

# 1 Grasses and grazing

The main plants in our native pastures of northern Australia are summer-growing tropical grasses which have evolved under conditions of light grazing and low, often variable, rainfall. There are also many broad-leaved species.

Grasses are nature's selection of plants that can tolerate grazing. Their growing points, at the base of each leaf, are not destroyed when the leaves are eaten. Our most important grasses are tussock species—mitchell grass, blue grasses, black spear grass—with each tussock made up of many separate shoots, or tillers.

Broad-leaved plants grow from the tips of their shoots and have to form new shoots when these are removed. Shrubs and trees are woody broad-leaved plants; the non-woody ones are called 'forbs'.

Cattle on native pasture may eat 20% forbs in their diet, sheep more than 30%. Forbs are often a good source of minerals but they are major weeds if unpalatable, poisonous or if they cause irritation. Native and naturalised legumes are forbs that provide higher protein feed.

## ***How long do grass plants live?***

Ephemeral plants are short-lived, often germinating, flowering and seeding on one good fall of rain.

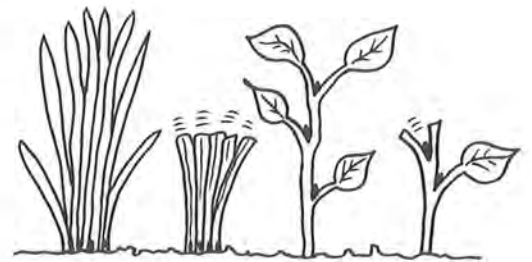
Annual plants live for one growing season only; they seed heavily, then die.

Perennial grasses have variable life-spans; queensland blue grass plants may live for less than four years whereas mitchell grass and black spear grass can live for decades. The individual tillers and roots may come and go but the tussock remains. All perennials must accumulate reserves of carbohydrate so they can send up new shoots after the winter.

**Pastures containing perennial grasses are more stable under grazing.**

## ***What controls grass growth?***

Moisture in the soil has most influence on growth in the dry conditions of Queensland. Temperature and soil fertility (mainly the available nitrogen) only become important when the soil is moist.

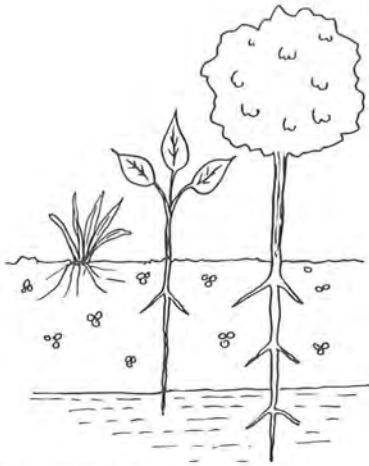


▲ After grazing, grasses keep growing from the base; forbs have to grow from new buds

▼ Rainfall determines how much grass grows







- ▲ Grasses are most effective with shallow moisture; forbs and shrubs can tap deeper
- ▼ Winter forbs are valuable sheep feed



- ▲ Dense trees greatly reduce grass growth
- ▶ Thin stands have less effect

### **Which plants will grow best?**

Although plants growing close together compete above ground for light, most of the competition occurs in the root zone and is for water.

The fibrous root system of grasses can extract water more effectively than the forb's single taproot but is usually more shallow. Thus grasses will win over forbs while the surface soil is moist but, as the depth to moist soil increases, deeper-rooted plants have the advantage.

After rain, established perennials produce new leaf more quickly than annuals starting from seed.

### **Does rain in different seasons affect pasture composition?**

Tropical grasses produce over 80% of their annual growth during summer and so are favoured by summer rain. Late summer rain boosts their seed production but also encourages woody plant seeds to germinate.

Winter rains favour woody plants and forbs, including medics in southern regions.

### **What is the effect of trees and shrubs?**

Trees and shrubs compete strongly with grasses for soil moisture even though they can draw water from different depths.

Woody plants may keep growing in winter because they are less affected by low temperatures and frosts and can tap water from a greater depth. Most Australian trees and shrubs are evergreen and can respond quickly to rain.



### **Is this tree effect different in the north?**

There is a difference north of about Bowen (20°S). There competition for soil moisture becomes less important because

- the eucalypt tree density may be only one-third of that in the south
- heavy monsoonal rain gives enough water for both trees and grass in the wet, and none for either in the more severe dry.

**Clearing trees benefits pasture growth in most summers in the subtropics but only in dry summers in the tropics.**

### **Which grasses give the best ground cover?**

Creeping species give better ground cover than tussock grasses under heavy grazing. The creeping stems are called stolons if above ground and rhizomes if below. Creeping grasses are often naturalised introductions.

When tussock grasses are heavily grazed, the number of tillers in each tussock is reduced, the tussocks become further apart and the amount of bare soil increases.

Under dry conditions, the tussock base and its roots remain to provide some resistance to erosion while creeping grasses, such as indian couch, may die back to widely spaced individual plants with little ground cover.

**A healthy pasture protects the soil against erosion.**

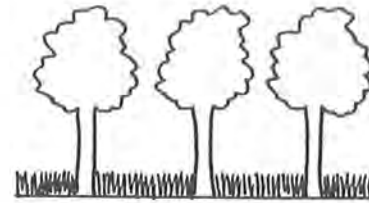
### **What happens to a grass when it is grazed?**

After the younger, active leaves have been eaten the plant grows more slowly for a time.

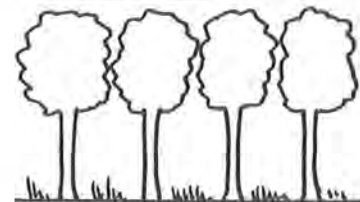
If the plant is grazed heavily and repeatedly, the old roots are not replaced because new leaves have first call on the reserves. The root system is reduced and the tussock gets smaller as tillers die and are not replaced. As the flower stems or heads are eaten, no seed is dropped. If the plant eventually dies, it cannot be replaced because there is no seed on the ground.

**Grasses are stimulated by light grazing, can tolerate moderate grazing but will weaken under constant heavy defoliation.**

#### NORTHERN

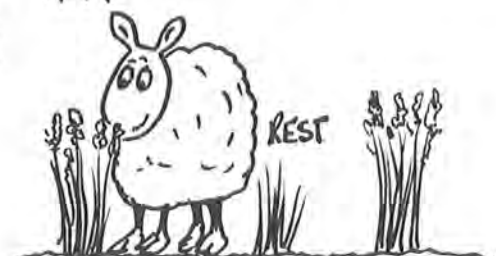
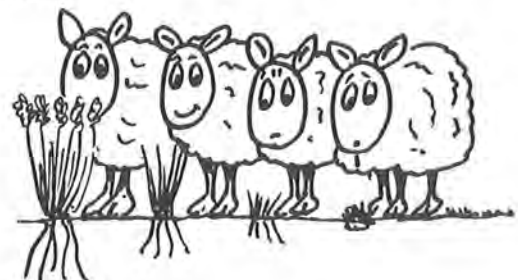


#### SOUTHERN

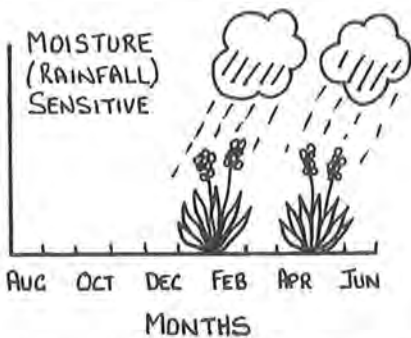
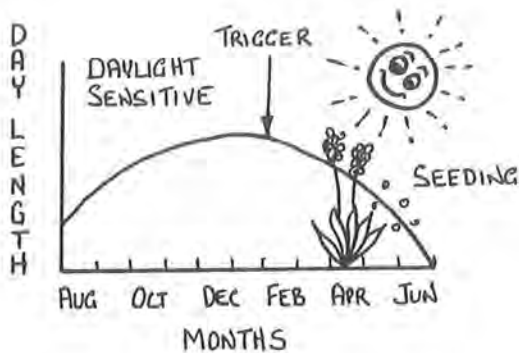


▲ Tree clearing has a smaller effect in the north

▼ Constant heavy grazing weakens grass; lighter grazing and spelling allow grass to recover

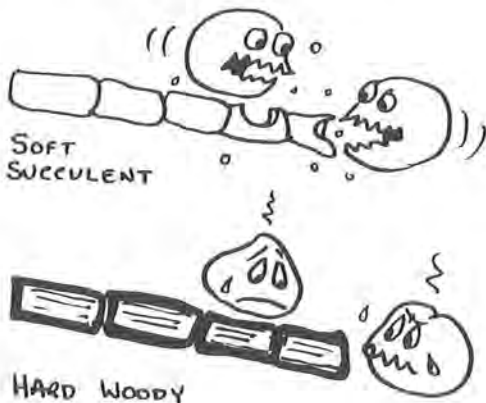






▲ Daylength or rainfall can trigger flowering

▼ Rumen bacteria take longer to break down old woody feed



### When is the grass plant most susceptible?

Most damage from grazing occurs when a grass is sprouting from its reserves after a dormant period—in spring or after a drought or fire. Grazing during flowering and seed set will reduce seed reserves.

Grazing will do least damage when the grass is dormant and not trying to send up new leaves—in winter.

### When do grasses flower?

Flowering in many grasses is triggered as the days shorten in autumn. Flower stems emerge about three weeks later and seeds drop within six to eight weeks.

In more arid regions, many grasses will flower whenever there is enough soil moisture and the temperatures are right. A month after good rains, the whole paddock may be covered with seed heads.

**All native grasses must be allowed to drop good seed periodically for regeneration.**

### How long can seeds survive in the soil?

Grass seeds rarely last more than three years but some forbs, especially the weeds, can survive for years.

Seeds are lost if they germinate with false starts to the wet season. They then do not survive. Many seeds are dormant for several months after shedding which prevents them from germinating in the season when they were dropped.

Seed harvesting ants, where prevalent, can remove a lot of seed.

### What is grazing quality?

Good quality forage is broken down quickly by the bacteria in the rumen of the grazing animal and releases a lot of nutrients. The forage, and bacteria, are then digested in the intestine and so pass quickly through the animal. The animal can keep eating and producing.

Poor quality feed takes a long time to break down in the rumen because it is woody and the nutrients the bacteria need—nitrogen, sulphur—are deficient. The feed stays in the rumen and the animal cannot eat more. Minerals, such as phosphorus, needed by the animal's body may be deficient.

**Young fresh leaf early in the growing season is high in minerals and easily-digestible sugars and carbohydrates.** As the leaves age, the plant's cell walls become more woody and quality drops.

**What influences quality?**

The fertility of the soil and the stage of growth of the grass. You cannot do much about the basic soil fertility in extensive grazing areas but you may be able to manage the stage of growth of the grass, mainly through the use of fire.

Once flowering has been initiated, the grass tiller forms no new leaves as its energy goes into the flower stalk. This thickens until flowering and then turns woody to support the ripening seed head. Meanwhile the leaves are ageing and dying.

**The quality of a grass declines very quickly after it flowers.**

If the flower stalk is eaten, the plant may produce new leaf. New tillers may form but, if it is late in the season, these also send up flower stems.

**What else influences quality?**

With too much rain, the leaves keep growing but the minerals become diluted. Pastures in the monsoon regions often provide a 'green desert'—a great bulk of low quality feed.

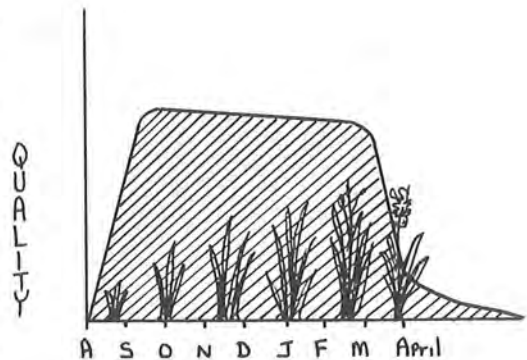
Following a good year, much of the available nitrogen may be tied up in the old standing grass and new growth can be limited and protein-deficient.

The best years for cattle and sheep growth have extended 'grass rains'—just enough rain to keep producing high quality shoots without a bulk of ageing leaf or seed heads. But when the rains stop, there is little carry-over feed and no new seed.

Frosted green grass, and even mature dry grass, can be nutritious until dew or rain encourages moulds and leaches out the nutrients.



▲ Young fresh grass after a fire



▲ Grass quality drops quickly after flowering

▼ Cattle graze poor quality feed on the roadside after eating out the paddock

