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Amphibian fauna of Sringeri Taluk (Chickamagalure District: Karnataka)

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Abstract

Thirty-five amphibian species belonging to the two extant orders—Anura and Gymnophiona—collected during a two-year survey around Sringeri are check-listed. Majority of the anuran species belong to the genus *Rana*, while the genus *Ichthyophis* was dominant amongst the Caecilians. The overall amphibian fauna of Sringeri amounts to 45 and 22% of that reported for Karnataka and the Western Ghats, respectively. The rich diversity of the amphibian fauna in the region is related to the congenial environmental features of the area.

Key words: Amphibia, species diversity, Sringeri.

1. Introduction

The range of topography, climate and vegetation encountered in India is clearly reflected by the rich biodiversity of its fauna[1], including that of the class Amphibia[2]. The imperative need to add more information to the biosystematics of fauna and flora of the Western Ghats has also been emphasized at the 1993 Indo-British Workshop on Biodiversity held at Bangalore. Although overviews on amphibians of India documented from time to time have always added newer species to the earlier lists, it is thought that the true diversity of Indian amphibians is greater than that is already known[2]. Even todate, the narrow biogeographic province of the sub-continent—the Western Ghats—is considered to have the richest diversity of amphibian species in the whole of tropical Asia. Apart from it, contemporary studies on the population dynamics of a few species of the Western Ghats[3,4] also suggest that the present trend in the decline of amphibian populations as evidenced elsewhere in the world[5,6] may not be so alarming, especially in the Western Ghats.

A little known part of the Western Ghats belt is the Sringeri Taluk (Chickamagalure District) where the destruction of the natural forest has not yet been severe, thanks largely to a relatively difficult terrain. Recently, however, both on account of timbering activities and/or shifts in the selected crop species for land use,

environmental interference in the area is on the increase. To date, information on the amphibians of Sringeri Taluk is largely related either to the Caecilians[7–9] and/or to one species of *Nyctibatrachus*[10]. Therefore, we believe that it is necessary to assess the amphibian fauna of this area before their natural habitats are altered or damaged beyond a true reflection of their species diversity and population abundance. This paper is the first of a series on the natural history observations of amphibians of the Sringeri Taluk and presents the diversity of species collected during 1990 through 1992.

2. Areas of survey and methods

Sringeri is a small Taluk (434 sq km) situated on the cliff of Western Ghats, Chickamagalure District (lat: 13° 15′ – 13° 36′ N; long: 75° 04′ – 75° 12′ E, altitude ranges from 624m msl at the Tunga basin to 1458m msl at the Varaha Parvatha). Survey and collections of amphibians were carried out at two-week intervals, 1990 through 1992, within a radius of 30 km from Sringeri town. Collections were made either during late evenings, 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 was also taken to search remote microhabitats such as rock crevices, areas covered by 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 8% formaldehyde for identification; the others were released into their respective natural habitats after recording their relative abundance, morphometry and/or morphological peculiarities, if any. At least four manhours, 2 h each in the morning and evening, were spent on each collection.

In the laboratory, freshly preserved specimens were segregated and identified up to the species level using the available taxonomic keys[11–24]. A species list was prepared thereafter in the light of documented literature on the systematics and distribution of the amphibian fauna of India.

3. Observations and discussion

During 1990–92, about 50 species(?) of amphibians were collected in and around Sringeri. Out of these, by using available standard taxonomic keys, only 35 could be identified up to species level.

It is apparent from Table I that the majority of amphibian species composition is due to the members of Ranidae, followed by those of Rhacophoridae. Among the Ranidae, the genus *Rana* and among the Rhacophoridae, the genus *Philautus* contributed the most to the species diversity of this locality. The Caecilians were represented by four species, belonging to two genera. Table II presents a comparative analysis of amphibian species diversity of Sringeri Taluk in relation to those reported earlier from India[2] and the Western Ghats[35] and Figure 1 represents the percentage composition of major anuran families of India[2], Western Ghats[35] and Sringeri Taluk.

Table I

Overall abundance of amphibian species collected around Sringeri

Family	*Genus*	*Sub-genus (if any)*	*Total no of species*
ANURA			
1. Ranidae	a. *Rana*	i. *Rana*	7
		ii. *Discodeles*	3
		iii. *Hylorana*	3
	b. *Nyctibatrachus*		3
	c. *Tomopterna*		1
2. Rhacophoridae	a. *Rhacophorus*		1
	b. *Polypedatus*		2
	c. *Philautus*		6
3. Microhylidae	a. *Microhyla*		1
	b. *Ramanella*		1
4 Bufonidae	a. *Bufo*		3
APODA/GYMNOPHIONA			
5. Ichthyophidae	a. *Ichthyophis*		3
	b. *Uraeotyphlus*		1
Total			
5 Families	11 Genera		35 Species

Note: The pattern of presentation of different families is based on earlier taxonomic works[12,13,17-20]

From the figure it is apparent that the percentage composition of major anuran families collected at Sringeri is highly comparable with those of Western Ghats in particular and India in general.

Comparing the reported taxonomic break up of the amphibian fauna of Western Ghats and Karnataka (Daniels[26]) with the present observations, it is evident that Sringeri has a sizeable amphibian fauna, amounting to 45% of that of Karnataka

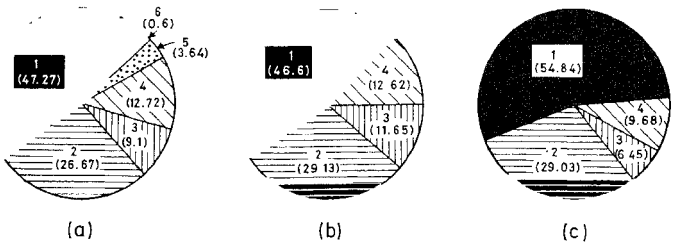

FIG. 1. Familywise break up (percentage) of anuran species of: (a) India (Inger and Dutta, 1986): (b) Western Ghats (Daniels, R.J.R., 1992), and (c) Sringeri Taluk (from present observations). [1: Ranidae, 2: Rhacophoridae, 3: Microhylidae, 5: Pelobatide, 6: Hylidae].

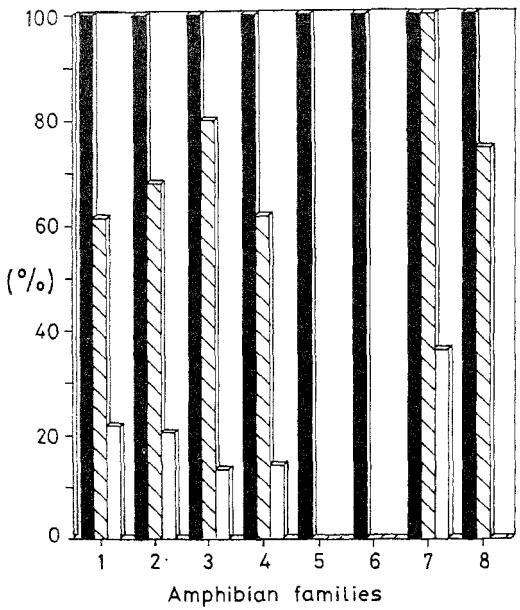

FIG. 2 Histograms indicating the number of species in each family for Western Ghats (▨) and Sringeri Taluk (▭) (Taking the total number of species recorded in India (■) as 100) [1. Ranidae, 2: Rhacophoridae, 3: Microhylidae, 4: Bufonidae, 5: Pelobatidae, 6: Hylidae, 7: Ichthyophidae and 8: Caecilidae].

(26 species out of 58) and 22% of that of the Western Ghats (26 out of 117) (see Figs. 1b and c). Figure 2 gives a vivid picture of amphibian species diversity of the Sringeri Taluk as compared with that of Western Ghats and India at large. It is to be noted that Sringeri and its environs support a sizeable diversity of amphibian species found in India.

Table III presents the amphibian species collected from Sringeri, with remarks on the individual species distribution in India, based on present observations and those reported by earlier workers. It is also to be noted that a number of species [*viz.*, *Rana verrucosa** (?), *R. greenii* (?), *R. doriae* (?), *Philautus pictus* (?), *P. nasutus* (?),

* *R. keralensis* (Dubois, 1980)**

Table II

Comparative analysis of amphibian species diversity as reported from India, Western Ghats and Sringeri Taluk

Families	*Genera*	*Number of species*		
		India (Inger & Dutta, 1986)	*Western Ghat (Daniels, R J.R., 1992)*	*Sringeri Taluk (Present observations)*
ANURA				
1. Ranidae	*Amolops*	3	–	–
	Micrixalus	7	6	–
	Nannobatrachus	2	2	–
	Nanorana	1	–	–
	Nyctibatrachus	7	8	3
	Occidozyga	1	–	–
	Rana	50	25	13
	Ranixalus	1	1	–
	Tomopterna	6	6	1
2. Rhacophoridae	*Chirixalus*	1	–	–
	Philautus	28	24	6
	Polypedatus	2	2	2
	Rhacophorus	11	4	1
	Theloderma	2	–	–
3. Microhylidae	*Kaloula*	1	1	–
	Melanobatrachus	1	1	–
	Microhyla	5	2	1
	Ramanella	6	6	1
	Uperodon	2	2	–
4. Bufonidae	*Ansonia*	2	2	–
	Bufo	16	10	3
	Bufoides	1	–	–
	Pedostebis	2	1	–
5. Pelobatidae	*Leptobrachium*	1	–	–
	Megophrys	3	–	–
	Scutiger	2	–	–
6. Hylidae	*Hyla*	1	–	–
Total	27 Genera	165 Species	17 Genera 103 Species	9 Genera 31 Species
APODA/GYMNOPHIONA				
1. Ichthyophidae	*Ichthyophis*	7	7	3
	Uraeotyphlus	4	4	1
2. Caecilidae	*Gegenophis*	3	2	–
	Indotyphlus	1	1	–
Grand total	31 Genera	180 Species	21 Genera 117 Species	11 Genera 35 Species

Table III

List of amphibian species collected in and around Sringeri Taluk

Sl. no. (1)	*Species* (2)	*Common name of the species and its reported distribution in India* (3)
1.	*Rana (Rana) hexadactyla* (Lesson, 1834)	'Green frog'—A large aquatic form. Throughout India[2,13,19,25-27].
2.	*Rana (Rana) cyanophlyctis* (Schneider, 1799)	'Skipper frog'—A common medium size aquatic frog. Throughout India[2,13,16,19,26,28].
3.	*Rana (Rana) tigerina* (Daudin, 1803)	'Indian Bull frog'—A common large size semi-aquatic form. Throughout India[2,13,16,26].
4.	*Rana (Rana) verrucosa** (?) (Gunther, 1875)	Moderate size, semi-aquatic frog. Kerala[13,16], Tamil Nadu[19].
5.	*Rana (Rana) limnocharis* (Boie in Weigmann, 1835)	'Indian Cricket frog'—A common small size semi-aquatic form. Throughout India[2,13,16,19,26,28-30].
6.	*Rana (Rana) greeni* (?) (Gunther, 1858)	A medium size, semi-aquatic frog. No reports so far from India, distributed in the hills of central Ceylon[13].
7.	*Rana (Rana) doriae* (?) (Boulenger, 1887)	A medium size semi-aquatic form. Andamans[2].
8	*Rana (Tomopterna) rufescens* (Jerdon, 1854)	'Rufescent Burrowing frog'—A medium size uncommon terrestrial form. Malabar[13], Kerala and Maharashtra[2]. Bombay southward along the Western Ghats to Malabar[19], Bombay, Gerusoppa–North Kanara[31].
9.	*Rana (Discodeles) beddomei* (Gunther, 1875)	A medium size terrestrial anuran. Forests of Southern India[2,13,16,20,26], (Common in Western Ghats).
10.	*Rana (Discodeles) leithii* (Boulenger, 1888)	'Leiths frog'—Small size aquatic, semi-aquatic frog. Gujarat, Kerala, Madhya Pradesh, Maharashtra[2]. Occurs along the Western Ghats from Surat Dangs, Gujarat in north, southward to central Kerala[20], Karnataka[26].
11.	*Rana (Discodeles) semipalmata* (Boulenger, 1882)	Small size semi-aquatic frog. South India[2,13,20].
12.	*Rana (Hylorana) curtipes* (Jerdon, 1853)	'Bicoloured frog'—A medium size terrestrial frog. Karnataka and Kerala[2,4,13,16,20].
13.	*Rana (Hylorana) aurantiaca* (Boulenger, 1904)	'Pretty frog/Golden frog'—A small size semi-aquatic form. Karnataka and Kerala[2], Travancore and South Kanara[20] (Karnataka).
14.	*Rana (Hylorana) temporalis* (Gunther, 1864)	'Bronzed frog'—A medium size semi-aquatic frog. Malabar and Ceylon[13], Maharashtra, Karnataka[2,20,26,32], Nilgiris[20].
15.	*Nyctibatrachus major* (Boulenger, 1882)	Medium size torrenticolous anuran. Kerala[1,16,30,32], Karnataka[26], Sringeri[10] (Karnataka).
16.	*Nyctibatrachus pygmaeus* (Gunther, 1875)	A small to moderate size aquatic form. Annamalai Hills[12,32,33].
17.	*Nyctibatrachus sanctipulustrius* (Rao, 1920)	Small to moderate size aquatic form. Karnataka[2,23].
18.	*Rhacophorus malabaricus* (Jerdon, 1870)	'Malabar Flying (Gliding) frog'—moderate size arboreal form. Karnataka[2,26], Kerala[16,30] and Goa[29,34].
19.	*Polypedatus maculatus* (Gray, 1834)	'Common Tree frog'—A medium size arboreal form. Throughout India except in Haryana, Punjab and Rajasthan[2,20,26].

(contd)

**R. keralensis* (Dubois, 1980)[36].

Table III*(contd)*

(1)	*(2)*	*(3)*
20.	*Polypedatus leucomystax* (Gravenhorst, 1829)	A moderate size tree frog. India and Ceylon[12]. Arunachal Pradesh, Assam, Sikkim, West Bengal[2].
21.	*Philautus leucorhinus* (Lichtenstein & Martens, 1856)	Small size arboreal form. India and Ceylon[12], Arunachal Pradesh, Assam, Sikkim, West Bengal[2].
22.	*Philautus pictus* (Peters, 1867)	A small size arboreal form. Not reported so far from India (?)
23.	*Philautus nasutus* (Gunther, 1868)	A small arboreal form. Not reported so far from India (?)
24.	*Philautus aurifasciatus* (Gunther)	A small arboreal form. Not reported so far from India (?)
25.	*Philautus punctatus* (Anders, 1871)	Small arboreal form. Nilgiris[2].
26.	*Philautus adspersus* (Gunther, 1872)	Small arboreal form. Not reported so far from India (?)
27.	*Microhyla ornata* (Dumeril & Bibron, 1841)	'Ornate microhylid'—A small semi-aquatic form. All states of India[2,14,16,18,26,29].
28.	*Ramanella montana* (Jerdon, 1854)	'Jerdon's Ramanella'—A small semi-aquatic to terrestrial form South–West India[14,18], Hills of Malabar Coast, South India[16,29]
29.	*Bufo holoius* (Gunther, 1875)	An uncommon moderate size toad Kerala[2], Andhra Pradesh[2,16], Karnataka[26].
30.	*Bufo beddomei* (Gunther, 1875)	'Beddome's toad'—A moderate size uncommon toad. Kerala[2], Travancore Hills[12].
31.	*Bufo melanosticius* (Schneider, 1799)	'Indian toad'—A moderate size common toad. All states of India[2,26].
32.	*Ichthyophis beddomei* (Peters, 1879)	Karnataka, Kerala, Tamil Nadu[2], Karnataka[26], Sringeri[7] (Karnataka)
33.	*Ichthyophis malabarensis* (Taylor, 1960)	Kerala[2], Sringeri[8] (Karnataka).
34.	*Ichthyophis bombayensis* (Taylor, 1960)	Maharashtra[2,15], Sringeri[9] (Karnataka)
35.	*Uraeotyphlus narayani* (Seshachar, 1939)	Kerala[2], Sringeri[7] (Karnataka)

P.aurifasciatus (?), *P.punctatus* (?), and *P. adspersus* (?) are first records from peninsular India. Furthermore, out of the 35 species listed, as many as 20 appear to be restricted to the western peninsular region of India.

Until recently, it was believed that Caecilians were poorly represented in Karnataka[26]. However, earlier reports from Sringeri area[7–9] and the present collections indicate that as many as four species are present in this region.

Several factors posed problems during the studies of amphibians around Sringeri. Except for the more commonly available and widely distributed species which could

be easily collected (*viz., Rana cyanophlyctics, R. tigerina, R. limnocharis, R. beddomei, R. curtipes, R. temporalis, Philautus nasutus* and *Microhyla ornata*), the others were difficult to find largely because of specialized, sometimes remote or cryptic microhabitats, elusive and cryptic behaviour, nocturnal activity patterns and their coloration blending splendidly with that of the habitat components. Another difficulty encountered was to find suitable taxonomic keys, especially those that can be used 'on the spot', during the field studies and the subtle variations in the morphometric data on which much of the amphibian taxonomy relies. As this account of the species diversity of amphibians is based on a two-year survey only more expeditions to this region would add larger number of species to the list appended here.

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