

AQUATIC WEEDS: A SERIOUS PROBLEM FOR WATER BODIES IN JHARKHAND

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Jharkhand lies between latitude 22°00' and 24°37' North and longitude 83°15' and 87°01' East. It comprises the Santhal Pargana and Chotanagpur with general characteristics of hot climate, undulating plateau, hills, and mountains, intermittent rivers, inefficient agricultural practices, tribal populous with a life style geared with forest ecology, having thick forest cover and large number of water bodies viz. dams, ponds, rivers, water falls, ditches and seasonal nalas. These water bodies harbors a number of plant species. These plants spend at least a part of their life cycle in water. Aquatic plants are important to maintain the aquatic ecosystem. Gregarious or excessive growth of these plants is regarded as aquatic weeds, which adversely influence physical, chemical and biological effects on water bodies with its resultant environmental, aesthetic and economic losses.

Keywords : Aquatic weeds; Water bodies.

Aquatic weeds have proved to be a persistent and expensive environmental problem costing millions of rupees to control, and unaccounted millions more to correct the damage to the environment. It can be said that aquatic weeds adversely affect every facets of water use. A study conducted on aquatic weeds in the parts of Jharkhand from the year 2002 to 2007 has revealed that these aquatic weeds affect the environment in a number of ways. The present communication deals with the same. Several literatures are available that deals with the aquatic angiospermic plants and problem caused by them¹⁻¹⁴.

A study on the aquatic and semi-aquatic, angiosperms, and their ill impact on environment was carried out in different parts of the Jharkhand. A total number of 32 species were reported from the area, which are supposed to cause harm to the water bodies as well as another environmental aspect. To make the accurate and intensive study, and survey of aquatic and semiaquatic species the study, area were visited at regular intervals, twice or thrice in every season to encounter the plants at their flowering and fruiting conditions.

During the field work, important characters like habit, habitat, color of the flowers, height of the plants, association of the plants with other plants, field numbers, local name and their degree of infestation were noted. After completion of the specific study of the specimens, the plants were identified with the help of local floras. After specific identification and study the plants were

dried and pressed under heavy herbarium press. Before pressing, the plants were poisoned in 2% saturated solution of HgCl₂ in rectified spirit. The specimens after drying, were mounted with the help of synthetic resin adhesive and thread on the herbarium sheets of standard size made up of thick white hand made papers. The herbarium sheet contains a printed label on its right hand bottom. The herbarium sheets are kept in the laboratory of SS Memorial College, Ranchi.

While making the survey of the aquatic and semi-aquatic plants from different parts of the Jharkhand; a total number of 32 aquatic and semi -quatic species are reported belonging to 22 families and 26 genera. Out of these 12 families belongs to dicot, having 12 genera and 16 species where as 10 families belong to monocot having 14 genera and 16 species. It was also observed that the excessive growth of these plants causes serious problems to the water bodies.

Problems caused by aquatic weeds - It clogs the water passages and intake points, disrupts navigation and other recreational activities like water sports. A number of aquatic weeds like *Eichhornia*, *Monochoria* and several *Cyperus* species causes huge reduction in paddy and other crops. Floating mats of aquatic weeds like water hyacinth and water lettuce, cover vast areas of fish water surface. They cause darkness underneath, prevent normal gaseous exchange between the atmosphere and water, and adversely changes the limnology of the water. Aquatic

Table 1.

S.No.	Name of the plants	Family	Flowering Time
1.	<i>Ranunculus sceleratus</i> Linn	Ranunculaceae	Nov.-Feb.
2.	<i>Nymphaea nouchali</i> Burm f	Nymphaeaceae	Aug.-Nov.
3.	<i>Nymphaea stellata</i> Wild	Nymphaeaceae	Aug.-Nov.
4.	<i>Nelumbo nucifera</i> Gaertn	Nelumbonaceae	July-Nov.
5.	<i>Ludwigia adsendens</i> Linn	Onagraceae	Whole year
6.	<i>Trapa natans</i> Linn.	Trapaceae	Sept.-Jan.
7.	<i>Enhydra fluctuans</i> Lour	Asteraceae	Dec.-March
8.	<i>Nymphoides indica</i> (Linn.) Kuntze	Menyanthaceae	Throughout the year
9.	<i>Nymphoides hydrophilla</i> Lour	Menyanthaceae	July-Nov.
10.	<i>Ipomea aquatica</i> Forsk	Convolvulaceae	Sept.-Feb.
11.	<i>Utricularia stellaris</i> Linn	Lentibulariaceae	Sept.-Nov.
12.	<i>Utricularia aurea</i> Lour	Lentibulariaceae	Sept.-Nov.
13.	<i>Ceratophyllum demersum</i> Linn	Ceratophyllaceae	Sept.-Dec.
14.	<i>Polygonum Plebejum</i> Linn	Polygonaceae	Nov.-March
15.	<i>Polygonum barbattum</i> Linn	Polygonaceae	Oct.-March
16.	<i>Ceratophyllum demersum</i> Linn	Ceratophyllaceae	Sept.-Feb.
17.	<i>Hydrilla verticillata</i> Linn	Hydrocharitaceae	Nov.-Jan.
18.	<i>Vallisneria spiralis</i> Linn	Hydrocharitaceae	Nov.-March
19.	<i>Ottelia alismoides</i> Linn	Hydrocharitaceae	Sept.-Jan.
20.	<i>Eichornia crassipes</i> Mart	Pontederiaceae	Apr.-Nov.
21.	<i>Monocharia vaginalis</i> Burm	Pontederiaceae	July-Nov.
22.	<i>Monocharia hastata</i> Linn	Pontederiaceae	July-Nov.
23.	<i>Commelina benghalensis</i> Linn	Comelinaceae	July-Nov.
24.	<i>Typha angustata</i> Borey Chaub	Typhaceae	April-June
25.	<i>Aponogeton natans</i> Linn	Aponogetonaceae	July-Dec.
26.	<i>Sagittaria sagittifolia</i> Linn	Alismataceae	Oct.-March
27.	<i>Potamogeton nodosus</i> Lamk	Potamogetonaceae	Oct.-March
28.	<i>Eriocaulon cinerum</i> R.Br.	Eriocaulaceae	Aug.-Nov.
29.	<i>Cyperus iria</i> Linn	Cyperaceae	Aug.-Jan.
30.	<i>Cyperus difformis</i> Linn.	Cyperaceae	Aug.-Dec.
31.	<i>Cyperus rotundus</i> Linn.	Cyperaceae	June-Jan.
32.	<i>Hygrorhiza aristata</i> Nees	Poaceae	Oct.-Dec.

plants also remove large quantities of nutrients from the surrounding water, which would otherwise go in to the production of primary and secondary food of the fish *i.e.* planktons. Nutrient depletion from the water bodies causes decrease in fish production. Aquatic plants are great destroyers of water which causes excessive loss of water due to evapotranspiration. Aquatic weeds foster snail borne human and domestic animal diseases, it allows the mosquitoes and other insects to breed and is also the home for rats which causes huge loss to cereal crops. Constant death and decay of aquatic plants, increases the bottom layer of mud and in this way decreases the depth of the water bodies. At the same time continuous decay of large quantity of these weeds contributes in global warming by means of biomethanation. A number of native plant species is on the verge of extinction due to allelopathic effects of new and invasive plants species.

A list of 32 aquatic and semi-aquatic angiospermic species along with their families, flowering and fruiting time is also enumerated in Table-1.

There are several examples in the state, like Victoria tank of Lohardaga, which were considered as the life line for the district, are ruined by the weeds. Once this pond was used for various purposes like bathing, swimming, water sports like boating, water polo, fishing etc., is today infested with the species like *Eichhornia*, *Alternanthera*, *Enhydra*, *Nelumbo*, *Hydrilla*, *Potamogeton*, *Ceratophyllum*, *Utricularia*, etc. resulting in inefficient use of the said tank.

Most of the large and well known ponds in the state, like ponds of Ranchi, Jamtara, Cahibasa, Chakradharpur, Gumla, Medininagar, Jamshedpur, Bundu, Dumka, Deoghar, Chatra, Hazaribag, Latehar, Koderma, Giridih, Dhanbad, Bokaro, Khunti, Ramgarh tells the similar stories.

The Mallah community in the state, who are completely depended on these water bodies are facing acute problem for their survival. They are bound to search for their livelihood options. It has been observed that the weeds cause great loss to the Government revenue as the pods which were auctioned to the fisherman community, are not being auctioned due to the ruined condition of the water bodies.

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References

1. Haines H H 1925, The Botany of Bihar and Orissa, Parts 1-6. Adlard and Son. West Newman Ltd. London.
2. Mooney H F 1950, The Flora of Ranchi District. Catholic Press, Ranchi.
3. Bressers R 1951, The Flora of Ranchi District. Ranchi.
4. Subramanyam K 1962, Aquatic Angiosperms. ICSIR, New Delhi, India.
5. Jha U N 1965, Hydrophytes of Ranchi. *Trop. Ecol.* 6: 98-105.
6. Ghosh 1971, Flora of Ranchi. Ph. D. thesis, Ranchi University, Ranchi.
7. Joshi N C 1973, Some problems and progress of weed control in India. In: Aquatic weeds in SE Asia. Dr. W. Junk. B.V. Publication, the Hague pp 263 – 264.
8. Ambasth RS and Ram K 1976, Stratified primary productive structure of certain macrophytic weeds in a large Indian Lakes. In: Aquatic weeds in SE Asia. Dr. W. Junk. B.V. Publication, the Hague pp 143 – 146.
9. Gupta O P 1979, Aquatic weeds, their menace and control. A textbook and manual. Today and Tomorrow Printers, New Delhi.
10. Majid F J 1986, Aquatic Weed utility and development. Agro botanical Publisher (India).
11. Singh M P 1990, Hydrophytes of Ranchi. *J. Econ. Tax. Bot.* 14 No.3
12. Mukherjee P 2001, The floristic and ecological Studies of aquatic angiosperms of Lohardaga. Ph. D. Thesis, Ranchi University, Ranchi.
13. Mukherjee and Kumar 2003, studies on the angiospermic flora of ponds of Ranchi, Proc. National Seminar on Plant Taxonomy and Biodiversity, Majal Gaon Maharashtra, Majal Gaon College, Majalgaon, Maharashtra.
14. Mukherjee Pal and Verma 2007, Aquatic weeds: Its ill impact on Environment. Proc. International Symposium on Recent Advances in Contemporary Biology, Environmental issue and Sustainable development, S.K.M. University, Dumka, Jharkhand.