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Diversity and Distribution of Hydrophytes in Davanagere District

Suchitra Boxi, Supritha S., Manmatha Gowda M P., and Haleshi C*

Department of Botany Davangere University Davangere-560065, Karnataka, India

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Corresponding Author: **Haleshi C** | E-Mail: **(haleshi@rediffmail.com)**

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ABSTRACT

The present study reveals that there are 123 species of hydrophytes from 75 genera and 40 families were recorded. The most well-represented family among them was Cyperaceae. Among 123 species 49 dicots, 73 monocots, and 1 pteridophytes, distributed across 40 families and 75 genera. Of the species that have been identified, monocotyledons were found to be the dominant class. The herbarium contained the documented plants along with their botanical names, families, local names, and growth habits.The families Poaceae, Cyperaceae, Nymphaeaceae, Fabaceae, Onagraceae, Lythraceae, and Scrophulariaceae were recorded from Kondajji, Kurki, Bhati Lake, and the Harihara River, respectively, during the study, which was conducted in an unexplored region with no previous documentation. Therefore, proper management of the water bodies will aid in the conservation of these species. The present study provides a database of hydrophytes from the Davangere region of Karnataka, aimed at preserving local biodiversity and facilitating future research.

Keywords: *Hydrophytes, diversity, Davangere lakes water bodies.*

INTRODUCTION

Hydrophytes are an essential component of the lentic ecosystem. Aquatic plants not only provide habitat and breeding grounds for aquatic animals but also help maintain the essential balance of the ecosystem [1]. They facilitate oxygen dissolution and serve as primary producers. The survival of all living organisms depends on oxygen. The study of hydrophyte diversity classifies them into four categories based on their growth habits: wetland, floating, emergent, and submerged [2]. Understanding fundamental biological concepts such as speciation, isolation, endemism, and evolution requires knowledge of phytodiversity, which refers to the variety and variability of plants, i.e., the number of species or taxa in a given region or group. This can be assessed at any level, from global diversity to ecosystems, communities, species, populations, individuals, and even genes within a single organism [3]. All of the water bodies on Earth, including lakes, rivers, ponds, streams, ditches, and oceans, make up the hydrosphere. Aquatic plants, or hydrophytes, are plants that have adapted to live in aquatic environments [4]. They grow only in soil or water that is continuously saturated, and they have the ability to alter the physico-chemical properties of pond water. It has a significant impact on the primary productivity of aquatic ecosystems. Hydrophytes can be classified as submerged, free-floating, fixed-floating, marshy, or amphibious [5]. They are vital for preserving the delicate nutrient balance in water, preventing excessive turbidity, and reducing soil erosion. Additionally, they provide food, oxygen, and shelter for other aquatic organisms. They are among the most crucial biotic components of aquatic ecosystems. This study was conducted in several water reservoirs in Karnataka, India[6]. The Davangere district and its surrounding areas are home to various water bodies that support a diverse range of hydrophytes, many of which have not yet been fully studied. A thorough investigation of the hydrophytes in this area was conducted to document their distribution, habitat ecology, and associations in detail. This can have both economic and medical repercussions.

MATERIALS AND METHODOLOGY

Study Area

The study was conducted in the Davanagere area of Karnataka, India, which is well-known for its diverse aquatic ecosystems, including lakes, rivers, and wetlands, as well as its great diversity of hydrophytic plants.

The reference point for the district is Davanagere city (Latitude: 14.4644° N, Longitude: 75.9218° E). The district map showing various study locations is provided below. Davangere average Rainfall is 73.085mm and high,low temperatures is 32.23℃, 18.9℃.

Selection of Collection Sites

The following important water environments in and around the Davanagere district provided samples of hydrophytic plants, which were selected for their ecological significance:

Kondajji Lake (Latitude: 14°34'11'' N, Longitude: 75°53'10'' E) Nestled amidst mild hills, Kondajji Lake is well-known for its abundance of birds and boating sports. It is roughly 13–14 kilometers from Davanagere city, close to Harihar taluk. The environment is representative of a normal freshwater lake.

Kurki Lake (Latitude: 14°22'26'' N, Longitude: 75°58'19'' E) . Kurki Lake, which is located in the Davanagere area, provides wetland habitat for a variety of aquatic plants and serves as a seasonal habitat for wildlife.

Bhati Lake (Latitude: 14.4° N, Longitude: 75.9° E) Bhati Lake, which lies in the Davanagere district, is an example of a typical body of water, including ponds and wetland edges that are frequented by aquatic vegetation.

Harihara River (Latitude: 14.84° N, Longitude: 72.85° E)

The Harihara River is crucial for researching flowing water hydrophytes, even though it is a comparative site located outside of the central Davanagere district.

In contrast to the district's still water lakes, it offers a different kind of aquatic ecosystem.

Materials Used

GPS Device/Smartphone: To ensure precise measurements of latitude and longitude at every collection location.
District Map: Used to identify sampling sites and organize field trips.
Sampling Tools: Gloves, scissors, forceps, and plastic bags for collecting plant specimens.
Data Sheets and Field Notebooks: Recording environmental data, morphology, site details, and GPS coordinates.
Camera: For photographic documentation of habitats and specimens.
Preservation Materials: Vials, presses, and storage containers to transport and preserve samples.

Methodology

Site Survey and Selection: Using GPS coordinates and the district map, key aquatic habitats like Kondajji Lake, Kurki Lake, Bhati Lake, and the Harihara River were identified for systematic sampling.
Sample Collection: Hydrrophytic plants were gathered manually or with the aid of tools from the shallow areas and water body edges, and GPS coordinates were recorded in order to match the distribution of species with particular sites.
Recording Environmental Data: During data collection, factors such water type, depth, substrate, canopy cover, and human influences were recorded.
Sample Documentation: Photographs of plants and habitats were taken in situ, with detailed notes on morphological characteristics.
Preservation and Transport: Samples were properly labeled with site name, date, and GPS coordinates, and transported in suitable containers to the laboratory for further processing.
Laboratory Identification: Collected specimens were identified using floras and botanical keys; relevant data were compiled for analysis [7][8].

Field work

Many field visits were made to collect different plant species in different seasons. Field notes contain all plant information that cannot be stored with the specimen. Details that genuinely describe the plant. This explains the area's natural characteristics as well as its location and community. Plant collection, identification, pressing, drying, mounting, labeling, and herbarium preparation are all included in field labor.

Collection

In general, any process of collecting plants can be referred to as a collection. The objective of collection can vary and include the creation of new herbaria, the documentation of flora, the analysis of research projects, the use of a portion of the plant as a crude medication for commerce, or ethnobotanical studies. The plant will be collected for the herbarium, either in its whole form or in a well-represented part. As specimens for the herbarium, the hydrophytes were collected, identified, and processed. These specimens were deposited the Herbaria of Davangere University, Davanagere.

Identification

To understand taxonomy language and recognize plant traits, plant specimens must be recognized using botanical keys.

Plants can be identified by morphological characteristics like ligules, stipules, and leaf forms, as well as reproductive organs like fruits and flowers. The most crucial characteristics for plant identification are reproductive structures.

RESULTS AND DISCUSSION

The district's abundance of hydrophytes and year-round streams, such as the Tungbhadra River, which supplies irrigation for Davanagere District, are examples of how biodiversity is enhanced in the area. Hydrophyte growth is promoted by soil, rainfall, humidity, temperature, and topography [9][10]. 112 species, representing 75 taxa and 39 groupings, were surveyed from several locations, including Kurki, Bathi, Harihara, and Kondajji, according to the study's findings. The genus, species, family, local name, and habitat of the hydrophytes were included, as were plant categories such as pteridophyta, dicotyledon, and monocotyledon. The dominant families are Cyperaceae with 10 genera and 24 species, followed by Poaceae with 6 genera and 8 species, Asteraceae 4 genera and 4 species Onagraceae 1 genera 2 species, and Scrophulariaceae belongs to 6 genera and 8 species each, Asteraceae and Hydrocharitaceae belongs to 4 genera and 5 species each, Amaranthaceae 1 genera 2 species, Acanthaceae 1 genera 2 species, Alismataceae2 genera 2 species,Apiaceae, Verbinaceae 2 genera 2 species,Fabaceae 3 genera 4 species, Polygonaceae 1 genera 4 species,Lythraceae 3 genera 4 species,Commelinaceae 2 genera 3 species, Menyanthaceae 1 genera 2 species, Potamogetonaceae 1 genera 2 species, Convolvulaceae 1 genera 2 species and Nymphaeaceae belongs to 1 genera and 2 species each, Araceae 3 genera 3 species, Rubiaceae 2 genera 2 species,and Salviniaceae belongs to 2 genera and 2 species each, whereas 12 families represented by a single species each i.e. Apocynaceae, Aponogetonaceae, Brassicaceae, Cannaceae, Combretaceae Characeae, Droseraceae, Eriocaulaceae, Gentianaceae, Lentibulariaceae, Marsileaceae, Melastomataceae, Molluginaceae, Nelumbonaceae, Plantaginaceae, Pontederiaceae, Salicaceae and Typhaceae (Table 1).[11][12]

Table 1: Davangere (2025) Rainfall and Temperature Data

Months	High. Temperature (℃)	Low Temperature (℃)	Rainfall (mm)
January	30.1	18.2	6.48
February	32.9	19.5	5.41
March	35.9	21.6	9.56
April	37.3	23.4	45.38
May	35.9	24	85.89
June	30.4	22.7	150.57
July	27.6	21.8	133.1
August	27.8	21.1	148.79
Average Data	**32.23**	**18.9**	**73.085**

Table 2. List of habitat-wise distribution of major hydrophytic plants present in Davanagere District, Karnataka

Name of the Families	No. of Genera	No. of Species
Areaceae	3	3
Asteraceae	4	4
Commelinaceae	2	3
Cyperaceae	10	38
Fabaceae	3	4
Hydrocharitaceae	4	5
Lythraceae	3	4
Poaceae	6	8
Polygonaceae	1	4
Scrophulariaceae	6	8

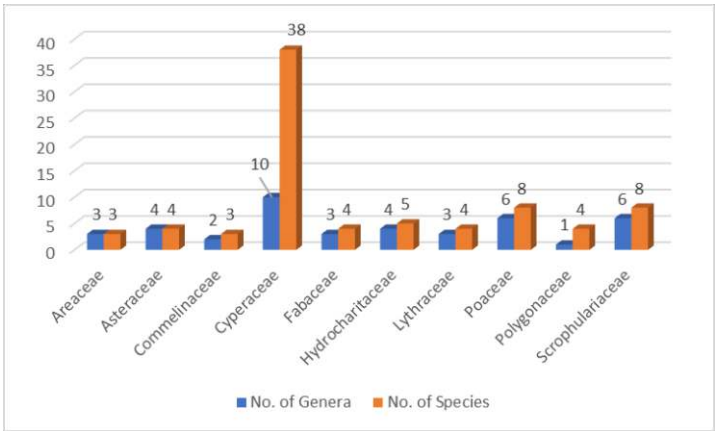

Chart 2: Graph of hydrophytic plants present in Davanagere district, Karnataka

Fig 1: Hydrophytes plants picture

CONCLUSION

Global biodiversity monitoring provides essential information on species distribution and abundance, enabling governments to save rural communities with high biodiversity that are home to rare and endangered species [13][14]. Hydrophytes play a important role in aqautic ecosystem, number of aquatic fishes, frogs, crabs, newts, turtles and many invertabrates depend on hydrophytes for their food, shelter, protection and reproductionAccording to the current study, a variety of hydrophytes have been found in the Davanagere district's many bodies of water, particularly in the villages of Kondajji, Kurki, Bhati (lake), and Harihar River [15][16]. The present study gives a summary of the plants currently found in this area and discovered that 123 hydrophytes from 75 genera in 40 families were investigated [17][18]. First-hand and original data are used in this study. Basic details about the current condition and makeup of hydrophytes in Karnataka's Davangere district are provided by this study [19][20]. These species must be preserved and protected for upcoming generations. The database of hydrophytes displayed in this work will be useful for upcoming projects pertaining to the preservation, conservation, and enhancement of regional biodiversity [21][22].

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