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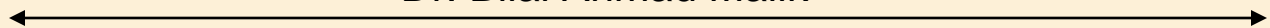
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TAXONOMIC STUDY OF THE WATER SPINACH (*IPOMOEA AQUATICA* FORSK. CONVULVULACEAE)

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ABSTRACT

Ipomoea is the largest genus in the flowering plant family Convolvulaceae, The most widespread common name is glories family.

The genus includes food crops; the tubers of sweet potatoes (*Ipomoea batatas*) and the leaves of water spinach (*I. aquatica*) are commercially important food items and have been for millennia. The water spinach (*I. aquatica*) commonly found in ponds, cultivated for stem and leaves used as vegetables.

The study of Anatomical as well as morphological character is the key aspect of various Classification systems which is the basic unit of Taxonomy.

The present study was conducted on the genus *Ipomoea* from Marathwada, reported a variation in Morphology, Anatomy, Pollen Morphology, Stomatal Morphology, Trichome structure as well as Maceration study.

MATERIALS AND METHODS

PLANT MATERIAL

Plant materials of *Ipomoea aquatica* was collected from Jalna city (N 19° 50' 59.2351" E 75° 53' 2.0741).

The plant material were collected in Wet condition for anatomy (Root, Stem, Leaf, Flowers) and Dry condition for morphology (Flowering twig) both form.

The wet collection of plant is stored in 6% Formalin solution. The pollen was collect in Acetic acid for acetolysis.

METHODS:

Various methods were used for the study plant *Ipomoea aquatica*:

- 1) De-hydrolyzing and Staining method is used to study anatomical feature of the particular plant part.
- 2) Maceration by (Jaffrey method)
- 3) Acetolysis

TAXON TREATMENT

Ipomoea aquatica Forsk. Fl. Aegypt. Arab 44. 1775. Clark in Hook. f. Fl. Brit. India 4: 210. 1883; Cook, Aquat. & Wetl. Pl. India 92. 1996; Naik, Fl. Osmanabad 218.1979; Naik, Fl. Marathwada 1: 584. 1998; Venkanna & Das in Sing et al. Fl. Maharashtra (Dicote) 2: 456. 2001; Almeida. Fl. Maharashtra 3b; 319. 2001. *I. reptans* Poir. In Lamk. Encycl. Suppl. 3: 460. 1814 non *Convolvulus reptans* (L.) Merr. Enum. 3: 368. 1925. *NALACHI BHAJI*

Annual or perennial, aquatica herb; stem hollow, spongy, 2–3 m long, trailing or floating on water, glabrous, or hairy at node. Leaf variable, often ovate-lanceolate, 8–12 x 4–8 cm, truncate, cordate, sagittate or hastate at base, acute or obtuse and mucronate at apex, glabrous; petioles 3–15 cm long. Flower solitary or in few flowered, axillary cymes; peduncles 1.5–8.0 cm long; pedicels 2–5 cm long; bract minute. Calyx 6–8 mm long, glabrous; sepal sub equal, ovate-oblong, obtuse and minutely mucronate, with thin pale margins. Corolla pink–purple, 3–5 cm long, glabrous. Stamens included; filaments hairy at base. Capsule ovoid, 7–8 mm long, glabrous. Seeds 2–4, broadly trigonous, grayish pubescent.

Flowering and fruiting: September to December and April to June.

Distribution: All District of Marathwada

Exsiccata - Jalna :(N 19° 50' 59.2351" E 75° 53' 2.0741).

Ecology: Occasionally found along pond margin

Uses: Leaves and young shoots are used as vegetables.

Note-In relatively dry situation, corolla may be entirely white, in perennial ponds the stems attain a considerable length.

Synonyms
-<i>Ipomoea clappertonii</i> R. Br.
-<i>Ipomoea incurve</i> G. Don
-<i>Ipomoea natans</i> Dinter & Süsseng.
-<i>Ipomoea repens</i> Roth
-<i>Ipomoea reptans</i> Poir.
-<i>Ipomoea sagittifolia</i> Hook. & Arn.
-<i>Batatasincurva</i> Benth.
-<i>Convolvulus adansonii</i> Desr.
-<i>Convolvulus clappertonii</i> Spreng.
-<i>Convolvulus incurvus</i> Schum. & Thonn.
-<i>Convolvulus repens</i> Vahl
-<i>Convolvulus rostratus</i> Zipp. exSpan.

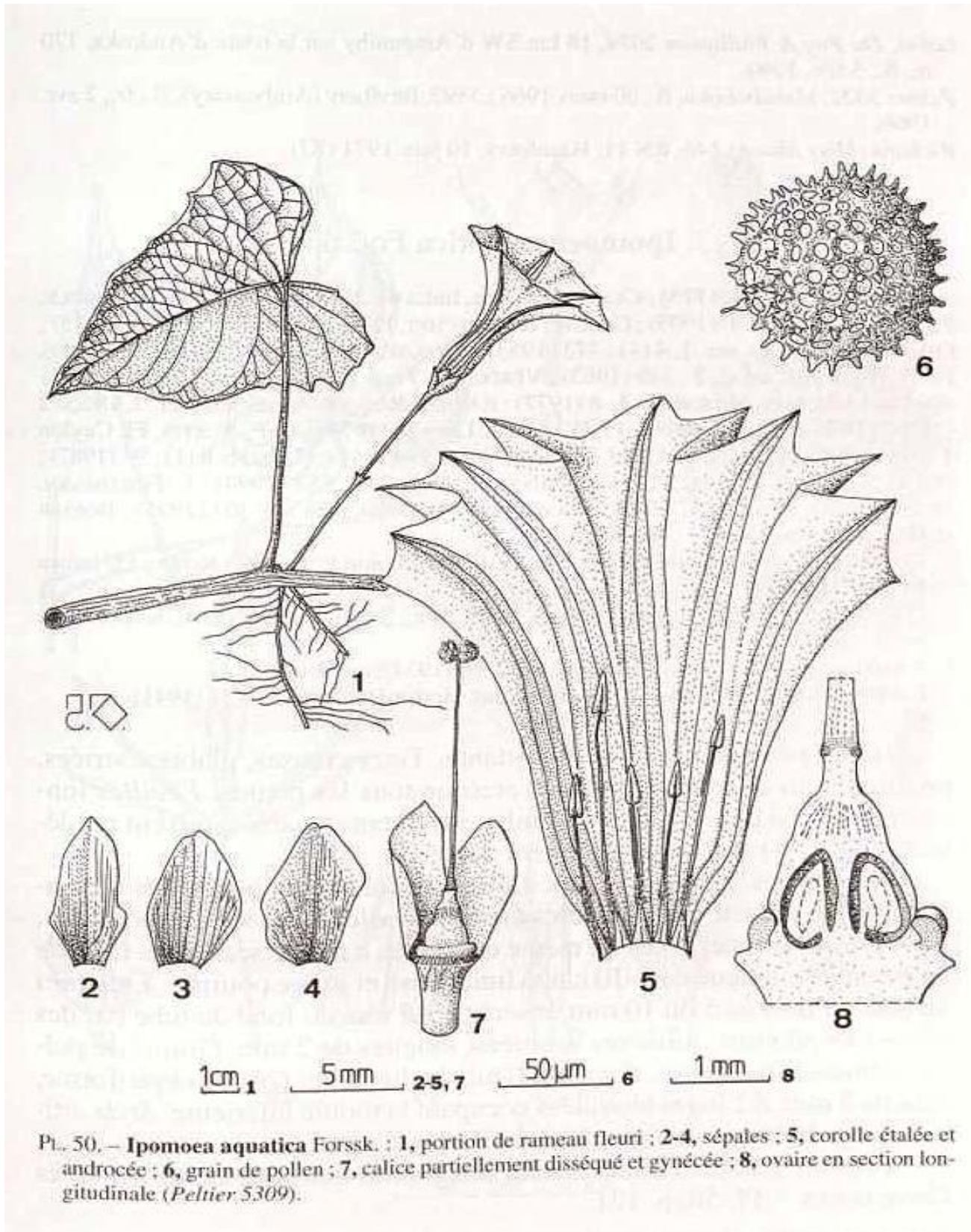


Illustration image of *Ipomoea aquatica*

ANATOMY

Anatomical characters in general, play an increasingly important role in the formulation of natural and phylogenetic groups. While anatomical evidences incidentally by themselves cannot form the basis of a general classification or phylogeny they are still largely applied to elucidate phylogenetic relationship and to reveal possible affinities when considered in conjunction with other kinds of evidences derived from allied fields of study, such as morphology, cytology, palynology etc.

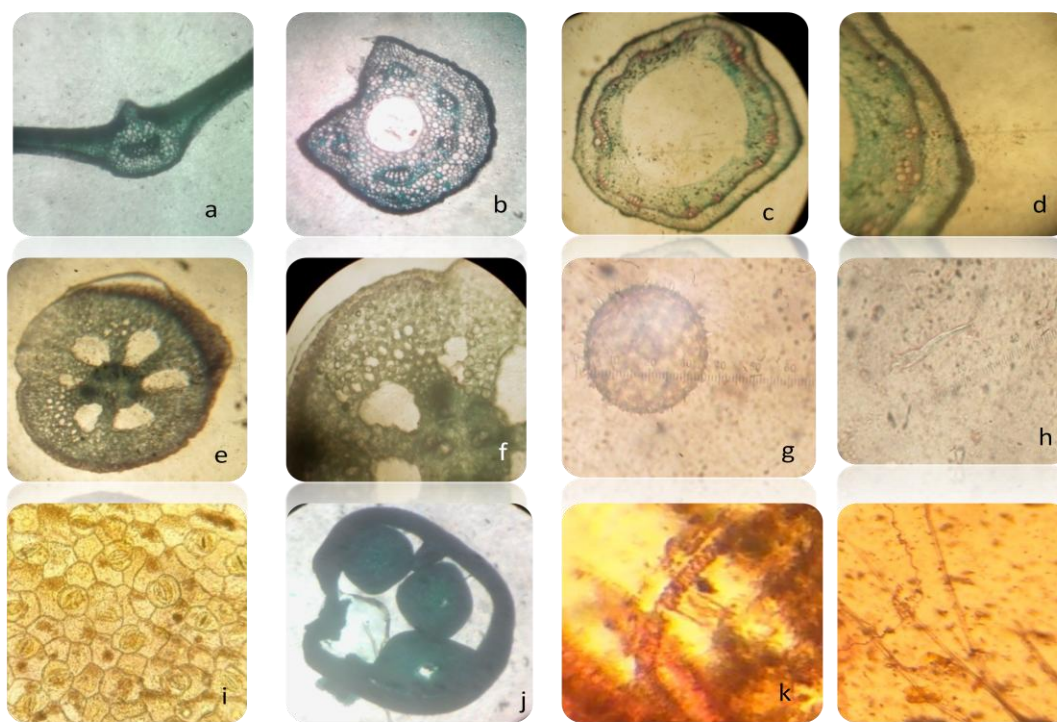


Photo Plate06 : – a - Leaf, b - Petiole, c & d - Stem, e & f – Root, g- Pollen, h - Trichome, i - Stomata, j - Ovary, k & l- Maseration .

LEAF ANATOMY

Lower and upper epidermis is **barrel-shaped compactly arranged**. Single layered.

Botheepidermis has a **thick hydrophilic cuticle**.

Stomatal distribution is **Amphistomatic and Anisocytic** type of Stomata.

Unicellular Uniseriate trichome is present on upper surface of leaf.

STEM ANATOMY

The transverse section through the internodes of stem shows the following anatomical features.

Epidermis: Epidermis consists of single layered cells of compact arrangement and covered with cuticle.

Cortex: The cortex is massive and consists of three distinct zones. The first zone is hypodermis of few cells thick, lying just below the epidermal layer. Two to three layers of parenchyma cells are present beneath the hypodermal layer is called the middle cortex. A continuous, compactly arranged barrel shaped cells forms the starch sheath layer which is the last zone of cortex. Crystals and latex are present in some cells of the middle cortex.

Vascular bundles:

Vascular bundles form a continuous cylinder of xylem and phloem. They are collateral, conjoint and open type with outer phloem, middle xylem.

Pith: Pith is massive with single layered parenchymatous cells. Middle portion of the pith is with many larger hollow cavities.

ROOT ANATOMY

The transverse section through the internodes of root shows the nearby similar anatomical features to the stem, the root having an aerenchymatous cells which resulting a 5 hollow cavity in root.

Epidermis: Epidermis consists of single layered cells of compact arrangement and covered with single cellular outgrowth of root hairs.

Cortex: The cortex is massive and consists of three distinct zones. The first zone is hypodermis of few cells thick, lying just below the epidermal layer. Two to three layers of parenchyma cells are present beneath the hypodermal layer is called the middle cortex. A continuous, compactly arranged barrel shaped cells forms the five hollow compartments which is the last zone of cortex.

Vascular bundles: Vascular bundles form a continuous cylinder of xylem and phloem. They are collateral, conjoint and open type with outer phloem, middle xylem.

Pith: Pith is few layered parenchymatous cells.

Maceration: Tracheids are long with spiral sidewall thickening.

Fibers are typically libriform type and are long. Ends are mainly blunt, but pointed endings are also recorded. Pits are present but lesser in number. Vessel elements are moderately long with simple and transverse or obliquely placed perforation plates.

Pits are simple and tails are frequently present with some vessel elements.

MEDICINAL USES

As with many plants (Etkin 2006, Ogle *et al.* 2003), this is considered a food with medicinal effects. *Ipomoea aquatica* is considered a laxative, is recommended for piles, and “in certain nervous conditions with sleeplessness and head-ache” (Burkill 1966, Read 1936, Van Valkenburgh & Bunyaphratharsara 2001). Some say the plant has a calming impact on people, an action that McDonald (pers.comm. 2006) referred to as “hypnotic.” Eating the plant is thought to aid in getting to sleep, and he agrees that eating a sufficient quantity brings on drowsiness. Naples (2005) also thought that “Eating a lot of the plant has a nerve-calming effect in cases of sleeplessness, stress, headache, general weakness and leukorrhoea.”

Sr. no.	Characters	I. aquatica
01	Habit	Aquatic/Floating
02	Leaves (Length)	2.1-6.0 cm.
03	Leaves (Width)	1.8-2.5 cm.
04	Leaves (Base)	Hastate
05	Leaves (Margin)	Entire
06	Petiole (Length)	2.9-6.0 cm.
07	Stem (Surface)	Fleshy
08	Stem (Branching)	Dichotomous/ Zigzag
09	Stem (Color)	Green
10	Stem (Type)	Spongy
11	Petal (Color)	Pink
12	Petal (Length)	Up to 4.0 cm.
13	Sepal (Length)	Up to 8 mm.
14	Pedicel (Length)	1.0-3.0 cm.
15	Seeds	Not well developed

RESULT AND DISCUSSION

The region of Marathwada has vegetation and distribution of *Ipomoea aquatica* quite diverse because of its varied climate and elevation. Members of this genus are dominant in the plains and some species are found in the Vidarbha region of the Maharashtra state. In past, the some pockets of the state remained untouched. In view of the fragmentary accounts genus *Ipomoea* has been compiled. The morphological description is listed in the given table.

The ethno botanical knowledge of plants is responsible for recognition of most of the medicines and foods used in our modern society. We have ignored the diversity of wild medicinal and food plants which

were existed in the past and have over exploited some important current species in various ways that causes a great threat to those important plant species. Like *Ipomoea aquatica*

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