Amalan Ladang (SHW 3003)
Kumpulan 3

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Grasses
Family - Poaceae
Poaceae

- **family Poaceae** *(noun)* - 1. the grasses: chiefly herbaceous but some woody plants including cereals; bamboo; sugar cane

Synonyms: [Gramineae](#), [family](#)
Why are grasses suitable as ruminant feed?

- Comprise of *herbaceous* materials that are easily grazed and digested
- Fulfills nutrient requirements
- No toxic constituents
- Able to regrow after cutting or grazing
- Continuous growth habit
- Spreads by rhizomes or stolons, rapid ground coverage
Why grasses are able to regrow after being cut or grazed

- Produce fresh shoots by tillering that replaces cut portion
- Non-reproductive shoots have growing points at base of plant that are not damaged by cutting or grazing
- Rhizomes and stolons are not affected by cutting or grazing
Important Characteristics of Pasture Grasses

- Growth habit – upright, creeping, rhizomatous
- Utilization – grazed, cut and carry, both
- Ecological adaptation – dry areas, wet areas, sandy
- Propagation – by seeds or vegetative only
- Nutritive value – protein, digestibility, minerals
- Toxic components
- Compatibility – can be grown with legumes?
Features of Poaceae

- either annuals or perennials.
- alternate leaves with extended blades and clasping sheath
- stems, or culms, are normally hollow and round, and enclosed by leaf sheaths.
- all species have parallel leaf venation.
STEM

- Culm
- Node
- Internode
- Stolon
- Tiller
STEM

- **Grass Stems** - are mostly hollow, cylindrical and interrupted at intervals by swollen joints or nodes. Stems are rarely branched above the ground and are called **CULMS**.

- Some grasses have stems which creep along the surface of the ground and give rise to new shoots (TILLERS) at their nodes. The horizontal stems are called **STOLONS**.

- If the horizontal stems go underground they are called **RHIZOMES**.
LEAF

Leaf Blade

Ligule

Auricle

Leaf Sheath
The leaf blade is usually long and narrow, with parallel sides and veins and tapering to a pointed or blunt tip. At the junction of the sheath and blade there is a small membranous flap of tissue called the LIGULE. This is sometimes just a fringe of hairs.
LEAF VENATION

- Venation is the pattern of veins in the blade of a leaf. The veins consist of vascular tissues which are important for the transport of food and water. Leaf veins connect the blade to the petiole, and lead from the petiole to the stem.
Ligule: a thin membrane or a row of hairs at the junction of leaf blade and sheath
The flower is usually bisexual. It consists of an ovary containing 1 ovule (the female part). The ovary is usually surmounted by two feathery stigmas and is surrounded by three stamens. Each stamen (the male part of the flower) consists of an anther and a filament.

The flower is protected by two sets of scales. The first set consists of the LEMMA and the PALEA which enclose the flower. This whole structure is called a floret.
• One or more florets may be arranged on an axis (the RACHILLA), with all of the florets being protected by a second set of scales at the base called GLUMES. The glumes enclose the florets before they are mature.

• The whole unit is called a SPIKELET. The Lemmas (of individual florets) and/or the Glumes, may have bristle-like extensions called AWNS arising from them.
FLOWER

- Awn
- Rachilla
- 1st Floret
- 2nd Floret
- Upper Glume
- Lower Glume
FLOWER (Floret)
Arrangement of Spikelets into a Flower Head or Inflorescence

When the spikelets are borne on stalks on branches from the main axis, the flower-head is called PANICLE.
If the spikelets are stalked directly on the main axis, then the flower-head is a RACEME.
Where there are no stalks, and the spikelets are seated on the main axis itself, the flower-head or ear is known as a **SPIKE**
Different forms of inflorescences

A: Panicle (Bluegrass, bentgrass)

B: Raceme (bahiagrass)

C: Spike (perennial ryegrass)
ROOTS
Different growth habit
How grasses grow

- New growth in grasses occurs in **three different ways**, from **three different meristems** or zones of growth.
- New **tillers** grow from axillary buds at the base of the plant,
- new **leaves** grow from apical meristems inside the stems,
- and **intercalary meristems** are secondary zones of growth at the base of the internode, sheath and blade. These are growth regions inserted between mature tissues.
SPECIES OF GRASSES
Pennisetum purpureum
Panicum maximum
Setaria sphacelata cv splendida
Brachiaria ruziziensis
Brachiaria decumbens
Brachiaria humidicola
LEGUMES

Family *Leguminoseae*
LEGUME

- **legume**, common name for any plant of the family Leguminosae, which is called also the **pulse**, legume, pea, or bean family.
- Botanically, a legume is the characteristic fruit of the pulse family plants, called also leguminous plants. It is a **pod** which usually splits along two sides, with the seeds attached along one of the sutures.
Features of Leguminoseae (Fabaceae)

- Numbering about 650 genera and 17,000 species
- The leaves are usually compound;
- the fruit is a legume (a type of pod);
- and the blossoms may have an irregular butterflylike (papilionaceous) shape. Typically, the flowers have 10 stamens, and the corolla and the calyx are formed of 5 petals and 5 sepals, respectively. Some species have thorny branches.
Trifoliate leaf

A compound leaf having three leaflets
Pinate leaf

Leaf resembling a feather; having the leaflets on each side of a common axis
bi-pinate leaf

- leaf resembling a feather; having the leaflets on each side of a common axis
Figure 107. Acacia sieberiana
Nitrogen fixation
Why are legumes important?

Each year legume- \textit{Rhizobium} symbiosis generates more useful nitrogen for plants than all the nitrogen fertilizers produced industrially - and the symbiosis provides just the right amounts of nitrogen at the right time at virtually no cost to the farmer.
This **symbiotic nitrogen fixation** is very beneficial for two reasons:

- it supplies the legume with nitrogen,
- it can significantly decrease spending on N-containing fertilizers for the subsequent crops.
Role of Legumes

- Supply nitrogen to grasses
- Increased protein for ruminants (grasses 6-12%, legumes 15-30%)
- Increased minerals (P & K) for animals
- Improved digestibility of feed
Dry matter production per year

- **Grasses 20-30 tonnes/ha**
  - C4 photosynthesis
  - Resistant to grazing

- **Legumes 15-20 tonnes/ha**
  - C3 photosynthesis
  - Less tolerant to grazing
SPECIES OF LEGUMES
Centrosema pubescens
Calapogonium muconoides
Peuroria phaseoloides
Stylosanthes guianensis
GLYRICIDIA SEPIUM
Sesbania grandiflora