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Typha Species: An Overview

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Abstract:
Herbal medicines are increasingly popular throughout the world and have promising potential to provide treatment, maintain and improve health, as well as prevent and treat several diseases because they are considered safe compared to modern conventional medicines and are more economical. However, most of these biologically active phytochemical constituents have limitations; namely, their absorption and distribution are low, and the target specificity of phytochemicals is generally low, which results in low bioavailability, resulting in decreased biological activity. Cattail or Typha is a genus of plants. It is found in wetland habitats. They are usually found in the Northern Hemisphere, but sometimes found in wetlands elsewhere. In North America 3 species are well known, T. *latifolia* (broadleaf cattail), T. *angustifolia* (narrow leaf cattail), and (southern cattail) T. *dominensis*. The current review discusses with the origin, distribution, ecology, taxonomic status, and different pharmacological uses.

Key words: Typha, Cattles, T. *latifolia*, T. *angustifolia*.

I. Introduction:

Cattail (Typha) is an iconic emergent wetland plant found worldwide. By producing an abundance of wind dispersed seeds, cattail can colonize wetlands across great distances, and its rapid growth rate, large size, and aggressive expansion result in dense stands in a variety of aquatic ecosystems such as marshes, ponds, lakes, and riparian areas. Cattail can also quickly dominate disturbed areas with waterlogged soils such as roadside ditches, retention areas, and fringes of stormwater ponds. (Grace J. B.et,al.,1982) These dense stands impact local plant and animal life, biogeochemical cycling, and wetland hydrology, which in turn alter wetland functions. Over recent decades, the distribution and abundance of cattail in North America has increased because of human disturbances to natural water cycles and increased nutrient loads. (Amit Pandey.et,al.,2018)

In addition, highly competitive nonnative and hybrid taxa have worsened the rapid spread of cattail. Because cattail invasion and expansion often change wetlands in undesirable ways, wetland managers often respond with widespread management efforts, though these efforts may have short-lived or weak effects. Notwithstanding the negative impacts, cattail provides beneficial ecosystem services including the reduction of pollution through bioremediation and the production of biofuel material. (Grace, J. B. & Harrison.,1986)

One species of Typha is probably found in and all other tropical parts of the world. The Typha genus is found on every continent apart from Antarctica. It can be found throughout US and southern Canada, in Temperate North America, Europe and Asia. Common cattail can also be found in Russia, Morocco, India, Iran, Mexico, the Philippines Portugal, and Greece where they act as weed of rice.The species was first discovered in the lake Chad Basin. Typha is a water- loving plant that can multiply and become difficult to control in favourable conditions making it. Typha is a water-loving plant that can multiply and become difficult to control in favourable conditions making it invasive. Many different species of Typha occur commonly in wet soil, marshes, swamps, and shallow waters throughout the world. They include-Typha *angustiforia* – Narrow leaved cattail.

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Typha *latifolia*- Broad- leaved cattail

Typha *glauca*- hybrid between the two species above and

Typha *australis*- This species found in Hadejia-Nguru wetland conservation area.
(Grace J. B.et,al.,1982)

II. Plant profile:

Genus: Typha
Species: *Angustifolia & latifolia*
Family: Typhaceae
Common Name: Lesser Indian Grass, Elephant Grass
English: Cattails
Marathi: Pan, Pan-Kanis, Panalwala, Ramvan
Hindi: Pater
Sanskrit: Earaka, Shivi
Gujarati: Gabajari, Panpani
Edible parts: Flowers, Stem, Leaves. Root, Pollen, Seed.

Taxonomic classification of Typha grass:

Category	Taxa
kingdom	Plantae
Division	Magnoliophyta (Angiosperms)
Class	Liliopsida (the monocotyledons)
subclass	commelinidae
order	Typhales
Family	Typhaceae
Genus	Typha
species	*Angustifolia, latifolia & domingensis*

(Mohammed I. N.et,al.,2022)

III. Description:

Typha is a member of the Typhaceae or cattail family. Cattail is an erect, rhizomatous perennial aquatic herb that can range in height from 3 to 10 feet. Leaves of the plant are long, linear, parallel-veined, strongly planoconvex, 1/8 to 1/3 of an inch wide, and deep green in color. Leaves originate from the base of the simple, slender stem and spread outward as they rise into the air. The flower head of the plant is a compact terminal spike that is shaped like an elongated cylinder. The flower spike is divided into pistillate flowers that form the conspicuous brown club located below the yellow spire of staminate flowers. The pistillate and staminate flowers are separated by a gap of 1 to 4 inches. Seeds of the plant are very small.(Amit Pandey.et,al.,2018)

Typha *latifolia* camwood make discovered previously, moderately undisturbed habitats, as much as Typha *angustifolia* regularly happens to additional flimsy what's more saline situations. Typha *angustifolia* will be recognized a pioneer on auxiliary progression about exasperates bogs. At those two species happen together, Typha *angustifolia* will be by confined on deeper waters Furthermore All the more saline states. Typha *lantifolia* thrives for shallow water. (Grace, J. B. & Harrison.,1986) Their mixture species, typha x glauca, need comparable habitat necessities will T. *angustifolia*. T. *latifolia* camwood be discovered in oceanic groups in the least stages, starting with promptly with late successional, while T. *angustifolia* also Typha x glauca regularly happen clinched alongside early should mid successional. (Grace J. B.et,al.,1982)

IV. Life History/Ecology:

Typha is a rhizomatous perennial aquatic herb that can reproduce vegetatively and through seed production. Seeds can germinate when shed but there must be favourable environmental conditions.

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In favourable environmental conditions, seedlings may germinate from April to September. (Grace, J. B. & Harrison.,1986) Leaves and new rhizomes are formed early in the spring. Narrow-leaved cattail generally flowers from early to mid-summer. Aerial shoot growth can continue into November or until the first freeze when plants go dormant. A single inflorescence can produce 20,000 to 700,000 small single-seeded fruits. T. *angustifolia* was first recorded in North America in 1820 floras written for Boston, New York, Philadelphia, and other east coast localities. Its absence from North American floras prior to this date suggests that it was introduced with European settlement.(Grace J. B.et,al.,1982)

Later floras reveal that the species was restricted to the north Atlantic seaboard of the U.S. for most of the 19th century, but then began to migrate westward along canals, railroad swales, and roadside ditches, following the development of transportation network. (Grace, J. B. & Harrison.,1986)

V. Distribution and Habitat:

Typha is native to Europe, America and India is now widely distributed in the eastern and northern United States. The plant can be found on wet or saturated soils growing within aquatic sediments in wet meadows, marshes, lakeshores, bogs, riverbanks, and along slow-moving streams. Narrow-leaved cattail can tolerate saline and alkaline environments. The plant occurs in early to mid-successional communities and may be common or dormant in brackish estuarine marshes.Cattail populations can be found throughout the world, from tropical to temperate zones, and from humid to dry climates. Their tolerance to varying climatic conditions and environmental changes helps them achieve widespread dominance in a variety of aquatic plant communities. (Y. Birnin Yauri.et,al.,2019) Cattails can occur in any place where the soil remains wet or saturated: roadside ditches, reservoirs, lakeshores, bogs, wet meadows, marshes, etc. Although the cattail is a freshwater aquatic plant, it can tolerate some degree of salinity and acidity. It is also tolerant of perennial flooding, poor soil conditions, and high concentrations of lead, zinc, copper, and nickel. Typha latifolia can be found in relatively undisturbed habitats, whereas Typha *angustifolia* typically occurs in more unstable and saline environments.(Grace, J. B. & Harrison.,1986)

Typha *angustifolia* is considered a pioneer in secondary succession of disturbed bogs. When the two species occur together, Typha *angustifolia* is generally restricted to deeper waters and more saline conditions. Typha *latifolia* thrives in shallow water. Their hybrid species, Typha x glauca, has similar habitat requirements to T. *angustifolia*. Typha *latifolia* can be found in aquatic communities at all stages, from early to late successional, whereas T. *angustifolia* and T. x glauca typically occur in early to midsuccessional communities and are frequently found in disturbed wetland sites. All species of Typha species can occur in dense, monospecific stands, or as scattered individuals, or clumps in stands of mixed vegetation.(Y. Birnin Yauri.et,al.,2019)

VI. Reproduction:

(a) Floral biology - The inflorescences of Typha are wind pollinated and bear copious pollen. Pollen inT. latifolia is shed as tetrads while in T. *angustifolia* it is shed as monads; hybrids have been reported to produce mixtures of monads , dyads , triads , and tetrads . T. *latifolia* produces about 90 x 106 tetrads per inflorescence (about 360 x 106 individual grains) compared to about 170 x 106 grains for T. *angustifolia* Because of the release of tetrads by T. *latifolia*, its pollen dispersal range is less than that of T. *angustifolia*. Also, the gap between the male and female inflorescences in T. *angustifolia*, has been suggested to act to reduce selfing. Pollen has been shown to remain viable for at least 4 weeks but to be sensitive to high humidity and temperature extremes.(Amit Pandey.et,al.,2018)

(b) Seed production and dispersal - The small single-seeded fruits are produced in great numbers with estimates for a single inflorescence ranging from 20,000 to 700,000. The pistillodia distributed throughout the inflorescence act to regulate the release of fruits. In humid conditions the pistillodia are swollen and act to maintain the integrity of the spike but when conditions are dry, the pistillodia shrivel and permit the inflorescence to burst. Fruits are equipped with numerous gynophore hairs that facilitate wind dispersal, though when wet, many of the fruits fall close to the parent plant. When the fruits come in contact with water the pericarp opens rapidly, and the seed is released and sinks with the pointed, posterior part downward. The pointed seeds can become embedded in the skin of fishes resulting in further transport. (Grace, J. B. & Harrison.,1986)

(c) Viability of seeds and germination - The seeds of all taxa are very small with those of T. *latifolia* (1.5 mm in length) being slightly larger than those of T. *angustifolia* (1.0 mm) Additional data from the extensive studies of Marsh include seed lengths of 0.962-1.776 mm for T. *latifolia*, 0.718- 1.358 mm for

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T. *angustifolia*, and 0.999- 1.532 mm for T. *xglauca*. Seeds are capable of germination when shed but for a seed to germinate there must be sufficient moisture, temperature, light intensity and light quality. Oxygen is not required for germination. Seeds retain viability for long periods when conditions are not suitable. Seedling establishment is likewise dependent upon adequate moisture, light, and temperature, but is also sensitive to chemical conditions in the water and sediment. After plants are well established, they can tolerate a much broader range of conditions. (Grace, J. B. & Harrison.,1986)

7. Uses

Medicinal Uses-

- The female flowers of the *Typha* species are used externally to control bleeding, in addition to wound healing and burns in Turkish folk medicine.

- The lower stem has diuretic and astringent properties, and the leaves have analgesic, antioxidant, and diuretic properties.
Pollens are stringent, desiccant, diuretic, haemostatic, and vulnerary. It is used for nosebleeds, uterine bleeding, postpartum abdominal discomfort, and abscesses. It is not recommended for pregnant women. (Rizwana Dilshad.etal.,2019)

- The roots have anti-inflammatory, antioxidant, astringent, cytotoxic, and diuretic properties. The spasmolytic, bronchodilator, and vasodilating effect of hydroethanolic
extract of *Typha domingensis* was reported earlier. (Rizwana Dilshad.etal.,2019)

- The pollen is astringent, diuretic, emmenagogue, haemostatic, refrigerant, sedative, suppurative and vulnerary.(Y. Birnin Yauri.et,al.,2019)

- A decoction of the stems has been used in the treatment of whooping cough.

- The roots are pounded into a jelly-like consistency and applied as a poultice to wounds, cuts, boils, sores, carbuncles, inflammations, burns and scalds.

- The seed down has been used as a dressing on burns and scalds.

- The young flower heads are eaten as a treatment for diarrhoea.

- The flowers are used in the treatment of a wide range of ailments including abdominal pain, amenorrhoea, cystitis. (Sugeng Nuradji.et,al.,2022)

Other Uses:

- Seating chair: The rushes are reaped and the abandons regularly dry for after the fact use over seat. Re-wetted, that abandons need aid turned. Also wrapped around the seat rungs to structure a thickly woven seat that is then stuffed. (Usually with the left-over rush). (Amit Pande.et,al.,2018)

- Culinary uses: Mostly parts of the Typha plant are edible to humans.

- Agriculture: The Seeds bring an helter skelter linoleic acid content, furthermore, have a chance to be used to bolster cows and chickens.(Y. Birnin Yauri.et,al.,2019)

- Building material: To nearby tribes around Lake Titicaca on Bolivia and Peru, Typha were around those practically vital plants and all aspects of the plant needed various employments. Throughout universe War II, the United States war fleet utilized those down for typha likewise a substitute for kapok in life vests Furthermore aeronautics jackets. Tests indicated that considerably following 100 hours about submersion the buoyancy might have been still powerful.(Mortan J.F.et,al.,1975)

- Paper: Tvpha stems what's more abandons could a chance to be used to aggravate paper. It will be solid for an overwhelming composition, and it is difficult to bleach, something like that it may be not suitableness for modern handling from claiming graphical paper. significant sums of cattail paper were prepared over New York, because of a lack for crude materials. French researchers tried strategies for twelve-month collecting of the abandons. Due to the helter skelter expense these routines were deserted and no further Scrutinize might have been carried out. Today Typha is used to settle on enlivening paper.(Mortan J.F.et,al.,1975)

- Fiber: Fiber's dependent upon 4m in length could be acquired from the stems when they need aid mechanically or synthetically approached for sodium hydroxide. Those originate fibers look like jute what's more could be used to prepare crude materials.

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Those leaf beet fibers might make utilized as an elective with cotton. The yield for leaf beet fibers may be 30 to 40 percent and Typha x glauca might transform 7 to 10 tonsil for every hectare yearly.(Mortan J. F.et,al.,1975)

- Biofuel: Typha might make utilized concerning illustration and wellspring for starch to prepare ethanol. Due to their helter skelter profit for northern plains latitudes, Typha would acknowledge will make a bioenergy crop. (Amit Pande.et,al.,2018)

- Use of Cattail Rhizome: The greater part notable sustenance that hails from the cattail may be its rhizome, and root-like underground stem that is a standout amongst those wealthiest wild sources about eatable carbohydrates in the northeast. The centre of the thick expanding rootstock, which grows horizontally in the mud, is starchy. Its camwood makes cooked furthermore consumed as potatoes, alternately dried and ground under flour utilized within heating. Also, as a substitute for corn starch. This flour could make aged to process ethyl liquor important as anti-freeze. Similarly, as a Shabby streamlined solvent, what's more for medicinal purposes. It contains more fat but slightly less protein than potato or wheat flours, and only potato flour has more minerals.(Rao M. R.et,al.,2016)

VII. Conclusion

Typha is a species of aquatic plant that is cosmopolitan (found in every continent) except Antarctica. They are highly invasive because of their high rate of growth and spreading mechanism. They have wind dispersal mechanism by producing a large number of seeds and can spread vegetatively through their active rhizome mechanism. Their high rate of invasion and spread make them form a dense monoculture which have implication for biodiversity. They also provide habitat for some wildlife species.

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