MORPHOLOGY OF FLOWERING PLANTS

DESCRIPTION OF SOME IMPORTANT FAMILIES

DESCRIPTION OF SOME IMPORTANT FAMILIES

1. FABACEAE (PAPILIONOIDEAE)

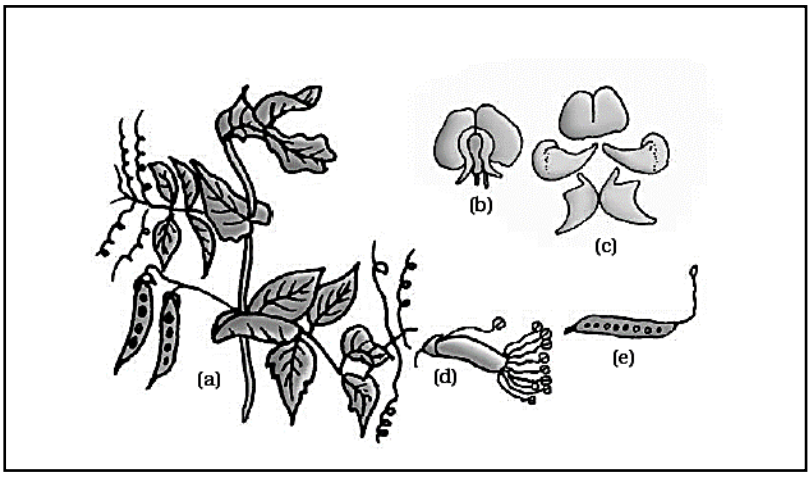


Figure: Pisum sativum (pea) plant: (a) Flowering twig (b) Flower (c) Petals (d) Reproductive parts

DISTRIBUTION:

Cosmopolitan distribution.

Habit:

Usually Annual or perennial herbs, shrubs, some are **Tendril climbers like Pisum sativum, Lathyrus odoratus,** some are **Twiners like Clitoria** and some are **trees like Dalbergia sissoo**.

Roots:

Tap root system, Many plants have nodules on secondary roots. **Nitrogen fixing bacteria-Rhizobium lie in the root nodules in the symbiotic form**.

Stem :

Erect, Herbaceous or woody, cylindrical, branched, solid, some are **twiners like Dolichos lablab**.

Leaf :

Alternate, pinnately compound or simple; leaf base, pulvinate; stipulate; venation reticulate. In Pisum sativum and Lathyrus odoratus, upper leaflets are modified into tendrils.

Inflorescence: Usually Raceme or Solitary axillary, **e.g. Lathyrus aphaca.**

Flower:

Bracteate, Pedicellate, **Bisexual, Zygomorphic**, Pentamerous.

Calyx:

5, Gamosepalous, Valvate or imbricate aestivation, odd sepal anterior.

Corolla:

Petals five, polypetalous, papilionaceous, consisting of a posterior standard, two lateral wings, two anterior ones forming a keel (enclosing stamens and pistil), vexillary aestivation This type of corolla is also called **Papilionaceous corolla**.

Androecium:

10 stamens, **Diadelphous - $A_{(9)+1}$** in which filaments of 9 stamens are fused while one stamen is free, Anther dithecous, Dorsifixed, Inserted.

Gynoecium:

Monocarpellary, Unilocular with many ovules, superior ovary, **Marginal Placentation**, style one.

Fruit:

Legume or pod which is single, dry, dehiscent fruit.

Exception : Lomentum in Arachis

Seed:

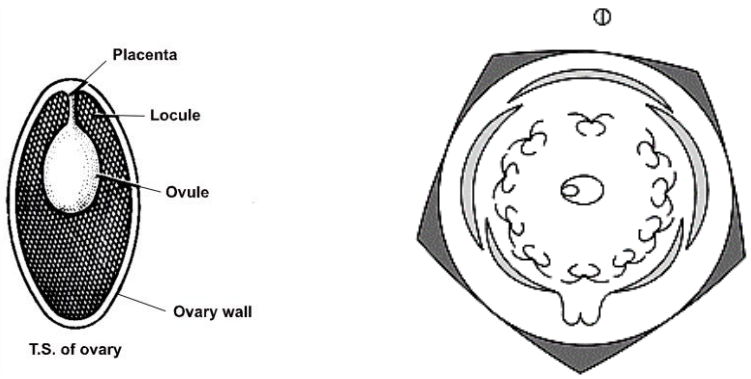
Non-endospermic, one to many.

Pollination:

Entomophilly but self pollination occurs in **Pisum sativum**.

Floral formula: $\%\,\male\,\female\; K_{(5)}\, C_{1+2+(2)}\, A_{(9)+1}\, \underline{G}_{1}$

Floral diagram:



Economic Importance:

Many plants belonging to the family are sources of

(i) pulses (gram, arhar, sem, moong, soyabean);
(ii) edible oil (Soyabean, Groundnut);
(iii) dye (Indigofera);
(iv) fibres (Sunhemp);
(v) fodder (Sesbania, Trifolium),
(vi) ornamentals (Lupin, Sweet pea);
(vii) medicine (Muliathi).

2. FAMILY SOLANACEAE

Classification

Kingdom	–	Plantae
Division	–	Angiospermae
Class	–	Dicotyledonae
Sub-Class	–	Gamopetalae
Order	–	Polymoniales
Family	–	Solanaceae

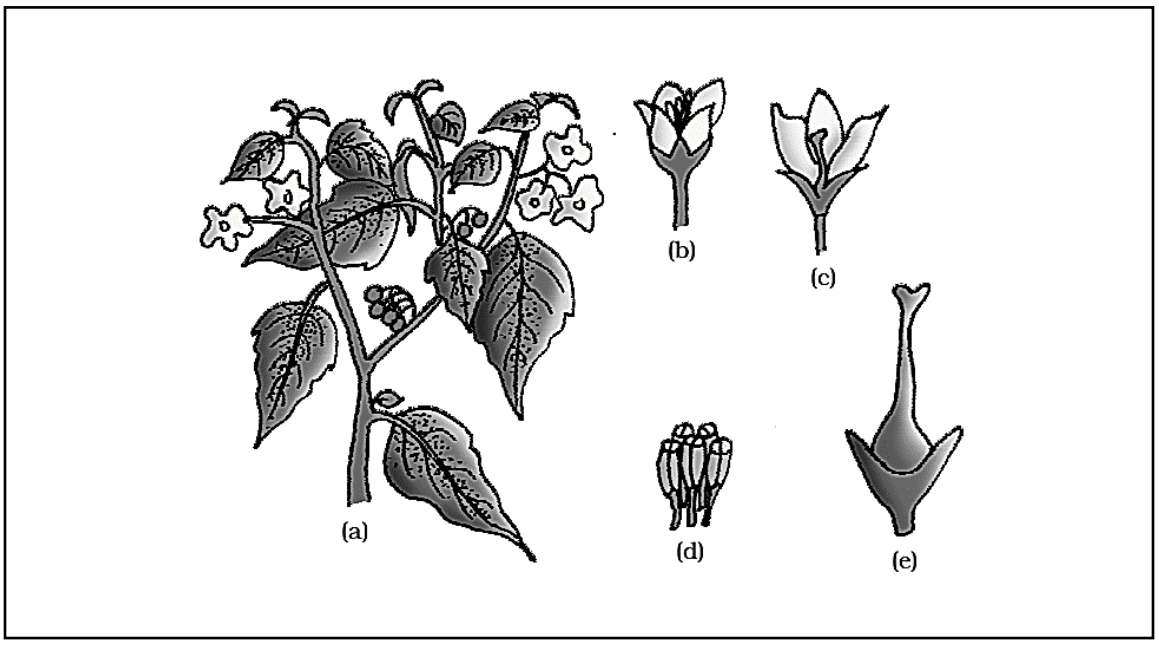


Fig.: Solanum nigrum (makoi) plant : (a) Flowering twig (b) Flower (c) L.S. of flower (d) Stamens (e) Carpel

Distribution:

Plants are mostly found in Tropical and temperate region.

Normally known as potato family.

Habit :

Plants are mostly **Annual or perennial herbs, e.g.** Nicotiana tabacum, Solanum nigrum **or shrubs e.g.** Cestrum nocturnum, **trees and climbers are rare.**

Root :

Tap root system.

Stem :

herbaceous rarely woody, aerial; erect, cylindrical, branched, solid or hollow, hairy or glabrous, underground stem in potato (Solanum tuberosum)

Leaf :

Alternate, simple, rarely pinnately compound, exstipulate; venation reticulate

Inflorescence :

Usually Cymose - In which the tip of the main axis terminates in a flower.

(a) **Monochasial scorpioid Cyme - e.g.** Atropa belladona
(b) **Monochasial Helicoid Cyme - e.g.** Solanum

Flower:

Pedicellate, bracteate or Ebracteate**, bisexual, Actinomorphic**, complete, hypogynous, Pentamerous.

Calyx:

5, Gamosepalous aestivation valvate, **Persistent- (a) Accrescent- enlarged balloon like present on fruit e.g.** Physalis**,** Withania**, (b) Marescent-dry & hard calyx present on fruit e.g.** S.melongena**,** odd sepal posterior.

Corolla:

5, Gamopetalous, valvate or imbricate aestivation**.**

Androecium:

5, Polyandrous, **Epipetalous**, Anther dithecous, basifixed.

Gynoecium:

Bicarpellary, syncarpous. Bilocular, **Axile placentation. Placenta is swollen, ovary situated on the thalamus obliquely. It is multilocular in** datura **and tomato due to the formation of false septum.**

Fruit:

Berry : Single fleshy and non-dehiscent **e.g. Tomato, Brinjal, Chillies,** Physalis **or capsule .**

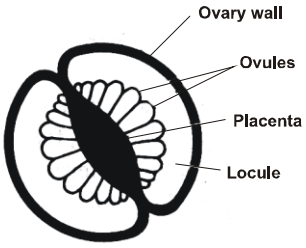
Seed:

Many, endospermic.

Pollination:

Normally Entomophily

Floral formula: $\oplus\ \male\ K_{(5)}\ \overset{\frown}{C_{(5)}}\ A_5\ \underline{G}_{(2)}$ (AIPMT - 2015)



T.S. Ovary

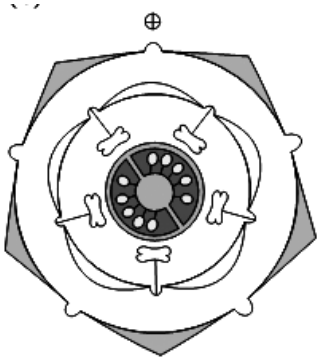


Diagram from NCERT

ECONOMIC IMPORTANCE:

Many plants belonging to this family are source of

(i) Food (tomato, brinjal, potato),
(ii) spice (chilli);
(iii) medicine (belladonna, ashwagandha);
(iv) fumigatory (tobacco);
(v) ornamentals (petunia)

3. FAMILY – LILIACEAE

Classification

Kingdom	–	Plantae
Divison	–	Angiospermae
Class	–	Monocotyledonae
Family	–	Liliaceae

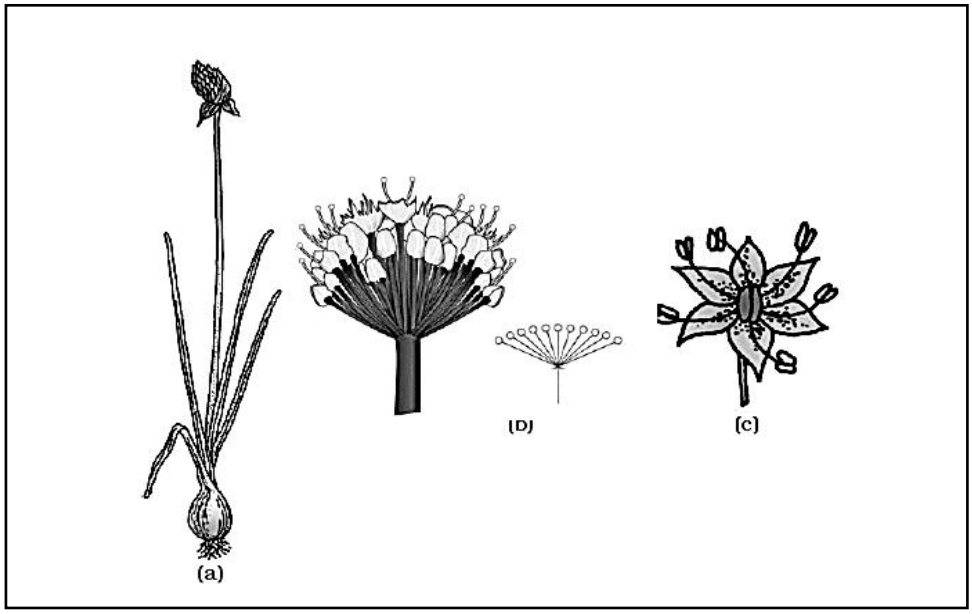


Fig.: Allium cepa (onion) plant : (a) Plant (b) Inflorescence (c) Flower

Commonly called the 'Lily family' is a characteristic representative of monocotyledonous plants.

Vegetative characters: Perennial herbs with underground bulbs/corms/rhizomes.

Distribution:

Cosmopolitan distribution (world wide).

Habit :

Normal **Parennial herbs e.g. Asphodelus** some are **shrubs e.g. Dracaena, some are climbers e.g. Smilax, Gloriosa, some are trees e.g. Yucca.**

Root :

Usually adventitious roots. **Fasciculated or tuberous roots are found in Asparagus.**

Stem :

Aerial or under ground. Food stores in the underground stem like.

1. **Bulb : e.g. Onion and Garlic**
2. **Corm : e.g. Colchicum autumnale**
3. **Rhizome : e.g. Aloe**

MODIFICATION OF AERIAL STEM

(i) **Cladode : e.g. Asparagus , Ruscus**
Exception : Abnormal secondary growth occur in Dracaena and Yucca.

Leaves :

Mostly basal, alternate, linear, exstipulate with parallel venation

Cauline, Radical (leaves locate on under ground stem) **e.g. Asphodelus,** Stipulate sessile, various types of phyllotaxy (alternate, opposite or whorled), parallel venation.

Exception :

1. **Reticulate venation - e.g. Smilax.**
2. **In Gloriosa leaf tips are modified into tendrils while in smilax stipules are converted into tendrils.**
3. **In Ruscus, leaves are modified into scales.**
4. **In Asparagus - leaves are converted into spines.**

Inflorescence:

Solitary / cymose; often umbellate clusters.

Usually racemose or **solitary axillary or terminal, panicle in Dracaena,** Yucca**, Spadix in Aloe** While **scapigerous umbel** in **onion (Allium cepa)** in which Inflorescence come out from under ground stem and clusters of flowers develop on the tip as umbel but it is actually scorpioid cyme instead of umbel.

Flower:

Complete, **bisexual,** Bracteate, **Trimerous, Actinomorphic**, Hypogynous.

Perianth:

6 Tepals, in two whorls **3 + 3, (Polyphyllous or Gamophyllous), often united into tube, valvate aestivation,** odd tepal anterior.

Androecium : 6 Stamens arrange in two whorls **3 + 3**, Polyandrous, **Epiphyllous**, Anther Dithecous, Basifixed or Versatile.

Gynoecium:

Tricarpellary, Syncarpous, Axile placentation, Trilocular, Stigma trifid. **In onion gynobasic style is present.**

Fruit:

capsule, rarely berry

Berry - e.g. Lily or Capsule e.g. Onion.

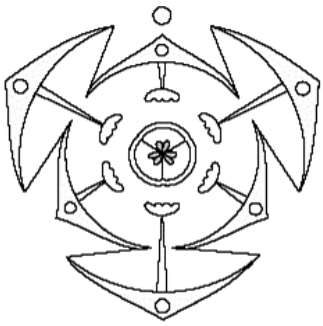
Seed : Endospermic.

Pollination :

Entomophilous, **Pollination through a specific insect e.g. By Pronuba Yuccasela in** Yucca.

Floral - formula: $\oplus \, ♂♀ \, \overbrace{P_{(3+3)}} \, A_{3+3} \, \underline{G}_{(3)}$

Floral diagram



Economic Importance:

Many plants belonging to this family are good ornamentals (tulip, Gloriosa), source of medicine (Aloe), vegetables (Asparagus), and colchicine (Colchicum autumnale).

(1) Food :

a. **Onion - (Allium cepa) :** Edible part is bulbs and fleshy leaves.
b. **Garlic - (Allium sativum) :** Bulbs.
c. **Asparagus officinalis :** Fasciculated roots.

(2) Medicines :

a. **Smilax zeylanica:** Roots yield sarsperilla like drug for purifying blood, piles, leprosy, gonorrhoea.
b. **Allium sativum:** Useful in Heart disease and rheumatism.
c. **Asphodelus tennuifolius:** Its seed are useful in the treatment of ulcer and swelling.
d. **Crinum asiaticum:** Extract of leaves is used in rheumatism and ear pain
e. **Fritillaria cirrhosa:** Drieds bulbs useful in Tuberculosis and Asthma
f. **Aloe:** Used in skin disease and constipation.

(3) Other uses:

(a) **Colchicum luteum and C. autumnale: Colchicine obtain from corm which is used in experiment** to **induce polyploidy.**
(b) **Indian bow string hemp (Sansivieria roxburghiana) :** Fibres obtain from leaves which are useful for making ropes, nets, etc.
(c) **Dragon's blood plant (Dracaena draca):** Red coloured resin obtain from its stem. It is also called Dragon blood. Metals are polished by this resin.
(d) **Phormium tenax:** Its oil is used in making paints & Varnish.

(4) Ornamental plants:

1. Mother in Law's tongue – Sansivieria trifasciata
2. Dragger plant – Yucca alolifolia
3. Glory lily – Gloriosa superba
4. Asparagus fern – Asparagus plumosus
5. Tulips – Tulipa gesneriana
6. Lily – Lilium bulbiferum
7. Butcher's boom – Ruscus aculeatus
8. Satavar – Asparagus officinale

4. Family cruciferae (Brassicaceae)

Classification:

Kingdom	–	Plantae
Class	–	Dicotyledonae
Sub - class	–	Polypetalae
Order	–	Parietales

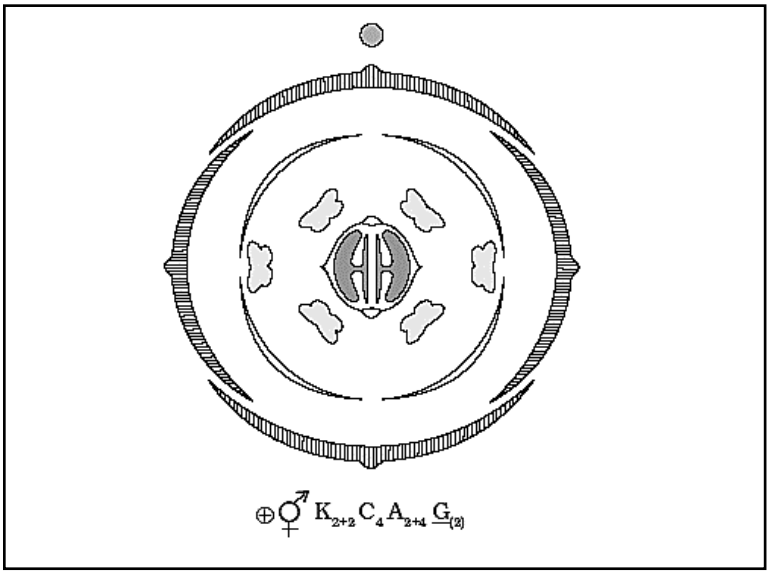


Figure: Floral diagram with floral formula

Distinguishing Features of Cruciferae

(5) The plant organs have **pungent odour.** (This odour is due to presence of **sulphur containing glucosides compound.**) Myrosin enzyme (present in secretory cells) hydrolyse them into glucose & different isothiocyanates (Various oils)

(6) **Inflorescence -** Typical raceme.

Exceptions:-

(i) **Iberis amara :** Candytuft (chandani) has corymb type of inflorescence in which lower flower have much longer pedicels than the upper ones.

(ii) The compound corymb inflorescence is present in cauliflower.

The common characteristics of flower: -

(1) **Flower-Ebracteate**

Bisexual or hermaphrodite

Actinomorphic but some times zygomorphic e.g. Iberis amara

Flower - Hypogynous and **tetramerous.**

(2) **Calyx-**sepals 4, polysepalous, calyx arranged in two whorls 2 outer and 2 inner, imbricate or valvate or quincuncial aestivation.

(3) **Corolla-**Petals 4, polypetalous, **valvate aestivation and cruciform/cross form.**

- Each petal in cruciferae is divided into two parts-long **claw** and broader (spreading) lamina-**limb.** i.e. clawed petals.

(4) **Androecium :-Stamens 6 (2+4),** arranged in two whorls - in which **two outer stamens are small** (antisepalous) **and inner four stamens are long** (antipetalous). This condition is known as **tetradynamous. Nectaries** are present at the base of the anthers.

- Polyandrous condition is found.
- Anthers are dithecous.

Exception :- 2 Stamens in Coronopus, 4 stamens in Lepidium and Cardamine and 16 stamens in Megacarpea.

(5) **Gynoecium :-** Bicarpellary, syncarpous.

- **The ovary is unilocular in the begining but it become bilocular later on the due to the formation of a false septum (replum).** Replum is developed from the thalamus inplace of wall of the ovary.
- **Placentation is parietal.**
- **Ovules are campylotropous (Curved ovule).**

(6) **Fruit :- Usually siliqua.**

Silicula fruit is found in Capsella.

Iberis(Chandani),

(7) **Seed :-** Non endospermic

Economic Importance:

A. **Food Stuff**

(i) Radish (ii) Turnip (iii) Cauliflower

(iv) Cabbage (v) Knol-Khol (vi) Mustard

(vii) Rai (viii) Taramira

B. **Medicinal uses:-**

(i) Halima (ii) Wall flower (iii) Chandani (Candy tuft)

C. **Ornamental Plants:-**

(i) Chandani (Candy tuft)

(ii) Wall Flower

(iii) Shepherd's purse (Capsella bursa -pestoris)

2. MALVACEAE = Cotton family, Mallow family

(1) Diagnostic features of malvaceae:-

The mucilage is present in various plant organs like flower, fruit. Stellate (star shaped) hairs are present on the shoot.

Inflorescence:- Cymose or solitary- solitary axillary or solitary terminal.

- Most of the economically im.p ortant fibre yielding plants belong to family malvaceae .

(2) General characteristics of flower:-

a. Flower :- Bracteate- Bracts are big and green in colour because simple leaves function as bracts. Flowers are bisexual, actinomorphic, hypogynous and pentamerous.

b. Epicalyx :- Epicalyx (Bracteoles) are 3-7; free and green in colour. They are the transformed bracteoles.
The structure of the bracteoles are like as bracts which is present on pedicel.
Valvate aestivation.

c. Calyx:- sepals 5, gamosepalous, valvate aestivation. In some of the plants persistant calyx are present, it means they are present on fruit
eg. Abelmoschus (Bhindi) and Gossypium (Cotton).

d. Corolla:- Petals 5, polypetalous, twisted aestivation, mucilagenous and attractive.

e. Androecium :- Stamens infinite, monoadelphous means filaments united together in one bundle and anthers remain free.

- Anthers kidney shaped, Monothecous
- The filaments are united together to form a long staminal canal or staminal tube around style.
- Staminal tube is united with the petals at the base of the flower, so stamens are epipetalous.

f. Gynoecium:- Pentacarpellary or polycarpellary, syncarpous but stigma's are free, so gynoecium is incompletely syncarpous.
The number of locules are equal to the number of carpels, so ovary is pentalocular or multilocular.
The ovary and style are enclosed in stamina tube but stigma remains outside.
Axile placentation

g. Fruit:- Loculicidal capsule e.g. Lady finger, Cotton.

h. Seeds:- Non endospermic

i. Floral formula:-

(3) Economic importance :- The family includes many plants of great economic importance e.g. food, fibres, oils, medicine and ornamentals:-

(A) Food:- (i) Okra/bhindi(Lady finger) = Abelmoschus esculentus or Hibiscus esculentus used as vegetable.

(B) Oils:- From Cotton seeds (Gossypium seeds). The seeds of Gossypium are used for obtaining oil which is hydrogenated to prepare vegetable ghee.Volatile oil known as Musk seed oil used in perfumary is obtained from Hibiscus abelmoschus seeds.

(C) Fibres :- Most of the economically important fibre yielding plants belong to the family malvaceae

i. Surface fibres:- These fibres are obtained from the surface of the seeds.

Cotton = Gossypium.

ii. Soft fibres or Bast fibres :-

(a) Patua = Hibiscus sabdariffa (Rosella hemp)

(b) Patsan [Deccan hemp] = Hibiscus cannabin us

(D) Tunber:

(i) Ochroma lagopus = Balsa wood, lightest wood

(ii) Malva sylvestris = Mallow wood

(E) Medicine :

Urena repanda -These roots are useful in hydrophobia.

(F) Ornamental :

(i) China rose [Shoeflower] = Hibiscus rosasinensis- Red shoes polish is obtained from the petals of this flower.

(ii) Holly hock [Gul-e-khera] = Althaea rosea (Blue colour is obtained from its leaves)

(g) Vitamins:- Gossypium seeds are rich in vitamin A, D, E, and B- complex.

3. LEGUMINOSAE

Leguminosae Family Is Devided Into 3 - Subfamilies

1. Papilionatae/Papilionoideae/Lotoideae 2. Caesalpinoideae 3. Mimosoideae

SUB - FAMILY → PAPIUONATAE

= Pea family= Pulse family

= FABACEAE FAMILY

IMPORTANT FEATURES

It is distributed all over the world.

Trees, shrubs, herbs are found in this family.

1. Roots :- Roots are branched and tap root system is present. Root nodules are present. In root nodules N-fixing bacteria Rhizobium leguminosarum are present.
2. Stem - Erect or climber
3. Leaves :- Stipulate, simple or pinnately compound. leaf base pulvinate/pulvinus, venation reticulate, alternate
4. Inflorescence :- Typical raceme (racemose).
5. Flower :- Bracteate, bisexual, hypogynous, pentamerous and zygomorphic symmetry.
   The zygomorphic symmetry is due to presence of different (odd) petals (dissimilar petals & androecium).
6. Calyx :- Sepals 5. gamosepalous, aestivation imbricate or valvate (mainly valvate)
7. Corolla :- This is the first main diagnostic character for the subfamilies of leguminosae. Petals 5, papilionaceous (Butterfly shaped), polypetalous, one petal is odd out of 5-petals, towards the mother axis- means posterior in position. It is the largest and outermost petal which is called standard or vexillum.

- Below the vexillum, two small free lateral petals present which are known as wings or alae. (lateral in position)

- Anterior two petals fused together to form a boat like structure called keel or carina which encloses the essential organs. i.e. stamens and pistil/carpel. Such type of aestivation is called vexillary or descending imbricate.

ANDROECRUM

This is the second main diagnostic character for the subfamilies of Leguminosae.

Stamens - 10: diadelphous (9) + 1

9 stamens fused together to form a sheath around the pistil while the tenth posterior one is free

- Anther dithecous

GYNOECIUM :- Gynoecium is monocarpellary, unilocular with many ovules, superior ovary. Style single and marginal placentation.

FRUIT :- Legume or pod (dry, dehiscent, one chambered fruit). Sometimes lomentum is also found eg. Arachis (mungphali)

SEED :- Non-endospermic, one to many

FLORAL FORMUlA :-

ECONOMIC IMPORTANCE

FOOD PLANT

Arhar (Pigeon pea) - Pulse	=	Cajanus cajan (indicus)
Chana(Gram) - Pulse	=	Cicer arietinum
Mattar (Pea)	=	Pisum sativum

Urad (Biak gram) - Pulse	=	Phaseolus mungo or vigna mungo
Mung (green gram) - Pulse	=	Phaseolus radiatus (esculentus) or vigna radiatus
Masoor - Pulse	=	Lens esculenta or L. culinaris or Ervum lens
French bean	=	Vigna/Phaseolus vulgaris or Kidney bean (Rajma)
Soyabean - Pulse	=	Glycine max (G. soja) - Soyabean contains more protein than meat
Gwar (cluster bean)	=	Cymopsis tetragonoloba
Methi	=	Trigonella foenum graecum
Mungphali (Ground nut)	=	Arachis hypogea
Sem- Pulse	=	Dolichos lablab
Cowpea (chowla)	=	Vigna sinensis

FODDER

Berseem	=	Trifolium alexanddrium. Used as green mannure
Dhaincha	=	Sesbania

FIBRES

Sunhemp	=	Crotalaria juncea (ternatea)

TIMBER

Shisham	=	Dalbergia sissoo (Indian Red wood)

DYES

Neel (Blue dye)	=	Indigofera tinctoria (dye is ibtained from leaves)

MEDICINAL PLANTS

Mulaithi (Liquorice)	=	Glycyrrhiza glabra. Its roots are used in cough & cold.

ORNAMENTALS

Indian telegraph plant	=	Desmodium gyrans
Sweet pea (Phool matar)	=	Lathyrus odoratus
Lupic	=	Lupinus albus

EDIBLE OIL → Soyabean, groundnut

OTHER .USES :-

Abrus precatorius	=	Crab's eye = Ratti = Jweller's weight - jwellers use it's seeds as weight

ASTERACEAE OR COMPOSITAE = SUNFLOWER FAMILY

It is largest family of angiosperms, having largest geographical distribution. The name of this family is based on its inflorescence.

Special characters : Inflorescence mostly racemose head or capitulum. Calyx is usually represented by hairy structure called pappus or represented by minute scales. It is persistant & attached on fruit & helps in dispersal of fruits. Petals 5, gamopetalous, valvate aestivation. Stamens-5, epipetalous, syngenesious, ovary bicarpellary, syncarpous, inferior ovary, unilocular, basal placentation. Fruit is cypsela with hairy pappus i.e. important character of this family. In Dahlia fasciculated roots are present.

FLORAL FORMULA

(A) **Ray florets** → Br % ♀ $K_P C_{(5)} A_0 \overline{G}_{(2)}$

(B) **Disc florets** → Br ⊕ ☿ $K_P \overset{\frown}{C_{(5)}\ A_{(5)}} \overline{G}_{(2)}$

(C) **Sterile florets** → Br Φ $K_P C_{(5)} A_0 G_0$

(It is a type of ray florets)

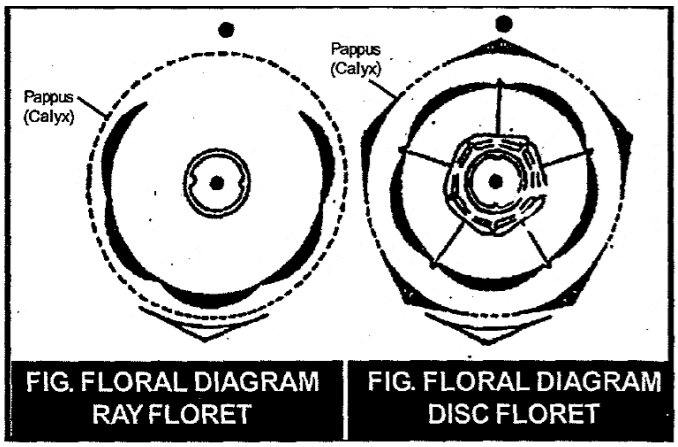


FIG. FLORAL DIAGRAM RAY FLORET | FIG. FLORAL DIAGRAM DISC FLORET

ECONOMIC IMPORTANCE :

(A) Food :

(1) Helianthus tuberosus - Their tubers are eaten which contain inulin crystals.

(2) Helianthus annuus = Sunflower (Suraj mukhi)- The seeds of this yiedls valuable oil which is used for cooking purposes.

(B) Medicinal plants :-

(1) Eclipta alba (Bhring Raj) - Juice is used as hair tonic.

(2) Chrysanthemum cinerariaefolium = Guldaudi- Pyrethrum named insecticide is obtained.

(3) Taraxacum officinale - 'Taraxacum' medicine is obtained which is purgative and diuretic.

(C) Ornamental :-

(1) Helianthus annuus = Sunflower

(2) Chrysanthemum = Gul-Daudi

(3) Tagetes = Genda (Marigold)

(D) Other Values :-

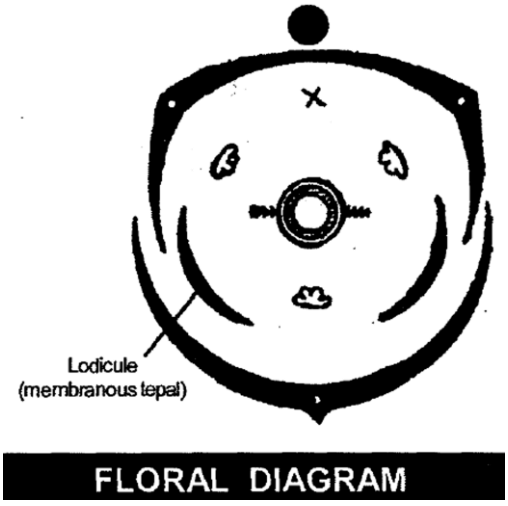
Parthenium hysterophorus/P.argentatum = Carrot grass or Congress grass- skin allergy develops from its pollen grains.

POACEAE OR GRAMINEAE = GRASS FAMILY

Special character : This is the largest family of the Indian flora. Poaceae is a monocot family. Inflorescence spike of spikelets. Flowers zygomorphic, bisexual, but in Zea and Coix flowers are unisexual. Flowers are hypogynous and trimerous. Tepals 2, polyphyllous, membranous and situated in anterio lateral position. They are called lodicules. Stamens 3, polyandrous, versatile (Long filamant is attached to the back of the anther at a point only and anther can swing freely). Monocarpellary or tricarpellary, syncarpous, superior, unilocular ovary, placentation is basal, stigma is feathery. Fruit is caryopsis. Culm stem is present.

FLORAL FORMUlA :-

$Br\ \oplus\ \varphi\ P_2\ A_{3\ or\ 6}\ \underline{G}_1$ or $\underline{G}_{(3)}$



FLORAL DIAGRAM

ECONOMIC IMPORTANCE:-

(A) Ornamental Plants :

Cynodon dactylon = Doob

(B) Cereals :-

(1) Avena sativa = Jai/oat

(2) Hordeum vulgare = Barley/jau – It is the oldest ancient crop

(3) Oryza sativa = Rice
(4) Pennisetum typhoides = Bajra
(5) Secale cereal = Rye
(6) Sorghum vulgare = Jawar
(7) Triticum aestivum = Wheat
(8) Zea mays = Maize

(C) Sugar:-

Saccharum officinarum

(D) Fibre Yielding Plants :-

S. munja = Moonj - Fibres obtained from stem is used for making ropes, mats and baskets etc.

(E) Timber Yielding Plants :-

Bambusa balcooa =Bamboo

(F) Other Uses :-

(1) Hordeum vulgare (Barley = Jau) is used for making beer.
(2) Zea mays is used in alcohol industry.

CUCURBITACEAE = GOURDS FAMILY

Special characters : Stem pentangular, branched, with bicollateral vascular bundles. They are arranged in two circles. Inflorescence-Solitary axillary. Most of the plants of this family are monoecious, it means male and female flowers are present on the same plant. Flowers are ebracteate, pedicellate, flowers are incomplete, unisexual, actinomorphic symmetry, flowers are pentamerous and epigynous. 5 Sepals, gamosepalous, valvate aestivation. Petals

5, gamopetalous, valvate or imbricate aestivation. Tricarpellary, syncarpous, inferior ovary, unilocular, parietal placentation but it looks like axile placentation due to swelling of placenta. 5 Stamens, usually cohesion in three groups 1 + (2) + (2). It means four stamens are present in two pairs and fifth one is free, synandrous condition, Fruit is pepo. The bitter taste of the fruit is due to presence of tetracyclic triterpenes.

FLORAL FORMULA

Male flower - Ebr $\oplus$ ♂ $K_{(5)}\ C_{(5)}\ A_{1+(2)+(2)}\ G_0$

Female flower - Ebr $\oplus$ ♀ $K_{(5)}\ C_{(5)}\ A_0\ \overline{G}_{(3)}$

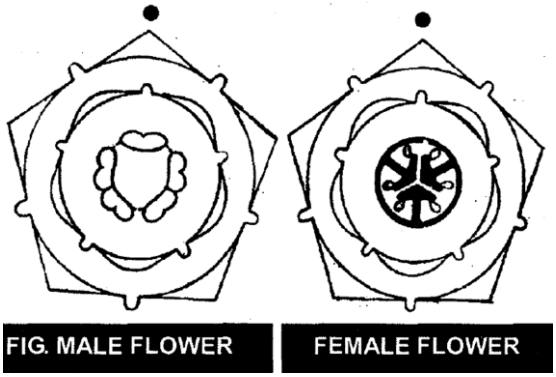


FIG. MALE FLOWER FEMALE FLOWER

ECONOMIC IMPORTANCE :

VEGETABLES AND FRUITS

Kadoo (Pumpkin)	=	Cucurbita pepo or Cucurbita maxima
Lauki (Bottle gourd)	=	Lagenaria vulgaris
Kharbooza (Muskmelon)	=	Cucumis melo
Ghia tore	=	Luffa cylindrica
Kakari	=	Cucumis melo var. utilissimus
Tarj,ooj (Water melon)	=	Citrullus vulgaris
Kheera (Cucumber)	=	Cucumis sativus

Karela (Bitter gourd)	=	Momordica charantia
Tinda	=	Citrullus vulgaris var. fistulosus
Most advanced dicot family	=	Asteraceae (compositae)
Most advanced monocot family	=	Poaceae (Gramineae)
Most primitive dicot family	=	Either Magnoliaceae Or Ranunculaceae (Butter cup family) (mainly Magnoliaceae)