



## Study of Taxonomy of *Pistia Stratiotes* (Water lettuce) and their Uses

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### Abstract :

*Pistia stratiotes* has a common name Water lettuce, is a small evergreen perennial plant with feathery roots. Free floating in lake, ponds etc, the plants forms rosettes of leaves up to 10 cm wide and 6cm tall. The plant can spread quickly especially in still water, to form quite extensive clumps. The plant is sometimes used locally for food, but only usually, where nothing better is available. *Pistia stratiotes* has a range of medicinal applications and is also used as a source of organic matter and to remove toxins from polluted water. It is sometimes grown as ornamental in the tropic and as an indoor aquatic ornamental in temperate regions.

**Keywords:** *Pistia stratiotes*, Taxonomic character, Uses.

### Introduction:

*Pistia stratiotes*, also known as "Jal Kumbhi " or Water lettuce. It is a free floating aquatic plant of streams, of ponds and lakes. *Pistia stratiotes* has a stoloniferous nature so it is always found anchored to the hydrosol when the water level recedes and in marshland conditions and love alkaline/ lime-rich water. It forms a dense mats on the surface of water bodies; as it is a floating weed, it disrupting aquatic flora and found underneath and thus adversely affects the water ecosystem and hinders water flow, swimming, boating, fishing water sports and navigation. (Attionu 1976, Halm et.al 1977, Sharma 1984). It replace the native hydrophytes in ponds and other water reservoirs. (Marwat et al 2010). It lowers available oxygen and pH of water and thus damages rice crop when enters into paddy fields, develop roots in the soil and competes with crop under shallow water conditions (Hussain et.al.2000).

### Taxonomy of *Pistia stratiotes*:

*Pistia stratiotes* is a genus of aquatic plants in the arum family, Araceae. The sole genus in tribe is *Pistieae* which reflects its systematic isolation within the family. The single species it comprises, *Pistia stratiotes* is often called Water cabbage, Water lettuce, Nice cabbage or Shelf flower.

*Pistia stratiotes* is a perennial monocotyledone plants.

**Leaves:** The leaves are thick, soft leaves that form a rosette. These leaves can measure 2-15 cm long and light green, with parallel venations and wavy margins. The surface of the leaves is covered in short, white hairs which form basket, like structures that can trap air bubbles and increase the plants buoyancy. The spongy parenchyma with large intercellular spaces in the leaves also aids the plant in floating.

**Roots:** It floats on the surface of the surface of the water, its roots hanging submerged beneath floating leaves.

**Flowers:** The flowers are dioecious, like petals and are hidden in the middle of the plants amongst the leaves.

**Inflorescence :** *Pistia stratiotes* has a spadix inflorescence, containing one pistillate flower with one ovary and 2-8 staminate flowers with two stamens. The pistillate and carpellate flowers are separated by folds in the spathe, where the male flowers are located above the female flowers oval, green berries with ovoid seeds from after successful fertilization.

**Reproduction:** The plant undergoes asexual reproduction by propagation through stolons, yet evidence of sexual reproduction has also been observed.

*Pistia stratiotes* are found in slow moving rivers, lakes and ponds. The species display optimal growth in the temperature of 22-30<sup>o</sup>, but can endure extreme temperature up to 35<sup>o</sup>C. As a result, *Pistia stratiotes* do not grow in colder temperature. The species also require slightly acidic water in pH range of 6.5-7.2 for optimal growth.



**Uses :**

#### **Environmental remediation.**

The high absorption property of *Pistia stratiotes* makes it a great choice for biodegradable oil absorbents in marine oil spills. The leaves of *Pistia stratiotes* can efficiently absorb significant amounts of hydrocarbons due to its large surface area and hydrophobicity.

As a hyper-accumulator, *Pistia stratiotes* has been studied as a potential candidate for wastewater treatment plants. The roots and leaves of the plants have been found to absorb excess nutrients and heavy metals, such as zinc, chromium, and cadmium in contaminated water.

*Pistia stratiotes* can be grown in water gardens to reduce harmful algal blooms and eutrophic conditions. The plants are able to control the growth of algae by restricting light penetration in the water column and competing for nutrients, with significant uptake of phosphorus, ammonia, and nitrogen.

**Medicinal properties :**



- **Anti-inflammatory properties** :-Extractions of the leaves of *Pistia stratiotes* reduces mast infiltration and degranulation in allergic reactions and present anti-inflammatory properties. The ethanolic extracts have also been positively correlated with a reduction in inflammatory disorders, such as Arthritis and Fevers.
- **Anti fungal properties**:- With the popular use of *Pistia stratiotes* as a traditional treatment for ringworms, researchers have tested *Pistia stratiotes* methanolic extracts on dermatophyte fungi. The results of the studied depicted significant fungicidal activity on T-rubrum, T-mentagrophytes, E-floccosum.

#### **Medicinal treatment :**

There are various medical uses of *Pistia stratiotes* throughout region in Asia. The dried leaves are prepared into powder form and are applied to wounds and sore for disinfection. A similar use in present Indian traditional treatment medicine, where the powdered leaf is applied to syphilitic eruption and skin infection. The leaf is infused in water to create an eyewash to treat allergic conjunctivitis. The eyewash is known to have cooling and analgesic effect.

Therefore, the plant is commonly called 'eye-pity' in Africa. In addition, the leaves of *Pistia stratiotes* can be burned into ash and the ash is used in treating ringworm infection of the scalp.

#### **Consumption:**

*Pistia stratiotes* is not palatable as it is rich in calcium oxalate crystals that are litters in taste. Nevertheless, there are records of the plant being utilized as famine food in India during the great famine of 1876-1878.

The Hausa people of Nigeria used the ash of the plant as a substitute for salt due to its high concentration of potassium chloride, a mineral salt. This salt substitute, also called Zakankau, was of high importance, especially when imported salt was unavailable.

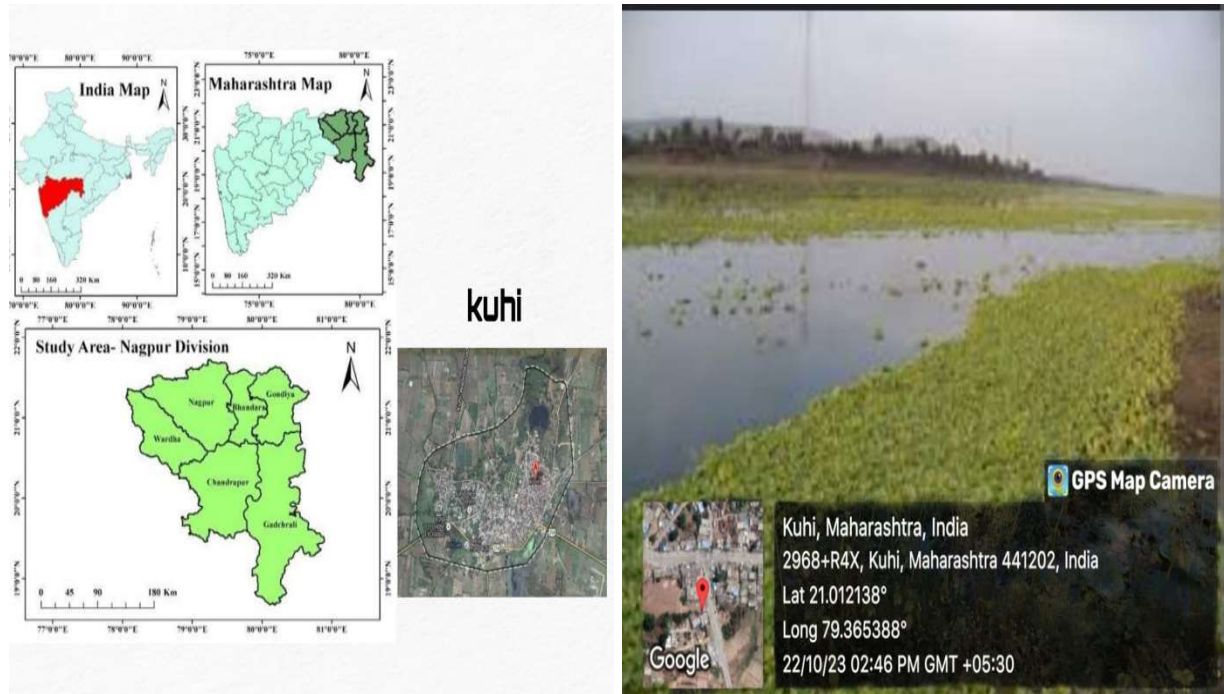
*Pistia stratiotes*, as the plant is a hyperaccumulator, and can absorb and accumulate toxic heavy metals present in its environment. The presence of high concentration of calcium oxalate crystals can induce various health concerns, such as inhibited mineral absorption and kidney stones.

*Pistia stratiotes* is commonly grown and collected as animal feed for ducks and pigs. Water lettuce is also considered an alternative for poultry feed in Indonesia due to its high content of crude protein.

#### **Conclusion:**

*Pistia stratiotes*, commonly called Water lettuce. It is commonly used as an ornamental plant in water gardens. It produces rosettes (4-6' across) of wedge-shaped, overlapping, fluted, soft green leaves covered with repellent hairs. This plant is mostly found in Nagpur district in Kuhl Theshil. The large amount of *Pistia stratiotes* plant is found in Kuhl lake, where the contaminated water is present. These plants affect the living micro-organisms present in the lakes. These affect the ecosystem of the lake. Biodiversity of the lake water changes. It most specifically changes the color of water. The water of the lakes become acidic in nature.

*Pistia stratiotes* weeds contain nutrients therefore this weeds can explored to possible use as fertilizer. Collection, processing and application at large scale might be difficult but kitchen gardeners can be motivated to collect this plant and use as fertilizers However, the heavy metal accommocation and the related ill effects need to be investigated.



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