

# AQUATIC WEEDS IN FRESHWATER POND AND THEIR ERADICATION



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Vegetation is an important part of any aquatic system, but sometimes it can get out of control and create problems. In recent years there has been a growing awareness among fish culturists regarding aquatic weed problems. Presence of small amount of certain aquatic plants in fish culture waters may be useful as they have a definite role in the development and maintenance of a balanced community.



**Weed infested ponds**

### **Dense growth of aquatic weeds causes the following problems:**

- Assimilates a large proportion of nutrients in the pond and thus, competes with fish population and limiting available fish food.
- Restricts fish movement and interfere with fishing operations
- Serves as ideal hunt for predatory fishes and insects, etc.
- Surface cover of floating weeds prevents light penetration to water column, thus reduces the photosynthesis.
- Assimilates large quantities of nutrients from water, thus reducing their availability for desirable planktonic algae.
- Invasive plant species completely destroy stands of native vegetation. They cause adverse effects on the animals that depend on the native vegetation for habitat and food.
- Causes fish mortality due to oxygen depletion or release of extra-cellular metabolites which are toxic.

### **Vital roles of aquatic plants/hydrophytes in aquatic system**

1. Use sunlight, carbon dioxide and water to grow and produce new plant tissues. Produce oxygen through photosynthesis, which is needed for aquatic animal life.
2. Microscopic plants (algae) form the base of the aquatic food chain. These plants are eaten by zooplankton. The zooplankton are eaten by small fish, which are then eaten by larger fish, and so on up in the food chain to humans and top predators.
3. Larger algae and flowering plants (macrophytes) provide habitat and shelter for fish. 10-15% area of pond with weeds (possibly encircled by bambo frame) cover is beneficial for aquaculture.
4. Rooted plants stabilize shorelines and bottom sediments. They absorb nutrients and filter pollutants from runoff, which improves water quality.
5. A diverse aquatic plant population adds beauty to a water body.



## Types of aquatic weeds

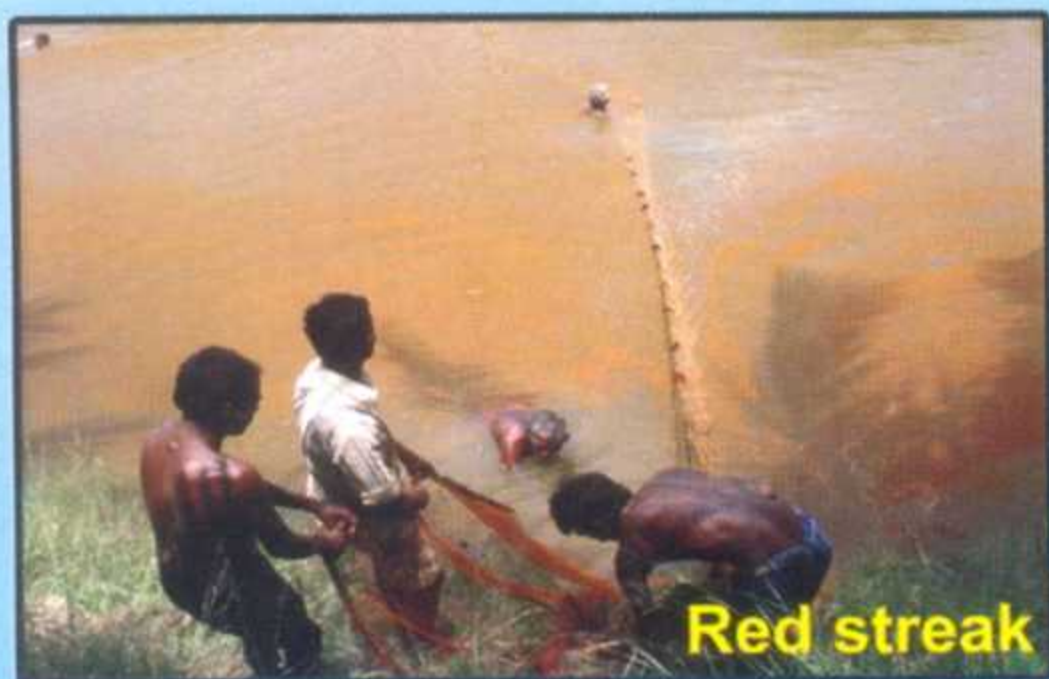
The plants can be divided into two botanical groups: algae and flowering plants or Macrophytes (hydrophytes)

Algae: There are mainly two types of algae:

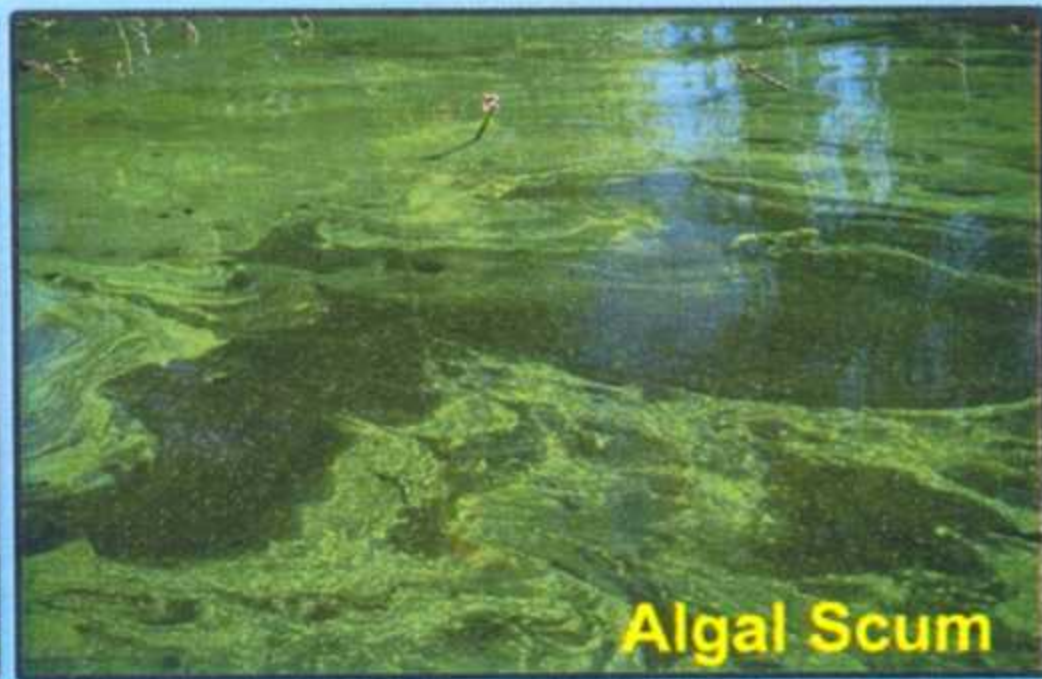
1. Microscopic algae (also called phytoplankton)
2. Mat-forming algae (also called filamentous algae)

**Microscopic algae:** The microscopic algae are single celled and also called as phytoplankton that colors the water green, yellow, yellow-green or brownish, etc. A heavy growth of algae may form "bloom" and lead to eutrophication. In quiet water, blooms can produce surface scum as well as green, red, black, or oily streaks. They convert solar energy into food, remove CO<sub>2</sub> from water during photosynthesis (in day time) and produce oxygen as a byproduct. During night or in cloudy day, they release CO<sub>2</sub> in the water through respiration and consume oxygen. The best practice for managing blooms of microscopic algae is to prevent nutrient-laden water from entering the water body.

Certain planktonic algae are beneficial as they maintain biotic balance in natural aquatic environment through production of oxygen and maintain an aerobic condition. They are the original source of food for most of the fish and aquatic animals.



Red streak



Algal Scum

**Mat-forming algae:** Filamentous algae are formed as single cells and are joined end to end making single thread, branched filaments, nets, or erect stem like whorled branches or forked leaf like forms. The important genera of the filamentous algae are: Chara, Nitella, Spirogyra, Hydrodictyon, Cladophora, Pithophora. Mat-forming algae form floating, mat-like growths that usually begin around the edges and bottoms of bodies of water in spring. This type of algae growth is the most common problem in ponds.

**Macrophytes (hydrophytes):** They are aquatic flowering plants coming under different families. They are more complex than algae because of vascular tissues that algae lack. Vascular tissues allow plants to conduct nutrients, water, and other materials throughout the plant. Weed macrophytes are grouped into four broad categories based on where they grow:

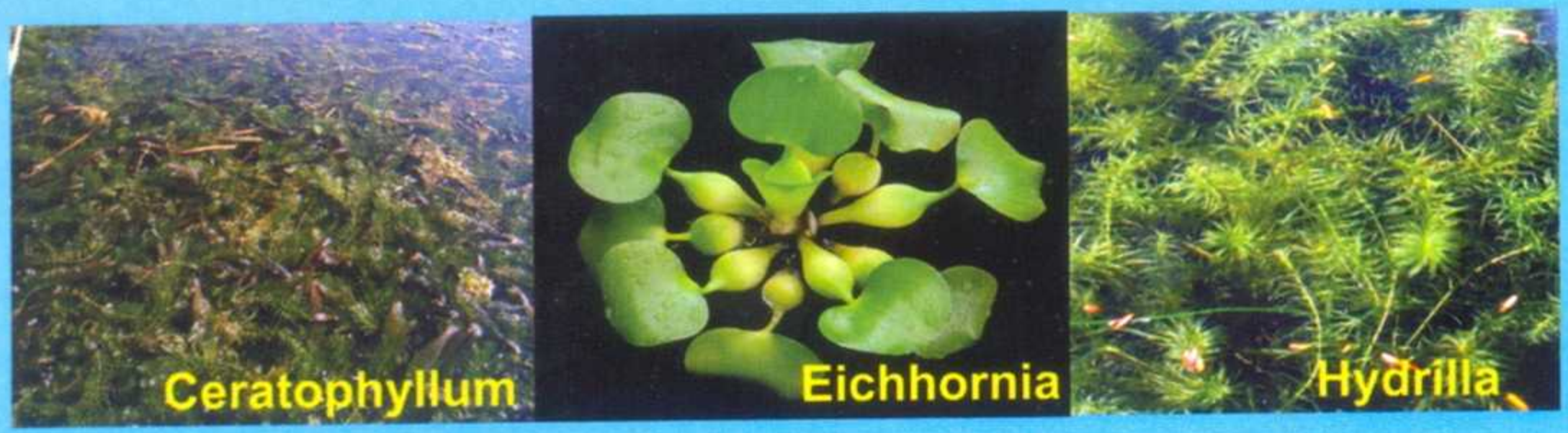
- **Submersed weeds**
- **Emersed weeds**
- **Floating weeds**
- **Emergent weeds (also called shoreline or marginal weeds)**



**Submersed weeds:** These weeds are mostly vascular plants rooted at the bottom and produce most of their vegetative growth beneath the water surface. Most of them have true roots, stems and leaves. Abundance and density of these weeds are primarily dependent on depth and turbidity of water, and physical characteristics of the bottom. They compete for nutrients with planktonic algae and decrease their production and a corresponding decrease in fish production. Potamogeton, Elodea, Myriophyllum, Ceratophyllum, Utricularia, Ranunculus, Heteratheral, Alisma, Zannichellia, Lemna, tap grass, and Hydrilla, etc. are the common flowering submersed weeds.

**Emerged weeds:** These plants rooted in the bottom mud with serial stems and leaves at or above the water surface. Some of the weeds of this group have broad leaves, 5-50 cm in diameter, and others have long narrow leaves like grasses, less than 3-15 cm or more in width; the latter are commonly called reeds. Their leaves and flowers float on the water surface. These plants are generally found in shallow water less than 4 or 5 feet deep. Some of the emerged weeds belong to the genera Nuphar, Nelumbo, Jussiaea, Myriophyllum, etc.

**Floating weeds:** These plants are found in nutrient-rich waters. Many water plants have leaves that float on the water surface either singly or in rosettes. They have true root and leaves. Some are rooted in bottom mud and have floating leaves that rise up to the water level. They reproduce very rapidly under favorable conditions and are among the most troublesome of aquatic weeds. Free-floating plants such as duckweeds, mosquito fern and watermeal can completely cover the surface of a pond as mats, shading out underwater plants, which depletes oxygen in the deeper waters. They are commonly found in still or sluggish waters. Small duckweeds (Lemna valdiviana) and Azolla (Mosquito fern) are free-floating. Bog-mat (Wolffiella gladiata) and giant duckweed (Spirodela polyrhiza) are frequently found growing in rivers, ponds and lakes. It occurs almost always under natural conditions in wetlands. Giant duckweeds usually have several roots hanging beneath each leaf.





The banana lily has floating leaves, but its rhizome is in the mud. The banana lily is frequently found in quiet ponds, lakes, and swamps, blooms during spring and summer. Water lilies have floating leaves. Other common floating weeds belong to the genera are Eichhornia, Pistia, Salvinia, Nymphaea, Nelumbo, Nechamendra and Brasenia.

**Emergent weeds:** Most marginal weeds are emerged weeds that can grow on saturated soil above the water surface. They grow from moist shoreline areas into water up to 60-90 cm in depth. This group is the most widely distributed rooted aquatic plant with broad leaves, herbs, shrubs, trees and some grasses. This group comprise of grass-like and broadleaved plants. Many of these plants spread rapidly by underground rhizomes as well as by seed. A variety of weeds like water primrose (Jussiaea), water ipomoea (Ipomoea aquatica), grasses (Paspalidium), rushes (Eleocharis) and sedges (Cyperus) are common in pond margins. Grass-like plants commonly include cattails, bulrushes, spikerushes and reeds. Broadleaves include willow trees, creeping water primrose, and purple loosestrife (an invader of wetland areas).

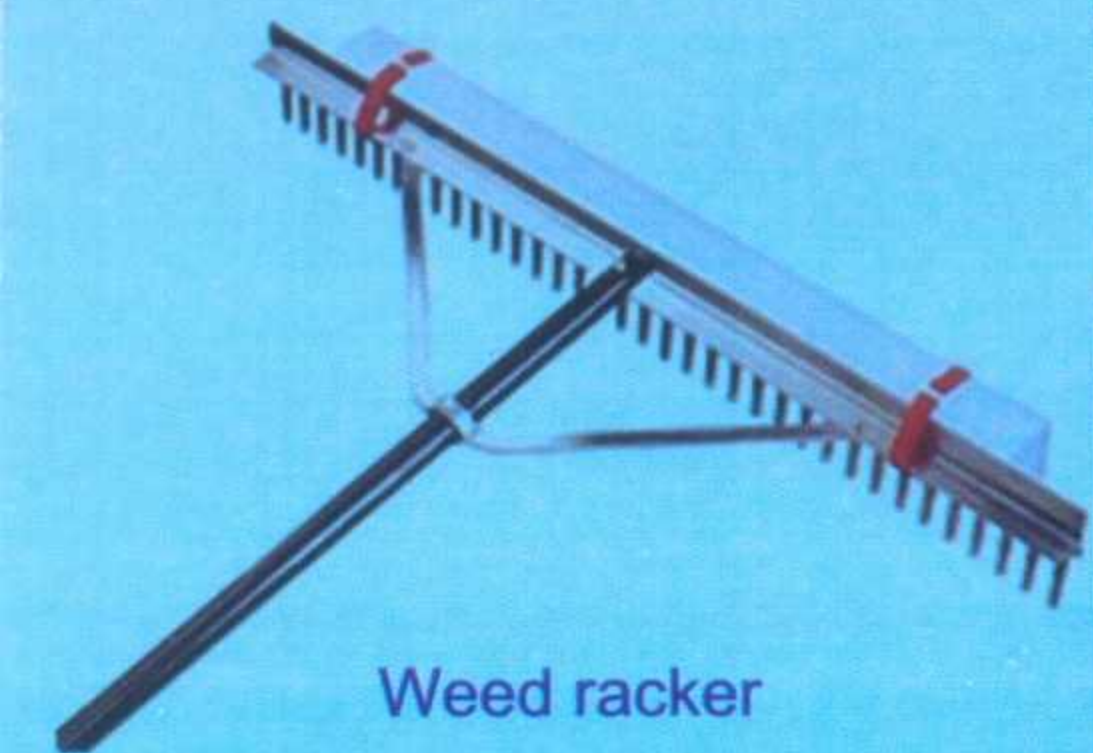
## Eradication of aquatic plants

To achieve good fish production from ponds aquatic weeds should be controlled in them. The different methods of aquatic weed control are given below:

### Manual and mechanical control methods:

Many times use of herbicides for control of aquatic weeds may not be possible, if the water is used for livestock, drinking, or fish rearing.

- ☒ In small water bodies, the traditional methods of hand picking, uprooting of emergent and marginal weeds, and cutting them with scythes are considered suitable. But often the infestation is so severe that these methods are impractical or uneconomical.
- ☒ The rooted submerged weeds in shallow areas are dislodged mechanically by racking with (a) wooden log weeders fitted with iron spikes and barbed wire; (b) by rotating bamboo poles fitted with basal cross attachment or broom fork with toothed prong, and (c) by racking or cutting the vegetation with long handled forks and sickles
- ☒ Winch operated mechanically to clear dense rooted submerged vegetation.



Weed racker



Manual harvest





## Biological control

Certain types of weeds can be controlled by means of selected varieties of herbivorous fishes. The more important herbivorous fishes are grass carp, *Ctenopharyngodon idella*; tawes, *Puntius javanicus*; common carp, *Cyprinus carpio*; tilapia, *Oreochromis mossambicus* and gourami, *Osphronemus goramy*. Other animals such as ducks and geese can be employed for controlling aquatic vegetation.



## Chemical control

There are several chemicals available for controlling aquatic weeds. It should be judiciously applied in the ponds. Application of proper dose in proper time should be followed to avoid harm to other aquatic animal. But application of chemicals should be avoided as far as possible.

Regular nettings in pond, desilting and drying of pond bottom during off season and adoption of better management practices can reduce weed menace in culture ponds.

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