 50 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*.

These genera are annuals or perennials, rhizomatous or stoloniferous or tufted or decumbent. The inflorescence is an open or contracted panicle. Spikelets in pairs (with terminal triplets), one sessile and one pedicelled. The mature sessile spikelets are dark reddish brown almost black.

Subfamily: Panicoideae; Tribe: Andropogoneae

Sorghum
From *sorgho*, the Italian name for the plant. The sessile spikelets usually have short awns (1-1.5 cm long) or are awnless, and the pedicelled spikelet is well-developed. There are 6 taxa recognised in Australia, and most of these are weedy, non-natives; and highly variable.

Sarga
The meaning of the name is obscure. The sessile spikelets usually have long awns (1.5–8.5 cm long) and the pedicelled spikelet is well-developed. There are 5 species in Australia, all natives.

Vacoparis
From Latin *vaco* (empty) and *paris* (companion), referring to the greatly reduced pedicelled spikelets. Annual grasses. The awn of the sessile spikelet 2.5-5.2 cm long, the pedicelled spikelet is reduced to narrow, linear glumes. There are 2 species in Australia.

Key to species on campus

1 Annual, usually semi-decumbent to 1.5 m tall; stem nodes pubescent or hirsute, with appressed hairs, or glabrous; inflorescence covered with white or pale brown hairs .... *Vacoparis laxiflorum*

1: Perennial, erect 1-3 m tall; stem nodes usually densely bearded with stiff, white hairs; inflorescence covered with reddish-brown hairs.....*Sarga plumosum*

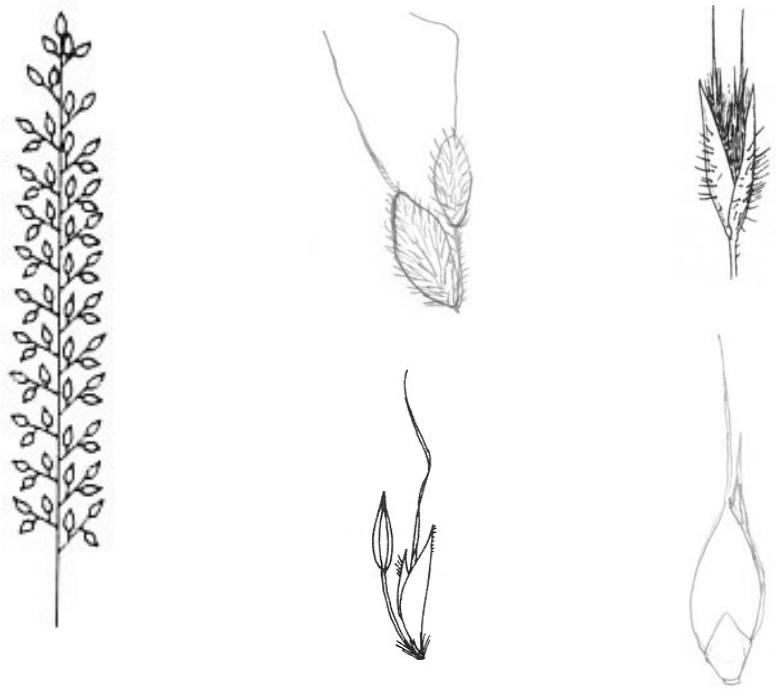
Vacoparis laxiflorum

Sarga plumosum

Plume Sorghum

Vacoparis laxiflorum

Group 6 – Inflorescence a contracted panicle, spikelet with 1 or 2 obvious awns



Bothriochloa - see Group 2

Dichanthium - see Group 2

Echinochloa - see Group 9

Ectrosia
E. leporina

See also Group 5

Open woodland in Douglas

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. Inflorescence paniculate, sometimes reduced to a few racemes. Spiklets solitary, with 4 or more florets. This genus is readily recognised by the modification of its upper florets into a dispersal device.

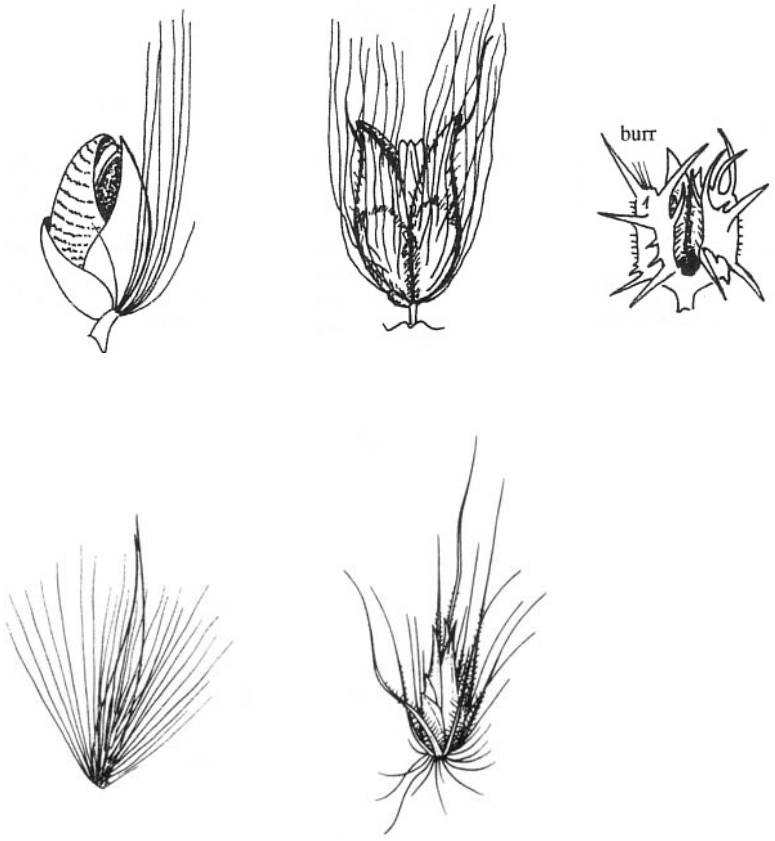
Subfamily: Chloridoideae; Tribe: Cynodonteae
Species: World = 14, Australia = 14 (inclucing the genus *Planichloa*)

There is only one species on campus, *Ectrosia leporina*, which is a slender annual to 70 cm tall. The mature inflorescence is purple and has a "furry" appearance, hence its common name, hare's-foot grass.

Ectrosia leporina

Hare's-foot Grass

Group 7 – Spikelets shortly awned or awnless; spikelets with bristles, long hairs subtending spikelet, or spine-like structures present



Arundo
A. donax

Cenchrus
C. echinatus

Melinis
M. repens

Pennisetum
P. ciliare (Cenchrus ciliaris)

Setaria
S. surgens

Setaria surgens – Pigeon Grass

Arundo

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. Inflorescence an open panicle. Spikelets solitary, lemmas covered with long, soft hairs.

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

Arundo donax is native to southern Europe and Asia. It was introduced into Australia as an ornamental, some varieties have variegated leaves. It is now recognised as an environmental weed.

The showy inflorescence is 30-60 cm long and 12 cm wide. Leaves are 5–100 cm long, 10–80 mm wide.

Arundo donax

Giant Reed

Cenchrus and Pennisetum

The distinction between *Cenchrus* and *Pennisetum* is contentious. Recent molecular evidence suggest that Buffel Grass and its allies, group better with the spiky species of *Cenchrus*.

Cenchrus
From Greek *kenchros* (millet).

Pennisetum
From Latin *penna* (feather) and *seta* (bristle), referring to the long feathery bristles in the spikelets.

Tufted or stoloniferous or rhizomatous annuals or perennials. Inflorescence spike-like, but technically a contracted panicle. Spikelets solitary or several in a whorl, and subtended by an involucre of soft or spiny bristles. Spikelets fall from plant with bristles attached, usually leaving a bare rachis.

Subfamily: Panicoideae; Tribe: Paniceae
Species (both genera): World = c102 , Australia = 22

Key to campus species:

1. Annual usually less than 50 cm tall, spikelets covered with coarse, sharply pointed spines, forming burrs ....*Cenchrus echinatus*

1: Perennial to 1 m tall, spikelets not forming burrs, enclosied in an involucre of numerous, stiff bristles, joined only at the base ..... *Pennisetum ciliare* (*Cenchrus ciliaris*)

Cenchrus echinatus

Mossman River Grass

Pennisetum ciliare (*Cenchrus ciliaris*)

Buffel Grass

Melinis

From the Greek *meline* (millet).

Stoloniferous or tufted, aromatic annuals or perennials. Inflorescence an open panicle, red, white or purple-coloured. Inflorescence branches slender. Spikelets solitary. Lower glume absent or obsure.

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

Melinis repens is easily recognised by its attractive, fluffy inflorescence which is red, pink or fading to white with age. It commonly grows along roadsides.

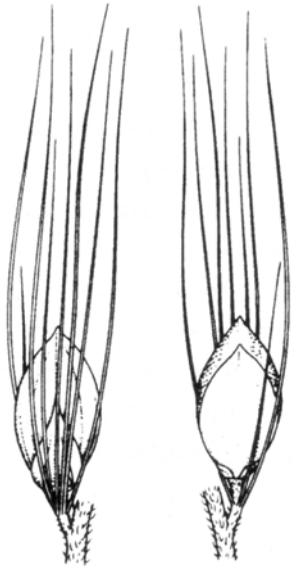
Melinis repens

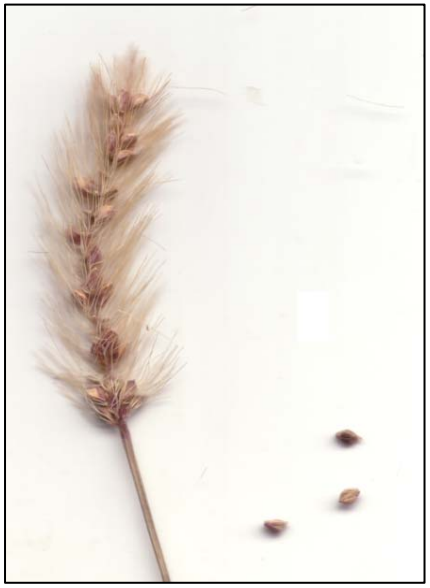
Red Natal Grass

Setaria
Pigeon Grasses

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

Annuals or perennials, rhizomatous or stoloniferous or tufted or decumbent. Inflorescence spike-like, but technically a contracted panicle. Spikelets solitary, usually with 1-numerous subtending bristles. Glumes unequal, lower glume usually shorter than spikelet. *Setaria* is looks similar to *Pennisetum* and *Cenchrus*, however spikelets fall from the plant without any bristle attached leaving a rachis with bristles attached.



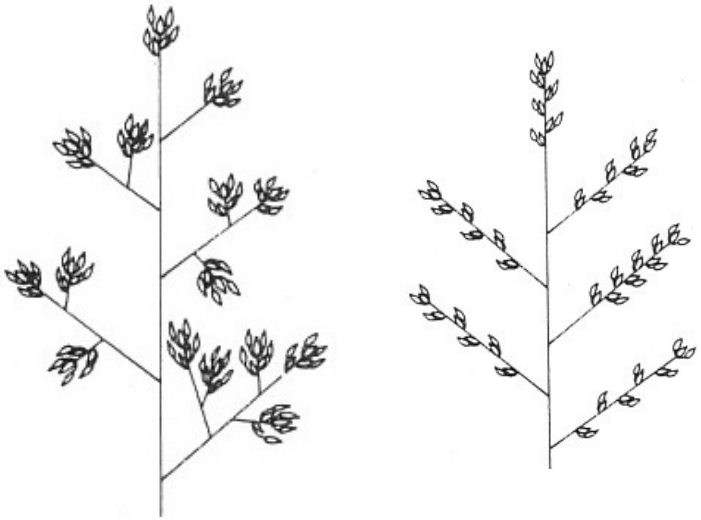


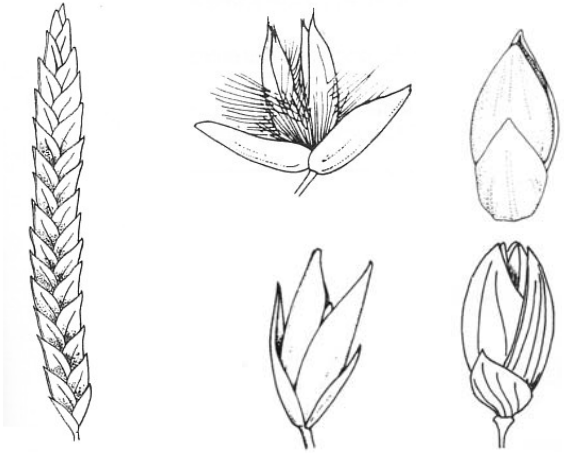
Subfamily: Panicoideae; Tribe: Paniceae
Species: World = c110, Australia = 16

Setaria surgens is an attractive annual grass, 20-60 cm tall.

Setaria surgens
Pigeon Grass

Group 8 – Inflorescence an open branched panicle with obvious secondary branching; awns absent or short





Arundo – see Group 7

Eragrostis
- **E. amabilis*
- **E. cilianensis*
- *E. cumingii*
- *E. elongata*
- *E. exigua*
- *E. fallax*
- **E. pilosa*
- *E. schultzii*
- *E. spartinoides*
- **E. tenuifolia*

Eriachne
- *E. mucronata*
- *E. obtusa*

Megathyrsus
- **M. maximus* (*Panicum maximum*)

Melinus – see Group 7

Panicum
- *P. effusum*
- *P. laevinode*
- *P. seminunudum* var. *cairnsianum*

Sporobolus
- *S. australasicus*
- **S. coromandelianus*
- *S. lenticularis*

Eragrostis
Lovegrasses

From the Greek *eros* (love) and *agrostis* (a grass).

Annuals or perennials, tufted or decumbent or stoloniferous. Spikelets are solitary. The genus is characterised by its usually numerous, identical florets (3 or more), and some species have persistent paleas. The photograph on the right show 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 *Poa* species.

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

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

There are 10 species found on campus.

Key to campus species:

1. Spikelets usually evenly distributed throughout the inflorescence **2**

1: Spiklelets concentrated along racemes or in interupted clusters along the main inflorescence axis **6**

2 Lowest node of inflorescence with whorled branches **3**
2: Lowest node of inflorescence with 1 or 2 branches **4**

3 Inflorescence usually 5-15 cm long; culm nodes and basal whorl of infloresence sometimes subtended by a ring of glands; a weed of roadsides, gardens, wastelands, usually grows in sandy alluvial soils .....*Eragrostis pilosa*
3: Inflorescence long relative to the plant, usually 18-36 cm long, plant not glandular; an endemic species usually found in seasonally flooded, alluvial habitats with heavy clay (rarely sandy) soils .....*Eragrostis exigua*

4 Plants distinctly glandular; culm nodes often purple-black, usually with a ring or cluster of glands close below the nodes; leaves with pitted or warty glands, especially on midnerve or margins; inflorescence usually with pitted or warty glands on axis, branches and pedicels .... *Eragrostis cilianensis*

4: Plants not or sometimes faintly glandular.....**5**

5 Inflorescence 2-14 cm long and less than 6 cm wide; spikelets cream-coloured .....*Eragrostis amabilis*

5: Inflorescence 5-28 cm long and usually more than 5 cm wide; spiklets olive-grey in colour ..... *Eragrostis tenuifolia*

6 Annual plant; inflorescence comprising more than half height of plant: annual of variable habit and dimensions; spiklets usually congested in tight clusters; often confused with *Eragrostis spartinoides* and *Eragrostis brownii*..... ..... *Eragrostis cumingii*

6: Perennial plants; inflorescence comprising less than half height of plant **7**

7 Plant with a sparse panicle with distant branches, interrupted in lower part becoming continuous towards the apex; spikelets shortly pedicellate, usually appressed to primary branches; glumes unequal; florets 8-57 per spikelet. .....*Eragrostis spartinoides*

7: Plant without the above combination of characters.....**8**

8 Plant with spiciform panicle, with the spikelets in dense, often globular clusters along the axis; spikelets sessile; glumes equal; florets 6-27 per spikelet .... *Eragrostis elongata*

8: Plant without the above combination of characters **9**

9 Tufted perennial 40-60 cm tall; spiklets clustered in axillary panicles or along interupted racemes of terminal panicle; glumes unequal; florets 11-56 per spikelet; spikelets c 3 mm wide .....*Eragrostis fallax*

9: Robust often sprawling grass 80-150 cm tall; panicle spiciform or open, often interupted, spikelets clustered along racemes, glumes unequal; florets 9-34 per spikelet; spikelets c 2 mm wide.....*Eragrostis schultzii*

Eragrostis amabilis
Delicate Lovegrass

Eragrostis cilianensis
Stinking Lovegrass

Eragrostis cumingii
Cuming's Lovegrass

Eragrostis elongata
Clustered Lovegrass

Eragrostis exigua

Eragrostis elongata – Clustered Lovegrass

Eragrostis fallax

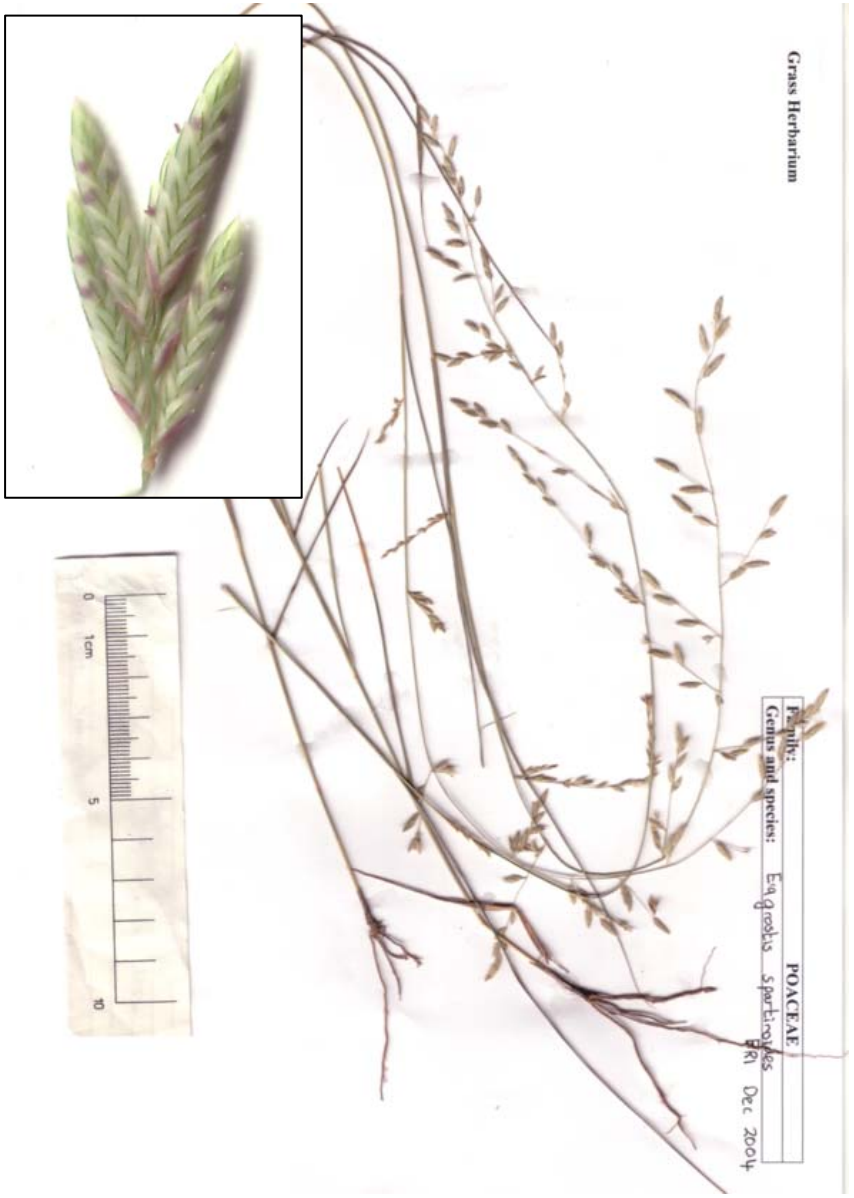
Eragrostis pilosa

Soft Lovegrass

Eragrostis schultzii

Schultz's Lovegrass

Eragrostis spartinoides



Eragrostis tenuifolia
Elastic Grass

Eriachne
Wanderrie Grasses

See Group 5 for full description of the genus.

The genus is recognised by the spikelet with has two bisexual florets and the glumes which usually spread widely at maturity. Lemmas are awned or awnless.

Subfamily: Micrairoideae; Tribe: Eriachneae
Species: World = 48, Australia = 48

There are two awnless species of *Eriachne* on campus.

1 Glumes equal; florets florets often longer than the glumes; lemma with a mucronate (with a sharp, abrupt terminal point) apex.....*Eriachne mucronata*

1: Glumes slightly unequal; florets slightly shorter than the longer glume; lemma with an acute apex ...*Eriachne obtusa*

Eriachne mucronata

Mountain Wanderrie Grass

Eriachne obtusa

Northern Wanderrie Grass

Megathyrsus
Guinea Grass or Green Panic

Megathyrsus maximus was previously known as *Panicum maximum* and *Urochloa maxima*.

From *mega* (large) and *thyrse* (type of inflorescence: a branched inflorescence in which the main axis is indeterminate and the lateral branches determinate in their growth).

Densely tufted perennials, culms usually erect, 60-250 m tall. The panicle is 12-60 cm long and whorled at the lower nodes. Spikelets solitary or in pairs. Glumes unequal, lower glume 33–50% of length of spikelet. The surfaces of the fertile lemma and palea are rugose (wrinkled); *Panicum* species have a fertile lemma surface which is smooth and often shiny.

Guinea grass 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

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

Megathyrsus maximus
Guinea Grass

Panicum

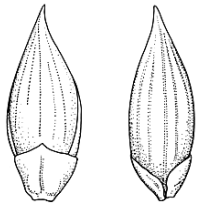
Old Latin name for common millet, *Setaria italica*, from Latin *panis* (bread).

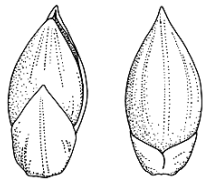
Annuals or perennials, of various habit but commonly tufted. Spikelets solitary or in pairs. Glumes usually unequal. Fertile lemma smooth

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

Key to Panicum species on campus:

1	Lower glume 30-50% the length of the spikelet; leaf sheaths glabrous; annual to c 1 m tall	*Panicum laevinode*
1:	Lower glume 50-95% the length of the spikelet; leaf sheaths hairy; annual or perennial	**2**
2	Lower glume 50-66% the length of the spikelet; perennial 2-100 cm tall; culm internodes and base distinctly hairy	*Panicum effusum*
2:	Lower glume at least 75% the length of the spikelet; annual 40-90 cm tall; culm internodes glabrous, leaf sheaths glabrous or hairy	*Panicum seminudum var. cairnsianum*



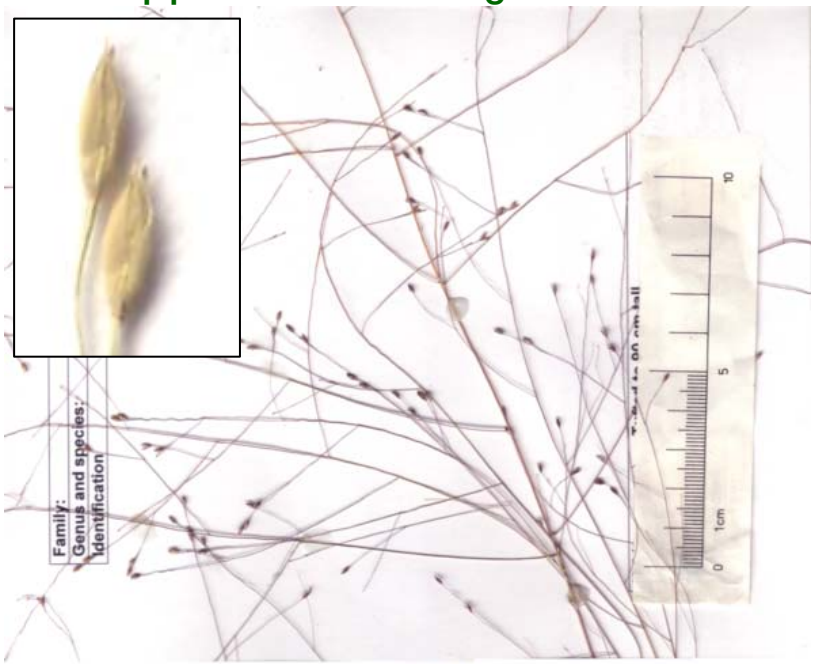


Panicum effusum

Hairy Panic

Panicum laevinode

Pepper Grass or Pigeon Grass



Panicum seminudum

Sporobolus

From the Greek *spora* (seed) and *bolos* (throwing), alluding to the free seed and (presumably) the sometimes forcible manner of its release.

Perennials or annuals, erect to decumbent, usually tufted. Spikelets solitary. Glumes unequal, lower glume often very short. It is distinguished from *Eragrosti*s by its 1-flowered spikelets and 1-nerved lemmas. The mature grain becomes sticky when wet.

Subfamily: Chloridoideae; Tribe: Cynodonteae
Species: World = c. 160, Australia = 24

1 Panicle open; lowest node of inflorescence with whorled branches **2**
1: Panicle contracted; lowest node of inflorescence with 1 or 2 branches .....**Go to Group 10**

2 Spikelets uniformly distributed in inflorescence; grain globular ..... *Sporobolus australasicus*
2: Spikelets situated on apical zone of inflorescence branches; grain not globular **3**

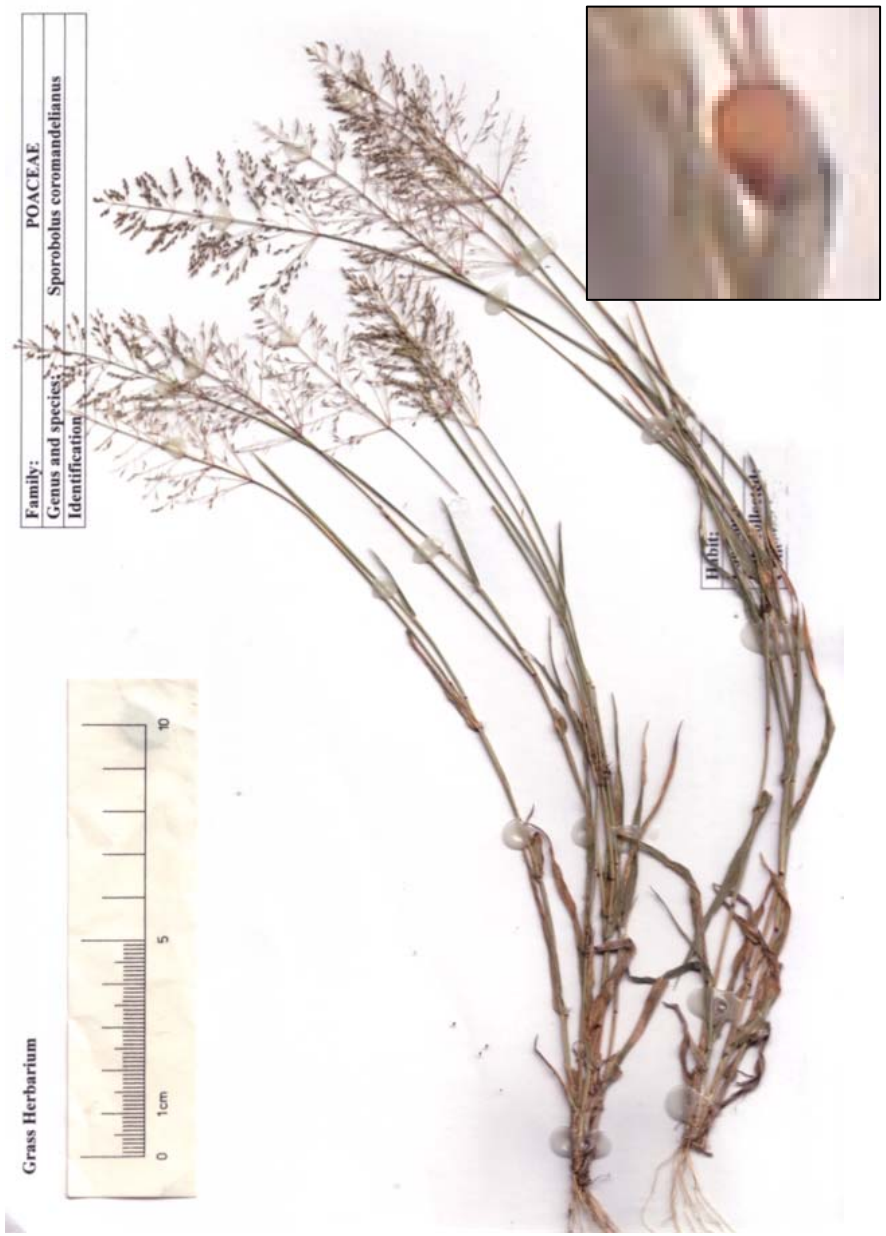
3: Inflorescence branches not all whorled; leaves broad, usually 4–5 mm wide; a weed of roadsides and gardens .... *Sporobolus coromandelianus*
3: Inflorescence branches all, except uppermost, whorled; leaves narrow, less than 4 mm wide; an uncommon endemic species .....*Sporobolus lenticularis*

Sporobolus australasicus

Australian Dropseed or Fairy Grass

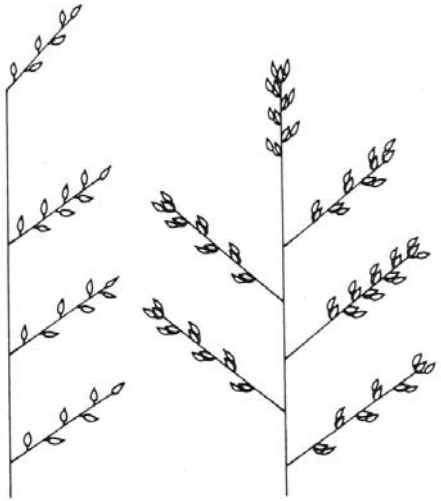
Sporobolus coromandelianus

Small Dropseed



Sporobolus lenticularis

Group 9 – Inflorescence a once-branched panicle; awns absent or short



Digitaria
- *D. ammophila*
- *D. nematostachya*

Echinochloa
- **E. colona*
- **E. esculenta*

Eriochloa
- *E.pseudoacrotricha*

Paspalidium
- *P. distans*

Paspalum – see Group 2

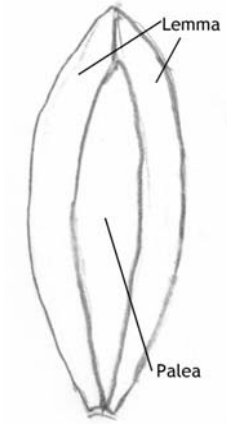
Urochloa
- **U. mosambicensis*
- **U. mutica*
- **U. oligotricha*
- *U. polyphylla*
- *U. pubigera*
- **U. subquadripara*

Digitaria
Finger Grasses

See Group 2 for full description of the genus.

The genus is recognised by the spikelets the morphology of the spikelets. The spikelets are in groups of 2 or 3, the lower glume is small or absent, and the palea of the upper floret completely clasps the upper lemma.

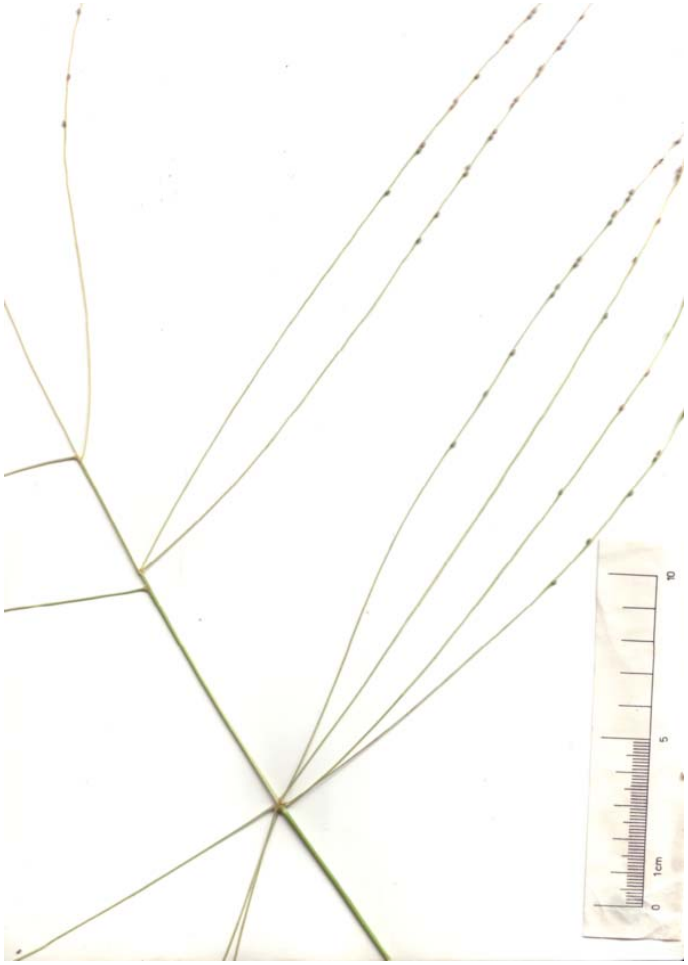
Spikelet showing lower glume



Upper fertile floret (with glumes and lower floret removed)

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

On campus, there are two species of *Digitaria* with racemose once-branched panicles. These tufted perannials are 15-60 cm tall, with leaves 4-25 cm long and 3-7.5 mm wide. At maturity, the inflorescence spreads out to a width of up to 60 cm wide.



1. Spikelets woolly-hairy ..... *Digitaria ammophila*
1: Spiklelets glabrous ..... *Digitaria nemotostachya*

Digitaria ammophila

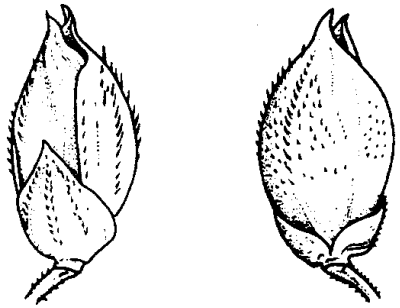
Silky Umbrella Grass or Spider Grass

Digitaria nemotostachya

Echinochloa

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

Annuals or perennials, tufted or decumbent. Ligule absent or present. Spikelets solitary or clustered, sometimes in distinct rows, usually awned. Glumes and lower lemma usually with stiff, bristly hairs, glumes unequal, lower glume c 50% of the spikelet length.



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

1. Inflorescence exserted from leaf sheath; spikelets awnless or mucronate (with a sharp, abrupt terminal point); ligule absent; an annual, decumbent grass, 3-60 cm tall, growing in disturbed areas, including roadsides ..... *Echinochloa colona*

1: Inflorescence embraced at base by subtending leaf; spikelets awnless or mucronate or awned; ligule absent; a cultivated annual, usually erect grass, 0.2-1.5 m tall, sometimes used for roadside revegetation ..... *Echinochloa esculenta*

Echinochloa colona

Awnless Barnyard Grass

Echinochloa esculenta

Japanese Millet

Echinochloa esculenta - Jap Millet used for roadside revegetation, Douglas

Eriochloa
Spring or Cup Grasses

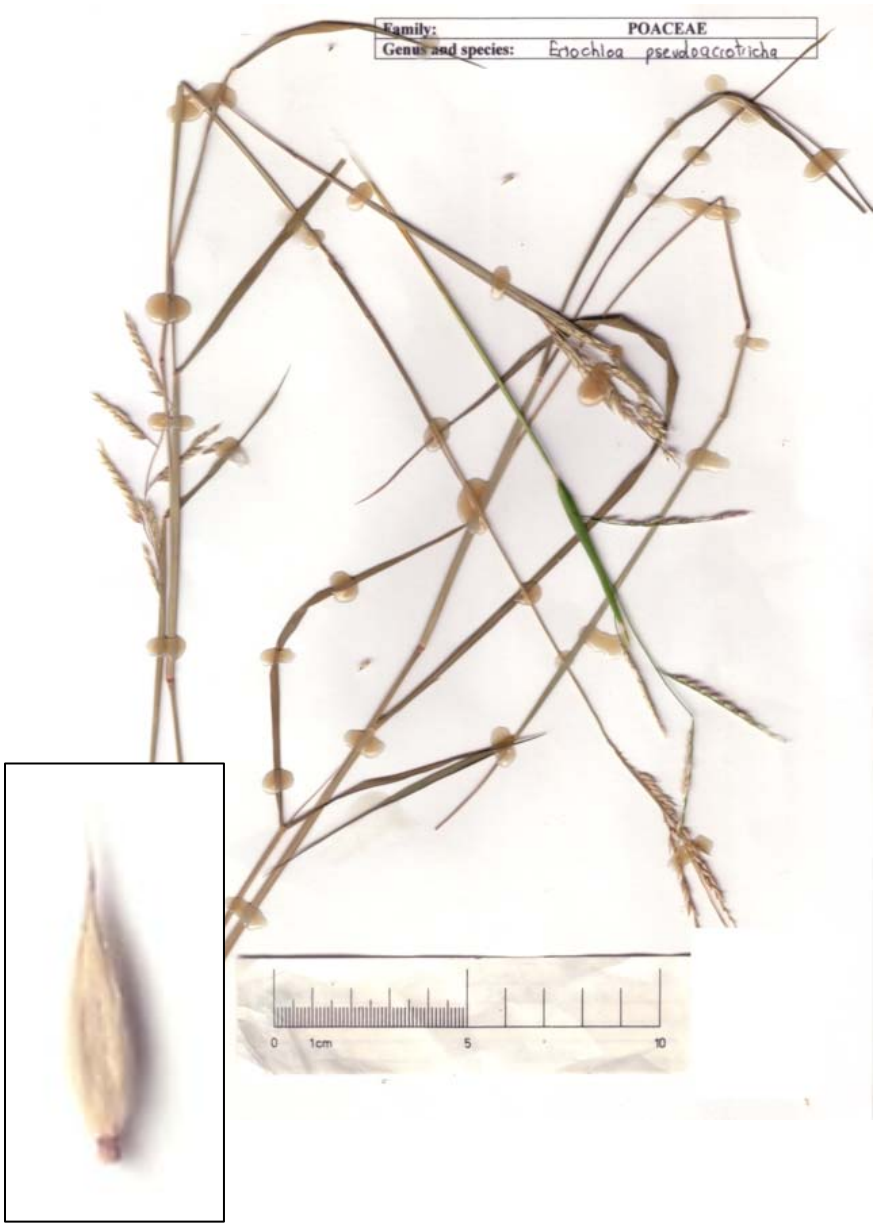
From Greek *erion* (wool) and *chloe* (grass), referring to the hairy spikelets and pedicels.

Annuals or perennials, stoloniferous or tufted to decumbent. Inflorescence with racemes appressed at first, spreading later. Spikelets solitary or in pairs.

Glumes unequal, the lower glume usually reduced to a cup-like ring at the base of the spikelet. The genus is distinguishable by this 'cup', this is formed from the lower rachilla internode which becomes swollen and fused to the lower glume.

Subfamily: Panicoideae; Tribe: Paniceae
Species: World = 30, Australia = 7

Eriochloa pseudoacrotricha
Early Spring or Cup Grass



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 racemes are appressed to the main axis. Spikelets solitary or in pairs. The rachis of each raceme extending as a bristle beyond the point of attachment of the last spikelet. Glumes unequal, the lower glume shorter than the length of the spikelet.

Subfamily: Panicoideae; Tribe: Paniceae
Species: World = c 40, Australia = 22

Paspalidium distans

Urochloa
Arm Grasses or Signal Grasses

From Greek *oura* (tail) and *chloe* (grass), alluding to the muricate lemma of the upper floret.

Brachiaria (excluding *Brachiaria eruciformis*[2]) species are now included in *Urochloa*.

Annuals or perennials, of various habit. Spikelets solitary, in pairs or clustered. Glumes unequal, lower glume shorter than spikelet. Fertile lemma rugose (wrinkled).

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

Key to campus species

1 Racemes numerous, usually more than 10; perennial to 1.5 m tall.....**2**
1: Racemes few, usually less than 10; annual or perennial.....**3**

2 Stonoliferous, robust, sprawling grass, usually grows along the edges of watercourses and can grow in shallow (50 cm) water .....*Urochloa mutica*
2: An erect grass, growing in open woodlands; an uncommon species .....*Urochloa oligotricha*

[2] In 2004, *Brachiaria eruciformis* had a name change to *Moorochloa ericiformis.*

3 Annual decumbent grass to 60 cm tall; inflorescence with spikelets in several untidy rows; lower racemes sometimes branching; spikelets finely hairy .....*Urochloa pubigera*

3: Annual or perennial of variable size and habit; inflorescence with spikelets in two regular rows; lower racemes never branching; spikelets glabrous or hairy..... **4**

4 Perennial of variable habit, 20-150 cm tall; spikelets hairy or glabrous; lower glume 50-70% as long as the spikelet, usually with1-3 stiff hairs on the midnerve of the upper glume; a common weed in Townsville ..... *Urochloa mosambicensis*
4: Annual or perennial, semi-erect to prostrate, 10-60 cm tall; spikelets glabrous lower glume 50-60% as long as the spikelet **5**

5 Spiklelets reddish; leaf margin serrate..*Urochloa polyphylla*
5: Spiklelets green to yellow; leaf margin not serrate..... ..... *Urochloa subquadripara*

Urochloa mosambicensis
Sabi Grass

Urochloa mutica
Para Grass

Urochloa oligostricha

Perennial Signal Grass or Dubi Grass

Urochloa polyphylla

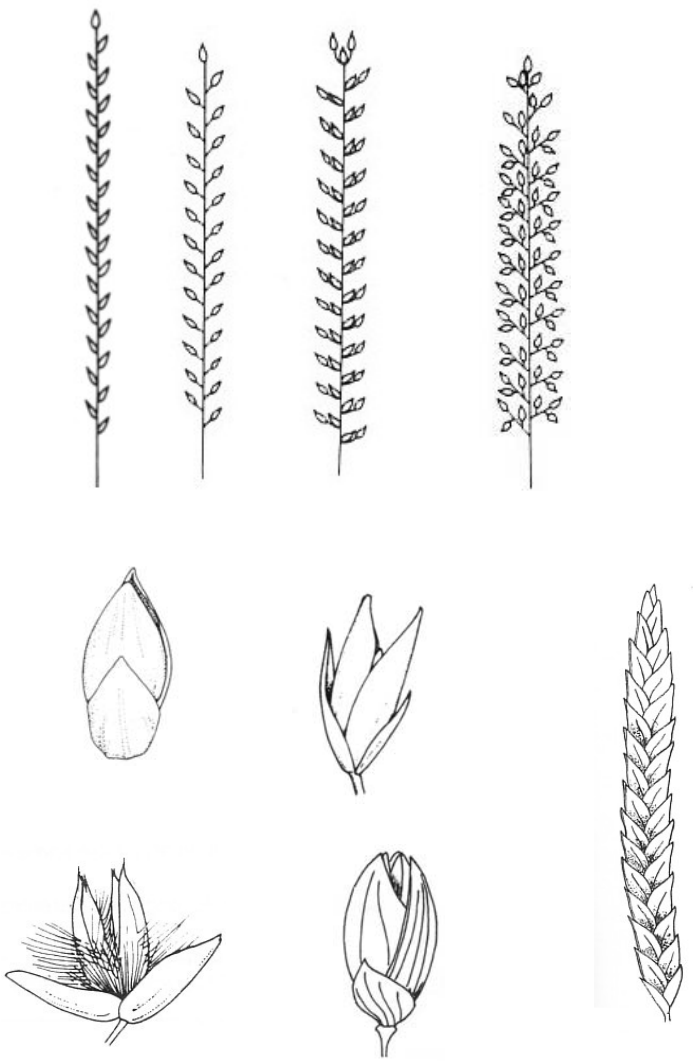
Urochloa pubigera

Arm Grass or Green Summer Grass

Urochloa subquadripara

Armgrass Millet

Group 10 – Inflorescence a spike, raceme or contracted branched panicle; awns absent or short



Eragrostis – see Group 8

Panicum– see Group 8

Paspalidium
P. rarum

Paspalum – see Group 2

Sporobolus
**S. jacquemontii*

Zoysia
Zoysia (cultivated plants)

See also Group 8
See also Group 9

Paspalidium

See Group 9 for full description of the genus.

The genus is recognised by the spikelets and the morphology of inflorescence. The racemes appressed to the main axis. The rachis of each raceme extending as a bristle beyond the point of attachment of the last spikelet.

Subfamily: Panicoideae; Tribe: Paniceae
Species: World = c 40, Australia = 22

Paspalidium rarum is an annual tufted grass to 40 cm tall; the racemes are reduced to 1 or 2 spikelets, therefore could be interpreted as a raceme.

Paspalidium rarum

Rare[3] Paspilidium or Rare Panic

[3] [3] Although the common name indicates it is a rare species, it is very common and widespread across northern Australia.

Sporobolus

See Group 9 for full description of the genus.

Subfamily: Chloridoideae; Tribe: Cynodonteae
Species: World = c. 160, Australia = 24

Many species of non-native *Sporobolus* with contracted panicles are becoming serious weeds.

Sporobolus jacquemontii is a densely tufted plant to 75 cm tall. It is a common weed in many Townsville lawns.

Sporobolus jacquemontii

Sporobolus jacquemonti

Rat's Tail Grass

Zoysia
Zoysia Grasses

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

Mat-forming perennials, rhizomatous. Inflorescence a single raceme with spikelets arranged on all sides.

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 hybrids and varieties:
Zoysia japonica - Japanese Lawngrass, Korean Lawngrass
Zoysia matrella – Manila Grass
Zoysia tenuifolia – 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.

The *Zoysia* on campus is a cultivated plant, and used as a ground cover in gardens beds. Since I have not observed the campus species in fower, I have not been able to determine which species it is.

Subfamily: Chloridoideae; Tribe: Cynodonteae
Species: World = 11, Australia = 2

Zoysia

Townsville[4] Grass Species

Alloteropsis cimicina
Alloteropsis semialata
Ancistrachne uncinulata
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
Arthragrostis deschampsioides
Arundinella nepalensis
Arundinella setosa
* *Arundo donax*
* *Axonopus compressus*
Bothriochloa bladhii subsp. bladhii
Bothriochloa decipiens
Bothriochloa ewartiana
* *Bothriochloa pertusa*
Brachyachne convergens
Brachyachne tenella
Capillipedium parviflorum
Capillipedium spicigerum
* *Cenchrus echinatus*
Cenchrus elymoides var. elymoides
Chionachne cyathopoda
* *Chloris gayana*
* *Chloris inflata*
Chloris lobata
Chloris pectinata
Chloris pumilio
* *Chloris virgata*
* *Chrysopogon aciculatus*
Chrysopogon fallax
Chrysopogon filipes
* *Chrysopogon zizanioides*
Cleistochloa subjuncea
Cymbopogon ambiguus
Cymbopogon bombycinus
Cymbopogon obtectus
Cymbopogon queenslandicus
* *Cynodon dactylon var. dactylon*
Cynodon nlemfuensis var. nlemfuensis
* *Dactyloctenium aegyptium*
Dactyloctenium buchananensis
Dactyloctenium radulans
* *Dichanthium annulatum*
* *Dichanthium aristatum*
Dichanthium fecundum
Dichanthium sericeum subsp. polystachyum
Dichanthium sericeum subsp. sericeum
Digitaria ammophila
Digitaria brownii
* *Digitaria ciliaris*
* *Digitaria didactyla*
Digitaria diffusa
* *Digitaria eriantha*
Digitaria gibbosa
Digitaria leucostachya
Digitaria longiflora

[4] This list was compiled from personal observations, input from Chris Gardiner (JCU), the records of Queensland Herbarium (BRI) and JCU Herbarium (JCT).

Digitaria minima
Digitaria nematostachya
Digitaria orbata
Digitaria parviflora
* *Digitaria violascens*
* *Echinochloa colona*
* *Echinochloa crus-galli*
* *Echinochloa esculenta*
* *Echinochloa polystachya*
Ectrosia leporina
* *Eleusine indica*
Elionurus citreus
Elytrophorus spicatus
Enneapogon lindleyanus
Enneapogon nigricans
Enneapogon polyphyllus
Enneapogon robustissimus
Enteropogon ramosus
* *Eragrostis amabilis*
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 minor*
Eragrostis parviflora
* *Eragrostis pilosa*
Eragrostis schultzii
Eragrostis sororia
Eragrostis spartinoides
Eragrostis stenostachya
Eragrostis tenellula
* *Eragrostis tenuifolia*
Eriachne ciliata
Eriachne mucronata
Eriachne mucronata forma (Alpha C.E.Hubbard 7882)
Eriachne obtusa
Eriachne pallescens var. pallescens
Eriachne rara
Eriachne triodioides
Eriochloa crebra
Eriochloa procera
Eriochloa pseudoacrotricha
Eulalia aurea
Hemarthria uncinata
Heteropogon contortus
Heteropogon triticeus
Hymenachne acutigluma
* *Hymenachne amplexicaulis*
* *Hyparrhenia rufa subsp. rufa*
Imperata cylindrica
Ischaemum australe var. arundinaceum
Ischaemum australe var. villosum
Ischaemum rugosum var. segetum
Leersia hexandra
Leptochloa decipiens subsp. decipiens
Leptochloa fusca subsp. fusca
* *Leptochloa fusca subsp. uninervia*
Leptochloa neesii
Lepturus repens
* *Megathyrsus maximus var. coloratus*
* *Megathyrsus maximus var. maximus*
* *Megathyrsus maximus var. pubiglumis*

*	*Melinis minutiflora*
*	*Melinis repens*
	Mnesithea formosa
	Mnesithea granularis
	Mnesithea rottboellioides
	Oplismenus aemulus
	Oplismenus compositus
	Oryza australiensis
	Oryza meridionalis
	Oxychloris scariosa
	Panicum decompositum var. decompositum
	Panicum effusum
	Panicum laevinode
	Panicum mindanaense
	Panicum mitchellii
	Panicum paludosum
	Panicum seminudum var. cairnsianum
	Panicum simile
	Panicum trichoides
	Paspalidium caespitosum
	Paspalidium constrictum
	Paspalidium disjunctum
	Paspalidium distans
	Paspalidium flavidum
	Paspalidium gracile
	Paspalidium rarum
	Paspalidium spartellum
V	*Paspalidium udum*
*	*Paspalum conjugatum*
	Paspalum distichum
*	*Paspalum notatum*
	Paspalum scrobiculatum
	Paspalum vaginatum
*	*Pennisetum alopecuroides*
*	*Pennisetum ciliare*
*	*Pennisetum pedicellatum subsp. unispiculum*
*	*Pennisetum pennisetiforme*
*	*Pennisetum setaceum*
*	*Pennisetum setigerum*
	Perotis rara
	Phragmites australis
	Phragmites vallatoria
	Pseudopogonatherum contortum
	Pseudopogonatherum irritans
	Pseudoraphis paradoxa
	Pseudoraphis spinescens
*	*Rottboellia cochinchinensis*
	Sacciolepis indica
	Sarga plumosum
	Schizachyrium fragile
	Schizachyrium occultum
	Schizachyrium pseudeulalia
	Sehima nervosum
	Setaria australiensis
	Setaria oplismenoides
*	*Setaria pumila subsp. pallidefusca*
	Setaria surgens
*	*Sorghum bicolor*
*	*Sorghum halepense*
	Sorghum nitidum forma aristatum
*	*Sorghum x almum*
	Spinifex sericeus
	Sporobolus australasicus
	Sporobolus caroli
*	*Sporobolus coromandelianus*
*	*Sporobolus fertilis*
*	*Sporobolus jacquemontii*
	Sporobolus lenticularis
*	*Sporobolus natalensis*
	Sporobolus sessilis
	Sporobolus virginicus
	Themeda arguens

* *Themeda quadrivalvis*
Themeda triandra
Thuarea involuta
Triodia stenostachya
* *Urochloa distachya*
Urochloa holosericea subsp. holosericea
* *Urochloa mosambicensis*
* *Urochloa mutica*
Urochloa oligotricha
* *Urochloa panicoides var. panicoides*
Urochloa piligera
Urochloa polyphylla
Urochloa pubigera
Urochloa reptans
* *Urochloa subquadripara*
Vacoparis laxiflorum
Whiteochloa airoides

* Naturalised species, are those species that are considered to have successfully established outside their native range, and are reproducing without human intervention such as cultivation.

V Threatened status: Queensland Nature Conservation Act 1992 – Vulnerable.

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