A Study on Aquatic Plant Hydrilla verticillate :A Valuable Pond Weed

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Abstract-*Aquatic plants are rich in protein and amino acid contents. Hydrilla Verticillata, a member of the Hydrocharitaceae family. It is a submersed, vascular hydrophyte plant that grows in fresh water bodies. It have many medicinal properties. Hydrilla plant also uses in phytoremediation process. The present paper is an attempt to provide a detailed botanical description, classification and medicinal uses of the plant.*

Keywords-Aquatic plant, Medicinal, antibacterial, detoxification.

I. INTRODUCTION

Aquatic plants are ecologically important due to their fundamental role in the aquatic system, contributing to the complexity of these habitats and are essential in promoting the diversity and function of aquatic systems [1]. Aquatic plants grow copiously in different aquatic bodies such as lakes and waterways all around the world [2]. An appropriate population of aquatic macrophytes contributes to the general fitness and diversity of a healthy aquatic ecosystem [3]. It is estimated that there are 2,50,000 to 5,00,000 species of plants on earth [4]. They are major components of fresh water ecosystems in that they play key functions, contribute to maintain the related biodiversity and supply services to human society. In addition, they provide habitats for insects, fish and other aquatic or semi-aquatic organisms [5].

Hydrilla verticillata, a submerged aquatic plant found widely in India, is listed as one of the most productive plants on earth. The plant have many medicinal values. *Hydrilla verticillata* also use in phytoremediation process. The plant have great affinity to accumulate metal ions in its bulk. This aquatic plant absorbs the metallic ions and deposits them in various parts of macrophyte depending upon their affinity towards that particular metal [6]. It was found to be efficient in decreasing values of pH, EC, TDS, BOD and COD etc., within 7 days of treatment of different concentrations of textile effluent [7]. If utilized in an efficient manner it could prove to be one of the cheapest and most feasible source for waste water treatment in industries producing waste water containing these metal ions [8].

II. MATERIAL AND METHODS

The sample of selected plants were collected from different water bodies of Pilani in Jhunjhunu district of Rajasthan. During the survey, plants occurring in different water saturated areas were collected, photographed and identified. The field survey was dual in every month. They were preserved according to the conventional herbarium techniques. The species are identified with the help of relevant literatures. Aquatic plants are classified according to their habitat and morphological characteristics.

III. STUDY SITE

The present study conducted on different water bodies of Pilani in Jhunjhunu district. Pilani is a small town of Jhunjhunu district. Jhunjhunu district is located between $27^0$51’0”N Latitude and $75^0$16’12”E Longitude.The climate of Jhunjhunu district in Rajasthan is mainly dry [13]. The summer months are hot while the winter months are cool.

IV. HABITATS

Hydrilla verticillata exhibits a degree of phenotypic plasticity (variable physical appearance) in response to age, habitat conditions, and water quality (Kay 1992). In the tropics, *H. verticillata* is described as tolerant of a wide variety of water conditions, from acidic and oligotrophic to eutrophic or brackish; it thrives on many kinds of pollution and tolerates a great deal of disturbance [9], although increasing salinity appears to limit its dispersal [10]. Due to its tolerance of low light condition [11], it is capable of growing in water up to 7 m deep [12].

V. BOTANICAL CHARACTERS

Hydrilla, a member of the Hydrocharitaceae family, is a submersed, vascular hydrophyte. Depending upon the conditions it grows under, it has highly polymorphic characteristics. *Hydrilla verticillata* (L.F.) Royle is either monoecious or dioecious with both male and female flowers. The leaves of *hydrilla* are typically 3-4mm wide by 5- 15mm long and occur in whorls of 5-8. Branching of *hydrilla* is sparse until it reaches the water’s surface, and then bifurcation

becomes extremely profuse, forming thick, dense mats in the upper parts of the water column.

Fig 1: *Hydrilla verticillata* Plant in Pond

Hydrilla reproduces using four mechanism, fragmentation, turions, tubers, and seeds. *Hydrilla* forms above and below ground stems called stolons and rhizomes, respectively, which gives rises to new vegetative growth. Monoecious *hydrilla* tubers sprout at a lower temperature than does the dioecious type. Their tuber production is greatest during short days, and overall they form more tubers than dioecious populations [13]. The dormant buds are formed either on the leaf axil or terminally on rhizomes and are known as axillary turions/turions and tubers/subterranean turions, respectively [14].

Hydrilla turions vary greatly in abundance, size, and weight. Axillary turions are on average half the size of tubers [15]. The female dioecious biotype populations only produce female flowers, while the monoecious biotype populations have both male and female flowers upon the same plant. It is generally rooted in sediments, but fragments can break free, survive, and re-establish in a new location [16]. 71% of test crosses between dioecious and monoecious hydrilla resulted in the production of seed. Of the seeds from these successful crosses, 90% were viable and the majority of seedlings survived [17].

Fig 2: *Hydrilla verticillata* Plant

VI. MEDICINAL USES

Two biologically important and structurally novel natural products, otteliones A and B obtained from this plant exhibit potent antitumor activity [18]. It also has antibacterial properties [19]. Hydrilla plant also used in digestion and gastro-intestinal function, improves blood circulation, help in detoxification, good for neurological health and cardiovascular function [20]. It increases endurance, help in blood sugar control, strengthens immunity to protect the body from invaders and slows ageing [21].

VII. CONCLUSION

The importance of aquatic plant diversity for sustainable life support is an acceptable fact throughout the world. But it is very difficult to define aquatic plants exactly because aquatic habitats cannot be sharply distinguished from terrestrial ones. Aquatic plants have economic and environmental uses, depending on their natural characteristics. Some are consumed in human diet, while other species have medicinal values and still other species are good resources of minerals and vitamins. It is also uses as phytoremediation. Hope this study will serve the purpose of aiding in future Research work on this plant.

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