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A survey on anurans at Walayar lake, Palaghat district, Kerala state, India

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ABSTRACT

In this survey, a total of 10 anuran species belonging to 6 families and 9 genera were recorded from the study area. Anurans represented the most dominant amphibian group observed during the study. Among the recorded families, Dicroglossidae was the dominant family with 3 species, followed by Bufonidae and Microhylidae with 2 species each. Ranidae and Rhacophoridae were represented by one species each. The genera Hoplobatrachus and Duttaphrynus were also represented by a single species each. The results of the present study indicate that the area possesses a moderate level of anuran species diversity. This study may serve as an important first step in establishing baseline data for anuran checklists, which can later be expanded to include all herpetofauna and other faunal diversity records.

KEY WORDS

Aquatic Ecosystems; Amphibians; Habitat loss; Diversity

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Introduction

Amphibians are the habitat specific and highly sensitive vertebrates occupying diverse habitat due to its sensitivity towards the environment. They are referred to as environmental indicator species and are crucial to the agricultural fields' ecological cycle. They consume insects, including a variety of agricultural crop pests.

Amphibians few the threat of extinction throughout the world. Here, the habitat loss is considered as a critical factor. India is an ideal home for astonishing diversity of amphibians especially the Western Ghats, and earth Himalaya (anuran hotspot). Over 170 species have been described so far and new species are being added every year, especially from Western Ghats. Much of this amphibian diversity is reported as an endemic and unique to the Western Ghats. Studies on amphibians have focused largely on taxonomic and have left wide gaps in the knowledge of natural history and ecology of these sensitive creatures. There is no information on field based continuous amphibian monitoring programs in India. Such studies are important in conservation of high diverse and endemic taxa. In the study an attempt was made to document the biodiversity of amphibian.

Amphibians include frogs, toads, salamander and caecilians. They are the first tetrapods dwell on land. Amphibians lead a life on both land and water. They are poikilothermic or cold-blooded animals. They are affected by the temperature in their immediate surroundings. Amphibians are the most important faunal group with a reported 7529 species worldwide [1]. Nearly one-third (32%) of the amphibian species of the world are threatened [2]. In the Indian subcontinent, there are 447 amphibians reported of which 406 are anurans, two species are Salamander and 39 species are caecilians [3]. Dinesh et al, reported, 239 species of amphibian from Western Ghats South India. Western Ghat is confident an anuran hotspot since 159 endemic amphibians are reported by Biju and bouneyt [4,5].

A global assessment indicates that rapid decline in amphibian population in recent times and have raised concern among amphibian conservationist [6]. Even though a region may have a variety of habitats, amphibians only use a particular habitat there. Depending on the physiochemical and climatic conditions, the number of individuals that represent each species in a community may differ from location to location. Human interference with an amphibian community's diversity and structure has been documented in a variety of habitats [7]. Habitat loss, fungal and climate change that on 40 % of the amphibian species [8].

However, the diversity of amphibians in the Western Ghats is seriously threatened by urbanization, human-dominated landscapes, and deforestation. Habitat loss, habitat modification, and changed land use patterns are the outcomes of these activities [9]. In general, amphibians are widely distributed, have a bimodal lifestyle, live in an ectothermic environment with a constant temperature, and have moist, permeable skin. Because of all of these, they are extremely sensitive to changes in the outside world. As a result, among vertebrates, amphibians are thought to be the best ecological indicators. The main objectives of this study are to monitor the diversity and distribution of amphibians at Walayar lake, Palakkad, Kerala.

Materials Method

Survey method

The method involves frequent field surveys and careful visual examination of amphibians in all the possible part in and around the lake area, such as agricultural fields, open land and rocky areas. The study survey was carried for a period of two years from March-2018 to March-2020. The observations were mostly carried out between 06.00 and 21.00 hrs. The parameters noted during observation include name of the species and habitat in which the species was found.

Frogs and toads collected from the study area were identified using essential identification keys and field manual. The photographs of specimens were taken for identification found in the study area. Easily visible characters, habits and habitat were also used for identification of the species. Expert opinion also obtained for conformation of the identification.

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Results

In this survey a total of 10 anuran species belong to 6 families and 9 genera were recorded (Table 1) (Figure 1 and 2). Anurans represent the most dominant group is the family Dicroglossidae family is dominant family of anuran is with 3 species that is followed by Bufonidae and Microhylidae with 2 species each. Ranidae, Rhacophoridae. Hoplobatrachus and Duttaphrynus are represent with a single species is anuran.

Fejervarya, Anaxyrus, Duttaphrynus, Hydrophylax, Hoplobatrachus, Uperodon, Microhyla, Euphlyctis, Polypedates and are the 9-genus collected from the study site. Regarding. IUCN status all the 10 species are grouped under the Least concern category (Figure 3).

Table 1. Species diversity of amphibians in Walayar lake during Jan 2019 to December 2020.

S. No	Name	Scientific name	Family	IUCN Status
1	Indian bull frog	*Hoplobatrachus tigerinus*	Dicroglossidae	LC
2	Asian grass frog	*Fejervarya limnocharis*	Dicroglossidae	LC
3	Canadian toad	*Anaxyrus hemiophrys*	Bufonidae	LC
4	Asian common toad	*Duttaphrynus melanostictus*	Duttaphrynus	LC
5	Wide - spread Fungoid frog	*Hydrophylaxbahuvistara*	Ranidae	LC
6	Sri Lankan Bullfrog	*Uperodon taprobanicus*	Microhylidae	LC
7	Berdmore's chorus frog	*Microhyla berdmorei*	Microhylidae	LC
8	Common skittering frog	*Euphlyctis cyanophlyctis*	Dicroglossidae	LC
9	Common tree frog	*Polypedates leucomystax*	Rhacophoridae	LC
10	Jerdon's bullfrog	*Hoplobatrachus crassus*	Bufonidae	LC

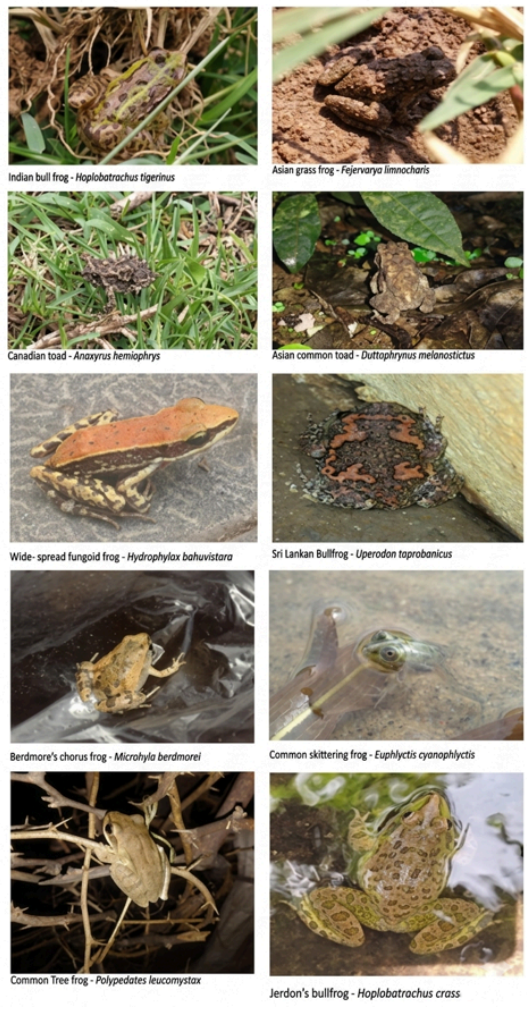

Figure 1. A collection of various anuran species showcasing distinct morphological features and habitats.

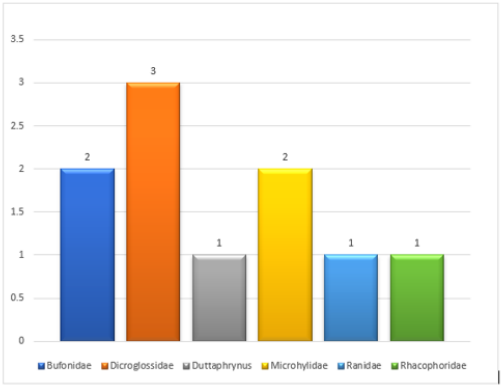

Figure 2. Familywise distribution of Amphibians in Walayar lake.

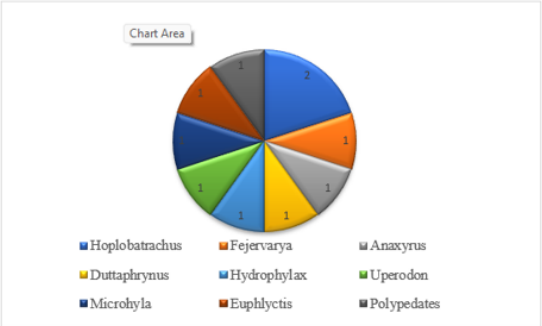

Figure 3. Showing of genus pattern of anurans in Walayar lake.

Discussions

As of November 2025, 8973 species of amphibians are reported from the world as documented in amphibian web database [10]. In India there are 454 species of amphibians reported under 16 families in 3 orders. Regarding the diversity in India, Western ghats is one of the biodiversity hotspots of the world where 253 species of amphibians were reported by Ramakrishna et al. [11].

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Sajjan et al., "reported 30 species of amphibians (19 genera of 9 families and 2 orders) from Sangli district, Maharashtra, India [12]. A study by Pradhan et al., from Darjeeling Hills, West Bengal, reported 48 individuals representing nine species belonging to four families and five genera" [13].

Pankaj et al., "Studied the diversity of amphibian in Gaya district Bihar. In this study a total of 10 amphibian species belong to 4 families and 7 genera were recorded from the Ramsar pond (site-1) area. In another site 8 Anuran belong to 4 families and 6 genera were documented" [14].

In a study conducted at the foothills of southern western Ghats (Coutrallam) Vasanthi et al., recorded a total of 17 species. (six families and 14 genera) [15]. A high diversity with 56 species of amphibians belong to 15 genera and five families were reported Kulathupuzha region in Kerala. Nag et al., reported a total of 12 species of Anurans from Nandi Hills and Moodiganahalli village, Chikkaballapur District, Karnataka [16]. In Kerala Das et al., recorded of 36 species of amphibians from Eraivikulam National Park [17]. A total of 17 species of amphibians were found in Thattekkad bird sanctuary, Ernakulam district, Kerala [18]. A study in Cauvery Delta regions of Tamilnadu revealed that 10 species of anuran which belong to 7 genera and 4 families [19]. In another study, Sri hari reported the occurrence of 12 species of amphibian are recorded from Kole wetlands of Kerala [20].

Saikia et al., observed 10 species of amphibians belong to 8 genera and 4 families from Botanical Survey of India, Experimental Botanic Garden, Meghalaya [21]. In Loktok lake, Manipur. Ningombam et al., reported 25 species of amphibians [22]. Twelve species of frogs under 4 families were recorded at Ameenpur Lake, Telangana state, by Sailu et al. [23]. In another study, a total of 11 anuran species were collected from Ranthambore, Tonk and Hadoti regions of Rajasthan [24].

47 amphibian species from 8 families and 15 genera were identified from a variety of habitats throughout the Wayanad district of the Western Ghats during the three-year observation period (2022–2025) [25]. Located in the center of the Himalayan state of Arunachal Pradesh, Itanagar Wildlife Sanctuary is a hotspot for Eastern Himalayan biodiversity. found 14 genera (21 species) in six families: Rhacophoridae (28.57%), Ranidae (14.29%), Bufonidae (7.14%), Megophryidae (7.14%), Microhylidae (7.14%), and Dicroglossidae (35.71%) [26].

Reports on 28 amphibian species from the Northern Western Ghats of Southern Maharastra's Chandgad taluka in the Kolhapur District. This accounts for 52.83% of amphibians recorded from Maharashtra and 6.26% of amphibians reported from the Indian Subcontinent. The recorded amphibians belong to 16 genera and 7 families. Of the amphibians identified, three are classified as near threatened, and one is classified as endangered, vulnerable, or critical by the IUCN [27]. Amphibian diversity was evaluated in various agro-ecosystem habitat types in the Bihar province's Aurangabad district. The following habitat types were chosen to evaluate the amphibian diversity of this area: (1) grassland; (2) ponds; and (3) agricultural and non-agricultural land. Thirteen species of amphibians from nine genera and four families were identified. The Aurangabad district of Bihar province has a rich amphibian fauna, according to this study [28]. Amphibian diversity in two Telangana state districts between 2010 and 2014. Amphibians were recorded in every potential habitat within the study area using a quick survey approach that involved meticulous visual estimation. A total of 14 amphibian species from 4 families and 9 genera were identified. According to this study, the Northern and Central Telangana region supports a wide variety of amphibian species. Additional research on habitat and population structure is required [29]. There is very little information available in the state of Telangana regarding.

There have been reports of amphibians. Murthy documented six species from the Nagarjuna Valley, which is currently covered by Reservoir Nagajunasagar [30]. Thus far, the variety of amphibians in various Telangana regions have been reported by some of the authors; 19 species fromfour families from Nagarjunasagar Tiger Reserve, 18 species from 4 families from the same area that comprise 11 genera and 20 species from four families and twelve genera and supported an annotated checklist with comments on taxonomy, nomenclature, habitat utilization, types of adaptation, and biogeography of the amphibians [30-32].

It's interesting to note that some amphibian lineages that are directly developing have extremely high species richness. There are about 800 direct-developing species in the Brachycephalidae family, and among salamanders, the majority of direct-developing of the 514 salamander species, Plethodontidae contains by far the greatest number of species (349). This could be interpreted as proof that amphibians use water independence as a particularly effective tactic. Additionally, it might result from direct developers alleged increased fragmentation into isolated demes, which could accelerate the formation of new species [33]. Due to their previously known restricted distribution and status as one of India's Lost Amphibians, the majority of amphibian species are classified as Critically Endangered by the IUCN. It is evident from this investigation that a long-term study of the ecology and distribution of herpetofauna is required in order to understand the richness of this virgin ecosystem and the potential for the recovery, rediscovery, or occurrence of new species.

Amphibians are important creatures to agriculturalists, since they play a key role in aquarium ecosystem as predator. They mainly consume of insect pest. Amphibians are mainly attracted to the agricultural land where they faced on various insect pests [34].

Conclusion

The decline in amphibian population is due to growing human settlements that resulted in habitat loss or fragmentation of habitat of different animals including amphibians. Also, unpredictable rainfall, diseases, upward migration of species along the elevation gradient and drying of springs has resulted in decrease population of amphibians.

Inadequate species-specific data, inadequate representation within protected areas, lax enforcement of legal protections, and low public awareness are just a few of the challenges facing amphibian conservation in India. Many amphibians live in areas outside of conventional forest reserves, like farmlands, roadside wetlands, and seasonal pools, which are rarely the subject of conservation efforts.

In this study 10 species of Anurans under 9 genera are collected in and around the Walayar lake. This study may generate the base line data for the anuran's diversity in Walayar lake. It was the preliminary report on the amphibian faunal diversity of this Lake. They were collected from a restricted area and further study is recommended to explore the diversity

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and assess the effect of emerging threat on habitat and anuran population.

Disclosure Statement

No potential conflict of interest was reported by the author.

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