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Research Article

Studies in pollution controlling plant species of Salim Ali Lake

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Abstract

Environmental pollution has reached to such a stage that biological species are struggling for its existence. Human beings are also facing the health impacts due to increased pollution. None of the spheres of earth remain untouched by pollution. Be it hydrosphere, lithosphere or atmosphere, each one is experiencing abnormal levels of pollution. Atmosphere is polluted the most. Major sources of atmospheric pollution are industrial emissions, vehicles, construction activities, mining, dust particles and other anthropogenic activities. With advancement in science and technology, human population has also increased dramatically. The present paper deals with the selection of pollution tolerant aquatic plants growing in the water environment of Salim Ali Lake, Aurangabad. The systematic analysis will be carried out. According to earlier work on Macrophytes in Salim ali lake by Chavan et al. (2013) has revealed the presence of 44 aquatic plants, out of which 18 species belonged to Dicotyledons and 16 to monocotyledons representing 27 families.

INTRODUCTION:

Water is one of our basic natural resources. It is essential for life in both the biochemical and biophysical senses and its influences are both internal and environmental. It is not only the most abundant single substance in the biosphere but probably is the most remarkable as well. The water environment can generally be characterized as a dilute, aqueous solution, containing a large variety of organic and inorganic chemical species, dissolved and in suspension, and including a variety of plant and animal life. Knowledge of the qualitative and quantitative composition of water is the first step to reveal the nature of the particular environmental problem.

One of the most important environmental areas is the quality of life-giving water. Now a day lakes are degraded by both natural and anthropogenic activities, which deteriorate their quality, and push them to the bank of extinction. In this process of unplanned human developmental activities initiated the need of suitable conservation strategies. Normally, lakes perform the functions directly related to their physical, chemical and biological integrity to decide quality status of water (Shetye Chaphekar, 1989; Rotschke, M, 1937.

The present piece of research work is initiated on pollution status at Salim Ali Lake by interference and increase in the population of phytoplankton and microbe. Salim Ali Lake is popularly known as Salim Ali Talab or Abari Houd and located near Delhi Gate Aurangabad. It is situated in the northern part of the city. During the Mughal period it was known as Khiziri Talab. Later on it has been renamed after the great ornithologist, naturalist Salim Ali and also known as birdman of India (Palmer C. Mervin 1969) .

Salim Ali Lake comprised a rare and rich biodiversity spot within the city. Salim Ali lake is very much interesting with regards to vegetation because of the fact that the floristic compositions of this locality are mixed type having both terrestrial and aquatic which are yet to be explored. No systematic and extensive floristic works on this lake have been done except for a few scattered reports. The present paper deals with the selection of pollution tolerant aquatic plants growing in the water environment of Salim Ali Lake, situated in Aurangabad District of Maharashtra.

MATERIALS AND METHODS

The present work is based on the results of extensive systematic field studies of the plants of this area for a period of three years (May 2014April 2017) under minor project funded by Dr. Babasaheb Ambedkar Marathwada University, Aurangabad. Field trips were made once in a week converting the entire area with a view to find out the aquatic plant species and their ecological features. Field observations were recorded like habit, habitat, association and frequency in the field, available local names, as well as flowering and fruiting periods of the investigated taxa. The plants have been identified from fresh materials with the help of different Floras (Naik; Cook). The collected specimens were then poisoned, pressed and dried. After drying, the plants were mounted on the herbarium sheets and labeled properly for future use.

RESULTS AND DISCUSSION

The biota in the surface water is governed entirely by various environmental conditions that determine the selection of species as the physiological performance of the individual organisms. The primary production of organic matter, in the form of phytoplankton and macrophytes is more intense in lakes and reservoirs than in rivers. The physico-chemical properties of freshwater bodies are characteristic of the geochemical, climatic, geomorphological and pollution conditions (largely) prevailing in the drainage basin and the underlying aquifer. In contrast to the chemical quality of water bodies, which can be measured by suitable analytical methods, biological quality is a combination of both qualitative and quantitative characterization. The sample collected should be small in volume, enough to accurately represent the whole water body.

During the present investigation minimum and maximum along with average values of physico-chemical parameters of the water temperature was recorded. This plays important role in controlling the occurrence and abundance of blue-green algae, planktons and Macrophytes. The dissolved oxygen content was the highest during water at all 03 stations of lake as agreed with earlier workers. During the present investigations, biological oxidation demand fluctuated directly with water temperature and pH of all 03 stations lake. During present investigation all three samples of water of these collecting sites was alkaline in nature. The concentrations of nitrate and phosphate were greater at all 03 stations of lake. The concentration of nitrate, phosphate and sulphate indicated the higher concern of pollution at all 03 stations of lake. (Trivedy and Goel, 1986; APHA, 1985.)

The abundance of blue-green algae during winter and summer confirmed the earlier observations Moore, et, al 1980.

The Lake has been situated in the north of Aurangabad city. Sewage and effluent from Cidco, Hudco and other areas have been added in this water body which makes it polluted. Municipal Corporation has taken efforts to make it pollution free but pollution has not been controlled. Ecosystem has got its mechanism to control the pollution. During preliminary investigations it was observed that some plant species are growing luxuriantly in Salim Ali Lake. Hence it was decided to work on plant which tolerates the pollution. During the investigations 44 aquatic plants were recorded out of which 18 species belongs to Dicotyledons and 16 species of monocotyledons representing 27 families.

Table.1. List of plant species recorded from Salim Ali lake

Sr. No.	**Plant Species recorded**	**Station**			
		1	2	3	4
1	*Aeschynomene American*	+	-	+	+
2	*Alternanthera sessilis*	+	+	-	+
3	*Bacopa monnieri*	+	+	+	+
4	*Ceratophyllum demersum*	+	+	+	+
5	*Eichhoruia crassipes*	-	+	+	-
6	*Hydrilla verticillata*	+	+	+	+
7	*Leersia hexandra*	-	+	+	-
8	*Pistia stratiotes*	+	-	+	+
9	*Vallisneria spiralis*	+	+	+	+
10	*Cyperus sp*	+	+	+	+

The species documented during the studies were *Aeschynomene American, Alternanthera sessilis Ceratophyllum demersum, Bacopa monnieri, Ceratophyllum demersum, Eichhoruia crassipes, Hydrilla verticillata, Leersia hexandra, Pistia stratiotes, Vallisneria spiralis* and different species of *Cyperus*. Plants like *Pistia stratiotes, Eichhornia crassipes* and *Hydrilla verticillata etc.* These plants remove pollutants from water body and grow well. These plants can be utilized for removal of pollutants and heavy metals from the polluted water bodies without affecting its flora and fauna (Desikachary, 1959; Moore, 1980). These species are also found effective for accumulation of heavy metals and to control water pollution.

Discussion

These plants can grow fast in the sewage effluents or in rich organic pollutant water-bodies, which can act as biological filter in sewage effluent. Plants like *Wolffia, Lemna* and *Spirodela* of the family Lemnaceae have also been utilized as fresh fish feed and they resulted in good fish production. Some of the aquatic plants like *Pistia stratiotes, Eichhornia crassipes*, and *Hydrilla verticillata*, have already been proved to be as Hg (II) and Cr (VI) accumulators. These plants can be utilized for removal of the heavy metal pollutants from the polluted water bodies without endangering the lives of other flora and fauna. By considering the data it was concluded that, physico-chemical parameters and pollutions tolerant genera and some species of blue

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green algae confirmed in Salim Ali Lake. Nature takes its care as its own which could be indicated through presence of aquatic plant species like *Aeschynomene American, Alternanthera sessilis Ceratophyllum demersum, Bacopa monnieri, Ceratophyllum demersum, Eichhoruia crassipes, Hydrilla verticillata etc.* Further studies in this matter advocated Desikachary, 1959; Nandan and Patel 1985; . Their presence indicates that the water on the verge of pollution.

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