FABACEAE

It was originally treated as one of the three sub-families (Papilionoideae) of the family **Leguminosae** in Bentham and Hooker's System of plant classification, later it was raised **to** the status of a separate family.

There are about 452 genera and 8500 species in this family, which are worldwide in distribution. Mostly they grow in tropical and sub-tropical regions.

Important Plants

1. *Arachis hypogea* (Groundnut)
2. *Abrus precatorius* (Crabs' eye, Guruvinda)
3. *Butea monosperma (B.frondosa)* (Flame of the forest)
4. *Cajanus cajan* (Red gram, Pigeon pea)
5. *Cicer arietinum* (Bengal gram, Chick pea)
6. *Crotalaria juncea* (Sun hemp)
7. *Dolichos lablab* (Chikkudu, Bean)
8. *Dalbergia latifolia* (Indian Rose wood)
9. *Glycine max* (Soybean)
10. *Indigofera tinctoria* (Blue dye plant)
11. *Derris indica (Pongamia pinnata)* (Kanuga)
12. *Phaseolus mungo(Vigna mungo)* (Black gram)
13. *Phaseolus aureus (Vigna aureus)* (Green gram)
14. *Pisum sativum* (Garden Pea)
15. *Lathyrus sativus* (Wild Pea)
16. *Pterocarpus santalinus* (Red Sanders)
17. *Trigonella foenum -graecum* (Fenugreek, Menthulu)
18. *Tephrosia purpurea* (Vempali)
19. *Sesbania sesban* (Avisa)
20. *Ulex*

Vegetative Characters

Habitat:

Most of the members of this family are mesophytes.

Exceptionally xerophytic adaptations are seen in Ulex

Habitat

There is great diversity in the habit. Many of the plants are annual herbs, some are shrubs, some others are trees.

Some are weak stemmed that climb as twinners ***(Dolichos)*** or with tendrils ***(Pisum, Lathyrus).***

In twinners the stem twines round a support without any special organ of attachment

Root System :

Plants are characterised by tap root system. The roots bear root nodules in which the symbiotic nitrogen fixing bacteria, ***Rhizobia*** are present.

The nodules also contain a characteristic pink pigment called' Leg-haemoglobin'.

Stem:

It is aerial, erect and herbaceous or woody. In some plants stem is weak and prostrate or twiner ***(Dolichos)*** or a tendril climber ***(Pisum, Lathyrus).***

The stem lies flat on the surface of ground in prostrate plants

Leaf:

Leaves are cauline, alternate, stipulate, petiolate and dorsiventral.

The leafbase is.pulvinus They are simple, pinnately compound, the entire leaf except stipules in *Lathyrus* and terminal leaflets in *Pisum* are modified into tendrils.

The leaflets in *Ulex* are modified into spines. Venation is reticulate.

(Swollen leaf base is called pulvinus.) (*In *Lathyrus* and *Pisum* the stipules are leaf like and are called foliaceous)

Floral Characters

Inflorescence:

It is usually an axillary or terminal ***raceme (Crotalaria).***

Flower:

Flowers are bracteate, bracteoles may be present or absent, pedicellate, complete, zygomorphic, bisexual,pentamerous and perigynous. The thalamus is cup shaped.

Calyx :

There are five sepals which are fused (gamosepalous). The aestivation is valvate. The odd sepal is anterior in position.

Corolla:

The corolla is Papilionaceous. It consists of five petals which are free.

The posterior petal is the largest and is called' Vexillum or Standard Petal'.

The two lateral petals are called 'Wings or Alae'.

The two boat shaped petals beneath the wings on the anterior side are called 'Keel or Carina'.

The keel petals are fused and encloses the essential organs. The aestivation is 'descendingly imbricate'.

Androecium:

It consists of 10 stamens. Usually the filaments of the stamens unite to form two bundles of (9)+l (Diadelphous) condition as in *Dolichos, Tephrosia* and *Pisum* or a single bundle (Monadelphous) as in Crotalaria and Arachis.

A staminal tube which is free at one margin is formed. Filaments maybe of same or different heights. Anthers are dithecous, introrse and dehisce longitudinally.

Gynoecium: It is monocarpellary with unilocular and half-inferior ovary. Usually many ovules are arranged in two vertical rows on marginal placentation. Style is long and curved ***at*** the ***apex.*** Stigma is usually simple. Nectar gland is present *at* the base of the ovary.

In some instances, ovary may be superior due to the presence of a stalk beneath it

eg: Crotalaria.

Floral formula : Br, Brl, , $K_{\{5\}}$, $C_{,+2+(2)}$ $A_{(10)\ or\ (9)+}$, $G_{,-}$

Pollination*:* As flowers are protandrous, usually cross pollination occurs. In ***Lathyrus*** and ***Pisum,*** there is ***self pollination.***

The mechanism of pollination in Fabaceae is 'piston mechanism'.

The type of pollination is entomophily.

The insects are attracted by the standard petal.

They alight on the wing petals and press them down in search of the nectar collected in the staminal tube.

Due to this, the keel petals are also pressed down and open exposing the stigma and stamens.

The stigma which comes out first, brushes to the abdomen of the insect and collects the pollen.

When the anthers come in contact with the insect, the pollen is deposited on its body.

As the insect leaves the flower the essential organs return to their normal position.

Since the movement of essential organs is like that of a piston, it is called '**piston mechanism'.**

Fruit:

Mostly the fruit is a legume or pod **(Pisum, Cajanus, Dolichos).** In **Pterocarpus** and **Dalbergia** it is a samara while in **A rachis** the pods are indehiscent and **geocarpic**

Development of fruit inside the soil is known as geocarpic.

Seed:

It is non-endospermic and dicotyledonous. The cotyledons store proteins in large quantities.

Economic Importance

Fabaceae is economically very important family. Members of this family are a good source of proteins, oils, vegetables, timber and fibres.

1. *Pulses like red gram* **(Cajanus cajqn),** *black gram* **(Phaseolus mungo),** *green gram* **(Phaseolus aureus),** *bengal gram* **(Cicer arietinun)** *are a rich sourceof proteins.*
2. *Pods of* **Dolichos, Glycine,** *used as vegetables.*
3. *Seeds of* **Pisum** *and* **Arachis** *are edible*
4. Groundnut oil from ***Arachis hypogea*** seeds and Soybean oil from seeds of ***Glycine max*** are used in cooking.
5. The oil cake from ***Arachis hypogea*** is used as fodder.
6. The oil from the seeds of Derris indica is used in the making of medicines.
7. Goldsmiths use the seeds ofAbrusprecatorius for weighing.
8. Many plants are useful as fodder {Crotalaria and Phaseolus)
9. Due to their nitrogen fixing ability several crops are used in crop rotation.
10. Fibre from Crotalaria (Sun-hemp) is used in the making ropes.
11. Seeds of Trigonella are used as condiment and medicine. The leaves are used as vegetable.
12. Sesbania and Tephrosia are used as green manure.
13. Indigofera tinctoria yields blue dye. which is used as a fabric whitener.
14. Wood from Pterocarpus santalimis (Red Sanders) is used for making musical instruments.
15. Wood from Dalbergia latifolia is used for making furniture.