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AMPHIBIAN FAUNA (FAMILY: MICROHYLIDAE AND RHACOPHORIDAE) ASSORTMENT AND ALLOCATION IN SOUTH INDIA

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ABSTRACT

South Indian region has vast number of flora and fauna, and also many endemic and endangered species. Amphibians are represented by high species richness and endemism in south india, Though there are few studies that have looked at the ecological aspects of the amphibians in the Western Ghats, inventories of amphibians are available for many parts of the Ghats. Though the amphibians are considered as biological indicators for their susceptibility to even very small changes in the surrounding environment and their habitats typically spread across the interface between terrestrial and aquatic habitats. They are the only vertebrate group with dual life stages and perform vital ecological functions. However, amphibian diversity of the Western Ghats is facing major threats due to deforestation, human dominated land-scapes and rapid urbanization resulting in land use changes, loss and modification of habitat. The present survey revealed that the family *Microhylidae* consists of 61 genera and 279 species in the worldwide, of which 15 species belonging to 5 genera occur in India. One species found in the present survey. Mean while the family *Rhacophoridae* includes 10 genera and 186 species in the world, of which 6 genera and 52 species occur in India. Now two species are found.

KEYWORDS: Amphibian fauna, Morphological characters, Family Microhylidae, Rhacophoridae Biological indicators, Western Ghats.

INTRODUCTION

Amphibian research in India is limping primarily due to the lack of appropriate and reliable reference books that cover all the known species. Such guides, despite the number of excellent photographs of rare species, we know have not been produced since we do not have sufficient specimens of all the described species anywhere in the country. The lack of correctly identified and well maintained specimens have offered little scope for even a serious student of amphibian, studies to attempt preparing a field guide to any part of India. (S.V.Subba reddy., 2007). Amphibians may be defined as cold blooded or poikilothermic verterbrates typically living on land and breeding in water, they are having a smooth or rough skin rich in glands which keep in moist. If scales are present, they are hidden in the skin. The class Amphibia divided into three sub-classess. They are 1. Labyrinthodontia 2. Lissamphibia 3. Lepospondyli. The sub-class Labyrinthodontia and Lepospondyli are extinct. But all the modern Amphibia are included in sub-class – Lissamphibia. The sub-class: Lissamphibia is divided into three orders as follows. Order: - Anura or Sailentia, Order: - Urodela or Caudata, Order: - Gymnophiana or Apoda.

According to S.V.Subbareddy (2007). Many species are found in South India among three orders. The following species are found on surveying and described in this investigation. These are surveyed and collected in and around Tirupati, and some part of Andhra Pradesh. The discovery of amphibians in Western Ghats was initiated during the year 1799 by Schneider and it continued at a regular pace till now. In the View of present scenario Amphibian fauna facing major threats due to deforestation, human dominated land-scapes and rapid urbanization resulting in land use changes, loss and modification of habitat, pollution and traffic noise (Aravind and Gururaja, 2011). Amphibians in India are highly diverse with 337 species of which 301 are anurans (Anil *et al*., 2011a; Biju *et al*., 2011; Dinesh *et al*., 2011). The amphibians in India are beginning to be studied in detail (Dutta, 1997), and species are being discovered

even now (Robin *et al*. 2013). To implement conservation programmes for amphibians it is important to understand the factors that control their diversity in the region. Amphibians play an important role in the ecosystem because they feed on insects, including many pest species of agricultural crops. They are also important food sources for many larger animals such as water birds, mammals, reptiles, and even spiders and large insects. They often have economical importance to humans as a food source (Mazzoni *et al*., 2003), medical resource in some regions (Chinese medicine) (Zhou *et al*., 2006), and as an important potential source of future pharmaceutical drugs (Clarke, 1997). In this study, we presented listing families of amphibians in and around southindia of the study area; the amphibian diversity of the Western Ghats is distinctive both in its diversity and endemism (Biju *et al*., 2001).The area is one of the world's ten "hottest biodiversity hotspots" and has over 7,402 species of flowering plants, 1,814 species of non-flowering plants, 139 mammal species, 508 bird species, 179 amphibian species, 6,000 insects species and 290 freshwater fish species; it is likely that many undiscovered species live in the Western Ghats. At least 325 globally threatened species occur in the Western Ghats. (Myers, N.; *et al.,* 2000. Dahanukar, N. *et al*., 2004; Nayar, T.S.*et al.,* 2014).

The amphibians of the Western Ghats are diverse and unique, with more than 80% of the 179 amphibian species being endemic to the rainforests of the mountains. (Vasudevan Karthikeyan; 2005). The endangered purple frog was discovered in 2003. (Radhakrishnan, C; 2007). Several families of frogs, namely of the genera Micrixalus, Indirana, Nyctibatrachus, are endemic to this region. Endemic genera include the toads Pedostibes, Ghatophryne, Xanthophryne; arboreal frogs such as Ghatixalus, Mercurana and Beddomixalus; and microhylids like Melanobatrachus. New frog species were described from the Western Ghats in 2005, and more recently a new species, monotypic of its genus Mysticellus, was discovered.(An evaluation of the endemism of the amphibian assemblages from the Western Ghats using molecular techniques; 2008) The region is also home to many caecilian species.

MATERILAS AND METHODS

Procurement of the experimental animals

Collections were made either during late evening, nights or early hours of the day. The habitats surveyed ranged from agricultural fields through semi-evergreen and low-altitude evergreen forests to high elevation evergreen forests of the area. During each collection, all aquatic, semi-aquatic, terrestrial and arboreal habitats were intensively searched for the presence of amphibians. Care also taken to search remote microhabitats, such as rock crevices, areas covered butteress, leaf litter, fallen and decaying wood, shrub-root basis and temporary water bodies formed during monsoons. At every collection, only a sub sample of each new species seen was preserved in formaldehyde for identification. The remaining frogs after collection were examined for morphological structures in both males and females. Then they were released into their respective natural habitats.

Maintenance of frog

Healthy frogs, weighing 50 ± 3 gms were collected from the pond, acclimated to the laboratory conditions in large glass aquaria with water (Temperature 27 ± 2°C; P^H 7.0 ± 0.2, light period – 12 hours) for 7 days. They were fed with cockroaches and earthworms *ad libitum*, with change of water daily.

RESULTS AND DISCUSSION

Family: Microhylidae (Narrow Mouthed Frogs)

The **Microhylidae**, commonly known as **narrow-mouthed frogs**, are a geographically widespread family of frogs, which is the largest number of genera of any frog family. (Blackburn, *D.C.2011).*As suggested by their name, microhylids are mostly small frogs. Many species are below 1.5 cm (0.59 in) in length, although some species are as large as 9 cm (3.5 in). (Zweifel, Robert G. 1998). They are small to medium-sized, short legged toad like burrowing frogs which are not found near water except during the breeding season. One look at the small, narrow, pointed head, tiny bulging eyes is enough to spot a microhylid in a sandy or most area. The first finger is always shorter than the second and the tips of the fingers are either rounded or dilated into flattened triangular disk. The skin is more or less smooth and without warts. The parotid glands are absent and the ear drum is indistinct. The pupil is horizontal or round, the jaws are toothless and the tongue is mostly elliptical. They remain hidden during the day in burrows which they make in loose sand by the spade like projection of their hind feet and become active at night. The family consists of 61 genera and 279 species in the worldwide, of which 15 species belonging to 5 genera occur in India. One species found in the present survey.

1.1: Microhyla ornate (Dumeril and Bibron):- It belongs to Phylum - Chordata; Class – Amphibia; Sub-Class – Lissamphibia; Order – Anura and Family – Microhylidae. It is commonly called as "Narrow mouthed frog" or "Ornata microhylid". They are terrestrial and nocturnal but are active during the day time in rainy season. Normally they are found in the grasses and bushes growing on moist soil. They are small sized, slender, ative frogs with bulging eyes. Head is broader than long. Snout is somewhat pointed and projects beyond the narrow mouth. Tongue is elliptical. Nostril is nearer to the tip of the snout than the eye. Ear drum is indistinct. Fingers are slender and do not bear webs, the first finger is shorter than the second. Tips of the fingers are flattened. Rudiment of web is present between the toes, the tips are blunt. Two small but distinct and oval (inner and outer) pedal tubercles are present. Skin is smooth. The upper side is light brown with distinct dark brown diamond shaped markings over

the back, beginning between the eyes, extending to both eye lids, narrowing behind the head and widening above the shoulder, then narrowing again and finally broadening out and sending a stripe to the groin and the thigh. A dark streak extends along the sides from behind the eye to the shoulder. Limbs are with dark cross bars. The belly is dull and white (**Plate 1. 1, Fig: A & B).**

Legend for Plate (1.1, Fig: A & B): Microhyla ornate (Dumeril and Bibron).

Fig. A: Dorsal view Fig. B: Ventral view.

Legend for Plate (1.2, Fig: A & B): Polypedates maculates

Fig. A: Dorsal view Fig. B: Ventral view

Legend For Plate (1.3, Fig: A & B): Polypedates leucomystax

Fig. A: Dorsal view Fig. B: Ventral view

Family: Rhacophoridae (Tree Frogs)

The Rhacophoridae are a family of frogs which occur in tropical sub-Saharan Africa, South India and Sri Lanka, Japan; northeastern India to eastern China south through the Philippines and Greater Sundas, and Sulawesi. They are commonly known as shrub frogs, or more ambiguously as "moss frogs" or "bush frogs". Some Rhacophoridae are called "tree frogs". Although a few groups are primarily terrestrial, rhacophorids are predominantly treefrogs which are arboreal. Mating frogs, while in amplexus, hold on to a branch, and beat their legs to form a foam. The eggs are laid in the foam and covered with seminal fluid before the foam hardens into a protective casing. In some species, this is done in a large group. The foam is laid above a water source so the tadpoles fall into the water once they hatch. (Zweifel, Richard G. 1998).

This family also contains the Old World flying frogs, including Wallace's flying frog (*Rhacophorus nigropalmatus*). These frogs have extensive webbing between their forelimbs and hindlimbs, allowing them to glide through the air. (Sunny Shah & Rachna Tiwari; 2001). As many frogs, Rhacophorids harbour monogeneans worms in their urinary bladder. The parasite species specialized to this family of frogs belongs to the genus *Indopolystoma*, described in 2019. (Chaabane, *et al*., 2019). They are characetrized by the presence of an additional short cartilagenous segment between the ultimate and penultimate toe segments. Most species are arboreal. The family includes 10 genera and 186 species in the world, of which 6 genera and 52 species occur in India. Now two species are found.

1.2: Polypedates maculates: - It belongs to Phylum - Chordata; Class – Amphibia; Sub-Class – Lissamphibia; Order – Anura and Family – Rhacophoridae. It is a common Indian tree frog. It is nocturnal and arboreal. It is a medium – sized, slim, narrow waisted tree frog with slender elongated limbs and goggling eyes. Head is broader than long. Snout is somewhat pointed and projects a little beyond the mouth. Nostril is nearer to the tip of the snout than the eye. Ear drum is distinct. Fingers are with rudimentary webs, the first finger is nearly equal to the second. Joints between the segments of the fingers and toes are very prominent. Toes are almost half-webbed with two segments of the fourth toe free. Tips of fingers and toes are dilated into flattened, spherical or horse-shoe shaped adhesive discs. A distinct oval inner pedal tubercle is present but outer pedal tubercle is absent. It has a smooth skin and granular belly on the underside of thighs. On its back there is a pair of distinct elevations, which is observed only when it is at rest. A dark brown marking extends from the tip of the nostril on both sides of the head, covering the eye right up to the middle of the belly. The color of the body is highly variable and depends on the color of the habitat. During rainy season they enter into human dwellings mostly preferring the dark and moist places of bathrooms (Plate: 1.2, Fig: A & B).

1.3: Polypedates leucomystax: It belongs to Phylum - Chordata; Class – Amphibia; Sub-Class – Lissamphibia; Order – Anura and Family – Rhacophoridae. It is commonly called as “Bamboo Tree Frog “. They are found in agricultural land and light forests. They are nocturnal and arboreal. They are large sized tree frog with elongated limbs and bulging eyes. Head is broader than long. Snout is not pointed and projects slightly beyond the mouth. Nostril is nearer to the tip of the snout than the eye. Ear drum is distinct. Fingers are without webs, the first finger is nearly equal to the second. Toes are almost fully webbed with a single segment of the fourth toe free. Joints between the segments of the fingers and toes are prominent. Tips of the fingers and toes are dilated into horseshoe shaped adhesive discs. A distinct oval inner pedal tubercle is present but outer pedal tubercle is absent. It has a smooth skin and granular belly. Males are smaller than females. The color of upper parts is light brown to chocolate with few dark

parallel stripes and under part is whitish **Plate (1.3, A & B).**

CONCLUSION

In conclusion, our consequences confirmed that Amphibians play an important role in the ecosystem because they feed on insects, including many pest species of agricultural crops. In the View of present scenario Amphibian fauna facing major threats due to deforestation, human dominated land-scapes and rapid urbanization resulting in land use changes, loss and modification of habitat, pollution and traffic noise. This study generated a base line data on the amphibian fauna of south Indian region, which may help in further studies. Mean while Provide conservation related education MATERIALS to farmers, campers, hikers and people. Educating and creating awareness about amphibians among school children who are residing inside and nearby areas.

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