

Subject - Botany

Class - B.Sc. (Subs) Part - II Group - A (Angiosperm's Taxonomy)

B.Sc. (Hons.) Paper Part - II, Paper - 3rd Group - B

Topic - "Diagnostic features, floral formula, floral diagram and economic importance of family - Ranunculaceae"

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Family - Ranunculaceae

Dicotyledones

Polypetales

Thalamiflorae

Ranales

Distribution :-

There are 50 genera and over 1,900 species distributed mainly in north temperate zone.

In India the family is represented by 20 genera and 154 species mostly confined to mountainous region.

Examples: - Ranunculus (Buttercup), Delphinium (Larkspur), Clematis (Virgin's bower), Anemone (Wind flower), Nigella (Love-in-a-mist) and Thalictrum (Meadow-rue).

They are mainly annual or perennial herbs but species of Clematis are woody climbers. Some species of Ranunculus (e.g. R. aquatilis) are aquatic herbs, whereas Caltha inhabiting swamps. The perennial species usually develop rhizome and tuberous roots (Aconitum and Ranunculus).

The leaves are alternate (Ranunculus, Delphinium) or opposite (Clematis) and exstipulate with sheathing bases.

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

- The leaves are simple and palmately lobed (Ranunculus) or decomposed (Delphinium).
- Aquatic species of Ranunculus show heterophylly with submerged leaves finely dissected.
- The leaves are modified into tendrils in Clematis in Clematis aphylla and the function of photosynthesis is carried over by the stem.

Inflorescence and Flower

The inflorescence is variable.

The flowers are solitary and terminal in Anemone and Nigella.

- They form long racemes in Delphinium and Aconitum and much branched panicles in Clematis and Thalictrum.
- They are arranged in dichotomous cymes in Ranunculus.

Flowers: — Flowers are bracteate (Ranunculus, Thalictrum) actinomorphic (zygomorphic in Aconitum and Thalictrum), polychlamyous and hypogynous.

- An involucre of green leaves is present outside the calyx in Anemone and Nigella.

Calyx: —

Calyx consist of 5 to 8 sepals which are distinct, and usually deciduous.

- In Delphinium and Aconitum sepals are petaloid and the posterior sepal is spurred.
- The aestivation is imbricate or valvate.

Corolla: —

Corolla consist of usually five, free free symmetrical (Ranunculus) or irregular (Aconitum, Delphinium) petals.

- In Ranunculus a pocket like nectary is present at the base of each petal.
- In ~~Helleborus~~ Helleborus the petals are modified into tubular honey leaves.
- In Caltha, Clematis and Anemone petals are altogether absent and the sepals become petaloid.

Androecium —

Androecium consists of many, polyandrous and spirally arranged stamens.

- In some genera like Helleborus, Nigella and Aquilegia the stamens are arranged in definite rings.
- In Helleborus some of the stamens are modified into honey leaves.
- The anthers are ~~adaxial~~ adaxial, distichous, extrorse and dehiscing longitudinally.
- The filaments are beautifully coloured in Thalictrum.

Gynoecium —

Gynoecium is usually of numerous free carpels arranged spirally on a distinct thalamus but in some taxa the number of carpels is definite.

For example in Aquilegia there are five carpels, Delphinium has three to one carpel, and in Actaea and Cimicifuga the number of carpel is reduced to one.

- In some species of Helleborus the carpels are connate at the base only, whereas in Nigella the five carpels are completely united.
- The ovary is superior, unilocular and has one to many anatropous ovules.
- Placentation may be basal (Ranunculus), apical (Clematis) or marginal (Delphinium). In Nigella whereas gynoeceum

is ~~Axycarpous~~ ~~Axycarpous~~, Ovary is pentalocular with axile placentation. The style and stigma are one.

Floral Formulae

Ranunculus : Br brd $\oplus$ ♀ $K_5 C_5 A_\infty \underline{G}_1$

Delphinium : Br brd $\oplus$ ♀ $K_5 C(4) A(15) \underline{G}_1$

Nigella : Ebr $\oplus$ ♀ $K_5 C_0 A_\infty \underline{G}_{(5-12)}$

Clematis : Br brd $\oplus$ ♀ $K_4 C_0 A_\infty \underline{G}_{(4-6)}$

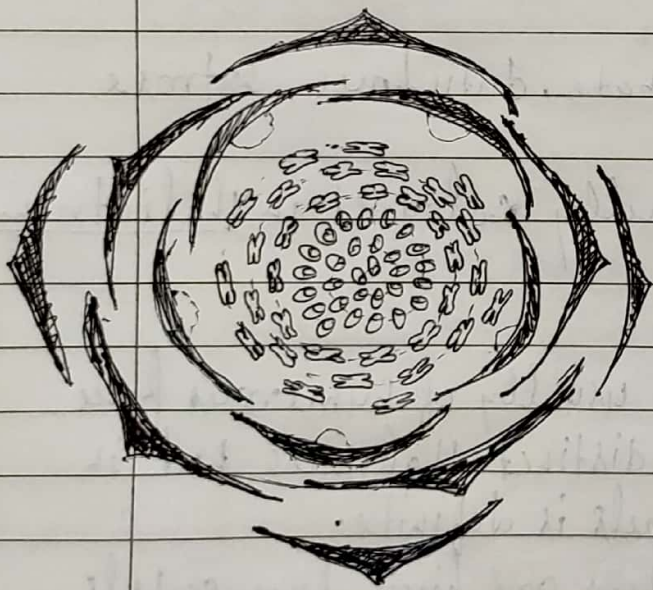


Figure :- Ranunculus sceleratus

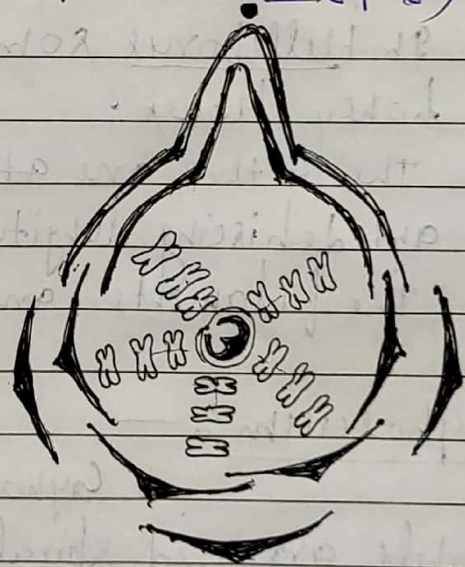


Figure :- Delphinium ajacis

Floral Diagram

Economic Importance:-

① Ornamental Plants:- The family provides large number of ornamentals commonly grown in our gardens because of their pretty flowers.

- eg - Ranunculus (Buttercup)
Thalictrum (Meadow-rue)
Clematis (Virginia-bower)
Anemone (Wind flower)
Delphinium (Larkspur)
Caltha (Marsh marigold)

② Medicinal Plants:-

- Roots of Aconitum napellus are the source of aconite, used for rheumatism and as nerve sedative.
- Roots of Adonis aestivalis are used as cardiac stimulant.
- Some species of Clematis are used as a remedy for leprosy and blood diseases.
- Plants of Anemone pulsatilla yield well known medicine Pulsatilla, which is used as a remedy for nerve exhaustion.
- Roots of Hydrastis Canadensis (Orange root) are used as antidote for snake bite.
- Seeds of Nigella arvensis (Black fennel, Kalajera) are used as condiment for flavouring. They are also used for in treatment of cough, fever and bronchial asthma.
- Several Himalayan species of Delphinium are used as cardiac and respiratory depressants.