

M.Sc. Botany (Semester II)
Course Title : Systematics and Evolution

Unit II: Poaceae (Gramineae)

Dr Ram Prasad

Department of Botany

Mahatma Gandhi Central University

Motihar, Bihar

Poaceae (Gramineae) : Grass Family

- Large and ubiquitous family of monocotyledonous flowering plants known as grasses
- Name “Poaceae” was given by John Hendley in 1895, on the basis of tribe Poeae.
- Term is derived from Greek word meaning fodder.
- Genus Poa introduced by Carl Linnaeus.

Scientific classification:

- Kingdom : Plantae
- Phylum : Angiosperms
- Class : Monocotyledonae
- Order : Poales
- Family : Poaceae

12- subfamilies

- Genera : 771
- Species : 12,000

Morphological characters

Habit: Annual (*Oryza*) or perennial (*Saccharum*) herbs; rarely tree (bamboos).

Roots: Fibrous, adventitious.

Stem: Herbaceous; cylindrical; jointed, hollow at internodes. Sometimes, forms rhizome or runner.

Stem of grasses is called a culm.

Leaves: Sessile with long sheathing base; alternate; simple; ligulate; parallel venation.

Inflorescence: *Spike of spikelets or panicles of spikelets.* Each spikelet is composed of 2-5 flowers. It is enclosed by a pair of bracts called **glumes**.

Spike of spikelets: The spikelets form dense clusters in sessile manner on main axis as in wheat.

Panicles of spikelets: The spikelets are arranged on a branched axis-panicle as in oat.

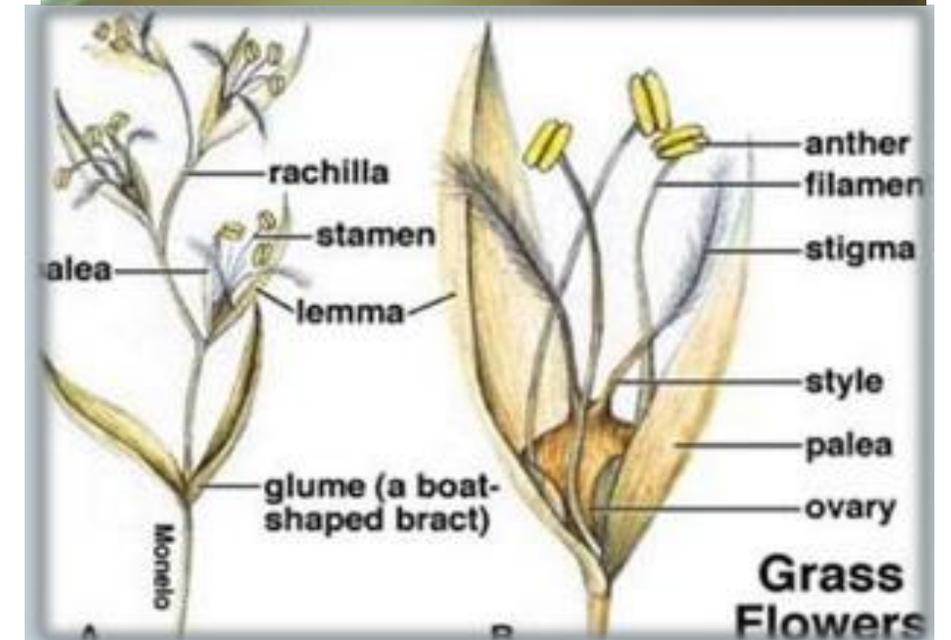
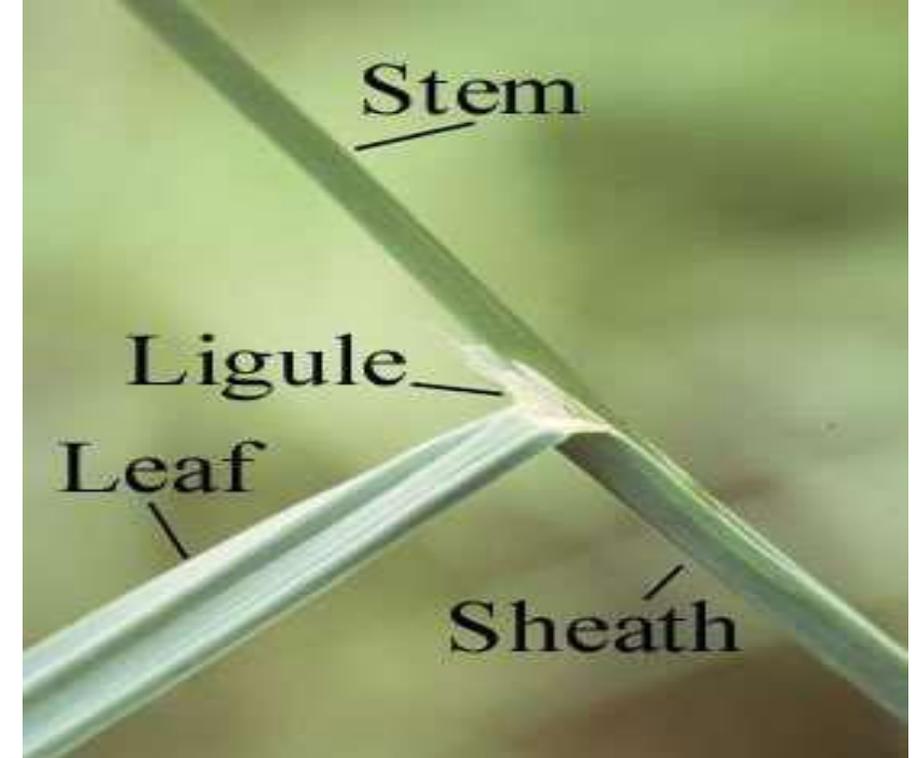
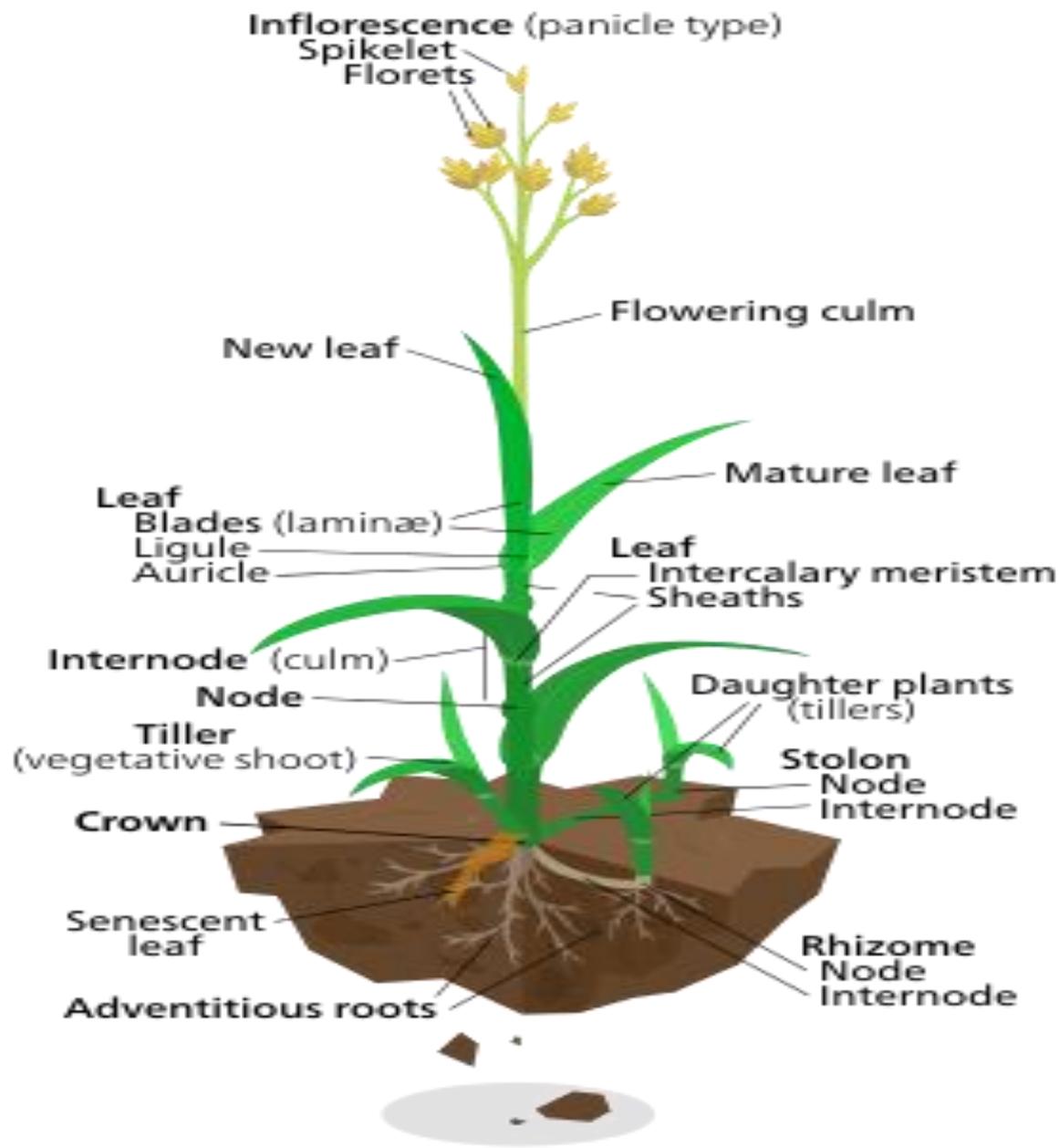


Fig. Diagram of a typical lawn grass plant.

Reproductive characters

Flower: Pedicillate; bracteate, two bracts **palea** and **lemma** enclose flower or floret; lemma contain bristle like **awns** zygomorphic; Bisexual (*Oryza*) or rarely unisexual (*Zea mays*); hypogynous.

Perianth: Represented by two or three scale like **lodicules**.

Androecium: 3 stamens in a whorl, sometimes 1,2 or 6; polyandrous; anther **versatile**.

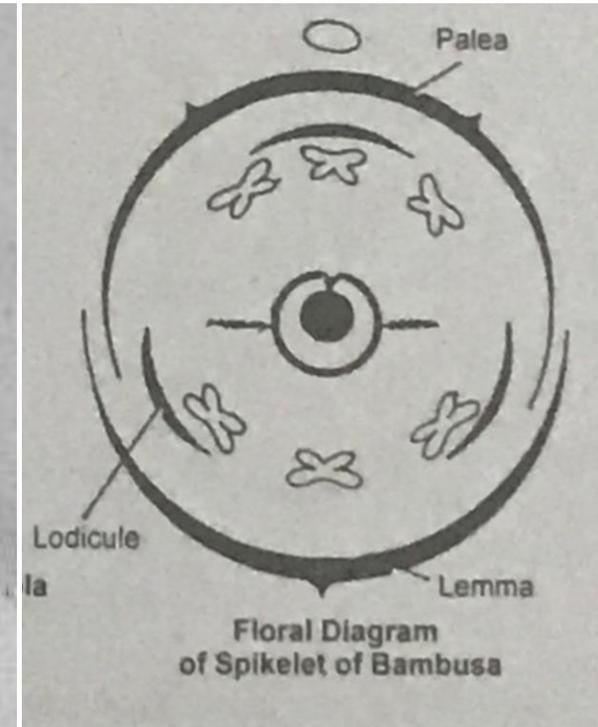
Gynoecium: Monocarpellary with superior unilocular ovary containing a single anatropous ovule; stigma usually 2; feathery; basal placentation.

Fruits: Mostly one-seeded Caryopsis (fruit wall is completely fused with the seed coat)

Seed: Endospermic

Pollination: By air

Floral Formula: $\text{Br. } \% \text{ } \text{♀} \text{ } P_2(\text{lodicules}) \text{ } A_3 \text{ } \underline{G}_1$



Poaceae is by far the most economically important family of angiosperms.

Avena (oats)



Oryza (rice)



Triticum (wheat)



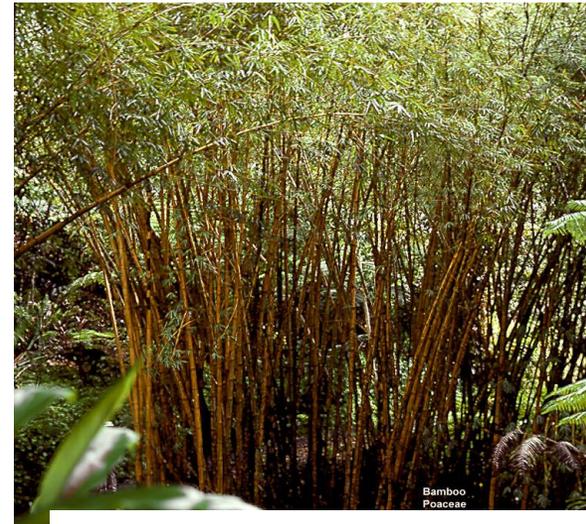
Pennisetum polystachyon



Saccharum (sugarcane)



Zea (corn)



Bambusa (bamboo)



Eleusine coracana

Economic Importance

This family has greater importance than all other families of the flowering plants. It has importance both for man and animals.

- **Food:** All the cereals and millets belong to this family. These from the basic food of mankind. These plants are: *Triticum aestivum* (Wheat), *Avena sativa*, *Zea mays* (corn), *Oryza sativa* (rice), *Hordeum vulgare* (barley), *Secale cereale* (rye), *Penisetum typhoideum* (Pearl millet, Bajra), *Sorghum vulgare* (Jowar).
- **Fodders:** Most of the fodders of the animals also belong to this family. The dried stems and leaves of the cereal crops are used as fodder for the cattle.
- **Sugar:** Sugar is obtained from the juice of *Saccharum officinarum* (sugar cane).

- **Ornamental plants:** Many grasses are used in lawns, e.g. *Agrostis* (florin grass), *Poa annua* (meadow grass), *Festuca* (Festuca grass), *Cyanodon* (Bermuda grass) etc. So these plants have ornamental significance.
- **Aromatic oils:** Certain grasses give aromatic oil, e.g. *Cymbopogon throws* (lemon grass) and *Andropogon odonatus* (ginger grass). This oil is used in perfumes and soap industry for making infusions.
- **Khus oil or oil of vetiver** obtained from rhizomes and roots of *Vetivera zizanoides*.
- **Alcohol and beverages:** Ethyl alcohol and many other beverages are prepared from cereals. For example, wine is prepared from rye, corn and rum molasses from sugar cane.

Paper industry: Some species of grasses are used for making papers.

Ropes: Fibers are obtained from the leaves of *Saccharum spontaneum* (Kans); *Erianthus munja* (Munj). These fibers are used for making ropes.

Used of Bamboo: *Bambusa* (bamboo) are used as building material. These are used for thatching huts, making boats, carts pipes etc. Their split stems are woven into mats, fans, hats and 'course umbrella. Their leaves are given to horse for curing cough and cold.

Acknowledgements

- Barnhart JH (1985) Family nomenclature. Bulletin of the Torrey Botanical Club 22(1): 1-24
- Pandey BP (2010) A Textbook of Botany: Angiosperms. S. Chand & Co. Ltd. (ISBN: 9788121904049, 9788121904049)
- Stussy TF (1990) Plant taxonomy. Columbia University Press, USA
- <https://en.wikipedia.org/wiki/Poaceae>
- I apologize to all authors whose findings could not be substantiated or cited in our presentation due to reasons of brevity

Thank you for your attention

