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BIOECOLOGY OF THE CARYOPHYLLACEAE FAMILY

Abstract: The Caryophyllaceae family, commonly known as the pink or carnation family, is a diverse group of flowering plants consisting of approximately 88 genera and 2,200 species. The family is widely distributed across the globe, with members found in a variety of habitats, including forests, grasslands, and arctic tundras. This article aims to provide an in-depth examination of the bioecology of the Caryophyllaceae family, including their morphological characteristics, physiological adaptations, and ecological roles.

Keywords: Caryophyllaceae family, biological state, ecological roles, medical uses, trees, statistics.

Introduction: The Caryophyllaceae Juss. is one of the fundamental dicot household of angiosperms and is globally represented by way of eighty-five genera and 2,630 species. This household is popularly acknowledged as the crimson household or carnation family. Plants of the household are existing global mainly in the Northern Hemisphere with the exception of most of the moist tropics. The Caryophyllaceae household is primarily founded in the Mediterranean location and famous magnificent variety in the habitat and boom shape there. Plants of the household are erect, prostrate, annual or perennial herbs or small shrubs, and few species (*Sanctambrosia* spp.) are large shrubs or small trees. The household is characterized by means of swollen nodes, with easy contrary leaves, solitary flora or dichasial cymes inflorescence, actinomorphic pentamerous or tetramerous flowers, clawed petals, ten stamens or much less in obdiplostemonous condition, ovary choicest with free-central placentation, fruit pill opening with the aid of tooth or valve and presence of anthocyanin pigments. The household Caryophyllaceae is nicely regarded for decorative flowering flowers such as *Dianthus chinensis* (Pink), *Dianthus barbatus* (Sweet William), *Gypsophila* spp. (Baby's Breath), *Agrostemma* spp. (Corn Cockle), *Saponaria* spp. (Soapwort), *Lychnis* spp. (Fire Pink), and *Silene* spp. (Campions) which structure a primary fraction of world's reduce flower trade. Some species of Caryophyllaceae as *Stellaria media* (Chickweed), *Cerastium cerastoides* (Mouse-ear Chickweed) and different *Stellaria* spp. *Cearstium* spp., *Silene* spp., etc. are noxious weeds of agricultural lands.

The household Cayophyllaceae is broadly recognized for gardening herbs however medicinal significance of its participants is moderately known. In the existing work we have tried to collect statistics concerning the medicinal flowers of the family, their ethnomedicinal uses, and pharmacological value of these vegetation in exclusive diseases. Only a few evaluations grant facts involving medicinal flowers of the household and their biomedical homes have been posted yet. All of these critiques are both targeted on specific taxa or a few species.

Materials and Methods

For the current review, statistics concerning medicinal houses and biochemical homes of plant life was once gathered with the aid of looking books and scientific databases together with PubMed, Elsevier, Google Scholar, Springer, etc.

Phytochemistry of the family

The household is characterized by means of the presence of anthocyanin pigments rather of the beta lain. Proanthocyanidin pigments are not often detected from the seed coats and C-glycosylflavonoids pigment are instead frequent in the family. The uncommon attribute of the household is appearance of secure and durable foam when components of the plant life are put into water and shaken. This conduct is due to the incidence of excessive quantity of saponins in the family. The saponins are discovered in quite a number organs of the plants, mainly in roots of *Saponaria* spp. *Silene* spp. *Gypsophila* spp., etc. and seeds of *Agrostemma githago*. The phytoecdysteroids mimics insect molting hormone and strongly interferes with metamorphosis of the insects. Phytoecdysteroids are synthesized frequently in the tribe *Lychnideae* of the subfamily *Caryophylloideae* of *Caryophyllaceae*, whereas *Silene*, *Lychnis*, *Petrocoptis*, *Sagina*, and *Saponaria* are most important phytoecdysteroid synthesizing genera of the family. A quantity of different compounds such as fatty acid derivatives, benzenoids, phenyl propanoids, isoprenoids, and nitrogen containing compounds are additionally remoted from the plant life belonging to the family.

Medicinal residences of plants

Ethnobotany is the learn about of how human beings of a unique way of life and location use indigenous flowers in their lives for their everyday fitness administration and different needs. The American biologist R.E. Schultes described ethnobotany as “the find out about of the relationship which exists between humans of primitive societies and their environment”. In extra easy words, it is an anthropological strategy to botany. The father of Indian Ethnobotany S.K. Jain described it as “the learn about of the direct relationship between flora and man is an interdisciplinary science and referred to as Ethnobotany”. A complete of 422,000 plant species are existing on the earth, amongst which 52,885–72,000 plant species are used as medicinal flowers round the world. Thus, ~ 17.1% of the whole world flowers consists of medicinally vital plants. These flowers are used to treatment many illnesses in one of a kind medicinal structure round the world. It is estimated that 70–80% of human beings global count number principally on normal natural remedy to meet their important fitness care needs.

Morphological Characteristics

The *Caryophyllaceae* household is characterized by using a vary of wonderful morphological features. The leaves are usually contrary or alternate, simple, and frequently lanate (woolly). The stems are regularly herbaceous, even though some species may additionally have woody bases. The plants are commonly organized in cymes or dichasia, with 5 petals that are regularly pink, white, or purple in color. The sepals are commonly inexperienced and may additionally be fused collectively to structure a calyx. The fruit is commonly a capsule, though some species may additionally produce nuts or berries.

A variety of species inside the *Caryophyllaceae* household have developed precise morphological diversifications to swimsuit their environment. For example, the "campion" flora (*Silene* spp.) has a special calyx form that approves them to replicate ultraviolet light, attracting pollinators such as bees and butterflies. The "pinks" (*Dianthus* spp.) have a unique "clove pink" scent that is launched by way of glands on the petals.

Physiological Adaptations

The Caryophyllaceae household has developed a vary of physiological variations to swimsuit their environment. Many species inside the household have developed deep root structures to get right of entry to water and vitamins deep inside the soil. This is mainly evident in species such as *Silene acaulis*, which has been determined to have roots extending up to two meters in length.

Some species inside the Caryophyllaceae household have additionally developed bloodless hardiness variations to continue to exist the harsh arctic climate. For example, the "mountain pink" (*Dianthus superbus*) has been observed to have a vary of physiological diversifications that enable it to live on temperatures as low as -40°C . These variations encompass the manufacturing of ice-nucleating proteins, which assist to forestall the formation of ice crystals inside the plant tissues.

Conclusion.

The Caryophyllaceae family is a diverse group of flowering plants that play a range of important ecological roles. The family has evolved a range of morphological and physiological adaptations to suit their environment, from deep root systems to cold hardiness adaptations. However, a number of species within the family are threatened or endangered due to habitat loss and degradation, as well as other human activities. In order to conserve the Caryophyllaceae family, it is essential that we implement a range of conservation strategies, including habitat protection and restoration, as well as ex situ conservation programs. By working together, we can help to ensure the long-term survival of this fascinating and ecologically important group of plants.

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