A Study on the Growth Characteristics of Water Hyacinth in 12 Lakes Of Medchal District, Hyderabad

Dr.Vajja Varalakshmi[1], V.V.Sridevi[2]

[1]Professor, Department of civil Engineering, Marri Laxman Reddy Institute of Technology and Management, Dundigal Village& Mandal, Hyderabad-500043 .

[2]Associate Professor, Department of Pharmaceutical Bio Technology, Marri Laxman Reddy Institute of Pharmacy, Dundigal Village& Mandal, Hyderabad-500043.

Abstract : ***Water hyacinth (Eichhornia crassipes) causing a serious problem by blocking waterways, and breeding ground for mosquitoes by its massive growth in the Lakes of medchal District, Telangana. There is no data on its seasonal growth and its distribution characteristics in the study area. Therefore the water hyacinth was sampled from twelve different lakes covering twelve villages of district and the following measurements were made on individual plants: plant weight (wet), leaf size: length and width, plant height and number of plants for squaremeter for summer, rainy, post monsoon and winter seasons in the year 2017 and also measured the physical and chemical properties of water hycanith. water hyacinth has 86.52% of moisture content and 13.48% solid matter. The plant has Ph Value of 5.8. The highest plant weight was recoreded during rainy season and the lowest plant weight was observed during the summer season. The length and width of the leaves were reached to its maximum length during summer and lowest during rainy season. The plant height was highest during the post monsoon and the lowest during the summer season. From this research it is evident that water hyacinth is a perennial aquatic weed and its growth characteristics changes with seasonal variation and the 12 Lakes are eutrophic which enhances the growth of water hyacinth and helps in natural water filtration process***

IndexTerms - Water Hyacinth, Growth characteristics, seasonal distribution, Medchal district lakes.

I. INTRODUCTION

The water hyacinth, Eichhornia crassipes, is a free floating aquatic plant of wide distribution in tropical, subtropical, and warm temperate regions throughout the world. Its free-floating plant body comprises of a shoot with a rosette of petiolate leaves, a terminal inflorescence andnumerous rootshanging in the water its attractive purple flowers produce viable seeds, but waterhyacinth propagates primarily vegetatively by forming ramets at the ends of stolons. The characteristics that make this plant grow rapidly in polluted waters make it an ideal candidate for large scale application for nutrient removal and water purification (Reddy and Sutton, 1984). It has been reported that these plants help in the uptake of heavy metals from polluted lake and river waters (Zaranyika and Ndapwadza, 1995) as well as improve the overall quality of eutrophic water bodies (DeBusk and Reddy, 1987). The rapid growth of this species has resulted in alterations in many bodies of water, by increasing evapotranspiration, by making navigation impossible, and by bringing about a negative effect on recreation. Population explosions of these plants also cause an increase in appropriate sites for the development of mosquitoes and snails, which are vectors of several diseases, and deplete oxygen in the superficial levels of the water column, which can cause great plankton and fish mortality (NAS, 1981). The high reproductive capacity and rapid growth of Eichhornia crassipes endow it with high vegetative development and productivity rates. These characteristics, along with an extreme tolerance, have given this macrophyte efficient mechanism for reproduction and dispersion, rendering it able to form dense stands within a few months in a large variety of habitats, such as rivers, lakes, or reservoirs. This could be the result of the lack of predators, competitors, or natural endemic diseases, added to intrinsic characteristics of the species, or physical and chemical conditions of the habitat (Gopal, 1987). Many researchers have evaluated using different methods to know the biomass production of this species, both in the field and laboratory. However, works carried out under natural conditions have not emphasized demographic approaches, which take into account classical analysis of growth and allow for flow in individuals and their constituting parts (McGraw & Garbutt, 1990). Since this flow represents the cycling of nutrients and the input of organic matter into the water body, its determination is important in studies of the ecology of aquatic systems (Pinto-Coelho & Greco, 1999). This research aimed at measuring the net primary production of Eichhornia crassipes using both a traditional method and a demographic approach to determine the temporal variations in its growth rate according to the biomass variation and the number of plants and leaves.

II. STUDY AREA

The Medchal District of Telangana State consists of 77 fresh water bodies. fresh water bodies are filled majorly by Water hyacinth (*Eichhornia*) and other biomass throughout the year causing a severe threat to the water chemistry, micro-habitat, causing a variety of disease vectors, increased evapotranspiration, fishing problems etc due to its rapid rate of proliferation. 12 water bodies are identified covering the villages Bachupally, Bahadurpally, Bowrampet, Dommara,, Pochampally , Doolapally, Dundigal, Gagilapur, Kompally Mallampet, Nizampet , Pragathinagar The map showing the water bodies selected for interventions is given below.

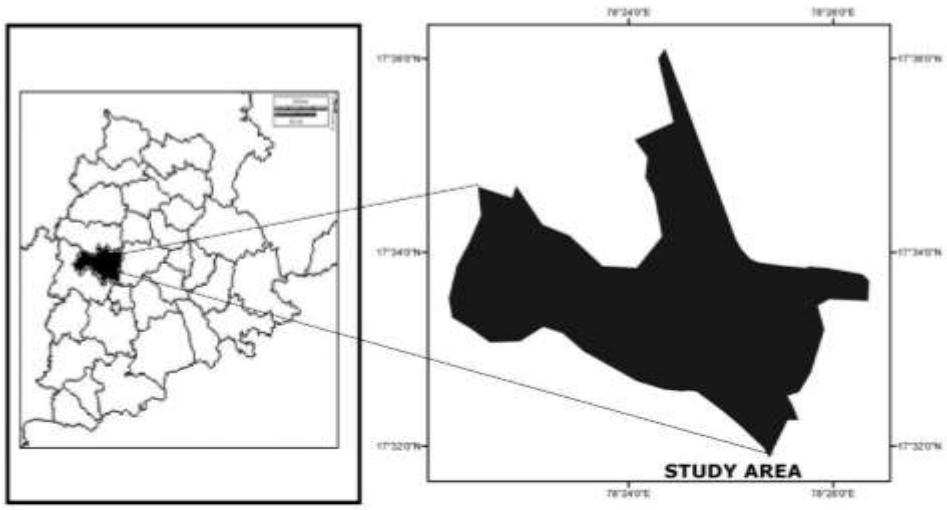

Fig.1 Study area

III. METHODOLOGY

Water hyacinth plants growing in Medchal district of Telanagana state (Fig.1) from twelve different lakes covering twelve villages were sampled at seasonal (summer, rainy, Post monsoon and winter) of 2017. Plants were washed with water to remove the dust and solid particles. The samples were returned to our research laboratory and the following measurements were made: plant weight length and width of plant leaf, Plant height (measured as the distance between the base of the tallest leaf and the top most portion of the lamina), and the number of plants for square meter. The samples are collected from each lake at six locations covering the entire lake and average the six locations of biomass. The minimum and maximum values were observed for all the seasons and also measured the physical and chemical properties of water hyacinth.

IV. RESULT AND DISCUSSION

From table.1 it is observed that water hyacinth has 86.52% of moisture content and 13.48% solid matter. The water hyacinth plants can stand both highly acidic and highly alkalinic conditions, but more vibrant growth is supported by neutral water bodies (Gopal, 1987). According to Gopal (1987), water hyacinth plants do not survive in water media with pH equal to or less than 4.0. and given that in Lakes in medchal district the average value for all seasons is 5.8, this is one of the contributing factors as to why water hyacinth continues to proliferate.

V. Table.1: Physico-chemical properties of water hyacinth

S.No	Parameter	Observed value
1	pH	5.8
2	Moisture content (%)	86.52
3	Organic matter (%)	72.86
4	Cellulose (%)	16.32±0.12
5	Hemicelluloses (%)	26
6	Lignin (%)	8.72
7	C (%)	38
8	N (%)	1.68
9	P (%)	0.76
10	K (%)	2.25

From the Table 2. it is evident that water hyacinth is a perennial aquatic weed which is found throughout the year. The biomass of water hyacinth was found to be in the ranges of 165-280(gms), 16-23(cms), 3-7(cms), 5-8(cms), 15-32 for plant weight, leaf length, leaf width, plant height and no.of plants for one square meter respectively. The optimal growth was observed at temperatures of 29 to 32°C, while growth ceased when water temperatures drop below 11°C and it is retarded above 35°C. Frosts kill the leaves and upper petioles which protect the rhizome, but prolonged cold temperatures, below 5°C, may kill the rhizome resulting in death of the plants (Owens & Madsen, 1995).The worldwide distribution of water hyacinth illustrates that this is a well adapted weed and tolerates considerable environmental variation.

Table.2 seasonal growth variation of water hyacinth plant

S.No	Location	January 2017 (Winter season)					May 2017 (Summer season)					September 2017 (Rainy season)				
		No. of Plants	Average of				No. of Plants	Average of				No. of Plants	Average of			
			Plant weight	Leaf length	Leaf width	Plant height		Plant weight	Leaf length	Leaf width	Plant height		Plant weight	Leaf length	Leaf width	Plant height

			(gm)	(cm)	(cm)	(cm)		(gm)	(cm)	(cm)	(cm)		(gm)	(cm)	(cm)	(cm)
1	Bachupally	20	198	18	4	5	24	171	21	6	6	25	225	16	2	7
2	Bahadurpally	24	194	19	3	8	20	176	20	7	8	22	230	17	2	8
3	Bowrampet	22	196	17	6	7	21	168	22	4	7	20	228	16	3	8
4	Dommara	30	183	18	4	7	29	164	21	3	8	27	240	17	4	9
5	Doolapally	28	180	19	4	8	30	170	20	2	6	32	235	17	4	7
6	Dundigal	16	194	19	3	6	18	172	23	6	6	26	280	18	4	7
7	Gagilapur	18	176	21	5	5	15	168	19	6	6	18	260	20	3	7
8	Kompally	21	189	20	5	5	21	172	21	5	8	23	235	18	3	9
9	Mallampet	20	195	18	4	8	20	169	22	4	8	22	242	16	3	9
10	Nizampet	18	179	19	3	7	20	165	20	3	8	22	270	16	4	8
11	Pragathinagar	23	181	18	3	7	23	166	20	6	7	24	260	17	3	8
12	Pochampally	16	180	18	4	8	18	170	21	4	8	19	265	16	4	8

From the results it is observed that the plant weight was gradually increased from summer to rainy and gradually decreased during post monsoon and winter. The highest plant weight was observed during the end of rainy season, this is due to the inflow of high nutrients and minerals from the agricultural runoff and the prawn fields. The lowest plant weight was observed during the summer season due to the decreased inflow of water into the lake and also due to the hot summer. The length and width of the leaves were reached to its maximum length during summer and lowest during rainy season. The lowest length is found in the rainy season because the leaves are in the initial stage of forming, due to the rains. The plant height was highest during the post monsoon and the lowest during the summer season. From this research it is evident that water hyacinth is a perennial aquatic weed and its growth characteristics changes with seasonal variation and the 12 Lakes are eutrophic which enhances the growth of water hyacinth and helps in natural water filteration process.

VI. CONCLUSIONS

The results from this paper reveals that in the study area more than 70 % of water bodies including lakes and ponds are infested by Water Hyacinth. The plant biomass was increased to several folds during the last five years and its spread to the lakes is rapidly increasing from day to day. The biomass of the water hyacinth should be properly utilized for making basket production and biogas production as found in the literature. The study area is near to the hyderbad city, it is necessary that the nutrients and the drainage from the industries should be well treated before the passage of effluents into the lake. If these plants can be put to good use, a lot of profitable products can be obtained from these and economical growth with occur.

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