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EICHHORNIA SP. AS SENTINEL OF POLLUTION IN AQUATIC ECOSYSTEMS

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Abstract: The role of *Eichhornia crassipes* in cleansing the ambient environment by absorbing the heavy metals from the Akulam Lake, Thiruvananthapuram, Kerala was studied for three months. The promising results revealed that the water hyacinth accumulated certain heavy metals like iron, manganese, copper, zinc and lead in its stem, leaves, flowers and air sac. The plant, when treated in fresh water for a certain period of time, did not showed heavy metal accumulation.

Key words: Bioaccumulation, Heavy metals, Water hyacianth

INTRODUCTION

The bioavailability and bioaccumulation of heavy metals in aquatic ecosystem is gaining tremendous significance globally. Several aquatic macrophytes are known to accumulate heavy metals by taking up them from water and producing internal concentration greater than their ambient environment. The present study was focused on the potentiality of a well-known aquatic macrophyte *Eichhornia crassipes* as a biological filter in ecosystems.

The aquatic plants which have accumulated heavy metals, when die and decay, these metals reach the sediment (Ho, 1988). According to Chakrapani (2002), the developmental activities in and around the lakes made them vulnerable to pollution. The unpolluted lakes are natural resources used by the public for various activities including irrigation, fisheries and tourism (Das, 2005). The present investigation was carried out to study the heavy metal absorption and accumulation in the different parts of the water hyacinth collected from the Akulam Lake, Kerala.

MATERIALS AND METHODS

For the present investigation, the water hyacinth, *Eichhornia* sp. was collected from Akulam Lake Thiruvananthapuram, Kerala by uprooting them. The samples were brought to the laboratory and washed well. The leaves, roots, stems and air bladder were carefully separated ,water content was wiped off well and dried in the oven at 85ºC for 48 hours. The dried samples were powdered and from each sample 1gm. was weighed out. The samples were digested with 5 ml of Con. Nitric acid and kept overnight. The next day the samples were diluted to 50ml.with distilled, deionized water, filtered using Whatmann No. 40. The clear filtrate obtained was send to the Central Soil Testing Lab, Trivandrum for the analysis of heavy metals.

Another lot of water hyacinth was kept in well water for one week and analyses were carried out following the above mentioned procedure. The results were tabulated.

RESULTS AND DISCUSSION

The accumulation of heavy metals in stem, leaves, air sac and flowers of *E. crassipes* collected from Akulam Lake is exhibited in Table 1 & Fig. 1 (a) to 1(e). The analysis clearly indicated that iron, manganese, copper, lead and zinc were accumulated in the body of *E. crassipes*. The leaves absorbed more heavy metals than other parts, in the order of Mn (1.92 ï 0.035), Zn (1.80 ï 0.005), Fe (1.16 ï 0.002), Pb (0.31 ï 0.01), and Cu (0.18 ï 0.001) ppm respectively. The role of *E. crassipes* in absorbing heavy metals and thereby cleaning the polluted water is clearly evident here. El-Enang and Maien (1996) had proved the ability of absorbing Cadmium by water hyacinth grown in the Nile River water. The absorption of the available nutrients by *E.crassipes* and high rate of self purification by the water body is vividly explained by Nyananyo *et al.* (2005). In the present experiment, the water hyacinth samples kept in well water did not show accumulation of heavy metals in its body parts.

Table 1. Heavy metal profile in the body parts of *E.crassipes*

Heavy metal (ppm)	STEM			LEAF		
	June	July	Aug.	June	July	Aug.
Mn	1.91±0.0057	1.86±0.015	1.21±0.015	1.92±0.035	1.8±0.005	1.1±0.001
Zn	0.57±0.001	0.67±0.001	0.67±0.001	1.8±0.005	1.6±0.007	1.2±0.015
Fe	0.4±0.040	0.59±0.002	0.89±0.04	0.58±0.001	0.66±0.003	1.16±0.002
Cu	0.01±0.01	0.05±0.01	0.06±0.005	0.02±0.015	0.07±0.001	0.18±0.001
Pb	0	0	0.15±0.001	0.31±0.01	0.27±0.005	0

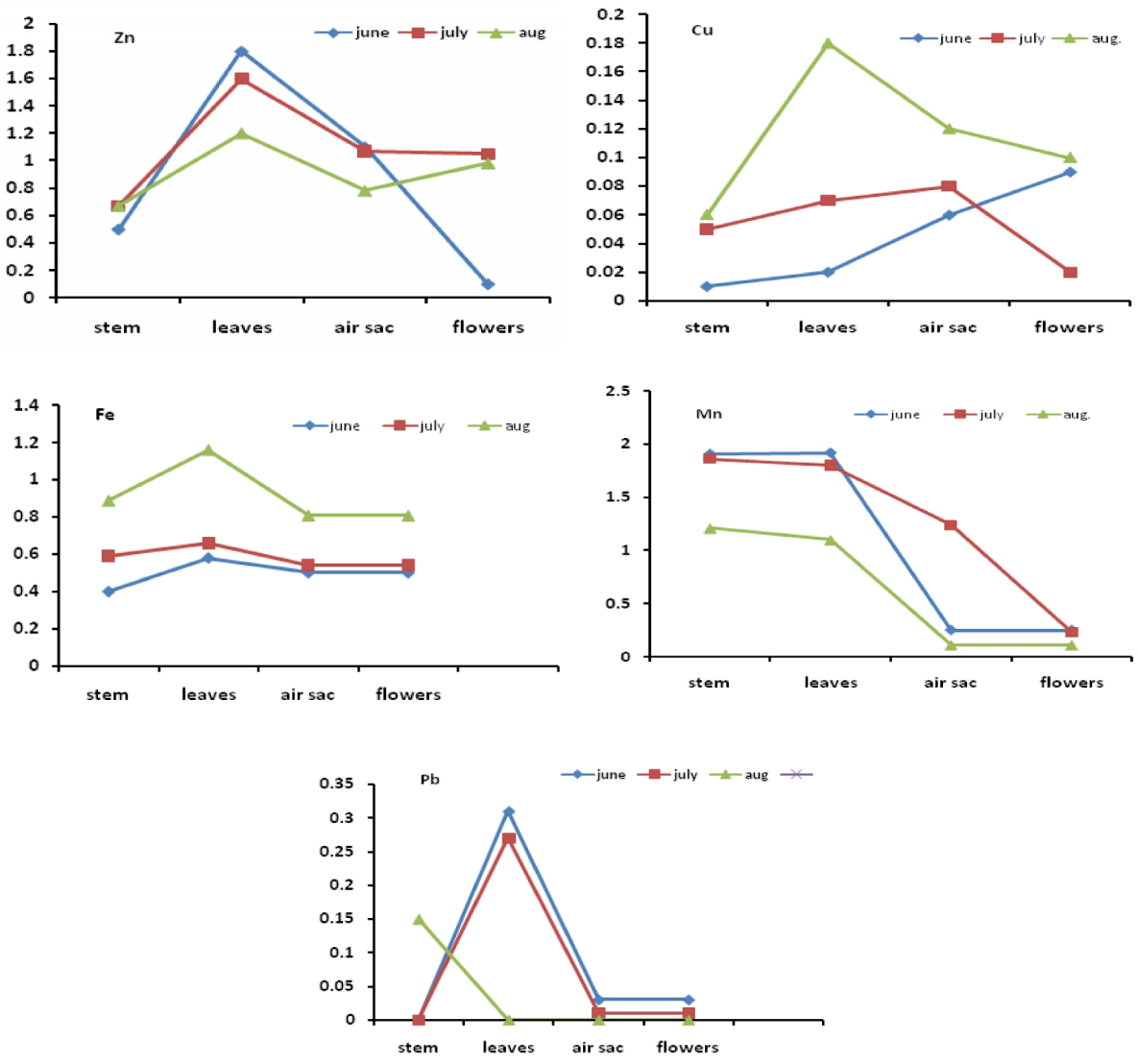

Fig 1(a) to 1(e). Accumulation of heavy metal in *E.crassipes*

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