Asian Journal of Conservation Biology, July 2020. Vol. 9 No. 1, pp. 130-133 AJCB: FP0130
ISSN 2278-7666 ©TCRP Foundation 2020

Documentation of Rare, Endangered and Threatened (RET) Anurans in the Malnad regions of Chikkamagaluru district in Central Western Ghats of Karnataka, India

Vishwajith H U[1], Pavan kumar K S[1], Keshavamurthy M V[2] and Dayananda G Y[1*]

[1]*Department of P.G studies and Research in Applied Zoology, Bioscience complex, Jnana Sahyadri, Kuvempu University, Shankaragatta –577451, Shivamogga, India.*
[2]*Department of zoology, Dr. G Shankar Government women's First Grade college And P.G study centre, Ajjarkad, Udupi, India*

(Received: November 30, 2019; Revised: May 05, 2020 ; Accepted: July 05 , 2020)

ABSTRACT

We studied the RET anurans of under-explored Malnad regions in Central Western Ghats of Karnataka.The study area covers Sringeri and Koppa irrigated by the river Tunga and its tributaries. The survey was carried out during the monsoons of 2017 and 2018. A total of 10 species of anurans belonging to 6 families and 8 genera were documented. Among them 3 species are categorised critically endangered (CR), 4 endangered (E), 1 vulnerable (V) and 2 are near threatened (NT) by the IUCN category and 9 species were endemic to Western Ghats. Our investigation was based on photographic voucher, technical description and IUCN status of anurans.

Key words: Rare, Endangered and Threatened, Anurans, Western Ghats, Chikkamagalur

INTRODUCTION

Information of Anuran species richness and diversity is becoming increasingly important in the context of global amphibian decline (Kiesecker 2010). Some of the major threats concerning Anurans in human dominated landscapes are rapid urbanization resulting in land use changes, loss and modification of habitat, pollution of available habitats and traffic noise **(**Collins and Storfer, 2003; Aravind and Gururaja, 2011). The amphibian (Caecilians, Salamanders and Anurans) fauna of India is very diverse and play a major role in ecosystem functioning, especially as consumers of pest insects and as preys themselves (Dinesh *et al*., 2009). Semi-permeable skin, amniotic eggs and the biphasic life make them particularly vulnerable to changes via contamination of their habitats. A total of 7215 species of amphibians in the world (Frost, 2013) of which 432 amphibians in Indian scenario (Dinesh *et al.,* 2019) are recorded and many more are being discovered. The Indian subcontinent has a unique assemblage of flora and fauna due to the subcontinent's successive and prolonged periods of isolation **(**Roelants *et al*., 2004) and the Western Ghats are a recognised biodiversity hotspot (Myers *et al*., 2000).

The Western Ghats constitute a 1600 km long mountain chain along the west coast of India and traverses the six states of Gujarat, Maharashtra, Goa, Karnataka, Tamilnadu and Kerala (Daniels, 2008). A recent study showed that, a total of 47 species of amphibians from India and 28 species from Western Ghats are feared as 'lost amphibians' (Dinesh and Radhakrishnan. 2011). According to the IUCN (2010) assessment, the 157 species of amphibians known from the Western Ghats fall under six broad categories; Eight Critically Endangered (CE); 69 Data Deficient (DD); 28 Endangered (EN); 30 Least Concern (LC); six Near Threatened (NT) and 16 Vulnerable (VU) (Dinesh and Radhakrishnan. 2011). The present study focused on the importance of anuran study and their habitat, long-term studies to unravel the diversity in evergreen mountain regions of Western Ghats of Chikamagalur district of Karnataka, India.

MATERIALS AND METHODS

Study area:

The study was conducted in Sringeri and Koppa taluk of Western Ghats of Karnataka (Figure 1). The region is characterised by semi-evergreen and moist deciduous types with some excellent patches of evergreen forests in Sringeri ranges. In Koppa, the average annual temperature is 23.2 °C and annual rainfall is 285,cm and it is located 13^0 32' to 13° 52' N and 75° 22' to 75° 36' E. In Sringeri, the average annual temperature is 23.5 °C and annual rainfall is 380cm and it is located 13° 25' to 13° 41' N and 75° 15' to 75° 25' E. Survey of various habitats preferred by amphibians like ponds, pools, river, streams, orchards, plantations, paddy fields, other fresh water sources etc was performed and rigorous fieldwork was conducted during the monsoons of 2017 and 2018. Sampling was done by visual encounter sampling method. The specimens were documented and photographed in the study areas. The species identity was confirmed by referring published literature, Pictorial Guide (Gururaja, 2012)

RESULTS

The assessment of anuran species in different region of study area revealed that a total of 10 species belonging to 8 genera and 6 families (Plate 01)**.** All the documented species exist in IUCN Red List as RET and 9 species were endemic to Western Ghats. A

**Corresponding Author's E-mail: inchara.gy@gmail.com*

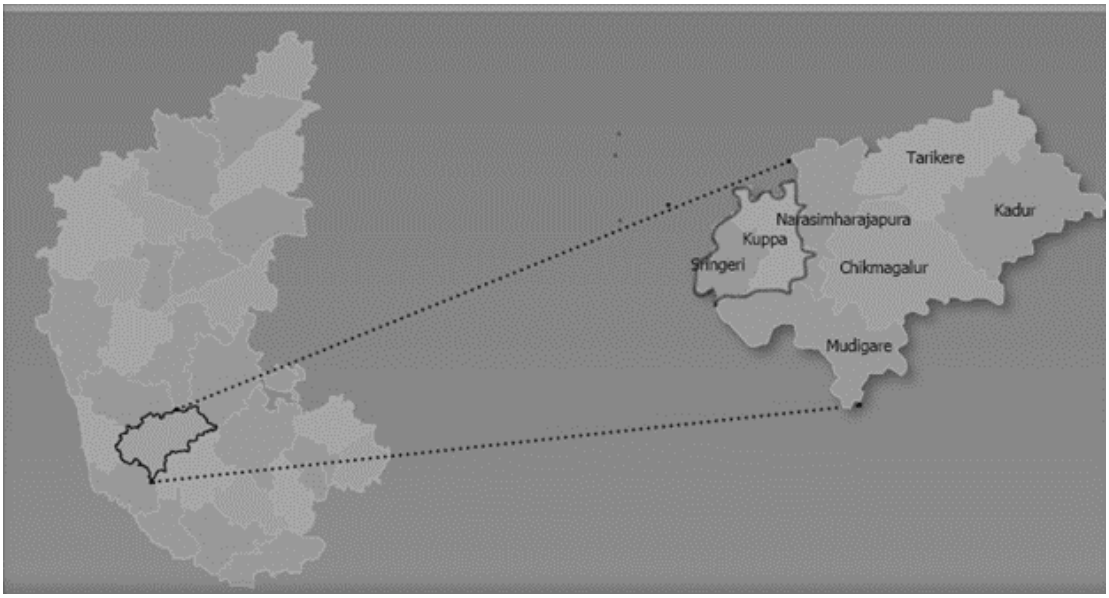

Figure 1. Map showing study area

detailed checklist of anurans, their common name, and IUCN category of each species is provided in Table 1.

The documented species belong to different families of the anurans. Among them, family Rhacophoridae, Microhylidae, Ranidae and Nyctibatrachidae represents 2 species each and the family Dicroglossidae and Micrixalidae contains only 1 species (Figure 2).

Percentage distribution of species according to IUCN Red List. Out of 10 species, a major chunk of the distribution has species listed as Endangered by IUCN Red List. This is followed by critically endangered and near threatened and finally vulnerable species (Figure 3).

In the habitat distribution, 46% of species were found in the terrestrial habitat, 27% on semi-aquatic habitat and 27% were arboreal (Figure 4).

The typical habitats for the documented species are listed in Table 2, where chance of overlapping their habitat is significantly observed.

Table 1. Checklist of documented RET species of amphibians

Sl. No	SCIENTIFIC NAME	COMMON NAME	IUCN CATEGORY
I.Family: Ranidae			
1	*Indosylvirana indica (Biju et al.,2014)*	Golden Frog	VU
2	*Clinotarsus* curtipes (Jerdon, 1853)	Bi-Coloured frog	NT
II.Family: Micrixalidae			
3	*Micrixalus kottigeharensis (Rao, 1937)*	Kottigehara Dancing Frog	CR
III.Family: Dicroglassidae			
4	*Minervarya sahyadris (Dubois, 2001)*	Sahyadri burrowing frog	EN
IV.Family: Microhylidae			
5	*Uperodon mormoratus (Rao, 1937)*	Marbled Ramanella	EN
6	*Uperodon taprobanicus (Parker, 1934)*	Painted Ramanella	NT
V.Family: Nyctibatrachidae			
7	*Nyctibatrachus dattatreyaensis (Dinesh, 2008)*	Dattatreya Night Frog	CR
8	*Nyctibatrachus karnatakensis (Dinesh 2007)*	Karnataka night frog	EN
VI.Family: Rhacophoridae			
9	*Pseudophilautus amboli (Biju and Bossuyt, 2009)*	Amboli Bush Frog	CR
10	*Rhacophorus lateralis (Boulenger, 1883)*	Small tree frog	EN

Source : IUCN Red List (2009): http://www.iucnredlist.org/amphibians.)CR - Critically Endangered; EN - Endangered; VU - Vulnerable; NT - Near Threatened, conservation status according to the IUCN.

Table 2. Anurans utilize different microhabitat in the study area.

SL No.	Species	Habitat category					
		Tree	Bush	Water logged area	Leaf litter	Land and rock	Stream and falls
1	*Indosylvirana indica*			✓			✓
2	*Micrixalus kottigeharensis*			✓			✓
3	*Minervarya sahyadris*			✓	✓		
4	*Uperodon mormoratus*				✓	✓	
5	*Uperodon taprobanicus*				✓	✓	
6	*Nyctibatrachus dattatreyaensis*			✓			✓
7	*Pseudophilautus amboli*	✓	✓				
8	*Clinotarsus curtipes*				✓	✓	
9	*Rhacophorus lateralis*	✓	✓				
10	*Nyctibatrachus karnatakensis*			✓			✓

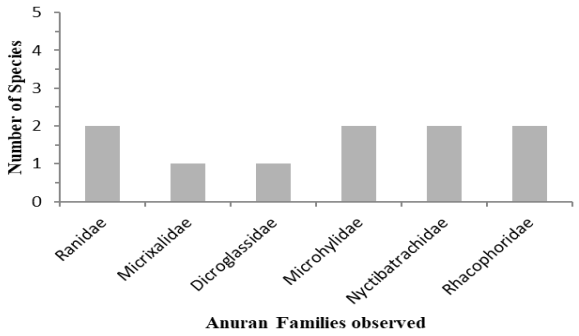

Figure 2. Number of anuran species recorded during study period.

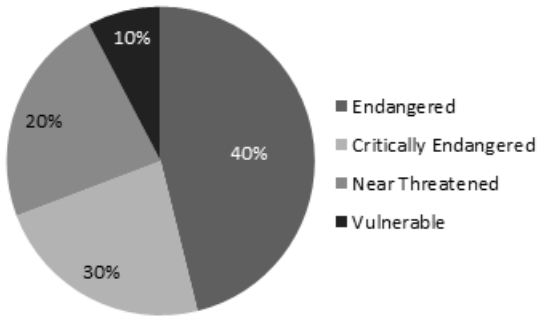

Figure 3. Percentage distribution of species according IUCN Category.

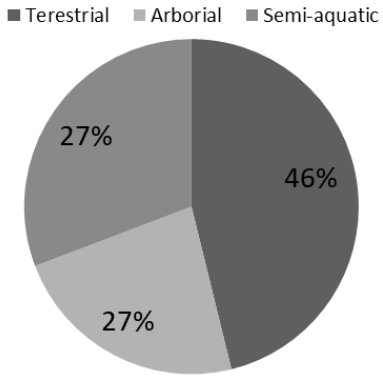

Figure 4. Percentage wise distribution of Anurans according to Habitat.

DISCUSSION

Gurushankara *et al*. (2007) worked on the Morphological abnormalities in natural populations of four different species of different habitats like forest, water bodies, agriculture (paddy) fields and coffee plantations and they examined 6303 individuals and observed six type abnormalities among them agriculture field shows maximum percentage of abnormality (5%) (Gurushankara *et al*., 2007). Ganesh *et al*. (2007) documented the herpetofauna in rain forest of Karnataka covering four different district such as dakshina kannada, talakaveri, shivamoga and Uttara kannada located within the biodiversity hotspot of Western Ghats. They report the 69 species of 40 genera in that 38 species are endemic and study the microhabitat availability and preference and utilization of each species. Purushotham *et al*., A checklist of amphibians in the Agumbe rainforest research station and they documented 28 species out of that 26 are anurans and 2 species of caecilians. Krishnamurthy. *et al*., in 2003 worked on amphibian diversity in kuduremukh national park and they document 42 species of amphibians out of that 36 species of anurans and six species of caecilians. Among the 42 species 30 species are endemic to the Western Ghats. Also the study reveals the importance of natural habitat and the influence of alteration in habitats on the diversity and distribution of amphibians. In the present study we concentrate only on RET species and their habitat distribution in the study area. Agricultural field and areca plantation are the common habitats for some RET species hence it is big threat to the anurans. Hence checklist of RET species is helpful to upcoming herpetologists and it implies that to get a better understanding on the herpetofaunal community, the habitat must be complex enough to accommodate and fulfil the needs of diverse species. The study area is a home for rich diversity of RET anurans but they have anthropogenic risk factors in their own habitat due to encroachment, human exploitation and use of chemical pesticides in agricultural fields. Present sightings of RET anuran species in such marginal habitats calls for better protection of such habitats as well.

ACKNOWLEDGEMENTS

We sincerely acknowledge our deep sense of gratitude to Abhijith H.U., Research Scholar Applied Botany, Kuvempu University. We also thank to our beloved friends Divyashree C S, Madhavi G S and Sri Krishna K M for their help during field works.

REFERENCES

Aravind, N.A. and Gururaja, K.V., 2011. Theme paper on the amphibians of the Western Ghats.Western Ghats ecology panel.

Collins, J. P., & Storfer, A., 2003. Global amphibian declines: sorting the hypotheses. *Diversity and Distributions*, 9(2), 89–98.

Daniels R.J.R and Vencatesan J., 2008. Western Ghats: Biodiversity, People and Conservation. Rupa Publications India,148pp.

Dinesh, K.P., Radhakrishnan, C., Gururaja, K.V. and Bhatta, G.K., 2009. An annotated checklist of Amphibia of India with some insights into the patterns of species discoveries, distribution and endemism. *Records of Zoological Survey of India*, Occasional Papers No. (302): 153 pp.

Dinesh, K.P., Radhakrishnan, C., Channakeshavamurthy, B.H., Deepak, P. and

Kulkarni, N.U. (2019). A Checklist of amphibians of India with IUCN conservation status.

Version 2.0. Online publication is available at www.zsi.gov.in Updated till January 2019

Dinesh, K.P., Radhakrishnan, C., Channakeshavamurthy, B.H., Deepak, P. and Kulkarni, N.U. (2019). A Checklist of amphibians of India with IUCN conservation status. Version 2.0. Online publication is available at www.zsi.gov.in Updated till January 2019.

Dinesh K. P and Radhakrishnan. C., 2011. Checklist of amphibians of Western Ghats, *frog leg*, No.16, 15–20.

Frost, D.R,.2013.Amphibian Species of the World 6.0, an online reference11/01/2019 02:21 am. *American Museum of Natural History*.

Ganesh, S. R., Chandramouli, S. R., & Edward, S. L. (2007). A Study on Herpetofaunal Assemblages in the Rain Forests of Western. *Journal of Scientific Transcations in Environment & Technovation*, *1*(2), 95-103.

Gururaja K.V., 2012. *Pictorial Guide to Frogs and Toads of the Western Ghats*. Gubbi labs LLP.153 pp.

Gurushankara, H. P., Krishnamurthy, S. V., & Vasudev, V. (2007). Morphological abnormalities in natural populations of common frogs inhabiting agroecosystems of central Western Ghats. Applied Herpetology, 4 (1), 39.

IUCN Red List 2009: http://www.iucnredlist.org/ amphibians. Cited 10 August , 2017

IUCN 2010. IUCN Red List of Threatened Species. Version 2010.4.<www.iucnredlist. org>. Downloaded on 12 January 2018.

Kiesecker, M.J**.,** 2010. Global stressors and the global decline of amphibians: tipping the stress immunocompetency axis. *Ecological research* 26(5): 897-908.

Krishnamurthy, S. V. (2003). Amphibian assemblages in undisturbed and disturbed areas of

Kudremukh National Park, central Western Ghats, India. Environmental Conservation, 30(3), 274-282.

Myers, N., R.A. Mittermeier, C.G. Mittermeier, G.A.B. da Fonseca & J. Kent., 2000. Biodiversity hotspots for conservation priorities.

Purushotham, C. B., & Tapley, B. (2011). Checklist of Amphibians: Agumbe Rainforest Research Station. frog leg, (16), 2.

Roelants, K., J. Jiang and F. Bossuyt., 2004. Endemic ranid (Amphibia: Anura) genera in southern mountain ranges of the Indian subcontinent represent ancient frog lineages: evidence from molecular data. *Molecular Phylogenetics and Evolution,* 31(2).pp730–740.

Plate 01. Anurans of different microhabitat in the study area