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Pavan Kumar KS

Department of P.G Studies and
Research in Applied Zoology,
Bioscience Complex, Jnana
Sahyadri, Kuvempu university,
Shankaragatta, Shivamogga,
Karnataka, India

Vishwajith HU

Department of P.G Studies and
Research in Applied Zoology,
Bioscience Complex, Jnana
Sahyadri, Kuvempu university,
Shankaragatta, Shivamogga,
Karnataka, India

Dayananda GY

Department of P.G Studies and
Research in Applied Zoology,
Bioscience Complex, Jnana
Sahyadri, Kuvempu university,
Shankaragatta, Shivamogga,
Karnataka, India

Corresponding Author:**Dayananda GY**

Department of P.G Studies and
Research in Applied Zoology,
Bioscience Complex, Jnana
Sahyadri, Kuvempu university,
Shankaragatta, Shivamogga,
Karnataka, India

Anuran diversity in different habitat of Sringeri and Koppa Taluk

Pavan Kumar KS, Vishwajith HU and Dayananda GY

Abstract

The amphibian fauna of India is very diverse and play a major role in ecosystem functioning, especially as consumers of pest insects and their therapeutical value. The present updated checklist of India enlists 432 species of amphibians. The study was carried out from the month of June 2017 to October 2019 by belt transect method. The length 5×500m was laid in each of the study areas and the observed anurans inside the transect were documented and photographed. A total of 42 species belonging to 16 genera 7 families (Bufonidae, Dicroglossidae, Micrixalidae, Nictibatrechidae, Ranidae, Ranixalidae and Rhacophoridae) were documented during the present investigation. Dicroglossidae being the family represented by maximum number of species (14 species) and Bufonidae family having only one representative species. Out of 42 species, three species *Nyctibatrachus dattatreyaensis*, *Pseudophyllautus amboli* and *Micrixalus kottigeharensis* belongs to critically endangered category and two species *Fejervarya sahyadris* and *Ramnella marmorata* belongs to endangered status according to IUCN, 2020. Among these 20 (47.6%) species are endemic to westernghats. Further studies are on the above line are required to investigate the complete status of anurans in and around Sringeri and Koppa areas.

Keywords: Amphibian fauna, belt transect method, western Ghat, anurans, Sringeri and Koppa

Introduction

Information of Anuran species richness and diversity is becoming increasingly important in the context of global amphibian decline [1]. 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 [2]. 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 their therapeutical value [3, 4]. Semi-permeable skin, amniotic eggs and the biphasic life make them particularly vulnerable to changes via contamination of their habitats [5]. Recorded 7215 species of amphibians in the world and in India, a total 384 amphibians have been recorded [6]. The Indian subcontinent has a unique assemblage of flora and fauna due to the subcontinent's successive and prolonged periods of isolation [7] and the Western Ghats are a recognised biodiversity hotspot [8]. Most of the studies on amphibians have been concentrated in the Western Ghats (biodiversity hotspot) on the west coast of India and other areas remain understudied [2]. The Western Ghats, biodiversity hotspot of India harbors as many as 157 species of amphibians which includes 134 anurans and 112 endemic species [9].

A recent study suggests that, a total of 47 species of amphibians are feared lost in India and 28 species are lost from the Western Ghats. For the 28 species of amphibians feared to be lost from the Western Ghats, either the type specimens are lost/ missing or there are no species reports/collections after the new species discovery. In a recent expedition four species of the 28 species from the Western Ghats were rediscovered, the rest of the species need to be traced from their type localities to justify the species validity. According to the IUCN (2020) assessment, the 157 species of amphibians known from the Western Ghats fall under six broad categories; 8 Critically Endangered (CE); 69 Data Deficient (DD); 28 Endangered (EN); 30 Least Concern (LC); 6 Near Threatened (NT) and 16 Vulnerable (VU). In the IUCN assessment for amphibians of the Western Ghats, 44% of the species fall under DD; this may be because of the new species discovery surge in the recent past; 18% under EN, 10% VU, 5% CE, 4% NT, and 19% of the species are considered as LC [9].

Numerous studies have documented anurans in the Karnataka portion of the Western Ghats [10, 11, 12, 13, 14, 15, 16]

Material and Method

(i) Study area

The study was undertaken from the different ecosystem habitats of Sringeri and Koppa taluk, which are amongst the famous tourist places of Karnataka. The place with hills and planes travelled by the holy river Thunga and its tributaries

has bestowed rich diversity of flora and fauna which is well known for its vegetation, especially the medicinal herbs. Survey of various habitats preferred by amphibians like ponds, pools, river, streams, orchards, plantations, paddy fields, other fresh water sources etc



Fig 1: Map showing study area

(ii) Field methods

The study was carried out from the monsoon months of June to October in three consecutive years, 2017, 2018 and 2019. There are several field techniques to document herpetofauna in their wild ecosystem^[17]. The methods Belt transect method was used for the study. A belt transect of 5×500m length was laid in each of the study areas and the observed Amphibians inside the transect were documented and photographed (Nikon coolpix L340 and L40 cameras). Documented species were identified using standard manuals, earlier published research articles and Pictorial Guide^[18] and the species names are confirmed by consulting the experts in the field.

Result

The details of the documented species are given in Table 1. A total of 42 species belonging to 16 genera 7 families (Bufonidae, Dicroglossidae, Micrixalidae, Nictibatrehidae, Ranidae, Ranixalidae and Rhacophoridae) were documented during the present investigation. Dicroglossidae being the family represented by maximum number of species (14 species) and Bufonidae family having only one

representative species.

Out of these, three species *Nyctibatrachus dattatreyaensis*, *Pseudophyllautus amboli* and *Micrixalus kottigeharensis* belongs to critically endangered (C.E) category and five species *Minervarya sahyadris*, *Uperodon marmorata*, *Nyctibatrachus karnatakensis*, *Pseudophyllatus wynadensis* and *Rhacophorus lateralis* belongs to endangered status according to IUCN,2020. Only 32 species were identified up to species level due to taxonomic limitations in the field and photographs. Among these 47.6% species are endemic to westernghats^[19] (Fig 1).

The family Dicroglossidae showed highest number of species (14 species) and family Bufonidae had only one species. The percentage of IUCN Status of different species were recorded during the study period was 11% of critically endangered, 29% Endangered, 14% Near threatened and 7% Vulnerable species (Fig 2).

By this study it is speculative that Moist terrestrial habitat comprises maximum number of species (24 species) where as Aquatic habitat has least number of species (3 species) (Fig 3).

Table 1: A Systematic list of anuran species with their status and habitat in different ecosystem during the study period

Sl No	Name	Common Name	IUCN Status	Current Population trend	Endemism to Western Ghat	Activity	Habitat
Family – Bufonidae							
1	<i>Duttaphrynus melanostictus</i> (Dijk <i>et al</i> , 2004))	Common Indian Toad	LC	Increasing	Non Endemic	Day	Terrestrial
Family - Dicroglossidae							
2	<i>Fejervarya</i> sp			Unknown		Night	Moist Terrestrial
3	<i>Euphlyctis aloysii</i> (Joshy <i>et al</i> , 2009)	Aloysius Skittering Frog		Unknown		Night	Aquatic
4	<i>Euphlyctis cyanophlyctis</i> (Khan <i>et al</i> , 2009)	Common Skittering Frog	LC	Stable	Non Endemic	Night	Aquatic
5	<i>Euphlyctis mudigere</i> (Joshy, Alam, Kurabayashi, Sumida and Kuramoto, 2009)	Mudigere Skittering Frog		Unknown		Night	Aquatic
6	<i>Fejervarya caperata</i> (Kuramoto, Joshy, Kurabayashi and Sumida, 2007)	Wrinkled Zakerana		Unknown	Endemic	Night	Moist Terrestrial
7	<i>Fejervarya granosa</i> (Kuramoto, Joshy, Kurabayashi and Sumida, 2007)			Unknown		Night	Moist Terrestrial
8	<i>Fejervarya kudremukhensis</i> (Kuramoto, Joshy, Kurabayashi and Sumida, 2007)	Kudremukh Zakerana	DD	Unknown	Endemic	Night	Moist Terrestrial
9	<i>Fejervarya rufescens</i> (Biju <i>et al</i> , 2016)	Reddish Burrowing Frog	LC	Unknown	Endemic	Night	Moist Terrestrial
10	<i>Fejervarya</i> sp			Unknown		Night	Moist Terrestrial
11	<i>Fejervarya</i> sp			Unknown		Night	Moist Terrestrial
12	<i>Fejervarya</i> sp			Unknown		Night	Moist Terrestrial
13	<i>Fejervarya</i> sp			Unknown		Night	Moist Terrestrial
14	<i>Hoplobatrachus tigerinus</i> (Padhye <i>et al</i> , 2008))	Indian Bull Frog	LC	Stable	Non Endemic	Night	Moist Terrestrial
15	<i>Minervarya sahyadris</i> (Biju <i>et al</i> , 2004)	Sahyadri Minervarya	EN	Decreasing	Endemic	Night	Terrestrial
Family - Micrixalidae							
16	<i>Micrixalus fuscus</i> (Biju <i>et al</i> , 2004)	Kalakkad Dancing Frog	NT	Decreasing		Day	Terrestrial
17	<i>Micrixalus kottigeharensis</i> (Biju <i>et al</i> , 2004)	Kottigehara Dancing Frog	CR	Decreasing	Endemic	Day	Terrestrial
18	<i>Micrixalus</i> sp			Unknown			
19	<i>Uperodon montanus</i> (Biju <i>et al</i> , 2016)	Jerdon's Ramanella	NT	Unknown	Endemic	Night	Moist Terrestrial
20	<i>Uperodon marmorata</i> (Biju <i>et al</i> 2016)	Marbled Ramanella	EN	Decreasing	Endemic	Night	Moist Terrestrial
Family - Nictibatrechidae							
21	<i>Nyctibatrachus dattatreyaensis</i> (IUCN SSC Amphibian Specialist Group, 2012)	Dattatreya Night Frog	CR	Unknown		Night	Moist Terrestrial
22	<i>Nyctibatrachus jog</i> (Biju, Bocxlaer, Mahony, Dinesh, Radhakrishnan, Zachariah, Giri and Bossuyt (2011)	Jog Night Frog	DD	Unknown	Endemic	Night	Moist Terrestrial
23	<i>Nyctibatrachus kempholeyensis</i> (Biju <i>et al</i> , 2004)	Kemphole Night Frog	DD	Unknown	Endemic	Night	Moist Terrestrial
24	<i>Nyctibatrachus karnatakensis</i> (Dinesh 2007)	Karnataka Night Frog	EN	Unknown	Endemic	Night	Moist Terrestrial
25	<i>Nyctibatrachus</i> sp			Unknown		Night	Moist Terrestrial
Family - Ranidae							
26	<i>Clinotarsus curtipes</i> (Biju <i>et al</i> , 2004)	Bicoloured Frog	NT	Decreasing	Endemic	Night	Terrestrial
27	<i>Hydrophylax malabaricus</i> (Biju <i>et al</i> , 2004)	Fungoid Frog	LC	Stable	Non Endemic		Moist Terrestrial
28	<i>Indosylvirana temporalis</i> (Biju <i>et al</i> , 2004)	Gunter's Golden backed frog	NT	Decreasing	Non Endemic	Night	Moist Terrestrial
29	<i>Indosylvirana aurantiaca</i> (Bhiju <i>et al</i> , 2004)	Boulenger's Golden backed Frog	VU	Unknown	Non Endemic	Night	Moist Terrestrial
30	<i>Indosylvirana indica</i>	Indian Golden	VU	Unknown	Endemic		Moist

	(Biju <i>et al.</i> , 2004)	backed frog					Terrestrial
Family - Ranixalidae							
31	<i>Indirana semipalmata</i> (Biju <i>et al.</i> , 2004)	Small Handed Frog	LC	Unknown	Endemic	Night	Moist Terrestrial
32	<i>Indirana</i> sp			Unknown		Night	Moist Terrestrial
33	<i>Indirana</i> sp			Unknown		Night	Moist Terrestrial
Family - Rhacophoridae							
34	<i>Polypedates maculatus</i> (Sushil Dutta <i>et al.</i> , 2004)	Common Indian Tree Frog	LC	Stable	Non Endemic		Arboreal
35	<i>Polypedates occidentalis</i> (Das and Dutta, 2006)	Western Tree Frog	DD	Unknown	Endemic	Night	Arboreal
36	<i>Pseudophilautus amboli</i> (Biju and Bossuyt, 2009)	Ambol Bush Frog	CR	Decreasing	Endemic	Night	Arboreal
37	<i>Pseudophilautus</i> sp			Unknown	Endemic	Night	Arboreal
38	<i>Pseudophilautus wynaadensis</i> (Biju <i>et al.</i> , 2016)	Wayanad Bush Frog	EN	Decreasing	Endemic	Night	Arboreal
39	<i>Raorchestes luteolus</i> (Kuramoto and Joshy, 2003)	Yellow Bush Frog	DD	Unknown	Endemic	Night	Arboreal
40	<i>Raorchestes tuberochumerus</i> (Kuramoto and Joshy, 2003)		DD	Unknown	Endemic	Night	Arboreal
41	<i>Rhacophorus lateralis</i> (Biju <i>et al.</i> , 2004)	Small Tree Frog	EN	Decreasing	Endemic	Night	Arboreal
42	<i>Rhacophorus malabaricus</i> (Biju <i>et al.</i> , 2004)	Malabar Gliding Frog	LC	Decreasing	Endemic	Night	Arboreal

(LC= Least concerned; EN= Endangered; DD=Data deficiency; CR=Critically Endangered; VU=Vulnerable; NT= Near Threatened)

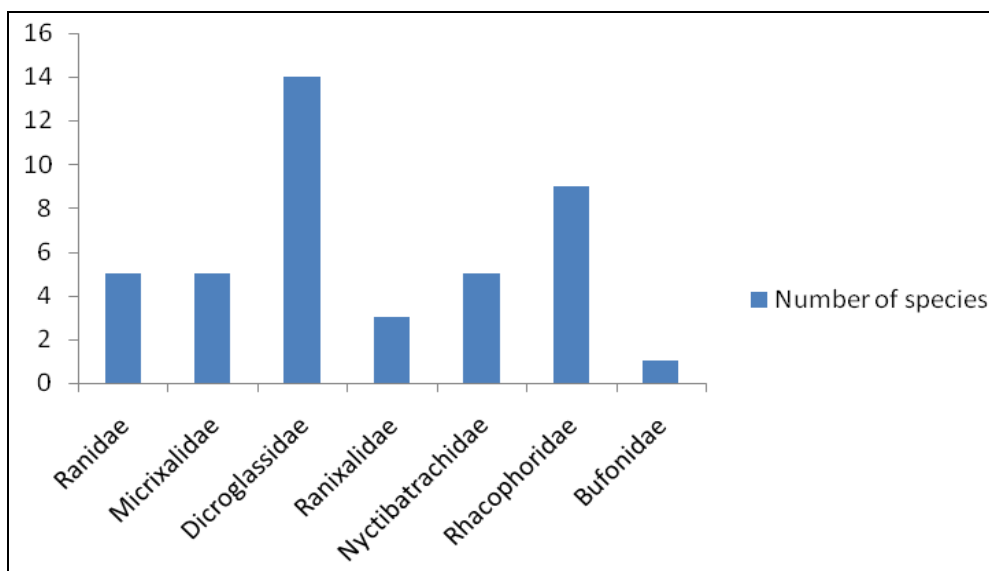


Fig 1: Number of species recorded during the study period.

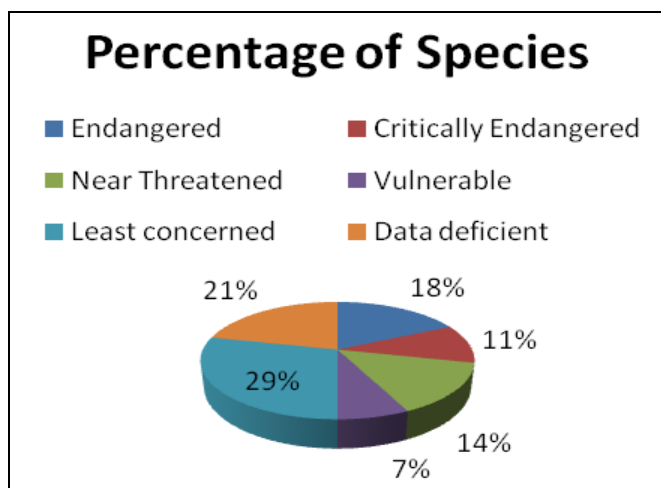


Fig 2: Percentage of Anuran species status during study period

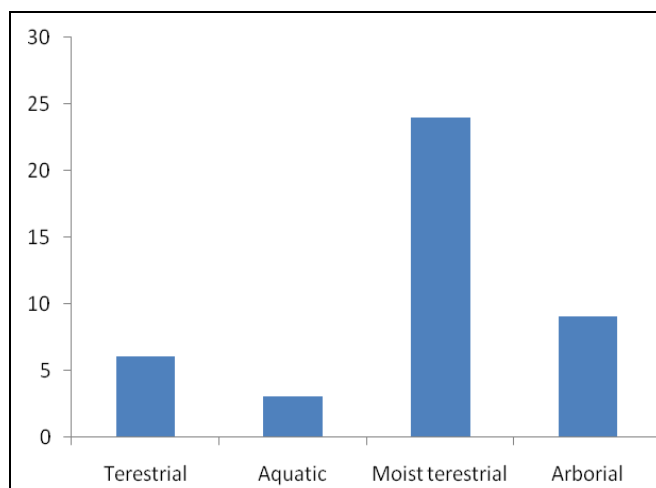


Fig 3: Number of species recorded in different habitats during the study

Discussion

The study area is a home for rich diversity of anurans but they have some sort of risk in their own habitat due to encroachment, human exploitation and use of chemical pesticides in agricultural fields. This checklist revealed that, out of 42 species, 3 species come under critically endangered category, 5 are endangered, 4 nearly threatened and 2 are vulnerable.

From the review of literature, overall abundance of amphibian species collected around Sringeri taluk was 35 during 1993. The checklist in the nearest region, Agumbe rainforest research station records 28 species of amphibians of which 26 are anurans. The known species share the habitats differently such as, most of the species depends upon the moist terrestrial habitat (24), some species depends on terrestrial (6), arboreal (9) and a very least species depends on aquatic habitat (3). Many numbers of endemic species are existing in this area. So this checklist of anurans species is helpful to upcoming herpetologist and also batrachological conservation.

Conclusion

In conclusion occurrence of around 50% endemic anuran species of which 33.3% are globally threatened marks Sringeri and Koppa taluk as key site for amphibian diversity in Western Ghats biodiversity hotspot. Implementation of strong conservation measures and policies are needed in Koppa and Sringeri taluk for amphibian conservation. This study would be beneficial in this context.

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Reference

- Kiesecker, Joseph M. Global stressors and the global decline of amphibians: tipping the stress immunocompetency axis. *Ecological research*. 2010; 26(5):897-908.
- Aravind NA, Gururaja KV. Theme paper on the amphibians of the Western Ghats. Report submitted to Western Ghats ecology panel, 2011.
- Dinesh KP, Radhakrishnan C, Gururaja KV, Bhatta GK. 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*. 2009; 302:1-152.
- Tseng AS, Beane WS, Lemire JM, Masi A, Levin M. Induction of vertebrate regeneration by a transient sodium current. *Journal of Neuroscience methods*. 2010; 30:13192-13200
- Frost DR. *Amphibian Species of the World: an online reference*. Version 6.0. American Museum of Natural History, 2013.
- Dinesh KP, Radhakrishnan C, Channakeshavamurthy BH, Deepak P, Nirmal UK. A Checklist of Amphibians of India. 2017, 1-16
- Roelants K, Jiang J, Bossuyt J. 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*. 2004; 31:730-740.
- Myers N, Mittermeier RA, Mittermeier CG, Gustavo AB, da Fonseca, Kent J. Biodiversity hotspots for conservation priorities. *Nature*. 2000; 403:853-858.
- Dinesh KP, Radhakrishnan C. Checklist of amphibians of Western Ghats. *Frog leg*. 2011; 16:15-20.
- Uttangi JC. Some more species of anurans from Dharwad, North Karnataka. *Journal of Bombay Natural History Society*. 1989; 86:256-257.
- Daniels RJ. Range extension in some south Indian amphibians. *Hamadryad*. 1992; 17:40-42.
- Dutta SK, Ray P. *Microhyla sholigari*, A new species of Microhylid frog (Anura: Microhylidae) from Karnataka, India. *Hamadryad*. 2000; 25:38-44.
- Krishnamurthy SV, Hussain SA. Amphibian fauna of Kudremukh National Park, Western Ghats, India. *Journal of Bombay Natural History Society*. 2000; 97(3):436-439.
- Manjunatha Reddy AH, Gururaja KV, Ravichandran MS, Krishnamurthy SV. Range extension of *Ansonia ornata* (Gunther, 1875) and *Indirana brachytarsus* (Gunther, 1875). *Hamadryad*. 2001; 26(2):358-359
- Aravind NA. First report of *Micrixalus nudis* (Amphibia: Ranidae) from Karnataka, India. *Hamadryad*. 2002; 27(1):145-146
- Krishnamurthy SV. Amphibian assemblages in undisturbed and disturbed areas of Kudremukh National Park, central Western Ghats, India. *Environmental Conservation*. 2003; 30(3):274-282.
- Muluaalem G. Review of Field Protocols on Herpetological Investigations: A Working Guide for Junior Herpetologists in Ethiopia. *The Journal of Zoology Studies*. 2016; 3(1):27-33.
- Gururaja KV. *Pictorial Guide to Frogs and Toads of the Western Ghats*. 2012; ISBN: 9788192446103
- Subramanian KA, Dinesh KP, Radhakrishnan C. *Atlas of Endemic Amphibians of Western Ghats*. 2013, 1-246 (Published by the Director, Zoo. Surv. India, Kolkata)
- IUCN Red List, 2009. <http://www.iucnredlist.org/amphibians>. Retrieved on March 18, 2020.