

Aquatic Weeds Community of Ottu Reservoir in Haryana State

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ABSTRACT

Aiming to identify the community of aquatic weeds of the Ottu reservoir which is situated in Sirsa city of Haryana, India. Aquatic weeds community of Ottu reservoir were monitored from March 2021 to June 2021. A total 7 species of aquatic weeds recorded 4 species (*Eichhornia crassipes*, *Lamnea minor*, *Pistia stratiotes* and *Nymphaea alba*) belongs to free floating aquatic weeds, 2 species (*Ceratophyllum demersum*, *Hydrilla verticellata*) belongs to submerged aquatic weeds and 1 species (*Typha latifolia*) belongs to em-

ergent aquatic weeds.

Keywords Ottu reservoir, Free floating aquatic weeds, submerged aquatic weeds, emergent aquatic weeds.

INTRODUCTION

Aquatic weeds are intense plants that grow and complete their life cycle in water and cause direct damage to the aquatic atmosphere as well as the relative ecology of the environment (Lancar and Krake 2002). Aquatic weeds are scientifically known as aquatic macrophytes. Aquatic weeds are the secondary producer on ponds, lakes, rivers, ditches, or the other aquatic system (Sanyal 2017). Aquatic plants play a vital role in a natural system, agriculture and agrobiolgy as their ability to clean the water improves water quality and additionally turn out food, shelter, and breeding place for fishes and aquatic animals and potent in supplying natural resources and additionally increasing the financial gain of neighboring folks residing around the natural aquatic system (Dwivedi and Pandey 2011). Aquatic plants play a very important role in aquatic systems in terms of supply of food and surround to fish, life, and aquatic organisms. Out of approximately one hundred sixty aquatic weeds, *Eichhornia crassipes*, *Salvinia molesta*, *Nymphaea stellate*, *Nelumbo nucifera*, *Hydrilla verticellata*, *Vallisneria spiralis*, *Typha angustata*, *Chara* sp., *Nitella* sp., *Ipomoea* sp., are of primary concern in India (Kumar 2011). They are correspondingly useful as physical stabilizers of waterway banks and bottom and they have the potential to produce

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oxygen through a chemical process and assimilate pollutants through growth (Jayan and Sathyanathan 2012). Aquatic plants are necessary elements of natural freshwater environments and form the foundation of a water body's overall health and productiveness. Aquatic plants inevitably become overabundant or unpleasant and hence the management required (Datta 2009). Aquatic weeds are generally categorized according to their size, shape and growth habits that have been developed, and are as: (i) Floating weeds, (ii) Emergent weeds, (iii) Submerged weeds, (iv) Filamentous algae, (v) Plankton algae.

The excessive growth of aquatic weed restricts fishing, swimming, and recreational activities causes foul style and odour of drinking water provides. It conjointly results in stunt flying of fish populations and fish killing because of decomposition. The aquatic weeds are of boundless importance these days as a way of providing food to fish species. Aquatic weeds play an important role in the aquatic system and function a supply food to the water birds and other animals hence forming a base for aquatic wildlife conservation practices (Sitte *et al.* 2014). In reservoir, aquatic weeds cause severe problems with appropriate hydro-geomorphological, climate, and trophic conditions especially free-floating plants such as *Eichhornia crassipes*, *Salvinia auriculata*, *Pistia stratiotes* and submerged species of Hydrocharitaceae, such as *Egeria densa* Planch, *Egeria najas* Planch. The study was conducted to collect the information of aquatic weed community of Ottu reservoir.

Study area

The Ottu reservoir is situated between 29.29'21" North latitude and 74.53' 38" East longitudes. The

Ottu reservoir is situated about 14 km from Sirsa district in Haryana.

MATERIALS AND METHODS

The current study was conducted to investigate the aquatic weed community in Haryana's Ottu reservoir. Aquatic weeds were collected from different sites of the Ottu reservoir and inspected visually, collected by hand pick and they were identified in laboratory using standard method of Lembi (2009).

The parameters were recorded as follow :

- I. Where the plant is growing?
- II. Leaf arrangement on the stem (Phyllotaxy)
- III. Leaf-blade architecture (Hydraulic architecture)
- IV. Characteristics of the leaf edge (Serrations)
- V. Venation

RESULTS

Macrophytes are important components and play a key role in the primary productivity of aquatic ecosystems. Aquatic macrophytes used nutrients and affected water quality. It also controls water quality by removing various organic and mineral components. A total of 7 species of aquatic weed collected from various sites of Ottu reservoir, and out of 7, 4 sp belongs to free-floating aquatic weeds respectively *Eichhornia crassipes*, *Lamnea minor*, *Pistia stratiotes* and *Nymphaea alba* 2 species belongs to submerged aquatic weeds respectively *Ceratophyllum demersum* and *Hydrilla verticellata* and 1 species *Typhalatifolia* belongs to emergent aquatic weeds. Classification of aquatic weeds species given in (Table 1) and types of aquatic weeds with their identified characteristics

Table 1. Classification of aquatic weeds species.

Name of species	Common name	Phylum	Class	Order	Family
<i>Eichhornia crassipes</i>	Water hyacinth	Spermatophyta	Magnoliopsida	Commelinales	Pontederiaceae
<i>Lamnea minor</i>	Duck weed	Spermatophyta	Monocotyledonae	Arales	Araceae
<i>Hydrilla verticellata</i>	Water Thyme	Tracheophyta	Liliopsida	Alismatales	Hydrocharitaceae
<i>Ceratophyllum demersum</i>	Coontail	Tracheophyta	Magnoliopsida	Ceratophyllales	Ceratophyllaceae
<i>Typha latifolia</i>	Cattail	Tracheophyta	Liliopsida	Poales	Typhaceae
<i>Pistia stratiotes</i>	Water lettuce	Spermatophyta	Monocotyledonae	Arales	Araceae
<i>Nymphaea alba</i>	Water lily	Spermatophyta	Dicotyledonae	Nymphaeales	Nymphaeaceae

Table 2. Types of aquatic weeds with their identified characteristics.

Name of species	Plant growing environment	Phyllotaxy	Leaf blade architecture	Characteristics of leaf edge	Venation
<i>Eichhornia crassipes</i>	Floating	Whorled	Simple leaf	Undulate, Entire	Bowed
<i>Lamnea minor</i>	Floating	No stem present	Simple leave	Entire	Pinnet
<i>Ceratophyllum demersum</i>	Submerged	Whorled	Compound leaf	Denath leaf (spine tipped teeth)	Palmateto pinnet
<i>Hydrilla verticellata</i>	Submerged	Whorled	Simple leaf	Serrate	Lateral vein (Parellal or slightly arched)
<i>Typha latifolia</i>	Emergent	Alternate	Simple leaf	Entire	Parellal
<i>Pistia stratiotes</i>	Floating	Alternate	Simple leaf	Entire	Parellal
<i>Nymphaea alba</i>	Floating	Alternate	Simple leaf	Entire	Lateral vein

given in (Table 2). Free-floating aquatic weeds, float freely on the water surface and the entire plant is suspended on the water, allowing the plant to be moved around the water by wind and water currents. Free floating aquatic weeds of Ottu reservoir respectively *Eichhornia crassipes* commonly know as water hyacinth is one of the most invasive aquatic plants on the planet. Water hyacinth was recorded during all sampling months. *Pistia stratiotes* leaves spread like roses on the water surface and it can be grown in ponds, ditches, and slow-flowing clam waters. *Lamnea minor* knows as the tiniest flowering plant and have single, flat oval leaf that floats on the surface of water. *Nymphaea alba* often known as white water lily, and is an aquatic plant with mud-anchored perennial rhizomes or rootstocks. Submersed weeds spend their entire lives below the surface of the water, although flowers and plant parts may rise above the surface. Plants usually take root in the mud, but many can break apart and float freely in the water. Some submerged species of Ottu reservoir viz., *Ceratophyllum demersum* found only in sampling site 1 in the month of March these plants have long slender stems without roots and the leaves that grow in rings and split in half. *Hydrilla verticellata* is hardy and fast growing aquatic weeds, and have long slender stem and it can grow up to 7 meters. Emergent aquatic weeds take root in bottom most mud and grow above water. Many can also grow under strict terrestrial conditions. Weeds are stiff and do not depend on water for support viz., *Typha latifolia* found to be most common aquatic plant and have characteristics brown cigar-shaped flower and it can populate speedily in the shallow area along the pond banks.

DISCUSSION

Aquatic weeds are those intense plants that grow and complete their life cycle in water and cause damage to aquatic atmosphere directly and to connected eco-environment comparatively. Aquatic plants are a natural part of the aquatic ecosystem. Aquatic plants play a vital role in natural system, agriculture and agro biology wherever their ability to clean up water improve water quality and additionally turn out food, shelter and breeding place for fishes and aquatic animals and potent in supply natural resources (Shah and Vyas 2015). During the overall studied period in Ottu reservoir, the 7 species of aquatic weeds were found out and 4 species (*Eichhornia crassipes*, *Lamnea minor*, *Pistia stratiotes*, *Nymphaea alba*) belongs to free-floating aquatic weeds, 2 species (*Ceratophyllum demersum*, *Hydrilla verticellata*) belongs to submerged aquatic weeds and 1 species (*Typha latifolia*) belongs to Emergent aquatic weeds.

Sitre *et al.* (2014) also recorded 16 macrophytes species and 4 species belongs to free-floating aquatic weeds, and 5 species (*Pistia* species, *Lamnea* species, *Hydrilla* species, *Ceratophyllum* species, and *Typha* species) are common found when compared to present studies. Jayan and Sathyanathan (2012) found the major aquatic weeds in Kerala was *Salvinia* species, *Eichhornia crassipes*, *Pistia stratiotes*, *Alternanthera* species, *Azolla*, common duckweed, and *Hydrilla verticillata*. 4 species was similar from present work. Similar Pitelli *et al.* (2014) also found 24 species of aquatic weeds and *Hydrilla verticellata*, *Eichhornia crassipes* was common in aspect to present study.

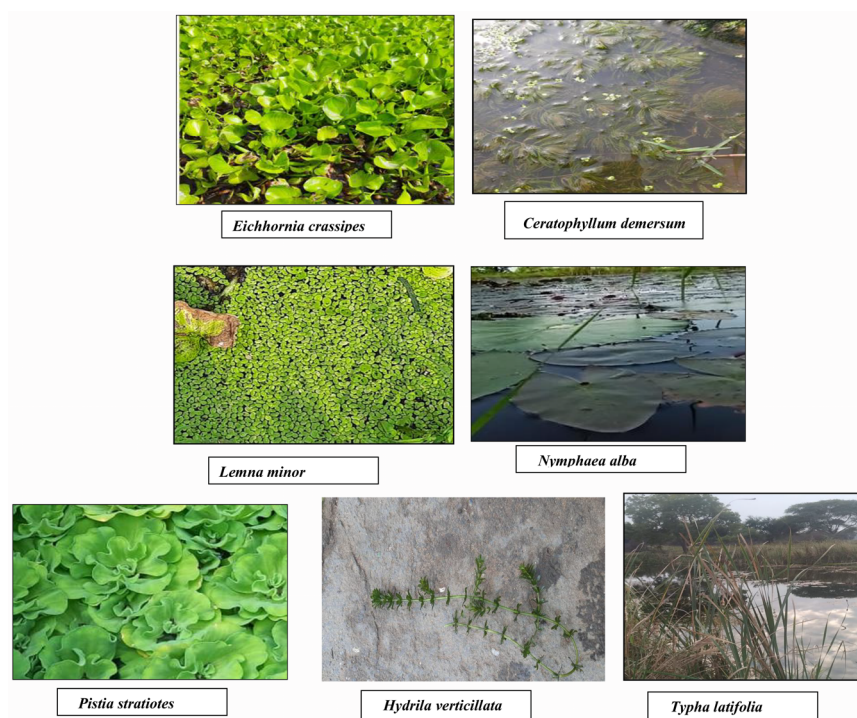


Fig. 1. Glimpse of aquatic weeds community of Ottu reservoir.

Eichhornia crassipes commonly known as water hyacinth is the most invasive and unreserved aquatic weeds found in India. *Eichhornia crassipes* are found in the warm region of the earth. During the study period, *Eichhornia crassipes* were found as dominant aquatic weed species and collected throughout the study period. Rao *et al.* (2014) also reported that the free-floating species *Eichhornia crassipes* throughout the studied period. Kshirsagar and Gunale (2013) found *Eichhornia crassipes* and *Pistia stratiotes* from stations II and III showed a high degree of organic pollution and they stated this species as pollution tolerant aquatic macrophytes and be used as a biological indicator for water pollution. Shah and Vyas (2015) also found *Eichhornia crassipes* at only one station (sampling station VIII) that was acknowledged as a highly polluted area of the river and acts as a basin for domestic sewage. Narayanan *et al.* (2007) stated that when water hyacinth spreads, the entire ecosystem of the affected water body changed. It restricts primary yields by reducing phytoplankton's ability to photosynthesize by blocking the water column and increasing sedimentation. This will cause deox-

idation with harmful effects on aquatic organisms, especially fish. Shading and crowding of native aquatic plants significantly reduce biodiversity in aquatic ecosystems.

In the present investigation *Ceratophyllum demersum* was only observed once in March in sampling site 1. Pelechaty *et al.* (2014) stated that *Ceratophyllum demersum* builds dense stands in nutrient-rich waters and also supported by Shah and Vyas (2015), *Ceratophyllum* (Johnson *et al.* 2004). *Ceratophyllum demersum* declared as indicators of a significant nutrient load. It may be possible that in sampling site 1 in March the nutrient load is more and create favorable environment for the growth of the *Ceratophyllum demersum*. The aquatic weeds found in Ottu reservoir were showed in Fig 1.

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