

**Topic: Ranunculaceae; Diagnostic features &
Economic Importance
B.Sc. Botany Sub. II
Group: A**

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Systematic position

Polypetalae

Thalamiflorae

Ranales

Ranunculaceae (Buttercup family)

Distribution:

The family includes about 50 genera and 2000 species (Cronquist, 1981) distributed mainly in temperature cold regions, and at high altitudes in mountains. Some members of the family are found in Arctic and Alpine regions too. The family is commonly represented by many species in the Himalayas. There are found in India about 28 genera and 190 species.

Habit:

The plants are either herbs annuals or perennials. Sometimes climbing shrubs (*Clematis* sp.). The plant perennates by means of tuberous roots (*Aconitum*) which contain the reserve food material.

Roots:

They are tap or adventitious, sometimes swelling up into small tubers.

Stem:

It is mostly aerial and herbaceous, in some (*Clematis*) it is climbing, while in perennial species it is a rhizome.

Leaves:

The leaves are alternate, exstipulate and more or less divided. In some cases the leaves may be opposite or even radical. In *Clematis*, the leaves are opposite and compound. They possess twining petioles. In *Clematis aphylla* the whole leaf becomes modified into a tendril. In the case of *Naravelia*, the leaves are compound and trifoliate; here the terminal leaflet becomes modified into a tendril. In *Anemone* the leaves are radical.

The leaf base usually broadens into a sheath which sometimes elongates into a pair of lateral stipules, e.g., in *Thalictrum*. The leaves of *Thalictrum foliolosum* are pinnately decomposed with auricled sheaths. The leaf lamina is sometimes entire. It is narrow in some

species of *Ranunculus*, however, in *Ranunculus ficaria* and *Caltha sp.*, it is cordate.

Heterophylly is found in the aquatic species of *Ranunculus*. In such cases the submerged leaves are very much dissected whereas the floating ones are simply lobed. In Delphinium the leaves are palmately lobed and much dissected. The leaves of Clematis are climbing.

Inflorescence:

Various types of inflorescences are found within the family. It may be typical raceme (Delphinium) or solitary axillary (*Clematis*) or terminal (*Anemone*) or cymose (*Ranunculus sp.*).

Flower:

The flowers are pedicillate, ebracteate rarely bracteates, regular or irregular (Delphinium, Aconitum), hermaphrodite, hypogynous and pentamerous.

Calyx:

In most flowers there is no distinction into calyx and corolla. It is often petaloid and coloured variously. Sepals are usually 5, caduceous or wanting, aestivation imbricate, rarely valvate.

Corolla:

Usually 5 or more, variously coloured, caduceus or wanting; nectaries at the base of petals are present (*Ranunculus*) or replacing petals and stamens. aestivation is imbricate.

Androecium:

Usually the number of stamens is indefinite. The stamens are free (polyandrous). They are hypogynous and arranged spirally. Mostly the anthers are extrorse, basifixed and dithecous. They dehisce laterally.

Gynoecium:

It consists of indefinite carpels (polycarpellary), the carpels are free, i.e., apocarpous. In *Delphinium* the number of carpels is reduced to one. In *Aconitum sp.*, there are three to five carpels. In *Nigella*, there are 5 to 8 carpels, which are more or less united (i.e., syncarpous).

Ovary:

In each ovary the number of ovules ranges from one to many. The ovules are anatropous. The placentation is either marginal (e.g., *Delphinium*), or basal (e.g., *Ranunculus*).

Fruit:

The fruit is usually either an etaerio of achenes, e.g., *Ranunculus* or an etaerio of follicles, e.g., *Aconitum*.

Seeds:

The seeds are endospermic. Each seed contains only endosperm with a very small embryo.

Pollination:

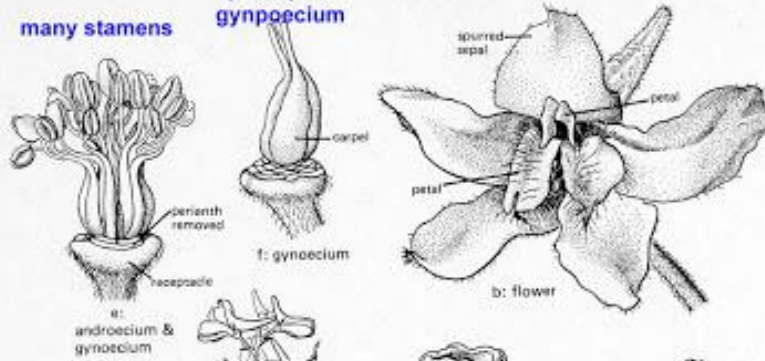
The pollination takes place either by means of insects (entomophily) or by wind (anemophily). In *Ranunculus* and others the flowers are generally protandrous. The flowers of *Delphinium* and *Aconitum* are pollinated by long tongued bees.

Some important Plants:

- i. *Ranunculus sceleratus* (*Butter cup*)
- ii. *Delphinium ajacis* (*Larkspur*)
- iii. *Nigella sativa* (*Kalonji*)
- iv. *Clematis nepalensi*

RANUNCULACEAE: Delphinium, a-h, *D. tricorne*; i, *D. carolinianum*

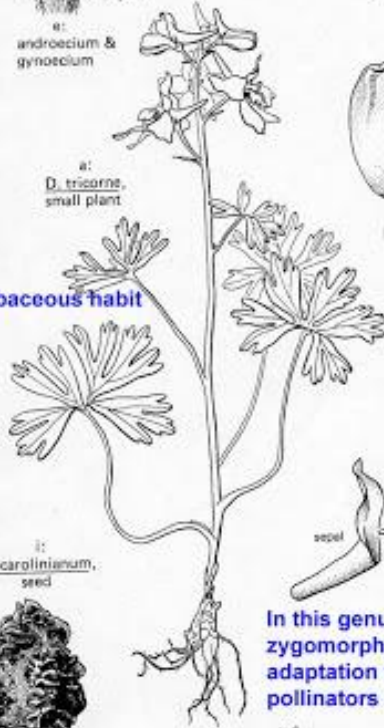
**apocarpous
gynoeceum**
many stamens



a: *D. tricorne*, small plant

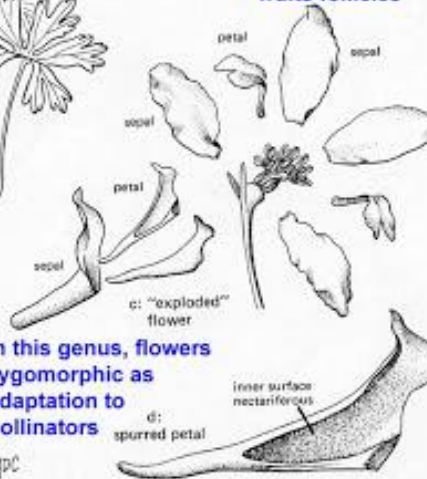
herbaceous habit

i: *D. carolinianum*, seed



In this genus, flowers zygomorphic as adaptation to pollinators

APC



Floral Formulae:

Ranunculus: $\oplus \text{ } \overline{\text{K}} \text{ } \overline{\text{C}} \text{ } \overline{\text{A}} \text{ } \overline{\text{G}}$

Delphinium: $\cdot \text{ } \overline{\text{K}} \text{ } \overline{\text{C}} \text{ } \overline{\text{A}} \text{ } \overline{\text{G}}$

Economic Importance:

✓ Ornamental Plants:

Ranunculus, *Delphinium ajacis* (Larkspur, violet flowers) *Anemone pulsatilla*, *Nigella sativa* (Hindi- Kalaunji) white flowers, *Clematis paniculata* (Virgin's Bower).

✓ Medicinal Plants:

- *Aconitum napillus*: Alkaloid aconite extracted from roots, used for blood pressure.
- *Anemone Pulsatilla*: Yields famous homeopathic medicine Pulsatilla. It is used for nerve exhaustion in women and for menstrual troubles.
- *Ranunculus ficaria*: Used for piles.

✓ Condiments:

- *Nigella sativa* (Hindi-Kalaunji): Seeds used.