



Propagation, Floral Biology and Economical Importance of Geranium

(*Heera Lal Atal and Manisha Mahanta)

Bidhan Chandra Krishi Viswavidyalaya, Mohanpur, West Bengal

* heera.atal93@gmail.com

Geraniums are a large group of ornamental flowering plants which consists of 430 species and belongs to the family Geraniaceae. Geraniaceae family is primarily composed of herbs in addition to woody shrubs and trees of small stature. It is particularly known for the production of essential oils and cultivated ornamentals. The name geranium has been derived from the greek word 'geranos' meaning 'crane'. The other name of geranium commonly known as 'cranesbill' is derived from the fact that the fruit capsules of some of the species are long and resembles the bill of a crane. Due to their potentiality of withstanding cold and harsh weather, geraniums are often known as 'hardy geraniums.' These plants are dicotyledonous in nature consisting with a pair of leaves within them. Geraniums are considered to be the most potent economically important bedding and pot plants in Northern America with an annual market sale of \$100 million (Canadian). Currently, North America and Europe are regarded as the leading producers and distributors of Geranium with a global annual sale of \$700 million. There are four major species of Geranium which are categorised under commercial production particularly zonal geraniums (*Pelargonium x hortorum*), regal pelargonium (*Pelargonium x domesticum*), ivy geraniums (*Pelargonium peltatum*) and scented geraniums (*Pelargonium* sp.). These species have been categorised based on its flower colour, types, foliage and growth habits.

Floral Biology of Geranium

The inflorescences of Geranium are hermaphrodite which are composed of male and female flowers within the same flower. The male flowers are primarily comprised of seven stamens of unequal length (5 long stamens + 2 short stamens) and consist of a stalk like structure known as filament ending with an anther covered with pollen. The ripened pollens are usually fluffy and bright yellow in colour. The female flowers are composed of pistil which consists of stigma, style (tube like structure) and ovary (Fig.1). The stigma is surrounded by several stigmatic papillae which are sticky in nature that helps the pollen to adhere with the sticky substance. In addition, it also helps in attracting pollinating insects. As the pollen gets adhered to the stigmatic surface, the pollen tube grows through the style and produces two sperm nuclei. One of the sperm nucleus fuses with the egg cell thereby producing a zygote while the other sperm nucleus fuses with the two polar nuclei to form an endosperm nucleus thereby leading to the development of a fertilized ovule which further transforms into a seed. The ovary acts as a protective coat for the developing seeds.

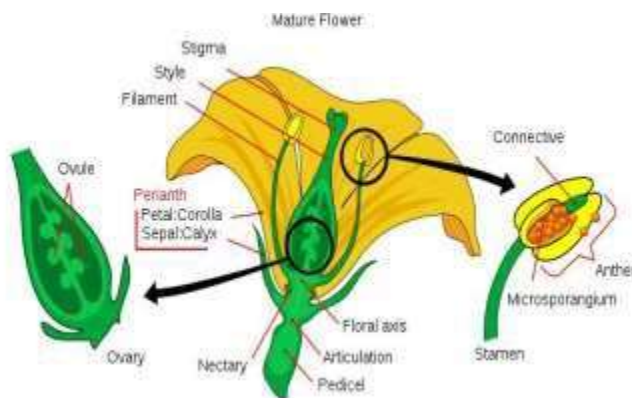


Fig: -1. Reproductive parts of flower

Commercial Uses of Geranium

Essential oil extracted from Geranium through steam distillation process is considered as one of the most potent oil which has a wide application in perfumery, cosmetics and flavour industry. It is extensively used in medicinal and agrochemical field specifically in terms of manufacturing high grade perfumes, in addition to having antifungal and antibacterial properties. Apart from utilizing geranium plant parts as a source of essential oils, it can also be cultivated for its decorative purpose. Global production of geranium oil is estimated to be 250-300 ton while its demand is estimated to be more than 800 tons per year. Due to the increasing demand in production of essential oils in addition to various industrial purposes, it has led to the cultivation and production of geranium plants on a large scale.

Health Benefits of Geranium

- 1. Antiseptic properties:** Although geranium is enriched with antiseptic properties, it is also possessed with antifungal and antibacterial properties. It helps in further preventing infections on wounds and skins.
- 2. Acts as an immunity booster:** Consumption of geranium in the form of liquid helps in improving the immune system of human body. It also acts as an antibody that helps in fighting against bacterial, viral and fungal pathogens responsible for causing infections and illness.
- 3. Diuretic benefits:** It helps in removal of excess urine from the bladder along with toxic materials and fluids that result in affecting metabolism. In addition, it also helps in keeping the colon and excretory system clean and hygienic.
- 4. Enhances metabolism:** The presence of cryptophytic properties in geranium oils not only helps in enhancing metabolism but it also ensures in maintaining healthy weight by decreasing additional calories from the cells of the body. Furthermore, it also helps in restoring new cells and flushes out the dead or damaged cells.
- 5. Prevention of Neuro diseases:** Utilization of geranium oils helps in activation of microglial cells in addition to release of nitric oxide which further prevents from inflammation in the neuro cells thereby reducing the occurrence of degenerative tissues. It also helps in preventing Dementia, Alzheimer and other fatal neuro diseases.
- 6. Prevents Respiratory disorders:** Respiratory problems including sore throat, cough, running nose etc. can be cured with the regular use of geranium oils.
- 7. Prevents skin disorders:** The presence of cicatrisant properties in geranium oil helps in treating skin disorders particularly eczema, fungal infections, dermatitis, acne and rashes.
- 8. Anti hemorrhagic properties:** The presence of natural alkaloids in geranium proves to be an excellent anti hemorrhagic agent that helps in further contracting veins and arteries to prevent the flow of blood. In addition, the hemostatic properties of geranium help in rapid blood clot thereby prevent it from infections and wounds.

9. Acts as anti-depressant: Regular use of geranium herb and essential oil helps in relieving stress and anxiety and prevents it from using allopathic medications for stress control.

10. Skin cleansing: Geranium oil acts as a good source of astringent which can be diluted with water for cleaning face and body due to its antiseptic properties. Thus it helps the skin to look radiant and flawless by removing dirt and dead cells.

Improved Propagation Techniques

A diverse species of geranium is propagated through conventional methods viz: either through cuttings or seeds. But conventional method of propagation encourages the transmission of bacterial and fungal diseases on stock plants (Mastalerz, 1971). Since the process of seed germination in geranium is entirely through the sexual mode of propagation, hence it is difficult to obtain true to type plants. Moreover, propagation through seeds could bring undesirable genetic composition changes in terms of oil composition and production which would further hinder the potentiality of production in perfumery, cosmetic or pharmaceutical industry. Thus, it is extremely encouraged to propagate through the technique of tissue culture for production of virus free planting materials as well as to maintain genetic stability on a large scale. In addition, techniques of *in vitro* micro propagation further helps in rapid multiplication decrease the cost of production, ease in handling, storage and transportation as well as limits quarantine restrictions.

References

1. <https://timesofagriculture.in/issue/>

