

Subject - BotanyClass - B.Sc (Hons.) Part-II, Paper-3rd Group-BTopic - "Diagnostic features, Floral formula, Floral diagram and economic importance of Family - Gramineae (Poaceae)."By - Dr. Ankit Kumar Singh

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Monocotyledon

Gramineae

→ Distribution :-

Family Poaceae contain about 600 genera and over 10,000 species, widely distributed all over the world.

It is the largest and most important family of the plant kingdom. Members of this family show great adaptability and thrive under the most varied conditions, occurring from arctic to antarctic, from sea level to high mountains, from fresh water of lakes and rivers to brackish situations on the coast, and extreme desert conditions.

This is the largest family in Indian flora and is represented by about 240 genera and 1180 species, occurring throughout the country from sea level to an elevation of 6,000 meters in Himalaya.

Some common examples of the family ~~are~~ included -
Triticum aestivum (Wheat), Oryza sativa (Rice)

Zea mays (Maize), Avena sativa (Oats), Hordeum vulgare (Barley), Saccharum officinarum (Sugar cane), Bambusa sp. (Bamboos), etc.

➔ Vegetative characters :-

Grasses are annual, biennial or most frequently perennial herbs. They are rarely shrubs or trees with woody stem which attain height of the 30 meters (Asiatic bamboo).

- Plant is attached by a tuft of fibrous adventitious roots.
- Perennial grasses persist by means of a sympodial rhizome formed by lower internode of stem.
- Rhizome is widely creeping in sand loving grasses.
- Aerial stems terminated by inflorescences are known as culms.

★ Leaves :-

Basal leaves are crowded in a tuft but the leaves on the culm are alternate and distichous.

Each leaves is usually composed of two parts, the sheath and blade (lamina). Sheath forms the basal part of the leaf, encircles the culm.

Venation is usually parallel but occasionally as in some bamboos, the veins are provided with transverse veinlets.

In xerophytic grasses the blades are often folded or rolled up due to the loss of turgor in the special parenchymatous cells (motor cells) present between the veins.

★ Inflorescence :-

Inflorescence terminate the culm and its branches.

The basic unit of inflorescence is spikelet. The spike are sessile or pedicelled and several to many are

Combined in various ways into spikes (e.g. Triticum), racemes (e.g. Paspalum), or panicles (e.g. Avena).

The spikes are ~~are~~ racemes are solitary, digitate or scattered along the main axis (rachis).

Each spikelet consist of many short or minute axis (rachilla) bearing two opposite row of bracts following closely one above the another.

Generally two lowest bract (sometimes one to six) are sterile and they are termed as sterile (or empty) glumes.

They vary considerably in shape, size and texture and provide good taxonomic characters.

Occasionally, ~~rare and~~ lower and rarely both empty glumes are lost by reduction.

- In Panicum, there are more than two empty glumes.
- The sterile glumes are followed by a variable number (1-50) of fertile or flowering glumes or lemma.

- The fertile glumes are closely similar to the sterile glumes (e.g. Eragrostis) or differ from them in shape, size, texture (e.g. Avena). They are often greenish, ~~hard~~ keeled, or rounded and awned or awnless.

A membranous bikerued or bikeruled structure is present between the fertile glume and the rachilla:

This structure known as palea, is partially or wholly enclosed by the fertile glume.

The palea morphologically represents bracteole below the flower.

The lemma and palea bear a flower in their axil.

⇒ Flowers: -

Flowers are small inconspicuous, bisexual (unisexal in Zey and related genera), zygomorphic and hypogynous.

⇒ Perianth: -

Perianth is highly modified and much reduced and is represented usually by two minute or fleshy and hyaline structures, known as lodicules. The two lodicules are present anterolaterally. Sometimes as in Bambusa, the third posterior lodicule is also present.

⇒ Androecium: -

Androecium consist of usually three stamens in a whorl, the odd stamen being anterior.

In Bambusa and Oryza there are two alternate trimerous whorls of stamens.

Sometimes as in Uniola only a single stamen is present which is usually anterior.

Rarely, there are numerous stamens as in Pariana. The filament are free and delicate, and the anther are basifixed (apparently and functionally versatile), ditheous, introse and opening usually by longitudinal ~~longitudinal slit~~ longitudinal slit.

⇒ Gynoecium: -

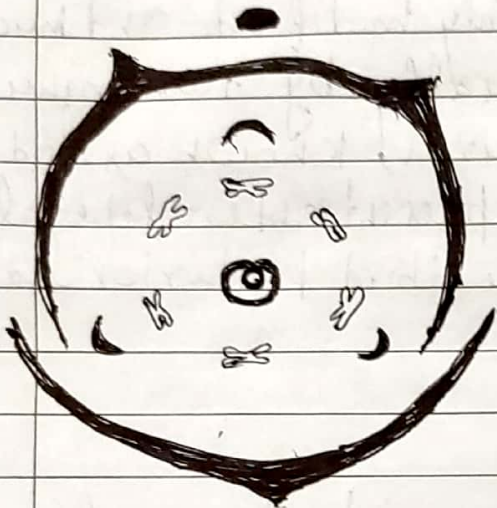
Gynoecium is monocarpellary with a superior unilocular ovary having a single anatropous ovule adaxial to the adaxial side of the ovary.

The placentation is basal. There are usually two

styles but a third style is also present in Bambusa.
The stigmas are generally plumose.

★ Floral formula -

Br 0/0 ♀ $P_2 A_3 \underline{G}_1$



Dendrocalamus strictus



Triticum aestivum

Floral Diagram

★ Economic Importance

Family Poaceae is the most valuable family in the whole plant kingdom.

They provide foods in the form of cereals for man and forage for domestic and wild animals.

Besides, they provide useful products, such as sugar, aromatic and edible oils, fibers, paper, starch alcohols, etc.

① Cereals : -

Following are the major cereals

"Cultivation of mind should be the ultimate aim of human existence." - B.R. Ambedkar

Triticum aestivum (Wheat, Gahun)

Oryza sativa (Rice)

Zea mays (Maize, Makka)

~~Zea mays~~ Zea mays

Hordeum vulgare (Barley, Jay)

Avena sativa (Oats, Jai)

Secale cereale (Rye)

Following are the small grain cereals and millets -

Sorghum vulgare (Jowar)

Pennisetum typhoides (Pearl millet or Bajara)

Panicum miliaceum (Common millet)

② Fodder: -

Fodder grasses for domestic animals are -

Cynodon dactylon, Lolium multiflorum, L. perenne,
Phalaris aquatica etc.

③ Sugar: -

Saccharum officinarum (Sugarcane, Ganne)

is a very important source of sugar.

Molasses, a byproduct of sugar industry is used in the manufacture of industrial alcohol and alcoholic beverage.

→ The bagasse is used for strawboard.

④ Fibers: -

Fibre obtained from the leaves of

Erianthus munja syn. Saccharum munja (Munja)

and Saccharum spontaneum (Kane) is largely used

"You must be the change you want to see in the world." - Mahatma Gandhi

for making ropes.

③ Oils: -

Some grasses are the important source of commercially important essential oils used in perfumery, mosquito repellent, creams and other medicines -

Cymbopogon citratus (Lemon grass oil from leaves)

Cymbopogon hardus (Citronella oil from leaves)

Vetiveria zizanioides (Oil of vetiver or khus oil from rhizomes and roots).

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