



Study of Ipomoea Carnea (Jacq), It's characteristics and It's Useful and Harmful Impact on lake, Mansar lake, Ramtek , Nagpur District, Maharashtra (India)

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ABSTRACT

Nagpur is the third- largest city of the Indian State of Maharashtra. Nagpur district lies between 21.1458°N and 79.0882°E in the plain to which it gives its name at the southern base of the Satpura hill. Invasive plant species are non-native, aggressive plants that spread rapidly disrupting local ecosystem and causing harm to the environment, economy and human health by outcompeting native species and altering habitats. The characteristics include fast growth, high reproduction and competitive ability, leading to loss of biodiversity, reduced ecosystem productivity and significant ecological damage. In this article, efforts are taken to gather the information of character of *Ipomoea carnea* (Jacq) which is the invasive plants species has great impact on the Mansar lake ,Ramtek, Nagpur District ,Maharashtra (India)

Keywords: *Ipomoea carnea*(Jacq), It's Characteristics, Impact on Ramtek Lake.

Introduction

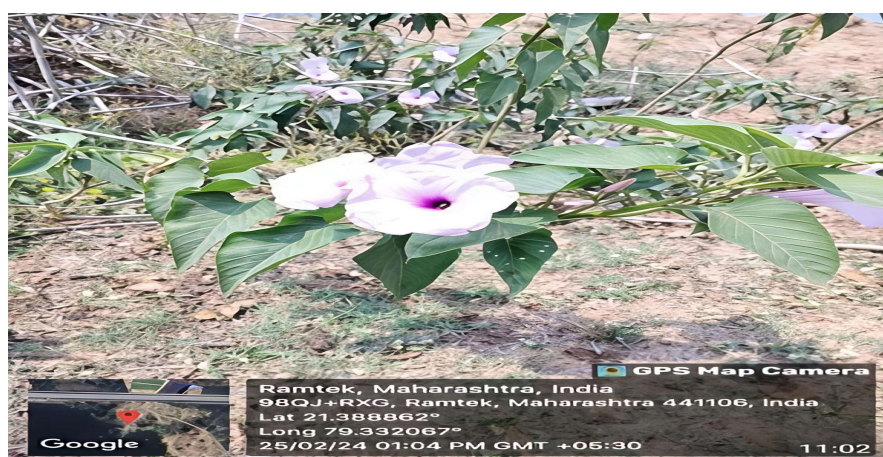
Ramtek is a city and municipal council in Nagpur district of Maharashtra , India. Located at the foot of a prominent hill north-east of Nagpur, Rmtek is an important Hindu pilgrimage centre associated with the god Ram. Ramtek is situated 7Km east of Mansar.Mansar is a census town in Ramtek tehsil of Nagpur district in the Indian state of Maharashtra.This town is located 5 Km West Ramtekand 45 Km northeast of Nagpur City.Ramtek thesil is having 21.3929° N latitude and 79.3268° E longitude. Mansar lake ,Ramtek, a wetland area in Nagpur, Maharashtra. The lake is one of the key water resources in the area and is critical for both economy and local climate. Scientific studies have raised concerns about the lake's water quality, primarily due to human activities like sewage disposal, encroachment, and contamination from agricultural and industrial resources. These is the high rate of pollution is a significant problem that could lead to water issues in the future. Despite pollution issues, the lake is supporting a variety of aquatic flora and fauna, including zooplankton, fish, birds and

phytoplankton. Due to the high rate of pollution there is growth several of invasive plants species, but *Ipomoea carnea*(Jacq) is the major problem.

RAMTEK (MANSAR LAKE)



Ipomoea carnea (Jacq) is a fast-growing invasive shrub commonly found around lakes, ponds, wetlands and riverbanks. It spreads quickly and affects the ecological balance of water bodies. It grows very fast and forms dense bushes around lake margins and shallow water areas. The plant spreads through both seeds and stem fragments making it difficult to control. It can survive in flooded soil, marshy areas, and polluted water bodies. Thick growth blocks sunlight from reaching aquatic plants and reduces space for native species. It aggressively compete for nutrients, sunlight, and water, reducing biodiversity. Large amounts of decaying plant material increase organic matter in water, reduce dissolved oxygen, increase Biological Oxygen Demand (BOD). affect pH and nutrient balance. Dense infestation can disturb fish breeding areas and aquatic animal habitats. Some parts of the plant contain toxic alkaloids that may harm grazing animals. Even after cutting, remaining stem pieces can regrow rapidly.



***Ipomoea carnea* (Jacq.)****Kingdom:** Plantae**Class:** Dicotyledons**Subclass:** Gamopetalae**Series:** Bicarpellate**Order:** Polemoniales**Family:** Convolvulaceae**Genus:** *Ipomoea***Species:** *Ipomoea carnea*(Jacq.)**Habitat**

Ipomoea carnea (Jacq.), commonly known as the pink morning glory. It is typically found in wet or moist environments, including riverbanks, marshes, and wetlands. It also thrives along roadsides, canal banks, and in disturbed areas. It frequently grows along the edges of rivers and canals, often forming dense thickets. Its preference for moist conditions makes it a common sight in wetland areas. It can be found along roadsides, field edges, and in other areas where the ground has been disturbed. In some regions, it invades fallow land and shallow wetlands.

Habit

Ipomoea carnea (Jacq.), generally exhibits a shrubby or small tree-like growth habit, reaching heights of 1 to 3 meters. It can also grow as a climber, particularly in shady environments, with stems extending up to 5 meters. The plant has a bushy structure and can form dense thickets.

Morphological Characteristics**Root**

Ipomoea carnea (Jacq.), possesses an extensive, deep root system that provides excellent soil stabilization and helps prevent erosion, particularly along riverbanks and slopes. The transverse view of the root structure is not readily available. The plant's vigorous growth and its natural tendency to colonize moist areas, such as waterlogged wetlands. The structure is capable of absorbing significant moisture and nutrients. The root also contains bioactive



compounds, similar to other parts of the plant. The root contains bicolateral vascular bundles. The pith area is composed of loose cells confined by large areoles. The plant's anatomical structure, including its vascular tissue, reflects typical characteristics of dicotyledonous plants.

Stem

The stem of *Ipomoea carnea* (Jacq.) is typically erect, woody, hairy, and greenish. It can grow up to 6 meters tall. The stems are more or less cylindrical and can become quite thick and trunk-like over time, with numerous branches. They may also exhibit a slightly twisted or twining growth pattern, enabling the plant to climb or spread over other vegetation. Internodes (the sections of stem between leaf nodes) are present. The stems have been used to make paper and were traditionally used to make tobacco pipes.

Leaf

Ipomoea carnea (Jacq.) has heart-shaped or ovate-lanceolate leaves that are typically 10 to 25 cm long. They are simple, alternating along the stem, and have a smooth or slightly hairy surface. The leaves are light green in color. The leaf venation is noticeable veins. The leaves are described as soft and fleshy.

Inflorescence

The inflorescence of the plant is a lax, terminal, pedunculate cyme, meaning it is a type of flower cluster that is loosely arranged, appears at the end of the stem, and is supported by a stalk. The flowers are typically described as pink, rose, or light violet. This indicates that the central stem of the flower cluster stops growing after producing a flower, and further growth comes from a lateral bud below the terminal flower.

Flower

Ipomoea carnea (Jacq.) produces relatively large, funnel-shaped flowers in these cymes. It is a flowering plant with large, trumpet-shaped pink flowers that are characteristic of the morning glory. It's a shrub that can also exhibit a climbing habit and is often found in wetlands and along riverbanks. The flowers are hermaphroditic, meaning they contain both male and female reproductive parts. Also known as besharam or behaya in Hindi and Marathi, which translates to "shameless" due to its tendency to spread rampantly.

Floral Parts

The flowers of the plant are typically pink, pale rose, or light violet, borne in lax, terminal cymes on a green, cylindrical pedicel. Each flower features a bell-shaped corolla with a few noticeable depressions where the petals join, and its entire margin is present at the corolla's mouth. The stalk of pedicel that supports the flower is green, erect, and cylindrical,



measuring 1.5–2.2 cm in length. The mouth of the corolla measures 5.2–6.0 cm long and 1.6–1.8 cm wide at its widest point. The corolla has a complete edge with slight indentations where the petals are joined.

Reproduction

Ipomoea carnea (Jacq.) primarily reproduces through two methods, vegetative propagation (cuttings) and sexual reproduction (seeds). Cuttings are a common and efficient way to propagate the plant, while seeds are dispersed naturally and also used for cultivation. Healthy stems are cut and placed in water or moist soil until roots develop. Spring or early summer is generally recommended. It produces capsules containing numerous seeds. Mature capsules split open, releasing the seeds, which are dispersed by wind and water. The hard seed coat can delay germination. Temperature and water treatments can help break down the coat and facilitate germination. The seeds are dark brown to black, three-sided, and covered in hairs.

Adaptation

Ipomoea carnea (Jacq.) adapts to diverse habitats from arid lands to wetlands and high elevations through vegetative propagation and anatomical adaptations like sclerification and stomatal regulation. It propagates easily via stem cuttings and seeds, allowing it to colonize new environments, with rapid growth, efficient water use at elevation, and a flexible habit (vining or upright) contributing to its success as an adaptable and invasive species. It can thrive in a wide range of habitats, from wet, waterlogged areas like riverbanks and canals to dry, arid regions and even high-altitude environments. Smaller stomata at higher elevations help to minimize water loss through transpiration. Increased sclerification (strengthening and hardening) in the roots, stems, and leaves provides rigidity to metabolically active cells, adapting them to high-elevation conditions. The plant can adopt an upright or trailing (vining) growth habit depending on the topography, a phenotypic adaptation rather than a genetic one. Its fast growth rate, efficient vegetative spread, and ability to colonize both wet and dry environments give it a competitive advantage over other plants. At high elevations, its adaptations facilitate land stabilization and help to reduce soil erosion, contributing to its ecological success in those areas.

Ecological Significance

Ipomoea carnea (Jacq.) has significant negative ecological impacts due to its invasive nature, displacing native plants by outcompeting them for resources and altering ecosystem structure. It disrupts wetlands, irrigation, and navigation, creating "ecological disasters". Its use



in bio compost, biogas production, and as a source of useful compounds for biomaterials offers potential positive ecological contributions, though the toxicity and invasive potential remain significant concerns. It is considered one of the world's most invasive weeds. It aggressively colonizes both land and water, including wetlands and riparian areas. Its explosive growth can outcompete native vegetation for light, water, and nutrients, leading to reduced native plant diversity and changes in ecosystem structure. In aquatic environments, it can impede navigation and impact fisheries. In agricultural areas, it hinders land use and cultivation. The plant is poisonous, causing cachexia (severe wasting) and neurological damage in animals. While some wildlife species are resistant, poisoning can be fatal. It is a fibrous material with high cellulose content, making it a suitable substrate for producing biogas. Studies show the potential of plant to accumulate certain pollutants in soils, which could be explored for phytoremediation. Extracts from plants have shown antifungal properties, suggesting potential uses in agriculture or as a source of novel compounds. While potential uses exist, its aggressive nature requires careful management in non-native environments.

USES

Ipomoea carnea (Jacq.) has diverse uses, including traditional medicine for issues like inflammation and rheumatism, and industrial applications in paper and activated carbon manufacturing. It also has potential as a biopesticide and in the creation of biocomposites. However, some parts of the plant, particularly the seeds, are toxic, requiring caution. Used for sores and rheumatic pain. The leaves can be used for rheumatic pain, and the plant exhibits analgesic properties. Traditional uses include purgative and cathartic properties. Traditional medicine uses it for sedative and anticonvulsant effects. Investigations have shown promise for properties like antidiabetic, antioxidant, antimicrobial, anticancer, and hepatoprotective effects. The stems are a good raw material substitute for wood due to their high lignin content. It can be used to create activated carbon for adsorbing metals from water. The plant, especially its seeds, is toxic and should be used with caution. While many therapeutic properties have been identified, more research is necessary to fully understand its potential and safety.

HARMFUL EFFECT

Ipomoea carnea (Jacq.) harmful effects stem from its potent alkaloids causing severe toxicity, leading to lysosomal storage diseases, neurological issues (ataxia, weakness, brain vacuolization), reproductive harm (embryo injury, teratogenicity), organ damage (liver, kidney, thyroid), immune suppression, and even death in animals, requiring strict handling and dosage control in studies, despite potential uses in bio composites or as a bio-pesticide. Neurological



Toxicity is causes staggering gait, tremors, loss of reflexes, and behavioural changes due to damage in the central nervous system (CNS), especially in the brainstem.

Alkaloids inhibit carbohydrate-metabolizing enzymes, leading to lysosomal storage disorders (vacuolization) in various organs. Reproductive & Developmental Toxicity can cause foetal injury, birth defects (teratogenicity), and poor postnatal development in offspring of exposed mothers. Organ Damage (Histopathology) it damages liver, kidneys, thyroid, and pancreas, showing cell vacuolization and degeneration. Induces weight loss, immune system alternation, anaemia, leucocytosis, and altered endocrine/gastrointestinal functions. Leaf extracts are toxic to fish (like guppies), causing behavioural changes, mucus secretion, gill damage, and mortality. Researchers must treat *Ipomoea carnea* (Jacq.) extracts and plant matter with extreme caution, using appropriate PPE (gloves, masks). Precise dosing is critical, as even low doses can have significant effects, and toxicity varies by animal species (e.g., goats more sensitive than sheep). Studies on its medicinal potential (e.g., anti-inflammatory, anticancer) must carefully balance benefits against severe risks, removing animals from exposure immediately if signs appear. In essence, while *Ipomoea carnea* (Jacq.) offers research potential (e.g., in bio composites, as a bio-pesticide), its severe toxicity, driven by compounds like swainsonine, makes it a significant hazard requiring rigorous safety protocols in any scientific setting.

Conclusion

Ipomoea carnea (Jacq.) is considered a harmful invasive species in lake ecosystems because of its rapid spread, dominance over native vegetation and negative effects on water quality and aquatic biodiversity. Its rapid growth and dense vegetation reduce the availability of sunlight, oxygen, and nutrients for native aquatic plants and animals. The plant alters the physical and chemical properties of water bodies by increasing organic matter and disturbing ecological balance. It also decreases biodiversity, obstructs water flow, and creates unhealthy conditions in lakes and wetlands. The ecological impact on lakes reduced native aquatic biodiversity, obstruct water flow, increases sediment accumulation, promotes eutrophication in stagnant lakes, creates breeding grounds for mosquitoes in dense vegetation. Therefore, proper management and control of this invasive species are necessary to protect aquatic ecosystems and maintain water quality.

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