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AQUATIC AND MARSHY PLANTS AND THEIR ECONOMIC IMPORTANCE IN BHADRA RESERVOIR PROJECT REGION, KARNATAKA

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ABSTRACT

In the present study, a total of 15 species of aquatic and marshy amphibious plants belonging to 13 families occurring in the Bhadra Reservoir Project region, Karnataka were found, and their description and economic importance is presented in this paper. Efforts have been made to find out the correct names in accordance with the latest International codes of Botanical nomenclature.

INTRODUCTION

Aquatic and marshy amphibious plants are still regarded by general mass of people as 'nuisance' because they are not yet aware of the great potential and economic value of these profusely growing uncontrollable plants. These are highly productive as compared to most terrestrial crops. As a matter of fact, these plants have been proved to be good source of livestock feed, human food, fish feed, biofertiliser, energy, fibre and paper. Furthermore, they have the capacity to purify the wastewater through the uptake of dissolved nutrients, including trace metals.

Macrophytes play an important role in the ecological functioning of lentic ecosystems. They also play a key role in determining the structure and function of ecosystems by making available energy and nutrients for higher trophic levels. Aquatic macrophytes have played very important role in restoration of shallow eutrophic lakes. Therefore, the evaluation of the life cycle of macrophytes is a key issue before using them in restoration of waterbodies.

Some sporadic mentions on the flora of the lentic waterbodies were made by earlier workers like Unni (1971), Shah (1978), Billore & Vyas (1981), Chambers & Kalff (1987), Islam (1999) and Kiran & Puttaiah (2005). The present investigation highlights the species composition and the economic importance of aquatic plants found in the Bhadra Reservoir Project region of Karnataka.

MATERIALS AND METHODS

Bhadra Reservoir Project is situated in the Karnataka state at 13°42' N latitude and 75°38' E longitude. Aquatic and marshy amphibious plants were collected from the ponds, tanks and beels of Bhadra Reservoir Project region during 2005-06 in numerous field trips. Genera or species of plants were identified through various authoritative sources (Biswas & Calder 1984, Mishra 1974, Dey & Kar 1989, Billore & Vyas 1981).

RESULTS AND DISCUSSION

There is no investigation on the taxonomic categorization and economic importance of aquatic and marshy amphibious plants in Bhadra Reservoir Project region of Karnataka. A total of 15 species of plants belonging to 13 families collected during 2005-06 is presented in this article. The families of these plants are arranged according to the International Code of Botanical Nomenclature.

The families Hydrocharitaceae and Cyperaceae are represented by 2 species and rest of the families depicted with single species each. The taxonomic categorization of aquatic and marshy amphibious plants and their uses are summarized below:

***Oryza sativa* (Family: Poaceae)**

It is the marshy aquatic plant, which is used as human food crop. It is a stable food in areas often submerged by flood water. This plant is used as an animal fodder to cows and buffaloes.

***Ipomea aquatica* (Water spinach) (Family: Convolvulaceae)**

The young leaves and stems are used as vegetable, boiled or cooked in oil. It is also used for pickles preparation and also as animal feed.

***Nelumbo nucifera* (Sacred lotus) (Family: Nelumbonaceae)**

The seeds and the rhizomes are used in a variety of cooked and uncooked dishes. The seeds were also ground to flour for making bread. Rhizomes are marketed fresh, dried, canned or even as a fine powder. They are cooked in curries and other oriental dishes. The dried and canned rhizomes, both sell at a high price. The seeds are eaten raw, cooked, ground to flour or canned after removing the skin and the bitter embryo. The petals are considered as cardiac tonic and said to have a cooling effect. The lotus is also used as an ornamental plant in this area.

***Nymphaea nouchali* (Water lily) (Family: Nymphaeaceae)**

The spongy petioles and peduncles are cooked and eaten by the poor people. The powdered rhizome is used in dyspensia, dysentery and piles. The edible seeds may be eaten raw or roasted in sand before eating.

***Trapa natans* Var. bispinosa (Family: Trapaceae)**

Fruit a spiny nut, with 4 prominent angles is edible. The fruits are harvested from the naturally growing plants and sold in market. The fruits are eaten raw or sweet dishes are prepared with them.

***Spirodela poly*detergent*rhiza* (Duckweed) (Family: Lemnaceae)**

Plant has no distinct stem or leaves, but consists of leaf like fronds. These plants are collected in huge quantities and used as organic manures or fodder for cattle and pigs in tropical regions of India. The plants are also consumed by herbivorous fish, ducks, goose and swans, etc. The high nitrogen value of the duckweed (6-7%) makes the plant an ideal source of organic manures. High protein content makes it as a source of animal feed. Moreover, this plant may also be used for purifying wastewater. The liquid extract from *Spirodela* was found to improve seed viability and increase seedling vigour of maximum number of seeds.

***Typha* species (Cattail) (Family: Typhaceae)**

The cattails are fast growing and invade waterways, rice fields, farm ponds, lakes, tanks and canals. Of all the wild plants, cattails have been called the most useful emergency food source. Traditionally these are important food to native people. They contain much protein like corn or rice and more carbohydrate than potato. In times of food scarcity, cattails have been considered as a source of starch, the seeds a source of edible oil and animal feed. Young cattail stems may be eaten as salads

or as green vegetables; even the yellow pollen may be eaten.

Typha species is a promising source of pulp and paper. The plants absorb nutrients from polluted wastewaters, purifying the water during the process.

***Cyperus* species (*Cyperus iria* and *C. difformis*) (Family: Cyperaceae)**

The stem of the plant has been used for writing material, paper, since ancient times (3500 B.C.). The plant is also a source of fibre, fuel and food. The roots are used as fuel and the pith made into food.

***Monochoria vaginalis* (Family: Pontederiaceae)**

It is similar to *Eichhornia crassipes* and the plant is also a good source of organic fertilizer. Liquid extracts from the plant improved the seed viability rate and increase the seedling vigour of some crops. It is also a source of cattle feed.

***Bacopa monnieri* (Family: Scrophulariaceae)**

This plant is also a good source of human food and the juice is used to cure fever.

***Azolla pinnata* (Water fern) (Family: Azollaceae)**

This delicate, small aquatic plant is of considerable economic importance and extensive researches have been conducted with it. It has been reported useful for controlling mosquitoes and other weeds, and also for feeding poultry, pigs and ducks. However, *Azolla*'s greatest economic value lies in its nitrogen fixing capacity, whereby the plant is capable of reducing the nitrogen demand in paddy fields. *Azolla* is used as a biofertiliser for increasing the yield of rice in China, Vietnam, Philippines, India and some other countries.

***Hydrilla verticillata* (Family: Hydrocharitaceae)**

Hydrilla has shown promise as a source of biogas. This plant is additionally rich in carotene and xanthophylls. It is also used as a fish feed. Moreover, the plant is used by fish farmers to breed the fish *Cyprinus carpio* since the eggs are adhered to this plant.

***Vallisnaria spiralis* (Eel grass) (Family: Hydrocharitaceae)**

It is a submerged plant, used for ornamental purpose. This plant is also used by fish culturists to breed the fishes. The cyprinid fish and grass carp are rapid feeder of eel grass.

***Alternanthera philoxeroides* (Family: Amaranthaceae)**

This plant is used as animal feed. It contains about 8.2-15.0% dry matter and 8.1-12.8% protein on dry weight basis.

***Cynodon dactylon* (Family: Poaceae)**

It is a good source of food to the aquatic molluscans. This plant is used to cure skin diseases. People utilizes this plant to worship god.

The Bhadra Reservoir Project region is less in aquatic and marshy amphibious plant diversity. But many of the plants are vanishing due to eutrophication (both natural and artificial) and overexploitation. *Hydrilla verticillata* and *Typha* species were found to be dominant at this region.

Most of the species mentioned in this paper are found to be threatened in one category or the other. It is pertinent that remedial measures be formulated to conserve the threatened plant species and preserve the biodiversity of this region which is on the verge of dying.

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