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A REVIEW ON *TYPHA ANGUSTATA*

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ABSTRACT

Typha angustata is perennial plant. And is an Aquatic weed is widely grown in water logged areas and belongs to the Typhaceae family in plant kingdom. Typha is a genus of *Typha angustata*. It contains eleven species of monocotyledonous flowering plants in the family Typhaceae. The Genus has a largely northern hemisphere distribution but it essentially cosmopolitan. Medicinal plants are the nature's gift to the Human being to have disease free healthy life. It plays a vital role to preserve our health. In recent times, the use of herbal products has increased tremendously in western countries in the world where the medicinal plant sector is a part of the honored tradition that is respected even todays. *Typha angustata* is an important plant of tropical regions .mainly it is distributed in the India, Japan and china.

Key words: *Typha angustata*, India, Japan.

INTRODUCTION

Typha angustata is a perennial plant and is an aquatic weed and is widely grown in waterlogged areas and is belongs to the family Typhaceae in the plant kingdom. *Typha angustata* is the most popular medicinal plant used for various medicinal properties and reported in many traditional literatures in India, as well as in China and Turkey. The height is 1.5-2cm, and its leaf and stem are standing straightly. Its leaf is thick and has 5-12 mm thickness. Male and female flowers develop in the dense, complex spikes on the same vertical stem. The male flowers are reduced to a pair of stamens and hairs and wither once the pollen is shed .leaving a short, bare stem portion above the female inflorescence. The stem is joint less. The dense cluster of female flowers forms a cylindrical spike some 10 to as much as 40cm and 1 to 4 cm broad. Seeds are minute about 0.2 mm long and attached to a thin hair or stalk which effects wind dispersal.

DESCRIPTION

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Biological Name: *Typha angustata*, *Typha Angustifolia*, cattails

Scientific Classification

Kingdom	Planate
Sub kingdom	Spermatopsida
Phylum	Tracheophytina
Sub phylum	Euphyllophytina
Infra phylum	Radiatopses
Class	Spermatopsida
Sub class	Aridae
Super order	Typhanae
Order	Polaes
Family	Typhaceae
Genus	Typha
Specific epithet	Angustata –Bory & Chaub
Specific epithet	*Typha angustata*

Other Names

English Names : Lesser Indian Reed mace, Elephant Grass, Small bulrush, cattails
Hindi Name : Pater
Tamil Name : Sambu
Telugu Names : Dabbu Jammu, Jammu, jambu.
Bengali : Kaaba.
Chinese : Chang bao xiang Pu.
Japanese : Hime-gama

Fig 1. *Typha angustata*

Chemical Constituents

Phytochemical screening of *Typha angustata* showed that the presence of Flavonoids, tannin, sterols and Triterpenes. The following Flavonoids are present in the shoots and flowering heads of *Typha angustata* those are

1. Naringenin
2. Isorhamnetin
3. Quercetin
4. Isorhamnetin-3-0(2~G-a-l-rhamnopyrano-syl)-rutinoside
5. Quercetin-3-0(2~g-α-l-rhamno-pyranosyl)-rutinoside
6. Sorhamnetin-3-0-rutinoside
7. Isorhamnetin-3-0-neohesperidosine
8. Kampferol-3-0-neohesperidosine.

The sterols are β-sitosterol, lanosterols, and cholesterol. The roots of *Typha angustata* contain polysaccharides. It also contains fatty acids like α-linolenic, linoleic and unidentified c82. The inflorescence of *Typha angustata* contains the following crystalline compounds those compounds were vanillic acids-p-hydroxyl-cinnamic acid, protocatechuic acid, E-propenoic acid-3-(hydroxyl phenyl)-2,3-dihydroxy propyl ester, succinic acid, p-hydroxy benzaldehyde and D-monitor.

It is also contains carbohydrates, glycosides and phenolics (Nivati SA *et al.*, 2013).

Nutritional value of *Typha angustata* per 100 g

Source: USDA Nutrient Database

Energy	106 kJ (25 kcal)
Carbohydrates	5.14 g
Sugars	0.22 g
Dietary fiber	4.5 g
Fat	0.00 g
Protein	1.18 g
Water	92.65 g
Vitamin A equiv.	1 µg (0%)
beta-carotene	6 µg (0%)
Thiamine (vit. B_1)	0.023 mg (2%)
Riboflavin (vit. B_2)	0.025 mg (2%)
Niacin (vit. B_3)	0.440 mg (3%)
Pantothenic acid (B_5)	0.234 mg (5%)
Vitamin B_6	0.123 mg (9%)
Folate (vit. B_9)	3 µg (1%)
Choline	23.7 mg (5%)
Vitamin C	0.7 mg (1%)
Vitamin K	22.8 µg (22%)
Calcium	54 mg (5%)
Iron	0.91 mg (7%)
Magnesium	63 mg (18%)
Manganese	0.760 mg (36%)
Phosphorus	45 mg (6%)
Potassium	309 mg (7%)
Sodium	109 mg (7%)
Zinc	0.24 mg (3%)

Edible Parts

Flowers, Leaves, Pollen, Root, Seed, Stem.

Medicinal Uses

Typha angustata is the most popular medicinal plant used for various medicinal properties and reported in many traditional literatures in India, as well as in China and Turkey.

- ✓ The leaves are used as diuretic (Duke JA and Ayensu ES, 1985).
- ✓ The pollen is Astringent, Desiccant, Diuretic, Haemostatic and Vulnerans (Yeng Him-Che, 1985)
- ✓ It is used in the treatment of nose bleeds, Haematemesis, Haematuria, Uterine, Bleeding, Dysmenorrheal, Post Partum Abdominal Pain and Gastralgia, Scrofula and Abscesses (Yeng Him-Che, 1985).
- ✓ The root stock is astringent and diuretic (Chopra RN *et al.*, 1986).
- ✓ It is contraindicated for pregnant women (Duke JA and Ayensu ES, 1985).
- ✓ The seed down is Haemostatic (Duke JA and Ayensu ES, 1985).
- ✓ It is used for inducing labor.
- ✓ It is used in acute experimental Myocardial Infarction in rabbits.
- ✓ The extract of the pollen from *Typha angustata* has ability to enhance the osteoinductive potential of demineralized bone matrix.
- ✓ *Typha angustata* used in the study of acid mine water of wetlands.
- ✓ It is used as Anti-Inflammatory agent. (Kolhe VN *et al.*, 2011)

✓ *Typha angustata* contains Naringenin which inhibits the vascular smooth muscles cell proliferation so that used as therapeutic agent in controlling of vascular problems (Jung-Jin L *et al.,* 2012).
✓ Due to presence Anti-Oxidants like Flavonoids (Kolhe VN *et al.,* 2011), Vitamin C and A, it can be used in the treatment of Alzheimer's disease.
✓ *Typha angustata* activated carbon can be successfully employed as low cost alternative to the commercial adsorbents in the removal of fluoride ion from wastewaters (Hanumantharao Y *et al.,* 2012).

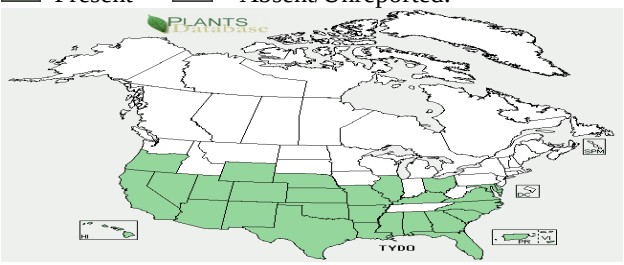
Other Uses
✓ *Typha angustata* is widely used as Biomass, Fiber, Insulation, and Miscellany, Paper, Soil stabilization, Stuffing, Thatching and Weaning (Singh G and Kachroo P, 1976).
✓ The stems and leaves have many uses, they make a good thatch, can be used in making paper, can be woven into mats, chairs, hats (Moerman D, 1998).
✓ They are a good source of Biomass, making an excellent addition to the compost heap or used as a source of fanatic (Angus and Robertson, 1989).
✓ A fiber obtained from the roots can be used to make strings (Jung-Jin L *et al.,* 2012).
✓ The hairs of the fruits are used for stuffing pillow etc.
✓ They have food insulating and buoyancy properties.
✓ The pollen is highly inflammable and is used in making fireworks.
This plants extensive root system makes it very good for stabilizing wet banks of rivers, lakes.

Distribution

Cattails are always found in or near water, in marshes, ponds, lakes, and depressional areas. They are obligate wetland indicator plant species. Cattails tolerate perennial flooding, reduced soil conditions, and moderate salinity. With influxes of nutrients or freshwater, cattails are aggressive invaders in both brackish salt marshes and freshwater wetlands. Narrow-leaved cattails are found in marshes at elevations <2000 m. They grow throughout North America and Eurasia (Hickman 1993

Distribution of *Typha angustata* throughout the World

Present Absent/Unreported.



Cultivation details

Grows in boggy pond margins or shallow water to 15 cm deep. Requires a rich wet soil if it is to well. Succeeds in sun or part shade. Plants can be very invasive, spreading freely at the roots when in a suitable site. Typha Domingensis aggressively invades and forms nearly pure stands in brackish or nutrient-enriched wetlands in the Florida Everglades and elsewhere. It is established but does not mature fruits on the cold coast of northern California.

Propagation

Seed - surface sow in a pot and stand it in 3cm of water. Pot up the young seedlings as soon as possible and, as the plants develop, increase the depth of water. Plant out in summer. Division in spring. Very easy, harvest the young shoots when they are about 10 - 30cm tall, making sure there is at least some root attached, and plant them out into their permanent positions (Huxley A, 2012).

Establishment

Typha species may be planted from bare rootstock or seedlings from container stalk or directly seeded into the soil. Bare rootstock or seedlings are preferred revegetation methods where there is moving water. *Typha* seeds germinate readily and are a cost-effective means to propagate cattail on moist soils. *Typha* species can be invasive in disturbed wetland situations and become a monoculture

Seed Collections

Select seed collection sites where continuous stands with few intermixed species can easily be found and obtain permission for seed collection. Seeds can be harvested when they are slightly immature. It is important to harvest the staminate stalks before they dry and blow away. Harvest by using either hand clippers, cutting the stem off below the seed heads, or by stripping the seed heads off of the stalk. Use a seed cleaner to process the seeds. Dry and store the seeds in brown paper Plant cleaned seed in fall. Plant in clean, weed-free, moist seedbed. Flooded or ponded soils will significantly increase seedling mortality. Broadcast seed and roll in or rake 1/4" to 1/2" from the soil surface. Some seed may be lost due to scour or flooding. Recommended seed density is unknown at this time.

Seed Germination in Greenhouse

Plant in the greenhouse in 1" x 1" x 2" pots, 1/4" under the soil surface. Keep soil surface moist. Greenhouse temperature should be 100° F (plus or minus 5° F). Seeds will begin to germinate after a couple weeks in warm temperatures.
Plants will be ready in 100-120 days to come out as plugs. By planting seeds in August, plugs are ready to plant in the soil by November. These plants are very small.

Growing plants to a larger size will result in increased revegetation success

MICROSCOPIC STUDY OF PLANT

Microscopy of leaf

Microscopy of leaf of T. *angustata* was done by subjecting it to transverse sections and surface studies. Surface preparation showed typical type of paracytic stomata where guard cells were covered by 4 subsidiary cells from which two were found typically arranged parallel but other two were at right angle to the parallel ones. Straight wall epidermal cells were found to be present. The leaf vessels were found with spiral venation and lignified. Prismatic as well as clusters of calcium oxalate crystals were present. Trichomes are absent. The transverse section of leaf showed characteristics features of monocot leaf with isobilateral lamina. The lamina margin was of wedge-shaped, had a thick zone of fibers at the margin and contained one to four vascular bundles embedded at the proximal edge of the zone. The sub epidermal vascular bundles along the abaxial and ad axial margins of the leaf were interspersed with fibre bundles in the chlorophyllous mesophyll. All vascular bundles were found covered with a band of lignified sclerenchymatous fibers' (Nivati SA *et al.,* 2013).

Microscopic characters of stem

The transverse section of stem showed characteristics features of a monocot stem and consisted of an epidermis with a narrow hypodermis external to vascular bundles and fibre bundles. Large vascular bundles were located throughout the stem and a band of sclerenchymatous fibers' was oriented concentrically around the stalk between the second and third rings of vascular bundles. The band of fibres was interrupted by vascular bundles and parenchyma. The vascular bundles were conjoint and collateral. Xylem vessels were found with typical Y type arrangement in the vascular bundles and with spiral thickening (Nivati SA *et al.,* 2013).

Microscopy of rhizome

The transverse section of rhizome showed circular outline with single layered epidermis consisting of tangentially elongated cells and covered with a thin layer of cuticle. Cortex was divided into two parts - outer cortex comprised of 7 to 11 layers of thin walled parenchymatous cells, oval to polygonal in shape and with intercellular spaces. The cortex was aerenchymatous with irregular lacunae and with scattered small bundles. Some of the bundles in cortex were only fibrous and others were vascularised. Starch grains were found to be present throughout the cortical parenchyma. The cortical region was delimited on its inside by a uniseriate endodermis which contained casparian bands, suberin lamellae and secondarily thickened walls. The outer edge of the central core was characterized by a prominent band of lignified fibers' (Nivati SA *et al.,* 2013).

Microscopy of root

The transverse section of root showed the outermost pilifarous layer densely covered with large number of unicellular hairs. Cells were parenchymatous and polygonal. Epiblema was followed by a 4 to 6 layered sclerenchymatous hypodermis. The cells were thin walled, polyhedral and compactly arranged. The cortex was found broad with 25 to 29 layers, distinctly divided in two zones, outer and inner cortex. Outer cortex consisted of 6 or 7 layers of compactly arranged, irregular to polygonal, thick walled cells while inner cortex was found with radially elongated air spaces occupying 3/4 th of the area of transverse section. Few layers of cells forming the innermost compact layer of cortex were found in contact with endodermis. Single layered endodermis was composed of thin-walled compactly arranged parenchymatous cells. Vascular bundles were polyarch, radial and exarch arranged inner to the thick walled single layer endodermis. Vascular bundles were arranged with xylem vessels forming a circle with lignified pith.

Microscopic characters of inflorescence

Macroscopically examination of inflorescence showed flower surrounded by slender hairs, representing reduced perianth. Many mineral crystals were found in the inflorescence powder.

The physicochemical parameters of female inflorescence

The physicochemical parameters of female inflorescence of *T. angustata* were established according to WHO specifications. Ash values of inflorescence were found to have 2.9 ± 0.61% of total ash, 0.214 ± 0.12% of acid insoluble ash and 2.15 ± 0.38% of water soluble ash and moisture content was found 0.43 ± 0.49%. Extractive values were found 1.04 ± 0.60% for water soluble, 1.02 ± 0.56% for alcohol soluble, 4.36% ± 0.15 for ethyl acetate soluble and 0.26 ± 0.83% for chloroform soluble matter.

CONCLUSION

Typha angustata possess excellent quality of Flavonoids. Hence it can be used as anti oxidants. It also has Defluoridation capacity so that used in water containing high percentage of fluorine. *Typha angustata* can be used as good medicine for Alzheimer's disease. Now a day's myocardial infarction is a serious heart problem so that if we collect and properly utilize *Typha angustata* it can be used in the treatment of myocardial infarction.

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