

# Grass, restio or sedge?

Grasslands are critically important regions of biodiversity but most of us cannot even identify an individual grass

by Eugene Moll

Cereals provide us with basic food, and account for approximately 50% of all human calorie intake. And since humans consume half of global productivity this is really a huge contribution to total energy consumption. Obvious examples of important cereals are maize, wheat, rice and sorghum\*. Other examples of commercially important grasses are sugar cane and bamboo (which is used as scaffolding in Asia), and the list goes on. However, did you know that all cereals are true grasses? And do you know how to distinguish a grass from the many other very similar looking grass-like plants?

## Grasses and their look-alikes

Grasses belong to the family Poaceae, the most widely distributed of all flowering plant families on earth. They cover more of the vegetated land surface than any other plant family (approximately 25%) from the wettest places to the driest deserts, from the tropics to the coldest places, and from sea level to high altitudes. The grass family is also very species-rich, second only to the Asteraceae or daisy family.

Because grasses are of such importance to people I think it is important that we should readily be able to identify them from other grass-like plants, and preferably in the vegetative state as flowers are not always present.

Grasses are easily confused with plants in other grass-like families, particularly the sedges (Cyperaceae) and the restios or Cape reeds (Restionaceae). Sedges are traditionally thought to be mostly marsh plants (like papyrus), but they are also common throughout grasslands, in heathlands and even occur in some very dry and cold habitats. They too have a global distribution.

Restios, on the other hand, are limited to heathlands, and then only to the heathlands of the Southern Hemisphere. Restios are particularly common and diverse in South Africa in the Cape, and they also occur in some swamps in northern KwaZulu-Natal and in Australian wet heathlands.

The Juncaceae is a fourth family of grass-like plants that is widely used in Africa and Asia for the weaving of many basket products. Incema (*Juncus kraussii*) is used to weave traditional sleeping mats. It is sustainably harvested annually from the coastal wetlands of KwaZulu-Natal, especially round Lake St Lucia, and elsewhere round the world. What makes *Juncus* easy to distinguish from grasses, sedges and

restios is that there are no nodes on the stems, and what leaves there are look like stems. Like the leafy bracts at the end of the inflorescence, all leaf-tips tend to be spiky.

There are a few other families that also have grass-like members, but these tend to be rather habitat-specific in South Africa such as the bulrushes (Typhaceae), a climbing forest 'grass' that is extensively harvested for basketry near Port St Johns (a member of the Flagellariaceae), the Xyridaceae and some members of the Iridaceae, such as *Bobartia*, that can be locally common in specific grassland areas. Another grassy plant is Palmiet, *Prionium serratum*, which is the only genus in the family Prioniaceae. Then in Australia, the grass-trees in the endemic family Xanthorrhoeaceae once occurred widely in heathlands.

## Why are grasses important to us?

Most people find grass and grass-like plants very difficult to identify, and rather are interested in woody plants or plants with showy flowers – any brief survey of the bookshelves in any bookshop will attest to that! However, with careful observation, sometimes with the help of a magnifying glass, it is possible to easily identify which 'grass' family it is that you see before you in the veld. And since grasses are often dominant, and are of such ecologically and economic significance, surely we should make more effort to identify them? As Africans we should be well aware that our grasslands are not only critically important biodiverse regions but also supply vitally important ecological services like holding the topsoil in high rainfall areas from whence our valuable water supplies originate. Grasses also provide grazing for game and domestic stock, while our savannas are important for wildlife and browsing domestic stock such as goats and some varieties of cattle. And did you know that some mammals are obligative grazers or browsers, while other mammals are facultative herbivores and are referred to as mixed-feeders?

One last thing we should all know is that without fire management our grasslands (including the fynbos restio communities) would disappear, and with increasing global CO<sub>2</sub> levels, grasses are in danger of being out-competed by woody plants. Thus the ecological consequences of not managing our grasslands will have a devastating impact on all people.

As we are dealing with biological entities



TOP: The grass covered foothills of the Drakensberg provide grazing lands and an area for rainfall to percolate into the soil. The root mats stop erosion, and the old grass can be used for thatching. In autumn and winter these grasslands should burn from time to time.

ABOVE: A mixed restio community with sedge tussocks.

BELOW: *Typha capensis* the common bulrush is a wetland specialist.

BELOW CENTRE: Hartmann's Mountain Zebra in northern Namibian savanna. They are true grazers.

BOTTOM: A *Juncus* community on a seasonally wet area on the road to the Cape of Good Hope.



that are variable between individuals of the same species – just like amongst your family and friends there will be tall and short, blue and brown eyed, in the vegetative state plants can vary quite considerably, so look at several examples and build your own picture of the species you are particularly interested in. Plants are much more difficult to identify than animals, not because there are generally many more plant species at the macro level but because plants are all polyploids – which means they have many genes for each character, not just two genes as is the case in animals.

I am going to concentrate on the field identification of the three widespread and commonly confused ‘grass’ families; the Poaceae, Cyperaceae and Restionaceae.

### The Poaceae

A unique feature of grasses is that they mostly have leaves that continue to grow throughout the life of the whole plant from a narrow meristematic (see glossary below) region at the leaf-base called the collar (think of a conveyor-belt). Thus they have evolved a strategy to be grazed continuously. However, you may not find the collar that easily, or the leaf blade, as in some grasses the leaves are

tightly rolled and look superficially like stems, or culms as they are known in grasses. (An example is steekgrass, *Aristida*). What you need to look for is a node, which is a small swollen place on the culm, and then carefully follow the culm up the internode to where the leaf comes off (this may be before the next node but often leaf-sheaths overlap and protect the next node). In doing this you will be following the leaf-sheath, as all leaves start at the node but are tightly rolled round the culm until the collar – from whence the blade ‘branches’ off from the culm. This leaf-sheath is split, and this split leaf-sheath is the diagnostic feature of all grasses, as is the pale collar region. To understand this part of the anatomy of grasses find a giant grass like *Phragmites*, the common reed, and look at this carefully while peeling back the leaf-blade from the culm, then find a smaller grass like *Panicum maximum* (green panic) and slowly work your way down to the more difficult gracile species of grass once you are confident of what to look for and where.

Because some grasses are small and wiry with thin culms and fine leaves, and they may also be heavily grazed, it can be difficult to find the sheath. Thus you may have to search out a suitable specimen that has

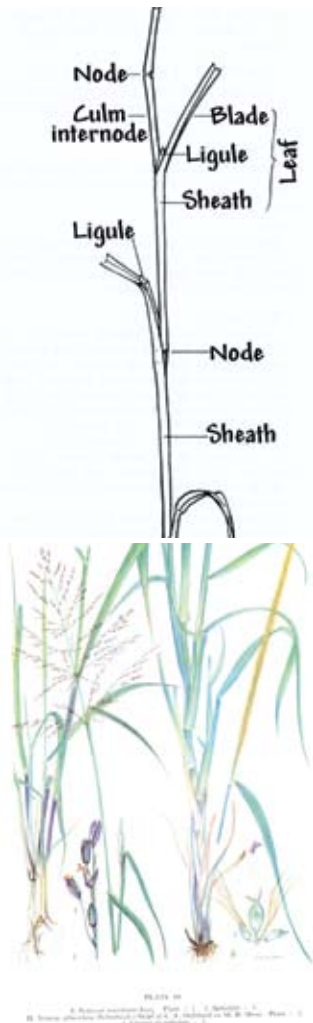
been partially protected from damage and also use a hand-lens or magnifying glass.

### Cyperaceae

Most people tend to think that sedges have triangular stems. Although this is the case in the Northern Hemisphere, many of our sedges have round stems and can look like grasses or even restios in the Cape region. Sedges however have tubular, closed leaf-sheaths and no leaf collar. Knowing this one feature allows you to separate sedges from grasses. To practice find a giant sedge like *Cyperus papyrus* (papyrus), which is a widely planted ornamental, and check it out, then work your way onto smaller sedges.

### Restionaceae

Basically all restios have no leaves, but scale-like bracts instead. Some restios have bunches of sterile stems that look leaf-like, particularly straight after a fire. Thus all restios can be distinguished from grasses and sedges by the fact that they are leafless. In the field some sedges can be superficially confused with restios, and a good hint to tell them apart is to look at the flower heads. All sedges have flower heads that have a green, leaf-like, bract



ABOVE LEFT: Note that the bulrush, *Typha*, also has a split leaf-sheath. CENTRE TOP: Parts of the grass plant. (From *The Grasses and Pastures of South Africa*.)

ABOVE CENTRE: Green panic grass *Panicum maximum*. Illustration: Gertrude E. Lawrence. (From *The Grasses and Pastures of South Africa*.)

ABOVE RIGHT: The pale area at the base of a grass leaf blade, where it branches off from the culm, is called the collar and it is where cells divide (the meristem) to make the leaf.



FAR LEFT: A split leaf-sheath on this *Phragmites australis*, the common reed, identifies it as a grass (Poaceae).

LEFT: The closed leaf-sheath, characteristic of sedges, is clearly visible on this giant sedge *Tetralix thermalis*.

BELOW: Restios can have large papery bracts like this *Elegia capensis*.

BELOW RIGHT: The inflorescence of sedges (*Cyperus*) have one or more leaf-like bracts.



that arises at the base of the inflorescence and extends well beyond. Restios have no such bract. One other thing about restios is that they are all perennials and long-lived, while some grasses (like winter grass) and sedges (uintjies) are annuals – many of which are amongst some of the most common garden weeds. 🌱

\* See the article 'Sorghum', by Phakamani Xaba, *Veld & Flora* 94 (4), pages 224-225.

#### READING

Chippendall, L.K.A., Scott, J.D., Theron, J.J., Meredith, D. et al. 1955. *The Grasses and Pastures of South Africa*, Part 1 A guide to the identification of grasses in South Africa and Part 2 Pasture management in South Africa by J.D. Scott, J.J. Theron, D. Meredith and others. Published by CNA for the Trustees of 'The Grasses and Pastures of South Africa Book Fund'.

## WHAT DOES THAT MEAN?

**Asteraceae** The daisy family. It is the biggest of all plant families with about 1 600 genera and about 23 000 species. Many of the members are herbaceous, but some are big trees like the silver-oaks (the genus *Brachylaena*) or small trees like the Camphor Bush *Tarchonanthus littoralis*, or widespread coastal shrubs like the Bushtick Berry or Bitou, *Chrysanthemoides monilifera*.

**Biomes** Regions that share similar ecological and climate characteristics.

**Browsing** The consumption, generally by mammals, of woody plants including forbs (which are dicotyledonous plants that can be herbaceous or grow from a woody underground part).

**Culm** The stem of the grass plant.

**Ecological services** These include purification of air and water, maintenance of biodiversity, decomposition of waste, soil and vegetation regeneration and renewal, pollination, groundwater recharge through wetlands, seed dispersal, greenhouse gas mitigation, and aesthetically pleasing landscapes.

**Facultative (mixed feeders)** Eating both grasses and woody plants, like elephant and buffalo, goats and most African cattle.

**Grassland** A type of vegetation where the grass layer is conspicuous and even dominant (i.e. there are no trees and shrubs). The Grassland Biome does not only refer to 'grasses'; it also includes rivers, wetlands and other ecosystems that occur in the grasslands. Many of South Africa's major rivers (Tugela, Vaal, Orange, Caledon and Kei) originate in the grasslands. Grasslands are rich in plant species too, making the biome second only to the Cape Floristic Region. In South Africa 44% of mammals are found in the Grasslands Biome. Grasslands stretch across seven of South Africa's nine provinces, covering approximately 29.5% of the country's land, totalling 36 million hectares. Many people live in the grasslands biome, and in fact, the biome supports many of the country's industrial sectors, including agriculture, forestry, urban

development and mining. Yet only 2% of the biome is conserved and 30% of the 36 million hectares it covers are transformed by other land-uses.

**Grazing** The consumption, generally by mammals, of grass. Thus grazers are grass-eaters.

**Heathland** The only vegetation type that is not climatically determined (as are Tropical Rain Forests or Desert Steppe for example). Heathlands are determined only by soil nutrients and occur where nutrients available for plants are extremely low, particularly in phosphorus and nitrogen (which are the key elements required for protein assimilation). Thus heathlands occur on sandy soils like those in the Western Cape (our fynbos), on peaty soils in Scotland and Ireland, on laterites in Western Australia and Elim in the Western Cape, and even on some calcium-rich soils such as on the Agulhas Plain and around Adelaide in Australia.

**Meristem** A region in plants that is capable of dividing and forming new cells (e.g. at a shoot tip or in the cambium layers between the bark and the wood).

**Obligative** Eating only one type of vegetation. Obligative grazers eat only grass like zebra, wildebeest and white rhinos and obligative browsers eat only shrubs and trees like giraffe and black rhinos.

**Poaceae** The grass family. All plant family names end in 'aceae' and in the Poaceae there are about 600 genera and about 10 000 species. They are critically important plants to humans and other animals and are used for food (cereals and grazing), gardens (lawns and ornamental), construction (thatch and scaffolding) and making baskets, mats and other household goods.

**Savanna (or savannah)** Vegetation type where grasses form the understorey and there is a woody (shrub or tree) overstorey or layer. Historically savannas were defined as having only widely scattered woody plants like the plains of the Serengeti. Today the term is used generally for any open, woody plant community that has a grass understorey such as most of the Kruger Park.