

OCCASIONAL PAPER NO. 245

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ZOOLOGICAL SURVEY OF INDIA**

**Amphibian Fauna of Nagarjunasagar
Srisaïlam Tiger Reserve, Andhra Pradesh**

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INTRODUCTION

The amphibian fauna of Andhra Pradesh is poorly documented. So far 17 species of amphibians belonging to 8 genera and 4 families (Sarkar *et al.*, 1993) were known. Four species of bufonids belonging to the genus *Bufo* Laurenti, 1768 [namely, *Bufo melanostictus* Schneider, 1799; *Bufo fergusonii* Boulenger, 1892 (now *Bufo scaber* Schneider, 1799); *Bufo hololius* Günther, 1875; and *Bufo stomaticus* Lütken, 1862], four microhylids belonging to three genera, namely, *Ramanella* Rao and Ramanna, 1925 [*Ramanella variegata* (Stoliczka, 1872)], *Uperodon* Duméril and Bibron, 1841 [*Uperodon systoma* (Schneider, 1799)], and *Microhyla* Tschudi, 1838 [*Microhyla ornata* (Duméril and Bibron, 1841); and *Microhyla rubra* (Jerdon, 1854 “1853”)], seven ranids belonging to two genera, namely, *Rana* Linnaeus, 1758 [*Rana* (= *Euphlyctis*) *cyanophlyctis* (Schneider, 1799); *Rana* (= *Euphlyctis*) *hexadactylus* (Lesson, 1834); *Rana* (= *Fejervarya*) *limnocharis* (Gravenhorst, 1829); *Rana* (= *Hoplobatrachus*) *crassus* (Jerdon, 1854 “1853”); and *Rana* (= *Hoplobatrachus*) *tigerinus* (Daudin, 1803)], and *Tomopterna* Duméril and Bibron, 1841 (now reassigned to *Sphaerotheca* Günther 1859 “1858” [*Tomopterna* (= *Sphaerotheca*) *breviceps* (Schneider, 1799); and *Tomopterna* (= *Sphaerotheca*) *dobsoni* (Boulenger, 1882)], and two rhacophorids belonging to two genera, namely, *Polypedates* Tschudi, 1838 [*Polypedates maculatus* (Gray, 1832)] and *Philautus* Gistel, 1848 [*Philautus variabilis* (Günther, 1859)] comprised the amphibian diversity reported by Sarkar *et al.* (1993).

During the past decade and a half, opportunistic and serious studies have resulted in addition of hitherto undescribed and unreported amphibian species to the known diversity. Das and Chanda (1998) described a new species of rhacophorid the Boring Bush Frog *Philautus terebrans* based on a specimen collected from Peddavalasa (17°47' N and 82°16' E) in Vishakapatnam district. Sivakumar *et al.* (2003) reported the occurrence of Painted Kaloula *Kaloula taprobanica* (Parker, 1934) in Andhra Pradesh based on collections made at Sriharikota Island in Nellore district. This taxon was also collected from Nagarjunasagar Srisailem Tiger Reserve between April to July 2003 (Thulsi Rao *et al.*, *in review*). Srinivasulu *et al.* (*in press*) report for the first time the occurrence of Grey Balloon Frog *Uperodon globulosus* (Günther, 1864) based on specimens collected from Nagarjunasagar Srisailem Tiger Reserve in June 2003. Furthermore, two ranid species were also recorded from Andhra Pradesh in the recent times. The first author has sighted specimens of Leith's frog *Indirana leithii* (Boulenger, 1888) on one occasion in Kawal Wildlife Sanctuary, Adilabad district and on two occasions in Nagarjunasagar Srisailem Tiger Reserve in October 1997, and recently in 2003 a specimen was collected from Gundla Brahmeshwaram Wildlife Sanctuary (CS *pers. observ.*). Thulsi Rao *et al.* (*in review*) report for the first time the occurrence of bronzed frog *Rana* (*Hylorana*) *temporalis* (Günther, 1864) from Andhra Pradesh based on a specimen collected from Gundla Brahmeshwaram Wildlife Sanctuary.

The present day amphibian diversity known from Andhra Pradesh includes 21 species belonging to 13 genera and four families (Table 1). The taxonomic status of *Bufo hololius* Günther, 1876 that had been reportedly collected from Nagarjunasagar area in Nagarjunasagar Srisailem Tiger Reserve (Pillai and Murthy, 1982) and another three specimens from southern Andhra Pradesh (Satyamurti, 1967) is indeterminant (Dubois and Ohler, 1999) and its record in the State needs verification. Owing to the taxonomic uncertainty of the specimens that have been included under *nomen Philautus variabilis* (Günther, 1859) – presently restricted in distribution to Sri Lanka, and the Indian populations earlier referred to this *nomen* being treated under *Philautus wynaadensis* (Jerdon, 1854 “1853”) and also the close proximity of type locality and distribution range of *Philautus terebrans* Das and Chanda, 1998, we provisionally treat *Philautus variabilis* (Günther, 1859) as not present in Andhra Pradesh pending collection of fresh materials.

Table 1. Amphibian diversity of Andhra Pradesh

S. No.	Family	Species	Remarks
1.	Bufonidae	<i>Bufo melanostictus</i> Schneider, 1799	Murthy, 1968 Dutta, 1997 Sarkar <i>et al.</i> , 1993 Chanda, 2002
2.		<i>Bufo scaber</i> Schneider, 1799	As <i>Bufo fergusonii</i> Boulenger, 1892 Donahue and Daniel, 1966 Dutta, 1997 Inger and Dutta, 1986 Sarkar <i>et al.</i> , 1993 Chanda, 2002
[2a.		<i>Bufo hololius</i> Günther, 1875 [Invalid taxon, pending taxonomic re-evaluation of the specimens]	Satyamurti, 1967 Pillai and Murthy, 1982 Dutta, 1997 Sarkar <i>et al.</i> , 1993 Chanda, 2002]
3.		<i>Bufo stomaticus</i> Lütken, 1862	Sarkar <i>et al.</i> , 1993 Chanda, 2002
4.	Microhylidae	<i>Kaloula taprobanica</i> (Parker, 1934)	Sivakumar, 2003 Thulsi Rao <i>et al.</i> (in review)

Cont. Table

S. No.	Family	Species	Remarks
5.		<i>Uperodon systoma</i> (Schneider, 1799)	Dutta, 1997 Sarkar <i>et al.</i> , 1993 Chanda, 2002
6.		<i>Uperodon globulosus</i> (Günther, 1864)	First report from Andhra Pradesh Srinivasulu <i>et al.</i> , <i>in press</i>
7.		<i>Microhyla ornata</i> (Duméril and Bibron, 1841)	Murthy, 1968 Dutta, 1997 Sarkar <i>et al.</i> , 1993 Chanda, 2002
8.		<i>Microhyla rubra</i> (Jerdon, 1854 “1853”)	Murthy, 1968 Dutta, 1997 Sarkar <i>et al.</i> , 1993 Chanda, 2002
9.		<i>Ramanella variegata</i> (Stoliczka, 1872)	Boulenger, 1890 Parker, 1934 Dutta, 1997 Sarkar <i>et al.</i> , 1993 Chanda, 2002
10.	Ranidae	<i>Euphlyctis cyanophlyctis</i> (Schneider, 1799)	Murthy, 1968 Dutta, 1997 Sarkar <i>et al.</i> , 1993 Chanda, 2002
11.		<i>Euphlyctis hexadactylus</i> (Lesson, 1834)	Boulenger, 1920 Dutta, 1997 Sarkar <i>et al.</i> , 1993 Chanda, 2002
12.		<i>Fejervarya limnocharis</i> (Gravenhorst, 1829)	Murthy, 1968 Dutta, 1997 Sarkar <i>et al.</i> , 1993 Chanda, 2002
13.		<i>Hoplobatrachus crassus</i> (Jerdon, 1854 “1853”)	Pillai and Murthy, 1982 Inger and Dutta, 1986 Dutta, 1997 Sarkar <i>et al.</i> , 1993 Chanda, 2002

Cont. Table

S. No.	Family	Species	Remarks
14.		<i>Hoplobatrachus tigerinus</i> (Daudin, 1802)	Murthy, 1968 Dutta, 1997 Sarkar <i>et al.</i> , 1993 Chanda, 2002
15.		<i>Indirana leithii</i> (Boulenger, 1888)	First report from Andhra Pradesh (present study)
16.		<i>Hylorana temporalis</i> (Günther, 1864)	First report from Andhra Pradesh (present study) Thulsi Rao <i>et al.</i> (in review)
17.		<i>Sphaerotheca breviceps</i> (Schneider, 1799)	Murthy, 1968 Sarkar <i>et al.</i> , 1993 Chanda, 2002
18.		<i>Sphaerotheca dobsoni</i> (Boulenger, 1882)	Inger and Dutta, 1986 Dutta, 1997 Sarkar <i>et al.</i> , 1993 Chanda, 2002
19.		<i>Sphaerotheca rolandae</i> (Dubois, 1983)	First report from Andhra Pradesh (present study).
20.	Rhacophoridae	<i>Polypedates maculatus</i> (Gray, 1834)	Dutta, 1997 Sarkar <i>et al.</i> , 1993 Chanda, 2002
20a.		<i>Philautus variabilis</i> (Günther, 1859) Invalid <i>nomen</i> , see text for details.	Dutta, 1997 Sarkar <i>et al.</i> , 1993 Chanda, 2002
21		<i>Philautus terebrans</i> Das & Chanda, 1998	Das & Chanda, 1998 Chanda, 2002

Srinivasulu and Srinivasulu (2004) opined that the herpetofauna of the Protected Area Network in the Andhra Pradesh is poorly documented. Except for a few scattered references by Murthy (1968), Sarkar *et al.* (1993), Rajesh *et al.* (2004), and Srinivasulu and Srinivasulu (2004) nothing much exists in literature about the amphibian diversity in Andhra Pradesh. The Ministry of Environment and Forests, Government of India initiated a nation-wide project for inventorization of faunal diversity of the National Parks of India. Under this programme the Freshwater Biological Station, Zoological Survey of India, Hyderabad was entrusted to inventorize of the faunal diversity of the three National Parks and Nagarjunasagar Srisailem Tiger Reserve in Andhra Pradesh. In this connection, a faunistic survey was conducted in June 2003 by the first author in association with Zoological Survey of India, Hyderabad and in collaboration with Andhra Pradesh Forest Department. The vouchers collected during the survey and the observations made by the first author between 1995 and 2004 are presented in this paper.

STUDY AREA

The Nagarjunasagar Srisailem Tiger Reserve (15°53' N – 16°43' N and 78°30' E – 79°28' E) is a massive stretch of forest located in Andhra Pradesh (Fig. 1). The Reserve, spanning an area of 3,568 km² (with a core area of 1,200 km²) was declared as a Protected Area (Wildlife Sanctuary) in 1978 that became a Project Tiger site in 1983. Today, it remains one of the largest Project Tiger sites in India and the only one in Andhra Pradesh.

Topographically, the Reserve is located on the biodiversity rich Nallamala Hills (Srinivasulu and Nagulu, 2002). The Nallamala Hills extend South from the Nagarjunasagar Srisailem Tiger Reserve into an adjacent wildlife sanctuary – the Gundla Brahmeswara Metta Wildlife Sanctuary. The river Krishna flows from East to West through the Reserve, bisecting the area into a larger Northern bank and a smaller Southern Bank.

The vegetation of the Reserve is primarily Southern tropical dry deciduous forest type (Champion and Seth, 1968; Srinivasulu, 2001) featuring species such as *Terminalia tomentosa*, *Anogeissus latifolia*, *Adina cordifolia*, *Hardwickia binata*, *Chloroxylon swietenia*, *Acacia sundra*, *Aegle marmelos*, *Dalbergia latifolia*, *Madhuca indica* etc. On the ground, the wide diversity of forest sub-types are clearly noticed including patches of almost pure bamboo (*Bambusa arundinacea*, *Dendrocalamus strictus*), Teak (*Tectona grandis*) plantation, Teak Mixed forest, Grasslands, and Riverine habitats among others. Open forests and grass savannah comprise around 55% of the core area of the reserve. In the buffer area, nearly 30% of the land cover is under agricultural cultivation.

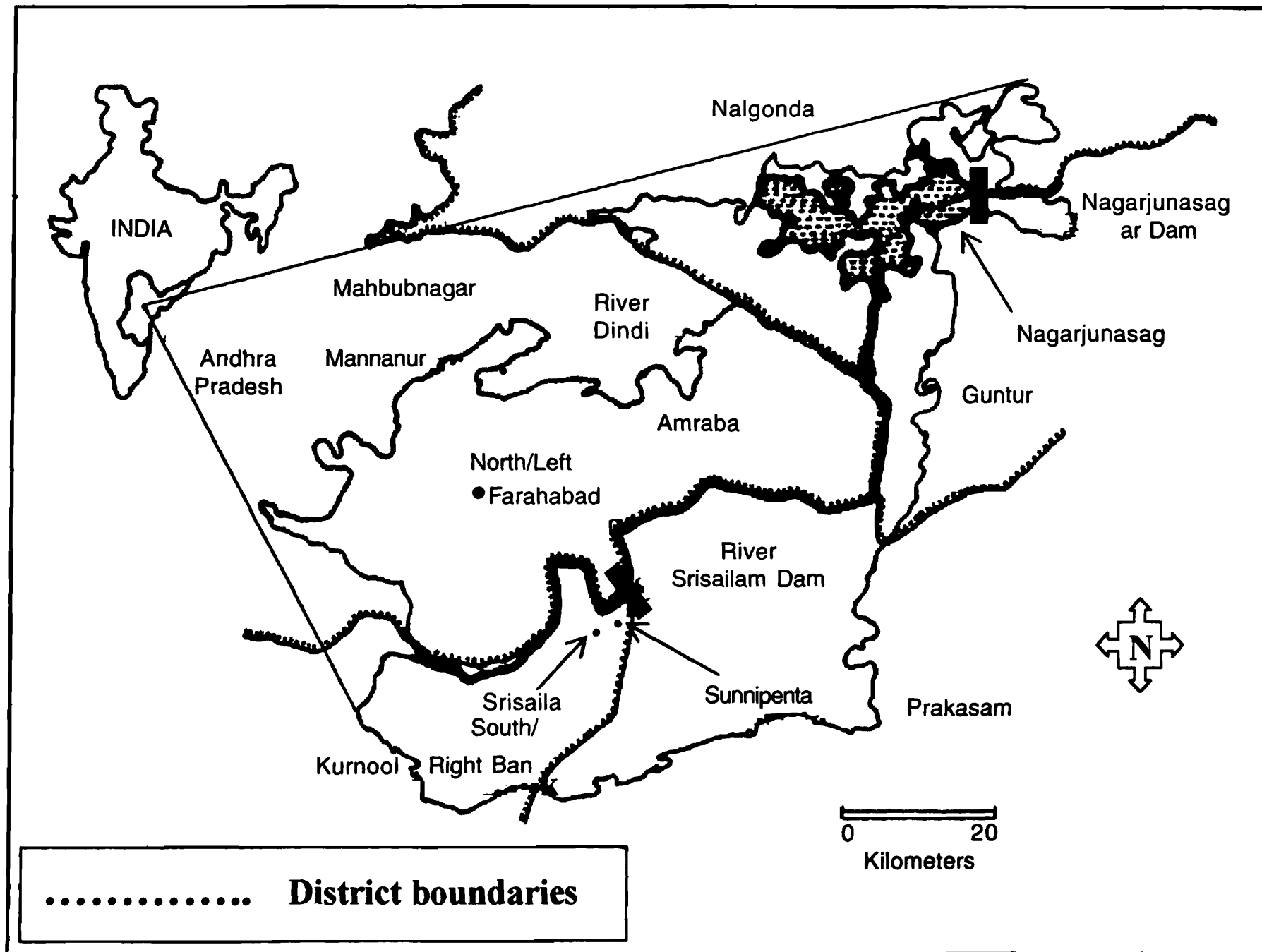


Fig. 1. Map of the Nagarjunasagar Srisailem Tiger Reserve, Andhra Pradesh

METHODOLOGY

Since December 1995 the first author (CS) has been conducting surveys in Nagarjunasagar Srisailem Tiger Reserve and the contiguous Gundla Brahmeshawaram Wildlife Sanctuary documenting vertebrate diversity of the Nallamala Hills (Srinivasulu and Nagulu, 2002). For documenting amphibian diversity surveys were carried out predominantly during the monsoon months. As technical advisor to the team based at field station of the Andhra Pradesh Forest Department's Eco-Resources Monitoring Lab in Sunnipenta, the first author (CS) also had an opportunity to collect amphibians from December 2001 to December 2003, and study the specimens that was deposited with the synoptic collections that were maintained there.

Between 3 to 16 June 2003, a faunistic survey was conducted by Freshwater Biological Station, Zoological Survey of India, Hyderabad to collect voucher specimens of the amphibians that were deposited with the National Zoological Collection at Hyderabad. In some cases, when voucher specimens were not collected, photo vouchers were taken and deposited with the Natural History Museum of the Department of Zoology, Osmania University, Hyderabad.

Random surveys were conducted in all the habitat types to document the amphibian diversity. Very often, but not always, we relied on calls during the night time to locate the species. Voucher specimens were usually hand picked while on ground, but nets of various sizes were also used to collect the more aquatic species.

Voucher specimens were preserved following standard techniques and deposited in National Zoological Collection, Zoological Survey of India, Hyderabad. All specimens were examined and carefully identified using diagnostic keys by Boulenger (1890), Daniel (1963a, b; 1975) and Daniel and Sekar (1989). Earlier collections made by the Zoological Survey of India maintained in National Zoological Collection at Kolkata provided additional vouchers and observations.

Detailed systematic accounts on the amphibians recorded during the study, including synonyms, family and generic keys, diagnostic characters, tadpoles, distribution and their IUCN status are provided. Line drawings of the habit of adult and tadpole were adapted from Boulenger (1890), Kirtisinghe (1957) and Ray (1999). Synonymy is following Frost (2004) and, world distribution and IUCN status are following IUCN, CI and NatureServe (2004).

RESULTS

A total of 19 species of amphibia consisting 3 bufonids, 6 microhylids, 9 ranids and 1 rhacophorid were recorded from Nagarjunasagar Srisailem Tiger Reserve (Table 2).

Of these, *Bufo stomaticus* Lütken, 1862; *Bufo melanostictus* Schneider, 1799; *Bufo scuber* Schneider, 1799 (Bufonidae); *Microhyla ornata* (Duméril and Bibron, 1841); *Microhyla*

rubra (Jerdon, 1854 “1853”) (Microhylidae); *Sphaerotheca breviceps* (Schneider, 1799); *Sphaerotheca dobsoni* (Boulenger, 1882); *Euphlyctis cyanophlyctis* (Schneider, 1799); *Euphlyctis hexadactylus* (Lesson, 1834); *Hoplobatrachus tigerinus* (Daudin, 1802); *Hoplobatrachus crassus* (Jerdon, 1854 “1853”); *Fejervarya limnocharis* (Gravenhorst, 1829) (Ranidae), and *Polypedates maculatus* (Gray, 1834) (Rhacophoridae) are common species.

Table 2. Amphibian diversity of Nagarjunasagar Srisailem Tiger Reserve, Andhra Pradesh

S. No.	Family	Species	IUCN Status
1	Bufonidae	<i>Bufo stomaticus</i> Lütken, 1862	Least Concern (LC)
2.		<i>Bufo melanostictus</i> Schneider, 1799	Least Concern (LC)
3.		<i>Bufo scaber</i> Schneider, 1799	Least Concern (LC)
4.	Microhylidae	<i>Kaloula taprobanica</i> (Parker, 1934)	Least Concern (LC)
5.		<i>Uperodon globulosus</i> (Günther, 1864)	Least Concern (LC)
6.		<i>Uperodon systoma</i> (Schneider, 1799)	Least Concern (LC)
7		<i>Microhyla ornata</i> (Duméril and Bibron, 1841)	Least Concern (LC)
8.		<i>Microhyla rubra</i> (Jerdon, 1854 “1853”)	Least Concern (LC)
9.		<i>Ramanella variegata</i> (Stoliczka, 1872)	Least Concern (LC)
10.	Ranidae	<i>Sphaerotheca breviceps</i> (Schneider, 1799)	Least Concern (LC)
11		<i>Sphaerotheca dobsoni</i> (Boulenger, 1882)	Least Concern (LC)
12.		<i>Sphaerotheca rolandae</i> (Dubois, 1983)	Least Concern (LC)
13.		<i>Euphlyctis cyanophlyctis</i> (Schneider, 1799)	Least Concern (LC)
14.		<i>Euphlyctis hexadactylus</i> (Lesson, 1834)	Least Concern (LC)
15.		<i>Indirana leithii</i> (Boulenger, 1888)	Vulnerable (VU Blab (iii))
16.		<i>Hoplobatrachus tigerinus</i> (Daudin, 1802)	Least Concern (LC)
17.		<i>Hoplobatrachus crassus</i> (Jerdon, 1854 “1853”)	Least Concern (LC)
18.		<i>Fejervarya limnocharis</i> (Gravenhorst, 1829)	Least Concern (LC)
19.	Rhacophoridae	<i>Polypedates maculatus</i> (Gray, 1834)	Least Concern (LC)

Other species were uncommon or rare in occurrence. Collection of Painted Kaloula *Kaloula taprobanica* (Parker, 1934) constitutes its first record on the Eastern Ghats (Thulsi Rao *et al.* (*in review*); present study). Grey Balloon Frog *Uperodon globulosus* (Günther, 1864) collected during the present study from Nagarjunasagar Srisailem Tiger Reserve has been reported for the first time from Andhra Pradesh (Srinivasulu *et al.*, *in press*). Similarly, the present study also revealed the presence of *Sphaerotheca rolandae* (Dobson, 1983) in Nagarjunasagar Srisailem Tiger Reserve that constitutes its first record from Andhra Pradesh. Occurrence of Marbled Balloon Frog *Uperodon systoma* (Schneider, 1799) and Variegated Ramanella *Ramanella variegata* (Stoliczka, 1872) in Nagarjunasagar Srisailem Tiger Reserve constitutes the first record for the Nallamala Hills, Eastern Ghats. Leith's Frog *Indirana leithii* (Boulenger, 1888), a taxon considered to be restricted in distribution to Western Ghats and first reported from Bastar, Chhattisgarh, has been observed to occur in the Nallamala Hills in Eastern Ghats. Although this species was observed earlier in Nagarjunasagar Srisailem Tiger Reserve we could not collect any voucher specimens. Furthermore, one voucher collected from Gundla Brahmeshwaram Wildlife Sanctuary deposited in the ERM Laboratory, Sunnipenta substantiates its presence in Andhra Pradesh (CS *pers. observ.*).

The list presented here is an outcome of a long-term study and by no means is complete. Absence of bush frogs belonging to the genus *Philautus* Gistel, 1848 and other bufonids and ranids. and recent collection of hitherto unrecorded species indicates that further intensive surveys would yield more species.

SYSTEMATIC ACCOUNT

Key to the families of amphibians found in
Nagarjunasagar Srisailem Tiger Reserve

- 1A. Jaw toothless 2
- 1B. Upper jaw toothed 3
- 2A. Skin rough and warty, parotid glands present BUFONIDAE
- 2B. Skin smooth, parotid glands absent MICROHYLIDAE
- 3A. Cartilaginous segment between penultimate and
ultimate toe segments absent RANIDAE
- 3B. Cartilaginous segment between penultimate and
ultimate toe segments present RHACOPHORIDAE

1. Family BUFONIDAE Gray, 1825

Synonymy : *Bufonidea* Fitzinger, 1827; *Bufones* Wiegmann, 1832; *Bufonini* Bonaparte, 1835; *Bufonina* Bonaparte, 1838; *Bufonidae* Bell, 1839; *Bufoidea* Swainson, 1839; *Bufoniformes* Duméril and Bibron, 1841 (Explicit family); *Atelopoda* Fitzinger, 1843; *Bufonia* Gravenhorst, 1845; *Phryniscidae* Günther, 1858; *Atelopodes* Fitzinger, 1861 "1860"; *Adenomidae* Cope, 1861 "1860"; *Bufonides* Bruch, 1862; *Bufonida* Haeckel, 1866; *Phryniscina* Mivart, 1869 (Explicit subfamily); *Dendrophryniscina* Jiménez de la Espada, 1871 "1870"; *Dendrophryniscidae* Jiménez de la Espada, 1871 "1870"; *Adenomeridae* Hoffmann, 1878 (Unjustified emendation of *Adenomidae*); *Bufonida* Knauer, 1883; *Bufoniidae* Boulenger, 1893; *Bufonidi* Acloque, 1900; *Dendrophryniscinae* Gadow, 1901; *Platosphinae* Fejérváry, 1917; *Bufoninae* Fejérváry, 1917; *Bufavidae* Fejérváry, 1920; *Bufonidae* Miranda-Ribeiro, 1926; *Tornierobatidae* Miranda-Ribeiro, 1926; *Dendrophryniscidae* Miranda-Ribeiro, 1926; *Atelopodidae* Parker, 1934; *Atelopodinae* Davis, 1935; *Nectophrynidae* Laurent, 1942; *Bufonoidea* Laurent, 1960; *Nectophrynoidini* Dubois, 1982; *Tornierobatinae* Dubois, 1983; *Adenominae* Dubois, 1983; *Tornierobatini* Dubois, 1987 "1986"; *Nectophrynini* Dubois, 1987 "1986"; *Stephopaedini* Dubois, 1987 "1986"

Type genus : *Bufo* Laurenti, 1768

Representatives of this family, distributed throughout the world excepting cold arctic regions, are characterized as true toads possessing fat body, broad waist, short legs and awkward hopping movements.

Diagnostic characters : Pectoral girdle arciferal; vertebral column procoelous; sacral vertebra posses double condyle for articulation with the coccyx; diapophyses of sacral vertebra usually dilated; jaw toothless; ear fully developed; Eustachian tube generally present, sometimes reduced; no palatal folds; coracoradialis attached to the procoracoid-clavicular bar at its mesial extremity; insertion of the semi-tendinosus passing ventral to, rarely piercing the gracilis; no intercalary phalanges; pupil horizontal; larva with horny mandibles and labial teeth; spiraculum sinistral.

Remarks : This family is represented by three species belonging to genus *Bufo* Laurenti, 1768 in NSTR.

I. Genus *Bufo* Laurenti, 1768

1768. *Bufo*, Laurenti, *Synopsis Rept.*, Vienna, 25

Synonymy : *Buffo* Lacépède, 1788 (Unjustified emendation of *Bufo*); *Batrachus* Rafinesque, 1814 (Substitute name for *Bufo* Laurenti, 1768); *Bufotes* Rafinesque, 1815 (Substitute name for *Bufo* Laurenti, 1768); *Calamita* Oken, 1816; *Oxyrhynchus* Spix, 1824; *Rhinella* Fitzinger, 1826; *Chaunus* Wagler, 1828; *Chascax* Ritgen, 1828; *Otilophis* Cuvier, 1829; *Phryniscus* Wiegmann, 1834; *Osilophus* Tschudi, 1838; *Palaeophrynos* Tschudi, 1838; *Palaeophryne* Fitzinger, 1843; *Phryne* Fitzinger, 1843; *Phrynomorphus* Fitzinger, 1843; *Otolophus* Fitzinger, 1843; *Phrynoidis* Fitzinger, 1843; *Chilophryne* Fitzinger, 1843; *Docidophryne* Fitzinger, 1843; *Eurhina* Fitzinger, 1843; *Peltophryne* Fitzinger, 1843; *Trachycara* Tschudi, 1845; *Anaxyrus*

Tschudi, 1845; *Otilophus* Günther, 1859 "1858"; *Peltaphryne* Cope, 1862; *Rhaebo* Cope, 1862; *Epidalea* Cope, 1864; *Pegaeus* Gistel, 1868; *Otaspis* Cope, 1869 "1868"; *Nannophryne* Günther, 1870; *Cranopsis* Cope, 1875 "1876"; *Ollotis* Cope, 1875 "1876"; *Platosphus* de l'Isle, 1877; *Dromoplectrus* Camerano, 1879; *Bufavus* Portis, 1885; *Stenodactylus* Philippi, 1899; *Aruncus* Philippi, 1902; *Otylophus* Cei, 1953; *Torrentophryne* Yang, Liu, and Rao, 1996.

Type species : *Bufo vulgaris* Laurenti, 1768.

Diagnostic characters : Pupil horizontal, tongue elliptic or pyriform, entire and free behind, vomerine teeth absent, tympanum distinct, exceptionally absent, fingers free, toes more or less webbed, the tips simple or dilated into small discs, outer metatarsals united, omosternum generally missing, if present cartilaginous, sternum a cartilaginous plate sometimes more or less ossified along the median line, diapophyses of sacral vertebrae more or less dilated, terminal phalanges obtuse or triangular, parotid glands are large and prominent, head generally without bony ridges present in some, skin rough and tuberculated.

Distribution : Cosmopolitan, found throughout the world except Australia, Madagascar, New Guinea and Polynesia.

Remarks : This genus is represented by three species, namely, *Bufo stomaticus* Lütken, 1862; *Bufo melanostictus* Schneider, 1799 and *Bufo scaber* Schneider, 1799, in Nagarjunasagar Srisailem Tiger Reserve. We do not include *Bufo hololius* Günther, 1876 reported by Pillai and Murthy (1982) to be occurring in Nagarjunasagar area following Dubois and Ohler (1999), who opined that this taxon is known only by type specimen housed in BMNH collection. The other specimens assigned to this *nomen* needs to be taxonomically re-evaluated.

Key to the species of *Bufo* occurring in Nagarjunasagar Srisailem Tiger Reserve

- 1A. Head without bony ridges *Bufo stomaticus*
- 1B. Head with bony ridges 2
- 2A. Parietal ridges absent, parotid gland bean shaped *Bufo melanostictus*
- 2B. Parietal ridges present, parotid gland as long as broad *Bufo scaber*

1. *Bufo stomaticus* Lütken, 1862

1862. *Bufo stomaticus* Lütken, Vidensk. Medd. Dansk. Naturhist. Foren., 14 : 305.

Synonymy : *Bufo andersonii* Boulenger, 1883; *Bufo Andersonii* Murray, 1884; *Bufo stomaticus stomaticus* Rao, 1920; *Bufo stomaticus peninsularis* Rao, 1920.

Common Name : Marbled Toad

Type Species : Syntypes, ZMUC (6 specimens), by original designation.

Type locality East Indies; restricted to Assam, India by Boulenger (1891).

Measurements : SVL 29-76 mm.

Diagnostic characters : Head depressed, broader than long, without bony ridge; nostril much nearer to the tip of the snout than to the eye; snout obtuse as long as or nearly as the diameter of the eye; canthus rostralis angular; loreal region oblique, concave; interorbital width slightly concave, about as broad as the upper eyelid; tympanum distinct, oval, its longer diameter about two-thirds the diameter of the eye; fingers free, first longer than the second; smaller inner and larger outer palmar tubercle; tips of fingers and toes swollen or blunt; toes more than half to three fourth webbed; web reaching the tips of all but the fourth toe; last two phalanges of fourth toe free; subarticular tubercles small; two (outer and inner) small metatarsal tubercles; tibiotarsal articulation reaches the tympanum or halfway between the tympanum and the eye; heels overlap when the tibiae are folded at right angles to the long axis of the body; skin covered with flat tubercles and spinous warts; upper eyelid with dorsal tubercles and thickened glandular edges; lower surface coarsely granulated, chin and throat smooth; a row of white tubercles along the outer region of the forearm; parotids large, flat, about 3 times as long as broad (Fig. 2; Photo Plate IA.).

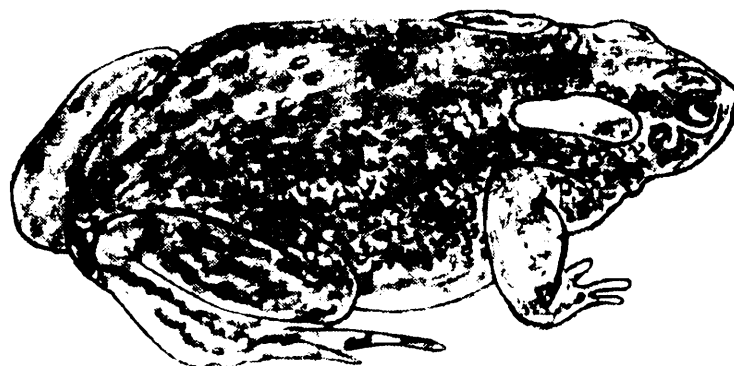


Fig. 2. Habit of the adult of *Bufo stomaticus* Lütken, 1862

Colouration : Dorsally yellowish-green to olive green with darker spots; ventrally whitish, sometimes with elongated darkish markings between middle of the throat and the belly; tips of digits dark brown; vocal sac subgular and darkish; nuptial excrescences on the upper side of the two inner fingers darkish.

Tadpole Not exceeding 20mm in length when full grown; colour more or less mottled or speckled; ventral surface distinctly paler (Fig. 3).

Distribution Afghanistan, Bangladesh, India, Iran, Nepal, and Pakistan. In India : Andhra Pradesh, Assam, Bihar, Chhattisgarh, Gujarat, Himachal Pradesh, Jammu and Kashmir, Kerala, Maharashtra, Orissa, Punjab, Rajasthan, Sikkim, Tamil Nadu, Uttaranchal, and Uttar Pradesh.

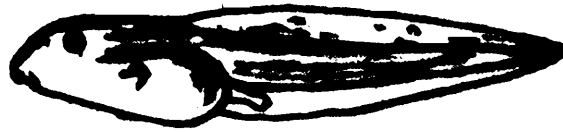


Fig. 3. Habit of the tadpole of *Bufo stomaticus* Lütken, 1862

Material from NSTR : 1 ex. Nandikonda valley, Nalgonda district, collected by I. N. Maligi, 9.8.1962 (Sarkar *et al.*, 1993); 1 ex. Nagarjunasagar, Nalgonda district, collected by B. Nath, 15.9.1962 (Sarkar *et al.*, 1993). During the present survey 5 examples were collected: 4 ex. Vatvarlapally, 14.6.2003 [FBS/ZSI/N/1148, 1150-1152]; 1 ex. Egalapenta, 14.6.2003 [FBS/ZSI/N/1153].

Remarks This species was common but not as abundant as the Common Indian Toad. The sighting frequency of this species increased manifold with the onset of monsoon. It was observed mainly during the night and a few amplexing pairs were also encountered. It was found common near human habitations and agriculture fields than in the forested tracts. They were found in many numbers in shallow rainwater pools throughout the Reserve, where they were also seen during the day time. Murthy (1968) reported its occurrence in the Nagarjunasagar in Nalgonda district for the first time. This species was also reported from Nandikonda valley (Sarkar *et al.*, 1993). During the present survey we observed this species at Vijayapuri and its environs (Guntur district), Mannanur, Farahabad, Vatvarlapally and Egalapenta (Mahbubnagar district) and Shikaram, Srisailem and Sunnipenta (Kurnool district). Further this species has also been observed by CS at different localities of Nagarjunasagar Srisailem Tiger Reserve, viz., Thummalabailu, Pecheruvu, Chinna Manthanala, Pedda Manthanala, Rollapenta, Bairlutu, Potharajupenta and many other localities of the Nagarjunasagar Srisailem Tiger Reserve in Kurnool district. Voucher specimens collected by us are the young ones.

2004 IUCN Status : Least Concern [LC].

2. *Bufo melanostictus* Schneider, 1799

1799. *Bufo melanostictus* Schneider, *Hist. Amph.*, 1. Jena. : 216.

Synonymy : *Bufo camortensis* Mansukhani and Sarkar, 1980; *Ansonia kamblei* Ravichandran and Pillai, 1990; *Bufo melanostictus melanostictus* Khan, 2001; *Bufo melanostictus hazarensis* Khan, 2001.

Common Name : Common Indian Toad

Type Species : Syntypes, ZMB 3462-63 (Peters, 1863); ZMB 3462 designated as lectotype by Dubois and Ohler (1999) who redescribed this type.

Type Locality : 'Ex India Orientalis'

Measurements : SVL 45-165 mm, Females are more variable in size (Pope, 1931).

Diagnostic characters : Head broader than long, with well developed canthal, pre-orbital, supra-orbital, post-orbital and supra-tympanic ridges; nostril nearer to the tip of the snout than to eye; snout obtuse but oblong as the diameter of the eye; loreal region oblique and slightly concave; inter-orbital space concave, wider than upper eyelid; tympanum vertical and oval, close behind the orbit, usually two thirds the diameter of the eye; fingers free, first longer than the second, small inner and large outer palmar tubercle; tips of fingers and toes swollen or blunt; toes nearly half webbed; subarticular tubercles not very prominent; two (outer and inner) moderate oval metatarsal tubercles; tibiotarsal articulation reaching the tympanum; heels meet when the tibiae are folded at right angles to the long axis of the body; skin covered with tubercles and spinous warts; generally a double series of large swollen warts along the back; parotids large, swollen and kidney shaped (Fig. 4; Photo Plate IB).

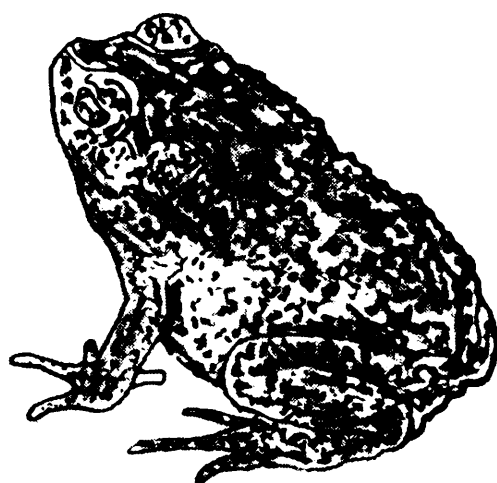


Fig. 4. Habit of the adult of *Bufo melanostictus* Schneider, 1799

Colouration : Very variable; general background olive or brown, often with suffusion of red on the back and limbs, cranial ridges, tips of spinous warts and digits black; ventral surface whitish or yellowish, with or without brown markings on the throat and chest that sometimes extends on to the belly; vocal sac subgular and darkish; nuptial excrescences (averaging 20mm in length) of the upper side of the two inner fingers black.

Tadpole : Uniform black or brown; only slightly paler on fin membranes and ventral surface; nostril less than half as large as the eye (Annandale and Rao, 1918) (Fig. 5).

Distribution : Bangladesh, Cambodia, China, Hong Kong, India, Indonesia, Lao People's Democratic Republic, Macau, Malaysia, Myanmar, Nepal, Papua New Guinea, Pakistan, Singapore, Sri Lanka, Thailand, Taiwan (Province of China), and Viet Nam. In India : Widespread.

Material from NSTR : 2 ex. Mannanur, Mahbubnagar district, Coll. D. P. Sanyal, 19.1.1988 (Sarkar *et al.*, 1993); 6 ex. Nagarjunasagar, Nalgonda district, Coll. B. Nath, Aug-Sept., 1962 (Sarkar *et al.*, 1993); 2 ex. Nagarjuna hill, Nalgonda district, Coll. B. Nath, 28.9.1963 (Sarkar *et al.*, 1993).

Remarks : Commonest among the anurans in the Nagarjunasagar Srisailem Tiger Reserve.



Fig. 5. Habit of the tadpole of *Bufo melanostictus* Schneider, 1799

Nocturnal in habit and was also found to be active during the day. This species was observed throughout the study period. Found in abundance in and around human settlements and agriculture fields. In the forested tracts their numbers were relatively less. Males were smaller than females. Amplecting pairs were observed after the monsoon set in. This species had been earlier recorded from Mannanur in Mahbubnagar district, Nagarjunasagar and Nagarjunakonda in Nalgonda district (Sarkar *et al.*, 1993). During this survey this species has been observed from many locations on the right bank of River Krishna in the Nagarjunasagar Srisailem Tiger Reserve in locations falling under Mahbubnagar district (namely, Farahabad, Vatvarlapally, Egalapenta and Domalpenta) and Kurnool district (namely, Sunnipenta, Srisailem, Shikaram and Hathakeswaram). Further, this species has also been observed by CS at different localities of Nagarjunasagar Srisailem Tiger Reserve, viz., Amrabad, Ippalapally, Maddimadugu, Umamaheshwaram, Bilakal (all in Mahbubnagar district), Thummabailu, Rollapenta, Chinna Manthanala, Pedda Manthanala, Pecheruvu, Bairluty (in Kurnool district) during earlier studies. No voucher specimens were collected during the present survey.

2004 IUCN Status : Least Concern [LC].

3. *Bufo scaber* Daudin, 1803

1803. *Bufo scaber* Daudin, *Hist. natur. Gen. et part. des reptiles*, 8. Paris : 96.

Synonymy : *Bufo fergusonii* Boulenger, 1892.

Common Name : Ferguson's Toad

Type Species : Syntypes in ZMB (3 specimens), of which ZMB 3464 was considered holotype; Dubois and Ohler (1999) redescribed the specimen and designated the same as lectotype.

Type locality : 'Orientali India'

Measurements : SVL 18-46 mm.

Diagnostic characters : Head depressed, broader than long, without bony ridge; nostril much nearer to the tip of the snout than to the eye; snout short and truncate; canthus rostralis angular; loreal region oblique, concave; interorbital width broader than the upper eyelid; tympanum distinct, oval, about three-fifths the diameter of the eye; fingers free, first longer as long as the second; smaller inner and larger outer palmar tubercle; tips of fingers and toes swollen or blunt; toes scarcely half webbed; subarticular tubercles indistinct; two (outer and inner) distinct metatarsal tubercles; tibiotarsal articulation reaches up to shoulder

only; heels meet when the tibiae are folded at right angles to the long axis of the body; skin covered with rounded warty throughout, warts being relatively smaller on the ventral side; parotids rounded, as long as broad, about the size of the upper eyelid (Fig. 6; Photo Plate IC).

Colouration : Dorsally grayish to dark olive; some specimens have a lighter cross-band between the eyes and light brown incomplete vertebral band looking like an elongated mark between the shoulders, also in some, a lighter patch behind the parotids that may or may not be continuing dorsolaterally up to the groin may be present, on the back dark indefinite markings may also be present; ventrally light grey, sometimes clouded with darkish markings between the throat and middle of the belly; dark cross bars on limbs; vocal sac subgular and darkish.

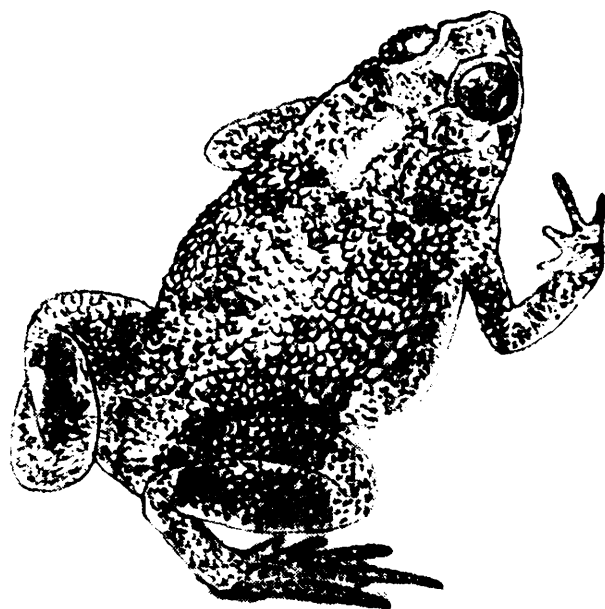


Fig. 6. Habit of the adult of *Bufo scaber* Schneider, 1799

Tadpole : Uniform brown; only slightly paler on fin membranes and ventral surface; nostril half as large as the eye (Annandale and Rao, 1918) (Fig. 7).

Distribution : India and Sri Lanka. In India : Andhra Pradesh, Chhattisgarh, Karnataka, Kerala, Jharkhand, Maharashtra, Orissa and Tamil Nadu.

Material from NSTR : No voucher specimen collected. Photo voucher (NHM.OU.2002 Amphibia1; Photo Plate IC) of one specimen encountered during in August 2002 is deposited in Natural History Museum of Osmania University, Hyderabad.

Remarks This species was common but not as abundant as the Common Indian or Marbled Toad. The sighting frequency of this species increased manifold with the onset of monsoon. It was observed mainly during the night. It was found nowhere in abundance and was encountered in the forested tracts near waterbodies. During the present survey we observed this species at Vijayapuri and its environs (Guntur district), Mannanur, Farahabad, Vatvarlapally and Egalapenta (Mahbubnagar district) and Shikaram, Srisailam and Sunnipenta



Fig. 7. Habit of the tadpole of *Bufo scaber* Schneider, 1799

(Kurnool district). Further, this species has also been observed by CS at different localities of Nagarjunasagar Srisailam Tiger Reserve, viz., Thummalabailu, Pecheruvu, Pedda Manthanala, Rollapenta, and Bairluty in Kurnool district.

2004 IUCN Status : Least Concern [LC].

II. Family MICROHYLIDAE Günther, 1858

1858. Micrhyllidae Günther, *Proc. Zool. Soc. London*, 1858 : 344.

Synonymy : Micrhyllidae. Günther, 1858.

Type genus : *Micrhyla* Duméril and Bibron, 1841 (an unjustified emendation of *Microhyla* Tschudi, 1838).

Representatives of this family, distributed through Africa, Madagascar, South East Asia, New Guinea, Central and South America, are characterized as narrow mouthed frogs possessing stout, squat and globular body, short legs and burrowing habit.

Key to the genera occurring in Nagarjunasagar Srisailam Tiger Reserve

- 1A. Tips of the fingers dilated into triangular discs; procoracoid present 1
- 1B. Tips of the fingers more or less blunt or rounded, procoracoid absent 2
- 2A. A bony ridge along the posterior border of each choana *Kaloula*
- 2B. A dermal ridge a little way behind each choana *Ramanella*
- 3A. Two strong shovel-shaped metatarsal tubercles present, tongue oval, entirely adherent with median longitudinal furrow, culminating posteriorly in a pouch *Uperodon*
- 3B. Two small, distinct but not shovel-shaped metatarsal tubercles present, tongue elliptical, half free behind without median furrow or posterior pouch *Microhyla*

Diagnostic characters : Vertebral column procoelous or diplariocoelous; diapophyses, plate like bone almost surrounding the choana; ethmoid divided or absent; ear fully developed or middle ear incomplete, Eustachian tubes present or absent; palatal folds usually present; coracoradialis attached to the whole width of the procoracoid-clavicular bar when the later is present; insertion of the semi-tendinous passing dorsal to the gracilis; no intercalary

phalanges; pupil vertical or circular; larva without horny mandibles, labial teeth or supra orbital cartilages; spiraculum, if present medium.

I. Genus *Kaloula* Gray, 1831

1831. *Kaloula* Gray, Zool. Misc., pt. 1 : 38.

Synonymy : *Hyladactylus* Tschudi, 1838; *Hylaedactylus* Duméril and Bibron, 1841 (Unjustified emendation); *Plectropus* Duméril and Bibron, 1841; *Pelida* Gistel, 1848; *Holonectes* Peters, 1863; *Calohyla* Peters, 1863 (Unjustified emendation); *Callula* Günther, 1864 (Unjustified emendation); *Cacopoides* Barbour, 1908; *Kallula* Bourret, 1927.

Type Species : *Kaloula pulchra* Gray, 1831.

Diagnostic characters Pupil horizontal; tongue oval, entire and free behind; vomerine teeth absent; tympanum indistinct or hidden; fingers free; toes more or less webbed; tips of digits with or without discs; omosternum, small cartilaginous; sternum large, cartilaginous, diapophyses of sacral vertebrae moderately dilated; vertebral column diplasiocoelous; terminal phalanges T- or Y-shaped; prevomer undivided; the post-choanal portion overlying the palatine region and raised into a strong, sometimes crenulate ridge; clavicles absent; procoracoids persistent as small vestiges lying on the mesial ends of the coracoids.

Distribution : Korea, Northern China, parts of SE Asia, India, Sri Lanka.

Remarks : This genus is represented by one species *Kaloula taprobanica* Parker, 1934 in Nagarjunasagar Srisailem Tiger Reserve. This constitutes the first record of this genus in the Tiger Reserve as well as the Nallamala Hills, Eastern Ghats, Andhra Pradesh.

4. *Kaloula taprobanica* (Parker, 1934)

1934. *Kaloula pulchra taprobanica* Parker, Monog. Frogs Fam. Micro., 86.

Synonymy *Kaloula pulchra taprobanica* Parker, 1934.

Common Name Painted Kaloula.

Type Species : Holotype, BM 1905.3.25.138, by original designation.

Type locality : Punduloya, Sri Lanka.

Measurements SVL up to 45 mm.

Diagnostic characters : Head small, depressed, broader than long; nostrils nearer to the tip of the snout than to the eye; snout short, rounded as long as or little longer than the diameter of the eye; canthus rostralis hardly distinct; loreal region oblique, somewhat concave; interorbital width broader than the upper eyelid; tympanum hidden; fingers free with well developed truncate discs; toes ending obtusely about one third webbed; subarticular tubercles

moderate; two (outer and inner which is about one and half times as long as outer) compressed metatarsal tubercles; tibiotarsal articulation reaching only to the axilla; heels do not meet when the tibiae are folded at right angles to the long axis of the body; skin smooth or granular covered with scattered flat tubercles on the back, and on the throat in males; belly smooth around the vent (Fig. 8; Photo Plate ID).

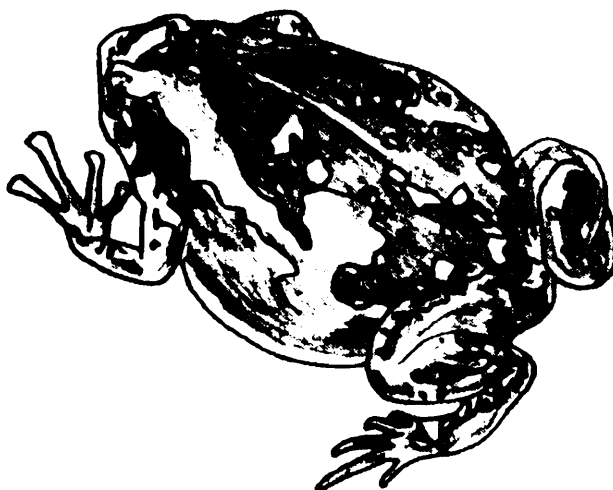


Fig. 8. Habit of the adult of *Kaloula taprobanica* (Parker, 1934)

Coloration : Dorsally brightly coloured with dark and brick red (sometimes crimson) areas in a more or less symmetrical pattern forming a narrow interorbital band and broader dorso-lateral bands; in some specimens the transverse extensions of the median dark area is fenestrated with spots and patches of brighter colour and interrupts the dorso-lateral bands; usually where the dark colour meets the brighter, the former is narrowly edged with black; ventrally light grey, spotted or marbled with brown; vocal sac subgular and darkish.

Tadpole : Horny mandibles, labial teeth or supraorbital cartilages absent; tail without a filament; spiracle opening through a transparent sheath on mid belly.

Distribution : Bangladesh, India and Sri Lanka. In India : Andhra Pradesh, Assam, Bihar, Jharkhand, Karnataka, Madhya Pradesh, Orissa, Tamil Nadu, West Bengal.

Material from NSTR : 4 examples in ERM labs (Srinivasulu, *pers. observ.*). During the present survey 1 example was collected: 1 ex. Shikaram Dwaram, 14.6.2003 [FBS/ZSI/N/1159].

Remarks : An uncommon species recorded from Andhra Pradesh only recently. On the night of 14 July 2003 one specimen of *Kaloula taprobanica* (Parker, 1934) was collected about 0015 hrs in a light drizzle at Shikaram Dwaram near Shikaram (16°02' N and 78°55' E) in Nagarjunasagar Srisailem Tiger Reserve in Kurnool district. The specimen was collected while it was trying to climb on the side embankment along the road towards the valley. As the place from where the specimen was collected is rocky it is presumed that the loose soil along the road is preferred by this species for burrowing. This species was collected away from the human habitation unlike other specimens that was earlier collected from Sunnipenta (Thulsi Rao, *in review*). Earlier, CS has observed this species only once while crossing a

forest path in Potharajupenta area in Gundla Brahmeshwaram Wildlife Sanctuary in June 1998. This constitutes the first record of Painted Kaloula *Kaloula taprobanica* (Parker, 1934) from the Nallamala Hills, Eastern Ghats.

2004 IUCN Status : Least Concern [LC].

II. Genus *Uperodon* Duméril and Bibron 1841

1841. *Uperodon* Duméril and Bibron, *Exp. Gen.*, 8 : 749.

Synonymy : *Systema* Tschudi, 1838; *Hyperodon* Jerdon, 1854 “1853” (Unjustified emendation); *Cacopus* Günther, 1864 (Substitute name for *Uperodon* Duméril and Bibron, 1841); *Pachybatrachus* Keferstein, 1868.

Type species : *Engystoma marmoratum* Guérin-Méneville, 1838 (= *Rana systema* Schneider, 1799), by monotypy.

Diagnostic characters : Pupil vertical (or circular); tongue subcircular, entire and scarcely free behind, with a median furrow; vomerine teeth absent; tympanum indistinct, sometimes hidden; fingers free, toes more or less webbed; tips of digits not dilated; clavicles, procoracoids and omosternum absent; sternum cartilaginous; terminal phalanges simple; outer metatarsals united; prevomer entire or undivided, the post-choanal portion overlying the palatine region and sometimes bearing a raised knob at its mesial end; vertebral column diplasiocoelous; diapophyses of sacral vertebrae prominently dilated.

Distribution : India, Sri Lanka, Nepal, Bangladesh.

Remarks : This genus is represented by two species in Nagarjunasagar Srisailem Tiger Reserve, among which *Uperodon globulosus* is reported for the first time from Andhra Pradesh (Srinivasulu *et al.*, *in press*), and *Uperodon systema* is reported for the first time from the Nallamala hills, Eastern Ghats.

Key to the species of *Uperodon* occurring in Nagarjunasagar Srisailem Tiger Reserve

- 1A. Large size (SVL up to 75mm); interorbital distance up to 3 times the diameter of the upper eyelid; uniform dorsal colouration *Uperodon globulosus*
- 1B. Medium size (SVL up to 55mm); interorbital distance up to 2 times the diameter of the upper eyelid; intense yellow/brown marbled colouration *Uperodon systema*

5. *Uperodon globulosus* (Günther, 1864)

1864. *Cacopus globulosus* Günther, *Rept. Brit. India*, 416.

Synonymy : *Cacopus globulosus* Günther, 1864; *Systema globulosum* Cope, 1867; *Uperodon globulosum* Parker, 1931.

Common Name : Grey Balloon Frog.

Type Species : Syntypes, BM (2 specimens) according to Boulenger (1882); BM 62.12.29.4 considered a syntype by Parker (1934).

Type locality : Russell Konda, Orissa, India.

Measurements : SVL 66-81 mm.

Diagnostic characters : Head small, broader than long; nostrils nearer to the tip of the snout than to the eye; occipital region slightly convex with an occipital and a weak supratympanal fold; Pupil round; snout rounded and twice as long as the diameter of the eye, projecting slightly beyond the mouth; canthus rostralis indistinct and blunt; loreal region flat; interorbital width three times the width of the upper eyelid; tympanum hidden; fingers free, without any discs; metacarpal tubercles indistinct; toes short with rounded tips, about one third webbed; subarticular tubercles not prominent; two (outer small and inner large, longer than the second toe) shovel shaped metatarsal tubercles; tibiotarsal articulation reaching only to the axilla; heels do not meet when the tibiae are folded at right angles to the long axis of the body; skin smooth to weakly tuberculated on the back, loose around the groin, ventral side smooth to wrinkled, weakly granular at the anal region (Photo Plate IIA).

Colouration : Dorsally uniform brown, reddish brown or grey; juveniles bear irregular brown spots; ventrally whitish (non-breeding) or yellowish (breeding); vocal sac subgular and black as is the throat region.

Tadpole : Horny mandibles, labial teeth or suprarrostral cartilage absent; tail without a terminal filament; spiracle opening through a transparent tube immediately in front of the anus (Bahduri and Daniel, 1956).

Distribution : Bangladesh and India. In India : Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Chattisgarh, Goa, Gujarat, Karnataka, Maharashtra, Orissa and West Bengal.

Material from NSTR : During the present survey 1 example was collected: 1 ex. between Mannanur and Farahabad, 14.6.2003 [FBS/ZSI/N/1138].

Remarks : The Grey Balloon Frog is the rarest microhylid that was observed in Nagarjunasagar Srisailem Tiger Reserve during the present study. Like its congeneric Marbled Balloon Frog *Uperodon systoma* (Schneider, 1799), this species too was observed only during the nights while crossing the road in light to heavy drizzle. One female specimen (FBS/ZSI/N/1138) collected on the night of 14 July 2003 between Mannanur and Farahabad (16°19' N and 78°44' E) constitutes first record of occurrence of this species in Andhra Pradesh (Srinivasulu *et al.*, *in press*). This species was not encountered from Nagarjunasagar area and was noted to be fond of habitats in the forested tracts that characteristically had good and loose soil. On the same night we encountered around five crushed specimens between 2145 to 0015 hrs between Shikaram and Srisailem indicating its vulnerability to vehicular movements within this stretch of the Reserve. This species was encountered during the present study

only from Farahabad plateau (Mahbubnagar district) and Srisailam environs (Kurnool district). This species could be more common and its possible occurrence in other parts of Nagarjunasagar Srisailam Tiger Reserve and Nallamala Hills, or for that matter in other areas of Andhra Pradesh cannot be ignored. This constitutes the first record of Grey Balloon Frog *Uperodon globulosus* (Günther, 1864) from Nallamala Hills, Eastern Ghats for the first time.

2004 IUCN Status : Least Concern [LC].

6. *Uperodon systoma* (Schneider, 1799)

1799. *Rana systoma* Schneider, *Hist. Amph.*, I : 144.

Synonymy : *Rana systoma* Schneider, 1799; *Uperodon systomus* Anders, 2002 (Incorrect treatment of a noun as an adjective).

Common Name : Marbled Balloon Frog.

Type Species : Syntypes, ZMB 3551 (2 specimens).

Type Locality : 'India Orientalis'

Measurements : SVL 62 mm.

Diagnostic characters : Head small, broader than long; nostrils equidistant from the tip of the snout and the eyes; Pupil rounded to slightly lozenge shaped; snout rounded and as long as the diameter of the eye, projecting slightly beyond the mouth, canthus rostralis indistinct and blunt; loreal region flat; interorbital width two times the width of the upper eyelid; tympanum hidden; fingers free, without any discs; metacarpal tubercle drop-shaped; toes short with rounded tips, about one third webbed; subarticular tubercles indistinct; two (outer small and inner large, twice as large as the outer one) flattened shovel shaped metatarsal tubercles; tibiotarsal joint does not reach the axilla; heels do not meet when the tibiae are folded at right angles to the long axis of the body; skin smooth to weakly tuberculated on the back, ventral side smooth, but rugose in specimens with strongly tuberculated dorsum (Fig. 9; Photo Plate IIB).



Fig. 9. Habit of the adult of *Uperodon systoma* (Schneider, 1799)

Colouration : Dorsally intensely marbled with yellow and dark brown; ventrally whitish to yellowish or brownish, vocal sac subgular and black.

Tadpole : Horny mandibles, labial teeth or suprarrostral cartilage absent; tail without a terminal filament; spiracle opening through a transparent tube immediately in front of the anus (Mohanty-Hejmadi *et al.*, 1979b) (Fig. 10).



Fig. 10. Habit of the tadpole of *Uperodon systoma* (Schneider, 1799)

Distribution : India, Nepal, Pakistan and Sri Lanka. In India : Andhra Pradesh, Himachal Pradesh, Karnataka, Kerala, Orissa, Rajasthan, Tamil Nadu, Uttar Pradesh, West Bengal.

Material from NSTR : During the present survey 3 examples were collected: 1 ex. ERM Labs, 11.6.2003 [FBS/ZSI/N/1142]; 1 ex. Farahabad, 14.6.2003 [FBS/ZSI/N/1149]; 1 ex. Shikaram, 14.6.2003 [FBS/ZSI/N/1154].

Remarks : Like the earlier species, the Marbled Balloon Frog *Uperodon systoma* (Schneider, 1799) too is an uncommon microhylid that was observed only after the onset of the monsoon in Nagarjunasagar Srisailem Tiger Reserve. This species was observed only during the nights while crossing the road in light to heavy drizzle. One female specimen (FBS/ZSI/N/1142) was collected from under a bush from Sunnipenta, while two males (one from Farahabad FBS/ZSI/N/1149 and one from Shikaram FBS/ZSI/N/1154) were collected while crossing the road. We encountered around six crushed specimens between 2145 to 0015 hrs between Shikaram and Srisailem indicating its vulnerability to vehicular movements within this stretch of the Reserve. This species was not encountered from Nagarjunasagar area, probably due to the little time we spent while it was raining there! This species too was noted to be fond of habitats in the forested tracts that characteristically had good and loose soil. Earlier CS has infrequently observed this species between Bairlutu and Potharajupenta near the common boundary of Nagarjunasagar Srisailem Tiger Reserve and Gundla Brahmeshwaram Wildlife Sanctuary between 1997 and 1999. Earlier this species has been collected only from Bukkapatnam in Anantapur district (Sarkar *et al.*, 1993) and very recently from Sriharikota Island in Nellore district (S. Sivakumar, *pers. comm.*). This constitutes the first record of the marbled balloon frog *Uperodon systoma* (Schneider, 1799) from Nallamala Hills, Eastern Ghats.

2004 IUCN Status : Least Concern [LC].

III. Genus *Microhyla* Tschudi, 1838

1838. *Microhyla* Tschudi, *Classif. Batr.* : 71

Synonymy : *Micrhyla* Duméril and Bibron, 1841 (Unjustified emendation of *Microhyla* Tschudi, 1838); *Siphneus* Fitzinger, 1843 (preoccupied by *Siphneus* Brants, 1827); *Dendromanes*

Gistel, 1848 (Substitute name); *Diploelma* Günther, 1859 "1858"; *Scaptophryne* Fitzinger, 1861 "1860" (*Nomen nudum*); *Copea* Steindachner, 1864; *Ranina* David, 1872 "1871"

Type species : '*Hylaplesia achalina* Boie, 1827' (*nom. nud.*) (= *Microhyla achalina* Tschudi, 1838).

Diagnostic characters : Pupil vertical or circular; tongue oval, entire and free behind; vomerine teeth absent; tympanum indistinct or absent; fingers free, toes more or less webbed, tips of digits more or less dilated; omosternum absent; sternum cartilaginous; diapophyses of sacral vertebrae moderately dilated; vertebral column diplasiocoelous; terminal phalanges simple or T-shaped; prevomer divided; the post-choanal portion lost, palatine present or absent; clavicles absent; procoracoids absent.

Distribution : India, Sri Lanka, Myanmar, China, Malaysia, Indonesia, Japan (parts of).

Remarks : This genus is represented by two species namely *Microhyla ornata* and *Microhyla rubra* in the Tiger Reserve.

Key to the species of *Microhyla* occurring in Nagarjunasagar Srisailam Tiger Reserve

- 1 Tibiotarsal articulation reaching slightly in front of the shoulder; toes with rudiment of web; inner metatarsal tubercles present, outer metatarsal tubercle absent.....
..... *Microhyla ornata*
- 2 Tibiotarsal articulation reaching the eye; toes one third webbed; both inner and outer shovel shaped metatarsal tubercles present..... *Microhyla rubra*

7. *Microhyla ornata* (Duméril & Bibron, 1841)

1841. *Engystoma ornatum* Duméril & Bibron, *Exp. Gen.*, 8 : 745.

Synonymy : *Engystoma ornatum* Duméril and Bibron, 1841.

Common name : Ornate narrow-mouthed frog.

Type Species : Holotype, MNHNP 5035.

Type locality : 'Côte Malabar', India.

Measurements : SVL 8-30 mm.

Diagnostic characters : Head, stout and pointed, broader than long; nostrils nearer to the tip of the snout than to the eye; snout obtusely pointed, a little longer than the diameter of the eye, projecting slightly beyond the mouth; canthus rostralis obtuse, straight; loreal region

vertical; interorbital width little broader than the width of the upper eyelid; tympanum hidden; fingers free, tips swollen into a small knob on ventral aspect, two elongated palmar tubercles, subarticular tubercles prominent; toes with blunt tips, rudiment of webbing at the base, subarticular tubercles distinct, two (outer small and round, and inner elongated and oval) metatarsal tubercles; tibiotarsal articulation reaches up to posterior corner of the eye; heels overlap when the tibiae are folded at right angles to the long axis of the body; skin smooth to granular, tuberculated in old specimens on the back, a raised median line often present on dorsum; a fold of skin across the head behind the level of the eyes, obliquely downward at the sides; a slight transverse fold from posterior corner of the eye to the groin; small white tipped tubercles on limbs, ventral side smooth, posterior aspect of thigh near anal region covered with densely set tubercles (Fig. 11, Photo Plate IIC).

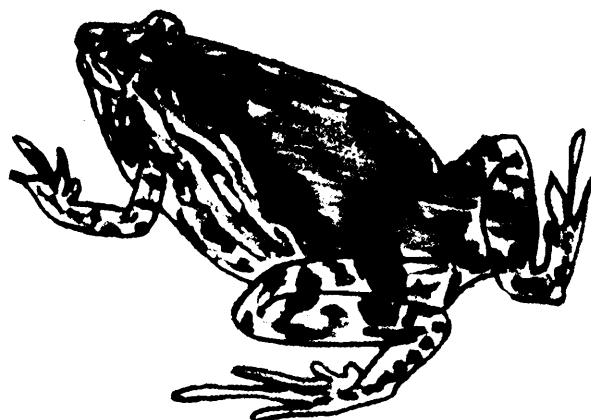


Fig. 11. Habit of the adult of *Microhyla ornata* (Duméril & Bibron, 1841)

Colouration : Highly variable; dorsally light brown with a median pinkish brown or sepia marking that looks like a 'V', this pattern begins at about the mid level of the eyes, narrows slightly on the occiput, then widens a little, narrows a little again at about the level of the axillae and then spreads out on the sacral region, sending a stripe to the groin on to the thigh; blotches of the same colour are present on the legs, loreal region and below the dorsolateral glandular fold darkish; ventrally white on belly, throat and chest closely dotted with brown or grey; vocal sac subgular and black.

Tadpole : Up to 20 mm in length; almost colourless except for minute yellowish brown spots particularly on the back where they form a somewhat diamond shaped figure and on muscular portion of the tail; tail with terminal filament; spiraculum opening above a notched flap on underside of the belly.

Distribution : Bangladesh, Bhutan, Cambodia, China, Hong Kong, India, Indonesia, Japan, Lao People's Democratic Republic, Macau, Malaysia, Myanmar, Nepal, Pakistan, Sri Lanka, Taiwan (Province of China), Thailand and Viet Nam. In India : Widespread.

Material from Nagarjunasagar Srisailem Tiger Reserve : Nagarjunakonda valley, Guntur district; collected by I. N. Maligi, 1.8.1962 (Sarkar *et al.*, 1993) 1 ex. Nagarjunasagar, Nalgonda district; collected by B. Nath, 14.9.1962 (Sarkar *et al.*, 1993) 1 ex. Nagarjunasagar; Nalgonda district collected by B. Nath, 15.10.1962 (Sarkar *et al.*, 1993). During the present survey 2 examples were collected: 1 ex. ERM Labs, 11.6.2003 [FBS/ZSI/N/1141]; 1 ex. Shikaram Dwaram, 14.6.2003 [FBS/ZSI/N/1160].

Remarks : The Ornate Narrow-mouthed Frog *Microhyla ornata* (Duméril & Bibron, 1841) is one of the commonest microhylid in Nagarjunasagar Srisailem Tiger Reserve. This species was observed only during the nights as during the day they take refuge beneath stones and logs. This species was fond of habitats in the forested tracts and was also observed in the vicinity of agriculture fields and human habitations. Two voucher specimens were collected (FBS/ZSI/N/1141 and FBS/ZSI/N/1160). This species had been earlier reported from Nagarjunasagar area in Nalgonda district (Murthy, 1968) and Nagarjunakonda valley in Guntur district (Sarkar *et al.*, 1993). Although during the present survey we observed this species only from Mannanur and Farahabad (Mahbubnagar district), and Sunnipenta (Kurnool district), this species is the most common microhylid. Further this species has also been observed by CS at different localities of Nagarjunasagar Srisailem Tiger Reserve, viz., Vatvarlapally environs (Mahbubnagar district), Pecheruvu, Thummalabailu, Rollapenta and Naguluty (Kurnool district) of Nagarjunasagar Srisailem Tiger Reserve from 1996 to 2000.

2004 IUCN Status : Least Concern [LC].

8. *Microhyla rubra* (Jerdon, 1854 “1853”)

1854 (“1853”). *Engystoma rubrum* Jerdon, *J. Asiatic Soc. Bengal*, **22** : 534.

Synonymy : *Engystoma rubrum* Jerdon, 1854 “1853”; *Microhyla* (*Diplopelma*) *rubra* Dubois, 1987.

Common Name : Red narrow-mouthed frog.

Type Species : Lost, presumably was in ZSI, Kolkata.

Type locality : Southern India and Sri Lanka.

Measurements : SVL 8-35 mm.

Diagnostic characters : Head short and pointed, broader than long; nostrils nearer to the tip of the snout than to the eyes; snout blunt, as long as the diameter of the eye, projecting slightly beyond the mouth; canthus rostralis indistinct; loreal region slightly oblique; interorbital width nearly twice the width of the upper eyelid; tympanum hidden; fingers free, tips rounded, not dilated into small discs, subarticular tubercles prominent; toes with blunt tip, one fourth to one third webbed, subarticular tubercles distinct; two (outer large and semi-circular and inner crescentic) metatarsal tubercles; tibiotarsal articulation reaches the eye; heels overlap feebly when the tibiae are folded at right angles to the long axis of the body; skin nearly smooth to granular, a raised median line often present on dorsum, a slight transverse fold from posterior corner of the eye to the groin; ventral side smooth (Fig. 12; Photo Plate IID).

Colouration : Dorsally light brown with a median pinkish brown or sepia marking, the pattern begins as a longitudinal band between the eyes, widens on the occiput sending antero-lateral extensions to the eyelids, becomes broader behind the level off the shoulders, narrows

a little again and broadens out on the sacral region, extending to the groin and also to the hind limbs as oblique bars on the thigh, shank and tarsus; loreal region and below the dorsolateral glandular folds darkish; ventrally white on belly, throat, and sometimes chest, spotted with brown; vocal sac subgular and black.



Fig. 12.

Fig. 12. Habit of the adult of *Microhyla rubra* (Jerdon, 1854)

Tadpole : Up to 34mm in length. Almost colourless, but bears fine brown dots and more darkly pigmented around the nostrils and a pair of dark longitudinal streaks on the head followed by a median dark streak along the middle of the back; tail with terminal filament; spiraculum opening above a notched flap on underside of belly (Fig. 13).

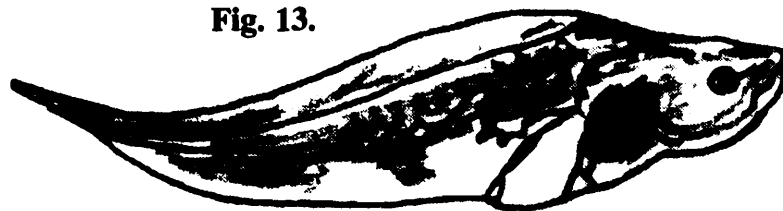


Fig. 13.

Fig. 13. Habit of the tadpole of *Microhyla rubra* (Jerdon, 1854)

Distribution : Bangladesh, India and Sri Lanka. In India : Andhra Pradesh, Goa, Karnataka, Kerala, Tamil Nadu, West Bengal.

Material from Nagarjunasagar Srisailem Tiger Reserve : None collected.

Remarks : Although numerous young individuals presumed belonging to this species were encountered during the survey, we did not come across adult individuals. This species seems to be relatively more common on the south of River Krishna than in the north. Further this species has also been observed by CS at different localities of Nagarjunasagar Srisailem Tiger Reserve, viz., Mannanur, Farahabad (in Mahbubnagar district); Thummalabailu, Rollapenta, Pedda Manthanala, Bairlutu, Naramamidi Cheruvu, Pecheruvu (all in Kurnool district). It was found to be uncommon in central and southern Nallamala hills. This constitutes the first record of this species from Nagarjunasagar Srisailem Tiger Reserve and Nallamala hills, Eastern Ghats.

2004 IUCN Status : Least Concern [LC].

IV Genus *Ramanella* Rao and Ramanna 1926 “1925

1926 “1925” *Ramanella* Rao and Ramanna, *Proc. Zool. Soc. London*, 1925 : 587.

Synonymy None.

Type Species : *Ramanella symbiotica* Rao and Ramanna, 1925 (= *Calula variegata* Stoliczka, 1872), by monotypy.

Diagnostic characters : Pupil horizontal; tongue oval, entire or brightly emarginate and slightly free behind; vomerine teeth absent; tympanum hidden; fingers free, toes more or less webbed, tips of the digits more or less dilated; omosternum small cartilaginous; sternum cartilaginous diapophyses of sacral vertebrae moderately dilated; vertebral column diplasiocoelous; terminal phalanges T-shaped; prevomer divided, anterior portion small, bounding the nasal opening antero-mesially; the post-choanal portion reduced to one or two slivers of bone lying free in the mucosa of the palatine region; clavicles absent; procoracoids small, opposed to mesial ends of the coracoids.

Distribution : India and Sri Lanka.

Remarks : This genus is represented by one species, *Ramanella variegata* (Stoliczka, 1872) in Nagarjunasagar Srisailem Tiger Reserve. This constitutes the first record of this species from the Nallamala Hills.

9. *Ramanella variegata* (Stoliczka, 1872)

1872. *Callula variegata* Stoliczka, *Proc. Asiatic Soc. Bengal*, 1872 : 111.

Synonymy : *Hylaedactylus carnaticus* Jerdon, 1854 “1853” (*nomen dubium*, tentatively suggested as a senior synonym); *Callula variegata* Stoliczka, 1872.

Common Name Variegated Ramanella.

Type Species : Syntypes, ZSIC 2761 and BM 74.11.12.2 (possibly). NHMW 4019 also referred to as syntype is apparently erroneously stated.

Type locality : Eluru, Andhra Pradesh, India.

Measurements : SVL 23-45 mm.

Diagnostic characters : Head small, broader than long; nostrils nearer to the tip of the snout than to the eyes; snout obliquely pointed, as long as the diameter of the eye; canthus rostralis rounded, indistinct; loreal region oblique convex; inter orbital width twice as broad as the upper eyelid; tympanum indistinct; fingers free, short and slender, tips truncated or thoroughly dilated; toes rounded, at tips not dilated, rudimentary webbing, sometimes reaching the proximal tubercle of the third toe, subarticular tubercles moderate; two (outer small and inner elongate) small scarcely prominent metatarsal tubercles; tibiotarsal articulation reaches

the posterior corner of the eye; heels meet when the tibiae are folded at right angles to the long axis of the body; skin covered with small tubercles on the back; a slight supra-tympanic fold; ventral surface smooth; anal region granular (Fig. 14).

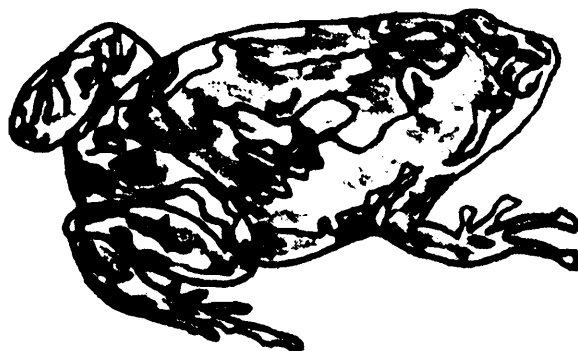


Fig. 14. Habit of the adult of *Ramanella variegata* (Stoliczka, 1872)

Colouration : Dorsally marbled brown, olive brown and white, or brown or olive brown with white spots; lower surface white except for the throat which is spotted with brown; vocal sac subgular and darkish.

Tadpole : Up to 45mm in length; brownish or gray with minute black spots, occasionally a blue spot in the groin; tail without terminal filament; spiracle opening immediately behind the anus through a long tube; muscular part of the tail blotched.

Distribution : India and Sri Lanka. In India : Andhra Pradesh, Karnataka, Kerala, Madhya Pradesh, Tamil Nadu, Orissa, West Bengal.

Material from Nagarjunasagar Srisailem Tiger Reserve : None collected.

Remarks : Although this species could not be collected during the recent survey conducted by us, CS has observed it on two occasions between Potharajupenta and Naguluty (Kurnool district) in June 1997. This constitutes the first record of this species from Nallamala Hills, Eastern Ghats. Sarkar *et al.* (1993) reported its occurrence from Andhra Pradesh based on a specimen collected by E.V. Mulley on 12 January 1981 from Dosthnagar near Indhanpally in Kawal Wildlife Sanctuary, Adilabad district.

2004 IUCN Status : Least Concern [LC].

III. Family RANIDAE Rafinesque, 1814

1814. *Ranaridia* Rafinesque, *Spechio Sci.*, 2 : 102-104.

Synonymy : *Ranaridia* Rafinesque, 1814; *Ranarinia* Rafinesque, 1815; *Ranae* Goldfuss, 1820; *Ranadae* Gray, 1825; *Ranina* Gray, 1825; *Ranoidea* Fitzinger, 1826; *Ranidae* Boie, 1828; *Ranaria* Hemprich, 1829; *Ranina* Bonaparte, 1832; *Ranae* Tschudi, 1838; *Ranidae* Bonaparte, 1840; *Raniformes* Duméril and Bibron, 1841 (Explicit family); *Limnodytae* Fitzinger, 1843; *Ranini* Bronn, 1849; *Raninae* Bronn, 1849; *Pyxicephalina* Bonaparte, 1850; *Ranoides* Bruch, 1862; *Ranoidea* Wied-Neuwied, 1865; *Ranida* Haeckel, 1866; *Dicroglossidae* Anderson,

1871, Ceratobatrachidae Boulenger, 1884; Ranidi Acloque, 1900; Ceratobatrachinae Gadow, 1901; Phrynopsinae Noble, 1931; Ranoidea Laurent, 1967; Platymantinae Savage, 1973; Limnodytini Dubois, 1981; Ceratobatrachini Dubois, 1981; Platymantini Laurent, 1986; Ptychadenini Dubois, 1987 "1986"; Tomopternini Dubois, 1987 "1986"; Pyxicephalini Dubois, 1987 "1986"; Ranixalini Dubois, 1987 "1986"; Occydozyginae Fei, Ye, and Huang, 1991 "1990"; Amolopsinae Yang, 1991; Dicroglossinae Dubois, 1992; Ptychadeninae Dubois, 1992; Pyxicephalinae Dubois, 1992; Conrauini Dubois, 1992; Paini Dubois, 1992; Limnonectini Dubois, 1992; Dicroglossini; Ranixalinae Dubois, 1992; Ranoidae Dubois, 1992; Indiraninae Blommers-Schlösser, 1993; Nyctibatrachinae Blommers-Schlösser, 1993; Amolopinae Zhang and Wen, 2000 (Unjustified emendation); Micrixalinae Dubois, Ohler, and Biju, 2001; Lankanectinae Dubois and Ohler, 2001.

Representatives of this family are cosmopolitan and widespread excepting southern South America, West Indies, the Australian region and most Oceanic Islands; are characterized as true frogs possessing long slender to heavy set and stocky body, narrow waist, long legs and graceful hopping movements.

Type genus : *Ranaridia* Rafinesque, 1814 (=unjustified emendation of *Rana* Linnaeus, 1758).

Diagnostic characters : Pectoral girdle firmisternal; vertebral column diplasiocoelous; diapophyses of sacral vertebra cylindrical or but very slightly dilated; upper jaw toothed; ear fully developed; Eustachian tube present; no palatal folds; coracoradialis not attached to the procoracoid-clavicular bar or only at its mesial extremity; insertion of semi-tendinosus passing dorsal to the gracilis; ribs absent; no intercalary phalanges; pupil horizontal; larva with horny mandibles and labial teeth; spiraculum directed backwards and upwards.

Remarks : This family is represented by eight species belonging to five genera, namely *Sphaerotheca* Günther, 1859 '1858'; *Euphlyctis* Fitzinger, 1843; *Indirana* Laurent, 1986; *Hoplobatrachus* Peters, 1863 and *Fejervarya* Bolkey, 1915 in Nagarjunasagar Srisailem Tiger Reserve.

Key to the genera occurring in Nagarjunasagar Srisailem Tiger Reserve

- 1A. Inner metatarsal tubercle very large, shovel-like and sharp edged, longer than first toe; tibiotarsal joint reaches between oscilla and tympanum..... ***Sphaerotheca***
- 1B. Inner metatarsal tubercle rather blunt, tibio tarsal joint reaches the eye or further, shorter than first toe..... 2
- 2A. Adults with lateral line system; eyes positioned conspicuously dorsal, posterior sides of thighs characteristically striped ***Euphlyctis***.
- 2B. Adults without lateral line system; eyes usually positioned laterally; posterior sides of thighs without stripes 3

- 3A. Dorsolateral folds present; tongue has a large papillae, longitudinal folds or elongated tubercles on dorsum absent *Indirana*
- 3B. Dorsolateral folds absent; tongue lacks the papillae, longitudinal folds or elongated tubercles on dorsum present 4
- 4A. Adults >60.0mm in SVL, large inner metatarsal tubercle, outer metatarsal tubercle absent; toes webbed to toe tips except 4th toe..... *Hoplobatrachus*
- 4B. Adults <60.0 mm in SVL, inner metatarsal tubercle significantly shorter than first toe, small outer metatarsal tubercle present; toes not webbed to the tips *Fejervarya*

I. Genus *Sphaerotheca* Günther, 1859 “1858”

1859 “1858” *Sphaerotheca* Günther, *Cat. Batr. Sal. Coll. Brit. Mus.* : 20.

Synonymy : None.

Type species : *Sphaerotheca strigata* Günther, 1859 “1858”

Diagnostic characters : Pupil horizontal; tongue large, free and notched behind; vomerine teeth in two oblique series; tympanum distinct; fingers blunt and short, first longer than second, subarticular tubercles prominent; toes moderate and partly webbed, subarticular tubercles fairly well developed but not as prominent as that of fingers; omosternum cartilaginous and moderately forked; sternum a cartilaginous plate; diapophyses of sacral vertebrae more or less cylindrical; terminal phalanges obtuse.

Distribution : Pakistan, India, Nepal, Sri Lanka, Myanmar, Bangladesh, Madagascar.

Remarks : This genus is represented by three species in Nagarjunasagar Srisailem Tiger Reserve.

Key to the species of *Sphaerotheca* occurring in Nagarjunasagar Srisailem Tiger Reserve

- 1A. Snout shorter than eye, tympanum half to two-thirds the diameter of the eye;.... 2
- 1B. Snout as long as the eye, tympanum two-thirds the diameter of the eye; tibiotarsal articulation reaching shoulder; tibiotarsal tubercle inconspicuous; toes with rudimentary webbing..... *Sphaerotheca dobsoni*
- 2A. Tympanum greater than half the diameter of the eye; tibiotarsal articulation reaching axilla or shoulder; tibiotarsal tubercle lacking; toes one-fourth to half webbed *Sphaerotheca breviceps*
- 2B. Tympanum about half the diameter of the eye; tibiotarsal articulation reaching up to posterior corner of the eye; tibiotarsal tubercle prominent; toes with rudimentary

webbing.....*Sphaerotheca rolandae*

10. *Sphaerotheca dobsoni* (Boulenger, 1882)

1882. *Rana dobsoni* Boulenger, Cat. Batr. Sal. Brit. Mus., 32.

Synonymy : *Rana dobsoni* Boulenger, 1882; *Rana (Tomopterna) dobsoni* Boulenger, 1920; *Tomopterna dobsoni* Deckert, 1938.

Common name Dobson's Burrowing Frog.

Type Species Holotype, BM 1947.2.28.45.

Type locality : Mangalore, West coast of India (Mangalore, Karnataka, India)

Measurements : SVL 16-54 mm.

Diagnostic characters : Head convex, broader than long; nostrils more or less equidistant from the tip of the eye and the tip of the snout; snout rounded, as long as the diameter of the eye, not projecting beyond the mouth; canthus rostralis obtuse; loreal region oblique, feebly concave; interorbital width broader than that of upper eyelid; tympanum distinct, two third the diameter of the eye; fingers free, rather short and obtuse, first much longer than second, tips moderately swollen, subarticular tubercles small, prominent; inner metatarsal tubercle crescentric strongly compressed, large being longer than the first toe, outer metatarsal tubercle absent; tibiotarsal articulation reaches between the axilla and the eye; tibiotarsal tubercle inconspicuous; heels meet when the tibiae are folded at right angles to the long axis of the body; skin finely granulate on dorsum, strongly curved glandular fold from the eye to the shoulder distinct; skin on belly and lower surface of thighs granulate (Photo Plate IIIA).

Colouration : Dorsally uniformly grey or indistinctly marbled with dark brown; in some cases a fine yellow vertebral line present; a prominent black band extending from the tip of the snout through the nostril and the eye to the shoulder expanding to a round spot on tympanum; limbs with or without indistinct darker cross bands; upper surface of thighs black spotted or marbled with white; ventral side whitish; vocal sac subgular almost black as the surrounding throat area; in adult breeding females the throat region is speckled brown.

Tadpole : No information exists. Probably similar to the tadpole of *Sphaerotheca breviceps* (Schneider, 1799).

Distribution India (Endemic). In India : Andhra Pradesh, Karnataka, Orissa, Tamil Nadu.

Material from Nagarjunasagar Srisailem Tiger Reserve : None. Owing to its affinity with *Sphaerotheca breviceps* and also the complexity of overlapping characters we could not assign any of the specimens collected by us to this species as they showed more character affinities to that of *breviceps* than to *dobsoni*.

Remarks : Although we have encountered many individuals of *Sphaerotheca* sp., only few specimens showed true characteristics (Photo Plate IIIA), throughout the Tiger Reserve many had overlapping characters indicating mixed characteristics of *Sphaerotheca breviceps* (Schneider, 1799) and *Sphaerotheca dobsoni* (Boulenger, 1882), we tentatively treated all the specimens collected by us as *Sphaerotheca breviceps* (Schneider, 1799). Also see Remarks under *Sphaerotheca breviceps* (Schneider, 1799).

2004 IUCN Status : Least Concern [LC].

11. *Sphaerotheca breviceps* (Schneider, 1799)

1799. *Rana breviceps* Schneider, *Hist. Amph.*, : 142.

Synonymy : *Rana breviceps* Schneider, 1799; *Rana (Tomopterna) breviceps* Boulenger, 1920; *Tomopterna breviceps* Deckert, 1938; *Rana (Tomopterna) breviceps breviceps* Dubois, 1983; *Tomopterna (Sphaerotheca) breviceps* Dubois, 1987 “1986”; *Sphaerotheca pluvialis* Marmayou, Dubois, Ohler, Pasquet, and Tillier, 2000.

Common name : Short-headed burrowing frog.

Type Species : Syntypes, ZMB 3351 (2 specimens).

Type locality : ‘Indes orientales’; “probablement de Tranquebar (Tamil Nadu; 11°02' N, 79°51' E)” according to Dubois (1983).

Measurements : SVL 18-65 mm.

Diagnostic characters : Head convex-sloping anteriorly, broader than long; nostrils more or less equidistant from the tip of the eye and the tip of the snout; snout rounded, shorter than the diameter of the eye, not projecting beyond the mouth; canthus rostralis indistinct or very obtuse; loreal region oblique and slightly concave; interorbital width smaller than that of upper eyelid; tympanum distinct, more or less half of the diameter of the eye; fingers free, first much longer than second, tips swollen, subarticular tubercles prominent; toes short, one fourth to half webbed, subarticular tubercles moderate; inner metatarsal tubercles shovel-like, sharp-edged, large being longer than 1st toe, outer metatarsal tubercle absent; tibiotarsal articulation reaches between axilla and tympanum; tibiotarsal tubercle lacking; heels do not meet when the tibiae are folded at right angles to the long axis of the body; skin covered with irregular warts, tubercles and interrupted longitudinal folds; skin on thighs between axilla and groin granulate, more so in the cloacal region (Fig. 15; Photo Plate IIIB).

Colouration : Highly variable, dorsally being light grey, beige, greenish to yellowish light brown, olive with symmetrical dark olive pattern or marbling; dorsal tubercles have pale centers; dark interorbital bar usually present, in some cases interrupted by pale mid-dorsal line, frequently a white or yellow mid dorsal line present, in later case a brown central line may be present; a dark band from tip of the snout to the supratympanal fold; upper lip and

loreal region bear dark bands; sides of the body marbled; yellowish white stripe from above the tympanum to the groin, limbs have broad olive bands, thighs and lower legs are posteriorly marbled; ventral side whitish; vocal sac subgular almost black as the surrounding throat area, in adult breeding females the throat region is speckled brown.

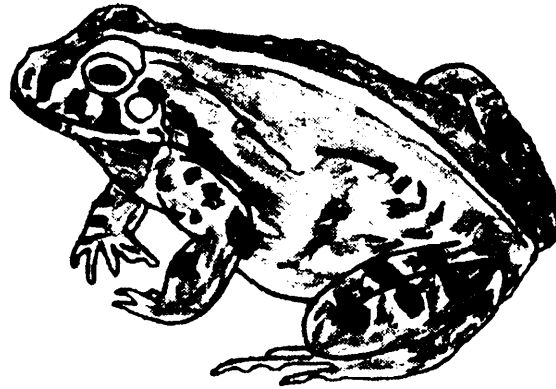


Fig. 15. Habit of the adult of *Sphaerotheca breviceps* (Schneider, 1799)

Tadpole : Up to 36mm; head and body pinkish brown with dark brown spots and markings; ventral surface grayish white, with some fine brown dots; tail rather lighter with fairly large dark brown blotches more numerous posteriorly (Ferguson, 1904; Mohanty-Hejmadi *et al.*, 1979a) (Fig. 16).



Fig. 16. Habit of the tadpole of *Sphaerotheca breviceps* (Schneider, 1799)

Distribution : India, Myanmar, Nepal, Pakistan and Sri Lanka. In India : Andhra Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Punjab, Orissa, Rajasthan, Tamil Nadu, West Bengal.

Material from Nagarjunasagar Srisailem Tiger Reserve : 1 ex. Srisailem, Kurnool district, collected by Sanyal, D. P., 6.11.1986 (Sarkar *et al.*, 1993); During the present survey 8 examples were collected: 2 ex. Vijayapuri South, 13.6.2003 [FBS/ZSI/N/1143 and 1144]; 2 ex. Mannanur-Farahabad Road, 14.6.2003 [FBS/ZSI/N/1146 and 1147]; 4 ex. Shikaram, 14.6.2003 [FBS/ZSI/N/1155-1158].

Remarks : Another of the uncommon ranid that was observed in preponderance with the onset of monsoon. We encountered this species from numerous localities during the survey. Out of the 8 specimens collected during the study, three specimens showed affinities of *Sphaerotheca dobsoni* (Boulenger, 1882). Careful morphometric studies revealed that the specimens showing overlapping characteristics scored more for *Sphaerotheca breviceps* (Schneider, 1799) than to other species, thus we tentatively treat them all belonging to this taxon. Among our collection we observed a great variation in marbling patterns on the

dorsum and only one specimen had the mid dorsal line. Further specimens belonging to this species complex had also been observed by CS at different localities of Nagarjunasagar Srisailem Tiger Reserve, viz., Mannanur, Farahabad, Vatvarlapally, Egalapenta, Domalpenta, Amrabad, Ippalapally, Maddimadugu, Umamaheshwaram, Bilakal (all in Mahbubnagar district), Nagarjunasagar Dam area, Nagarjunakonda (in Nalgonda district), Vijayapuri South, Anupu (in Guntur district), Sunnipenta, Shikaram, Srisailem, Hathakeswaram, Thummalabailu, Pecheruvu, Rollapenta, Chinna Manthanala, Pedda Manthanala and Bairlutu (all in Kurnool district).

2004 IUCN Status : Least Concern [LC].

12. *Sphaerotheca rolandae* (Dubois, 1983)

1983. *Rana (Tomopterna) breviceps rolandae* Dubois, *Alytes*, 2 : 166.

Synonymy : *Rana (Tomopterna) breviceps rolandae* Dubois, 1983; *Tomopterna (Sphaerotheca) rolandae* Dubois, 1987 '1986'

Common name : Roland's Burrowing Frog.

Type Species : Holotype, BM 1973.3024, by original designation.

Type locality : Kurunegala (alt. 60m, lat. 7°29' N, Long. 80°22' E), Sri Lanka.

Measurements : SVL up to 35 mm.

Diagnostic characters : Head convex, broader than long; nostrils equidistant from the tip of the eye and the tip of the snout; snout rounded, as long as the diameter of the eye, slightly projecting beyond the mouth; canthus rostralis obtuse; loreal region oblique, feebly concave; interorbital width broader than that of upper eyelid; tympanum distinct, nearly half the diameter of the eye; fingers free, rather short and obtuse, first much longer than second, tips moderately swollen, subarticular tubercles small, prominent; prominent metacarpal tubercles present; inner metatarsal tubercle large being longer than the first toe, shovel shaped, outer metatarsal tubercle absent; tibiotarsal articulation reaches posterior corner of the eye; tibiotarsal tubercle prominent; heels meet when the tibiae are folded at right angles to the long axis of the body; skin finely granulate on dorsum, strongly curved glandular fold from the eye to the shoulder distinct; skin on belly and lower surface of thighs granulate (Photo Plate IIIC).

Colouration : Dorsally uniformly grey, sometimes indistinctly marbled with dark brown; limbs with or without indistinct darker cross bands; upper surface of thighs black spotted or marbled with white; ventral side whitish; vocal sac subgular almost black as the surrounding throat area; in adult breeding females the throat region is speckled brown.

Tadpole : No information exists. Probably similar to other *Sphaerotheca* sp.

Distribution : India and Sri Lanka. In India : Andhra Pradesh (present study), Orissa, Tamil Nadu.

Material from Nagarjunasagar Srisaillam Tiger Reserve : None. One specimen encountered and examined on 14.6.2003 at about 7.30 PM near Farahabad slipped and escaped. Fortunately a photo voucher (NHM.OU.2003 Amphibia 2) could be procured.

Remarks : Rarest among the burrowing frogs with just one specimen encountered during the study period. The presence of *Sphaerotheca rolandae* (Dubois, 1983) in the Tiger Reserve constitutes its first record from Andhra Pradesh.

2004 IUCN Status : Least Concern [LC].

II. Genus *Euphlyctis* Fitzinger, 1843

1843. *Euphlyctis* Fitzinger, *Syst. Rept.* : 31.

Synonymy : *Dicroglossus* Günther, 1860.

Type species : *Rana leschenaultii* Duméril and Bibron, 1841 (= *Rana cyanophlyctis* Schneider, 1799) by original description.

Diagnostic characters : Pupil horizontal; tongue large, free, notched behind, cornua longer and more pointed with a median process behind them; vomerine teeth in two small oblique series; tympanum distinct; fingers pointed, first finger equal or longer than second, subarticular tubercles feebly prominent; toes with small knob-like swollen tips; fully webbed, subarticular tubercles feebly prominent; omosternum bony; sternum bony; diapophyses of sacral vertebrae cylindrical; vertebral column diaplasiocoelous; terminal phalanges obtuse; prevomer moderately small; clavicles present.

Distribution : Northwestern Africa, southern Arabian Peninsula, Pakistan, India, Afghanistan, Nepal, Malaysia, Sri Lanka.

Key to the species of *Euphlyctis* occurring in Nagarjunasagar Srisaillam Tiger Reserve

- 1A. Tibiotarsal articulation reaching between the eyes and nostrils; nostrils equidistant from the tip of the snout and the eyes; first and second fingers equal; throat and belly usually smooth *Euphlyctis cyanophlyctis*
- 1B. Tibiotarsal articulation reaches the eyes; nostrils nearer to the tip of the snout than to the eyes; first finger longer than second; throat and belly with granules and porous warts *Euphlyctis hexadactylus*

Remarks : This genus is represented by two species in Nagarjunasagar Srisaillam Tiger Reserve.

13. *Euphlyctis cyanophlyctis* (Schneider, 1799)

1799. *Rana cyanophlyctis* Schneider, *Hist. Amph.*, 1 : 137.

Synonymy : *Rana cyanophlyctis* Schneider, 1799; *Bufo cyanophlyctis* Latreille In Sonnini de Manoncourt and Latreille, 1801 (Incorrect subsequent spelling but now prevailing usage); *Rana cyanophlyctis* Shaw, 1802; *Bufo cyanophlyctis* Daudin, 1802 (Incorrect subsequent spelling); *Rana (Euphlyctis) cyanophlyctis* Dubois, 1981; *Occidozyga (Euphlyctis) cyanophlyctis* Dubois, 1987 "1986"

Common name : Skittering frog.

Type Species : Syntypes, ZMB 3197-98.

Type locality : 'Indian orientalis', probably from Tranquebar, India.

Measurements : SVL 20-75 mm (some individuals reach up to 120-130 mm).

Diagnostic characters : Head flat or depressed, slightly broader than long; nostrils nearer to the tip of the snout than to the eye; snout pointed, slightly projecting beyond the mouth; canthus rostralis indistinct; loreal region oblique and feebly concave; interorbital width narrower than that of upper eyelid; tympanum distinct, two third the diameter of the eye; fingers free, long and more or less obtusely pointed, with a more or less distinct dermal broader than is lacking in fourth finger; subarticular tubercles small and prominent; toes long and pointed, fully webbed, tips swollen into small discs; subarticular tubercles small and feebly prominent; inner metatarsal tubercle small, prominent and digitiform, outer metatarsal tubercle absent, a strong cutaneous/dermal fringe on outer toe, tarsal fold feeble or absent; tibiotarsal articulation reaches between the eye and the nostril; heels just meet when the tibiae are folded at right angles to the long axis of the body; skin smooth dorsally with rounded granules or small tubercles, coarsely granulated in the cloacal region and on the dorsal side of the legs, skin of belly smooth; lateral line system consisting of dorsolateral and ventrolateral rows extending from eye to the groin, a strong fold of skin from the posterior of the eye to shoulder, supra tympanic fold distinct (Fig. 17; Photo Plate IIID).

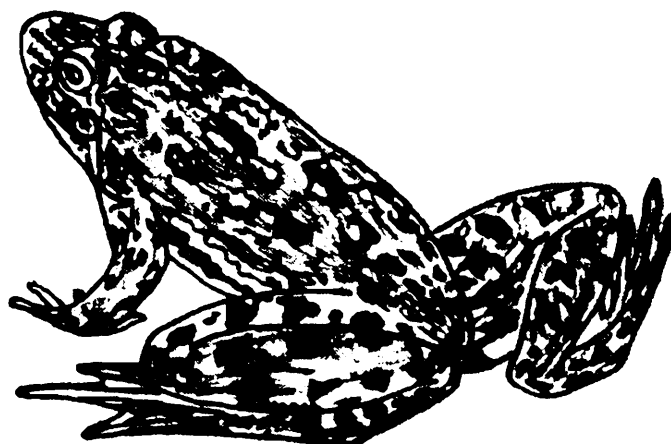


Fig. 17. Habit of the adult of *Euphlyctis cyanophlyctis* (Schneider, 1799)

Colouration : Dorsally greenish to grayish olive, yellowish to grayish brown or brownish olive, with large irregular dark spots that sometimes are very close to form blotches; mid dorsal line absent; along each flank running between fore and hind limbs and also on the back of the thigh a more or less distinct dark, light-edged band present; a dark interorbital band connects the eyelids; forelimbs speckled with a dark colour; hind limbs possess wide stripes that are usually broken into spots; toe webbing yellowish to white, marbled with brown; ventral side uniform white to yellowish white, with throat and breast sometimes speckled with brown; external vocal sacs grayish to blackish projecting through slits about the size of the diameter of the eye on either side along the posterior half of mandibular ramus; in adult females reddish lines on the throat indicates rudimentary vocal sacs.

Tadpole : Up to 74mm in length; upper surface of head and body yellowish-olive, spotted with black, sides silvery; muscular part of tail grayish with large black spots, on crest the spots are slightly smaller; under surface yellowish white, throat and belly sometimes with dark spots; tail acuminate, its dermal crest extending well on to the body, clearly deeper than the ventral, spiracle opening directed backwards and upwards (Fig. 18).



Fig. 18. Habit of the tadpole of *Euphlyctis cyanophlyctis* (Schneider, 1799)

Distribution : Afghanistan, Bangladesh, India, Iran, Nepal, Pakistan and Sri Lanka. In India : Throughout.

Materials from Nagarjunasagar Srisailem Tiger Reserve : Some were collected by Zoological Survey of India (ZSI) team from Fringumotu Hill, Nagarjunakonda, Vijayapuri, Nagarjunasagar dam, Guntur district; Mannanur, Mahbubnagar district; Tiger valley, Nagarjuna Hill, Nagarjunasagar, Nalgonda district, collected by ZSI staff over a period of time (Sarkar *et al.*, 1993). None collected during the present survey.

Remarks : Most common ranid frog in Nagarjunasagar Srisailem Tiger Reserve; it was encountered by us in different localities during the study period. Sarkar *et al.* (1993) also report it to be very common. Murthy (1968) reported it from Nagarjuna valley. We encountered this species at Farahabad, Vatvarlapally, Domalapenta in Mahbubnagar district and Srisailem, Sunnipenta and Shikaram in Kurnool district. Further, this species has also been observed by CS at different localities of Nagarjuansagar Srisailem Tiger Reserve, viz., Appapur, Bilakal, Mannanur, Farahabad, Vatvarlapally, Egalapenta, Domalpenta, Amrabad, Padra, Ipplapally, Maddimadugu, Umamaheshwaram, (all in Mahbubnagar district), Nagarjunasagar Dam area, Nagarjunakonda (Nalgonda district), Vijayapuri South, Anupu (Guntur district), Sunnipenta, Srisailem, Shikaram, Hathakeswaram, Thummalabailu, Rollapenta, Pecheruvu, Chinna Manthanala, Pedda Manthanala and Bairluty (all in Kurnool district).

2004 IUCN Status : Least Concern [LC].

14. *Euphlyctis hexadactylus* (Lesson, 1834)

1834. *Rana hexadactyla* Lesson, *Voy. India Orient. Zool.* : 331.

Synonymy : *Rana hexadactyla* Lesson, 1834; *Rana (Euphlyctis) hexadactyla* Dubois, 1981; *Occidozyga (Euphlyctis) hexadactyla* Dubois, 1987 “1986”

Common name : Green frog.

Type Species : Not known; presumably originally in MNHNP. Paratype (MNHN 4363), designated by Guibé (1950 “1948”).

Type locality : ‘Pondicherry’, India.

Measurements : SVL 20-95 mm (some individuals reach up to 120-130 mm).

Diagnostic characters : Head flat or depressed, as long as broad or slightly broader than long; nostrils nearer to the tip of the snout than to the eye; snout rounded, obtusely pointed, slightly projecting beyond the mouth; canthus rostralis indistinct; loreal region oblique and feebly concave; interorbital width narrower than upper eyelid; tympanum distinct, two third the diameter of the eye; fingers free, long and tapering, with a more or less distinct dermal border; subarticular tubercles small and feebly prominent; toes long and pointed, fully webbed; subarticular tubercles very small or indistinct; inner metatarsal tubercle small, prominent and digitiform; outer metatarsal tubercle absent; a strong cutaneous/dermal fringe on outer toe, tarsal fold feeble or absent; tibiotarsal articulation reaches between the tympanum and the eye; heels just meet when the tibiae are folded at right angles to the long axis of the body; skin smooth above, with fine granules or porous warts on the side and on the hind limbs posteriorly; lower parts distinctly granulate with enlarged porous warts on throat and under the thighs; along the belly and also near the flanks lateral line of porous warts distinct; a strong fold of skin from the posterior of the eye to shoulder, supratympanic fold distinct (Fig. 19; Photo Plate IVA).



Fig. 19. Habit of the adult of *Euphlyctis hexadactylus* (Lesson, 1834)

Colouration : Dorsally green or greenish brown, with or without a median streak, with a broad dark blotch on the middle of the back, flanked by elongated dark patches on either side, with a yellowish lateral band from behind the shoulder to the groin; white longitudinal streaks on each flank between fore and hind limbs; one or more white streaks on the back of the thigh, a few dark spots on hind limbs; ventral side various coloured, throat, breast, sides of the belly and ventral sides of limbs yellow or occasionally white, middle of the belly white, posterior with dark marblings, lower side of the thigh and webbings of the toes also bear dark marblings, occasionally throat and whole ventral surface bears dark marblings; young have several dark longitudinal stripes on the back and marblings on the thigh; external vocal sacs white projecting slits the size of the diameter of the eye on either side along the posterior half of mandibular ramus; in adult females reddish lines on the throat with rudimentary vocal sacs.

Tadpole : Up to 40mm in length; light olive, darker on head and body with dark dorsal marking and orange spots on the tail, ventral surface silvery with reddish on throat and orange spots on belly; tail pointed, depth of muscular portion one third the total depth, tail crest equal in size, spiracle opening directed backwards and upwards (Fig. 20).



Fig. 20. Habit of the tadpole of *Euphlyctis hexadactylus* (Lesson, 1834)

Distribution : Bangladesh, India and Sri Lanka. In India : Andhra Pradesh, Chhattisgarh, Gujarat, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Rajasthan, Tamil Nadu, and West Bengal.

Specimens from Nagarjunasagar Srisailem Tiger Reserve : None collected by us; a few unnumbered specimens in the collection of Andhra Pradesh Forest Department at Ecological Research and Monitoring Lab, Sunnipenta.

Remarks Another common ranid frog in Nagarjunasagar Srisailem Tiger Reserve, we encountered this species frequently during the study period in different locations of the Tiger Reserve and found it to be more common in and nearby large waterbodies and agriculture lands. Individuals with or without the mid-dorsal yellow stripe were encountered. Sarkar *et al.* (1993) state it to be uncommon in the State and did not encounter this species from any locations within the Tiger Reserve. Present study and earlier observations by CS put on record this species from Nagarjunasagar Dam area, Nagarjunakonda (in Nalgonda district); Vijayapuri south, Anupu (in Guntur district), Mannanur, Farahabad, Vatvarlapally, Bilakal, Egalapenta, Domalpenta, Umamaheshwaram, Padra, Amrabad, Ippalapally, Maddimadugu (all in Mahbubnagar district); Sunnipenta, Srisailem, Shikaram, Hathakeswaram, Thummalabailu, Rollapenta, Pecheruvu, Pedda Manthanala, Bairlutu and Kotalcheruvu (all in Kurnool district).

2004 IUCN Status : Least Concern [LC].

III. Genus *Indirana* Laurent, 1986

1986. *Indirana* Laurent, *Traite Zool.* : 761

Synonymy : *Ranixalus* Dubois, 1986 “1985”

Type species : *Polypedates beddomii* Gunther, 1875 (by original designation)

Diagnostic characters : Pupil horizontal, tongue large, free, with a long pointed papilla on the middle; vomerine teeth in two oblique series; tympanum distinct; fingers moderately long, tips dilated into rather large discs with a groove in front, first finger little shorter than the second, subarticular tubercles feebly prominent; toes long dilated as fingers, two thirds webbed; subarticular tubercles feebly prominent; omosternum bony, sternum bony, diapophyses of sacral vertebrae cylindrical, vertebral column diplasiocoelous; terminal phalanges T-shaped; prevomer moderately small, clavicles present.

Distribution : India.

Remarks : This genus is for the first time being reported from Andhra Pradesh and is represented by one species in Nagarjunasagar Srisailem Tiger Reserve.

15. *Indirana leithii* (Boulenger, 1888)

1888. *Rana leithii* Boulenger, *Ann. Mag. Nat. Hist.*, (6)2 : 506

Synonymy : *Rana leithii* Boulenger, 1888; *Rana (Discodeles) leithii* Boulenger, 1918; *Ranixalus leithii* Dubois, 1987 “1986”; *Rana (Discodeles) leithii* Daniel and Sekar, 1989.

Common name : Leith's frog.

Type Species : Holotype, BMNH (probably, BMNH 69.8.28).

Type locality ‘Matheran, Bombay’, Maharashtra, India.

Measurements SVL 28-33 mm.

Diagnostic characters : Head moderately depressed, as long as broad; nostrils near to the tip of the snout than to the eye; snout rounded, obtusely pointed, slightly projecting beyond the mouth; canthus rostralis feebly distinct, obtuse; loreal region oblique and concave; interorbital width narrower than upper eyelid; tympanum distinct, two thirds the diameter of the eye; fingers free, moderately long with tips dilated into rather large discs that are broader than long and with a groove in front separating the upper from the lower surface; first finger little shorter than the second; subarticular tubercles feebly prominent; toes long, dilated at tips as in fingers, two thirds webbed; subarticular tubercles feebly prominent; inner metatarsal tubercle oval, feebly prominent; two third the length of inner toe; outer metatarsal tubercle absent; tarsal fold absent; tibiotarsal articulation reaches between the eye and the tip of the snout; heels just meet or feebly overlap when the tibiae are folded at right angles to the long

axis of the body; skin covered with small, scattered elongate warts; a strong fold from posterior of the eye to the shoulder distinct; lower parts smooth.

Colouration : Dorsally brown with small dark spots; with a triangular dark spot between the eyes; upper lip with dark vertical bars; limbs with dark cross bands; lower parts white, throat mottled brown.

Tadpole Observed on rocks; wet by spray off a hill stream, colouration matches the dark grey of the rock (Chari and Daniel, 1953; Daniel and Shull, 1963; Sekar, 1992).

Distribution : India (Endemic). In India : Andhra Pradesh (first record), Gujarat, Karnataka, Kerala, Madhya Pradesh, Maharashtra.

Materials from Nagarjunasagar Srisailem Tiger Reserve : No vouchers collected.

Remarks : Although we did not encounter this species during the present survey, CS near Rollapenta sighted it on two occasions in August 1997. CS has also encountered this species in Kawal Wildlife Sanctuary, Adilabad district, Andhra Pradesh between during pre monsoon and post monsoon seasons of 1997 and 1998 respectively. The Andhra Pradesh Forest Department has recently collected a specimen of this species (ERM/A24) from Buggavagu area in Gundla Brahmeshwaram Metta Wildlife Sanctuary (that is contiguous to Nagarjunasagar Srisailem Tiger Reserve) on 4/10/02, which is present in the collection of the ERM Labs at Sunnipenta (CS *pers. observ.*) thereby confirming its presence in Eastern Ghats. The said specimen was studied and identified by Mr. Varad Giri of Bombay Natural History Society, Bombay and also by the first author individually. This constitutes the first record of this species from Andhra Pradesh, way outside its present day range that is restricted to Western Ghats.

2004 IUCN Status : Vulnerable [VU B1ab (iii)].

IV. Genus *Hoplobatrachus* Peters, 1863

1863. *Hoplobatrachus* Peters, *Monatsber. Preuss. Akad. Wiss. Berlin*, : 449

Synonymy : *Hydrostentor* Fitzinger, 1861 "1860"; *Hoplobatrachus* Peters, 1863; *Hydrostentor* Steindachner, 1867; *Ranosoma* Ahl, 1924; *Tigrina* Fei, Ye, and Huang, 1991 "1990" (Preoccupied by *Tigrina* Grevé, 1894).

Type species *Hoplobatrachus ceylanicus* Peters, 1863 (= *Rana tigerina* Daudin, 1802), by monotypy.

Key to the species of *Hoplobatrachus* occurring in Nagarjunasagar Srisailem Tiger Reserve

- 1A. Tibiotarsal articulation reaching between the eye and the nostrils, legs not relatively short, flat, oblong and blunt inner metatarsal tubercle, gular and pectoral region

without dark dots *Hoplobatrachus tigerinus*

- 1B. Tibiotarsal articulation reaching between the tympanum and the eye; legs relatively short; large shovel-like and crescent shaped inner metatarsal tubercle; large and irregular dark dots on gular and pectoral region *Hoplobatrachus crassus*

Diagnostic characters : Pupil horizontal; tongue large, free, notched and bifid behind; vomerine teeth in two strong oblique series; tympanum distinct; fingers free, obtusely pointed, first finger longer than second; subarticular tubercles distinctly prominent; toes moderate with slightly swollen tips, fully webbed; subarticular tubercles feebly prominent; omosternum bony, sternum bony; diapophyses of sacral vertebrae cylindrical; vertebral column diplasiocoelous; terminal phalanges obtusely pointed; prevomer small; clavicles present.

Distribution : Sub Saharan Africa, India, Sri Lanka, Malaysia, Myanmar, and through China (Southern).

Remarks : This genus is represented by two species occurring in Nagarjunasagar Srisailem Tiger Reserve.

16. *Hoplobatrachus tigerinus* (Daudin, 1802)

1802. *Rana tigerina* Daudin, *Hist. Nat. Rain. Green. Crap.* : 62.

Synonymy : *Rana typhonia* Linnaeus, 1758 (*nomen oblitum*); *Bufo typhoni* Schneider, 1799; *Rana tigerina* Daudin, 1802; *Rana tigrina* Merrem, 1820 (Unjustified emendation); *Rana (Euphlyctis) tigerina* Dubois, 1981; *Limnonectes (Hoplobatrachus) tigerinus* Dubois, 1987 "1986"; *Tigrina tigrina* Fei, Ye, and Huang, 1991 "1990" (Incorrect subsequent spelling of the species name).

Common name Indian bull frog.

Type Species : Holotype, animal figured on pl. 20, of the original; originally in MNHNP (now lost).

Type locality : 'Bengale', India.

Measurements : SVL 17-165 mm.

Diagnostic characters : Head strongly depressed, as long as broad, or broader than long; nostrils nearer to the tip of the snout, than to the eye; snout strongly pointed or round, projecting more or less beyond the mouth; canthus rostralis obtuse; loreal region very oblique, more or less concave; interorbital width narrower than the upper eyelid; tympanum distinct, two thirds to equal the diameter of the eye; fingers free, tapering with globular tips, first finger longer than second; subarticular tubercles small, distinct and globular; toes long and pointed, tips globular, fully webbed; subarticular tubercles oval and smaller than those on fingers; inner metatarsal tubercle long, flattened and blunt, not shovel-like; outer metatarsal

tubercle absent; a strong dermal fringe on outer toe; a tarsal ridge extends up to the inner metatarsal tubercle; tibio-tarsal articulation reaches between the eyes and the nostrils; heels overlap when the tibiae are folded at right angles to the long axis of the body; skin smooth or granulate covered with 6-14 longitudinal uninterrupted or slightly interrupted folds dorsally; some rounded tubercles on lower leg and heel a few around anal region; a strong fold of skin from posterior of the eye to shoulder; vertical skin smooth (Fig. 21).

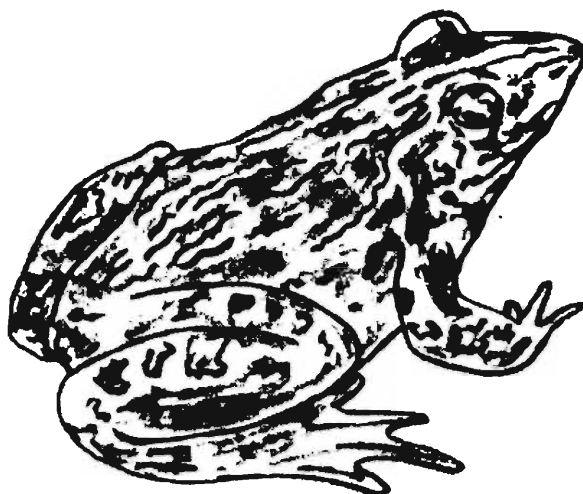


Fig. 21. Habit of the adult of *Hoplobatrachus tigerinus* (Daudin, 1802)

Colouration Dorsally grayish, yellowish to greenish olive marked with large irregular blackish, dark olive or grayish brown spots that are bordered with yellow towards the flanks; very narrow yellow vertebral stripe frequently present; two yellowish white lines - one small running parallel to mouth cleft to the forelimb, and another wider one from the posterior corners of the eyes to the groin is present in some specimens; in some a dark line along canthus rostralis is also present; limbs spotted or striped dorsally; posterior part of the thigh and toe webbing marbled; venter uniformly white, with some dark rounded spots on the throat along the lower jaw; vocal sacs darkish.

Tadpole : Size up to 40-43 mm in length; colour entirely black; ventral aspect flat; tail acutely pointed, blotched, depth of muscular portion half the total depth, tail crest equal in size; spiracle opening directed backwards and upwards (Fig. 22).



Fig. 22. Habit of the tadpole of *Hoplobatrachus tigerinus* (Daudin, 1802)

Distribution : Afghanistan, Bangladesh, India, Madagascar, Myanmar, Nepal and Pakistan. In India . . Throughout.

Materials from Nagarjunasagar Srisailam Tiger Reserve : 1 ex., Nagarjunakonda, Guntur

District, 10.11.1963, Coll. K. Reddaiah (Sarkar *et al.*, 1993); 2 ex., Nagarjunasagar, Nalgonda District, October 1962, Coll. B. Nath (Sarkar *et al.*, 1993). Murthy (1968) reported its presence in Nagarjuna Valley, Guntur District. During the present survey 1 example was collected: 1 ex. Vijaypuri South, 13.6.2003 [FBS/ZSI/N/1145].

Remarks : Another common ranid frog in Nagarjunasagar Srisailem Tiger Reserve frequently encountered in different locations of the Tiger Reserve and found it to be more common in and nearby large waterbodies and agriculture lands on plateaus and foothills. Calls were heard throughout the study period along the seasonal streams and waterbodies. Murthy (1968) and Sarkar *et al.* (1993) record its presence from the Tiger Reserve from Nagarjunakonda and its vicinity, Guntur district and Nagarjunasagar area, Nalgonda district. We collected a specimen along with many that were sighted from Vijayapuri South, Guntur district. Further, this species has also been observed by CS at different localities of Nagarjunasagar Srisailem Tiger Reserve, viz., Mannanur, Farahabad, Vatvarlapally, Bilakal, Umamaheshwaram, Egalapenta, Domalpenta, Amrabad, Ippalapally, Maddimadugu (Mahbubnagar district); Vijaypuri North, Nagarjunasagar, (Nalgonda district); Vijayapuri south, Anupu, Nagarjunakonda (Guntur district), Sunnipenta, Srisailem, Shikaram, Hathakeswaram, Thummalabailu, Rollapenta, Pecheruvu, Chinna Manthanala, Pedda Manthanala and Bairluty (Kurnool district).

2004 IUCN Status : Least Concern [LC].

17. *Hoplobatrachus crassus* (Jerdon, 1854 “1853”)

1854 “1853” *Rana crassa* Jerdon, *J. Asiatic Soc. Bengal*, 22 : 531.

Synonymy : *Rana crassa* Jerdon, 1854 “1853”; *Limnonectes (Hoplobatrachus) crassus* Dubois, 1987 “1986”

Common name : Jerdon’s Bull frog.

Type Species : In ZSI, Kolkata; now lost.

Type locality : “Found in a few tanks in the Carnatic” [Now part Tamil Nadu and part Andhra Pradesh, India].

Measurements : SVL 20-120 mm.

Diagnostic characters : Head strongly depressed, broader than long; nostrils nearer to the tip of the snout than to the eye; snout rather pointed than round, projecting more or less beyond the mouth; canthus rostralis obtuse; loreal region very oblique, more or less concave; interorbital width narrower than the upper eyelid; tympanum distinct, two third the diameter of the eye; fingers free, short, obtusely pointed, first finger longer than second, subarticular tubercles globular and feebly distinct; toes moderate with slightly swollen tips, fully webbed except the penultimate phalange of the fourth toe, subarticular tubercles globular and more distinct than those on fingers; inner metatarsal tubercle highly developed, shovel-shaped; outer metatarsal tubercle absent; a strong dermal fringe on outer toe; a tarsal ridge extends

up to the inner metatarsal tubercle; tibio-tarsal articulation reaches up to the tympanum; heels do not overlap when the tibiae are folded at right angles to the long axis of the body; skin smooth or granulate covered with 6-14 discontinuous longitudinal folds and some oblong tubercles dorsally; minute white warty tubercles on dorsal side of the legs and heel, and large tubercles around cloacal region; sides of the body smooth to finely warty; vertical skin smooth (Fig. 23; Photo Plate IVB).

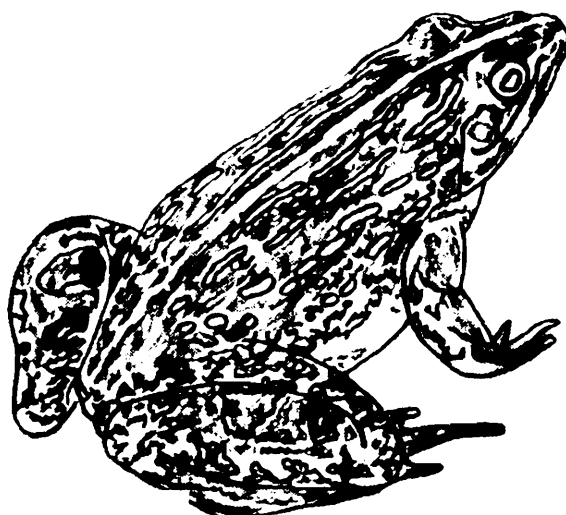


Fig. 23. Habit of the adult of *Hoplobatrachus crassus* (Jerdon, 1854 "1853")

Colouration Dorsally yellowish green to olive or grayish brown marked with large irregular dark spots; sometimes mid dorsal vertebral stripe also present; dark interorbital line sometimes present; upper and lower lips have light and dark transverse bars; sides of the body more or less intensely marbled; limbs have dark bars; posterior parts of the thigh and toe webbing marbled with light and dark colouration; venter uniformly dull white, with some black spots and dark brown stripes more or less restricted to the throat and breast; vocal sacs darkish.

Tadpole : Size up to 40-42 mm in length, head and body more than half the length of the tail; dorsal aspect dark grey spotted with brown; ventral aspect white; tail obtusely pointed, muscle dark brown with scattered black spots, depth of muscular portion half the total depth, tail crest transparent except on margin; spiracle opening directed backwards and upwards (Fig. 24).

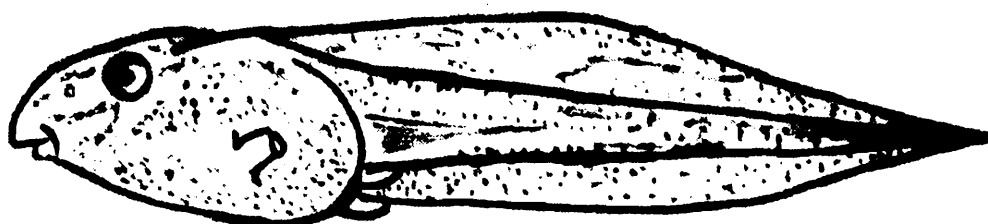


Fig. 24. Habit of the tadpole of *Hoplobatrachus crassus* (Jerdon, 1854 "1853")

Distribution : Bangladesh, India, Sri Lanka and Nepal. In India : Andhra Pradesh, Assam, Bihar, Jharkhand, Kerala, Orissa, Tamil Nadu, Uttranchal, Uttar Pradesh, West Bengal.

Materials from Nagarjunasagar Srisailem Tiger Reserve : 1 ex., Nagarjunakonda, Guntur District, 29.8.1962, Coll. I.N. Maligi (Sarkar *et al.*, 1993); 1 ex., Nagarjunakonda, Guntur District, 10.11.1963, Coll. K. Reddaiah (Sarkar *et al.*, 1993). A photo voucher [NIIM.OU.2003 Amphibia 1] was deposited in Natural History Museum of Department of Zoology, Osmania University, Hyderabad.

Remarks Uncommon ranid that was encountered only from select localities of the Tiger Reserve in Nagarjunasagar Area. Sarkar *et al.* (1993) record its presence from the Tiger Reserve from Nagarjunakonda and its vicinity, Guntur district. We encountered many specimens along the Nagarjunasagar Dam area. We did not collect any voucher specimen during the present study. Earlier CS has observed this species at Anupu (Guntur district).

2004 *IUCN Status* : Least Concern [LC].

V. Genus *Fejervarya* Bolkay, 1915

1915. *Fejervarya* Bolkay, *Anat. Anz.*, 48 : 181.

Synonymy : None.

Type species : *Rana limnocharis* Gravenhorst, 1829.

Diagnostic characters : Pupil rounded; tongue large, cordate and emarginate; vomerine teeth in two strong oblique series; tympanum distinct; fingers free, obtusely pointed, first finger longer than second, subarticular tubercles distinctly prominent; toes long with slightly swollen tips, moderately webbed, subarticular tubercles prominent; omosternum bony and forked, sternum bony; diapophyses of sacral vertebrae cylindrical; vertebral column diplasiocoelous; terminal phalanges obtusely pointed; prevomer moderately small; clavicles present.

Distribution : India, Sri Lanka, Malaysia, Myanmar, Nepal, Pakistan, Laos, Thailand, Cambodia, Vietnam, Indonesia, China (Southern).

Remarks : This genus is represented by one species occurring in Nagarjunasagar Srisailem Tiger Reserve.

18. *Fejervarya limnocharis* (Gravenhorst, 1829)

1829. *Rana limnocharis* Gravenhorst, *Delic. Mus. Zool. Vratislav*, 1 : 30.

Synonymy : *Rana limnocharis* Gravenhorst, 1829; *Rana (Euphlyctis) limnocharis* Dubois, 1980 "1978"; *Rana (Euphlyctis) limnocharis* Dubois, 1981 (by implication); *Rana (Fejervarya) limnocharis* Dubois, 1984; *Euphlyctis limnocharis* Poynton and Broadley, 1985 (by implication);

Limnonectes (Fejervarya) limnocharis Dubois, 1987 "1986"

Common name : Cricket frog.

Type Species : Not stated, but formerly in the Breslau Mus., now lost (Dubois and Ohler, 2000); Dubois and Ohler (2000) redescribed and nominated RMNH 4287 as neotype, this specimen being part of the original collection as the former types.

Type locality : Not stated, but Java, Indonesia (after Dubois and Ohler, 2000).

Measurements : SVL 9-82 mm.

Diagnostic characters : Head generally as long as broad; nostrils nearer to the tip of the snout than to the eye; snout generally pointed, projecting beyond the mouth; canthus rostralis rounded; loreal region acute and concave; interorbital width much narrower than the upper eyelid; tympanum distinct, about half the diameter of the eye; fingers free, long, thin with obtusely pointed tip, first finger longer than second, subarticular tubercles prominent; toes long thin and obtusely pointed tip, moderately webbed, subarticular tubercles prominent; inner metatarsal tubercle rather short and prominent; outer metatarsal tubercle absent; a strong dermal fringe on outer toe; a tarsal ridge extends up to the distal third of the tarsus; tibio-tarsal articulation reaches in between the tympanum and the nostrils; heels overlap when the tibiae are folded at right angles to the long axis of the body; skin smooth on snout, between the eyes and on dorsal parts of forelimbs, warty on the sides of the head, dorsal part of thigh and shanks, and lower parts of flanks; glandular folds on upper part of flanks and back; latero-dorsal folds absent; ventral skin smooth all over except the thigh that bears glandular warts (Fig. 25; Photo Plate IVC).

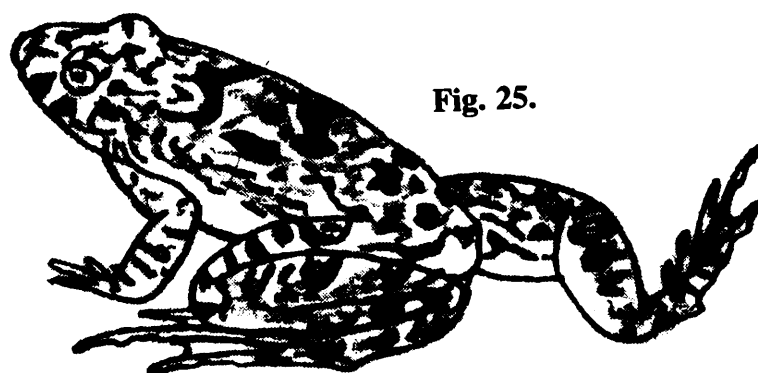


Fig. 25.

Fig. 25. Habit of the adult of *Fejervarya limnocharis* (Gravenhorst, 1829)

Colouration : Dorsally greenish or grayish olive with large black spots; some also have a broad or narrow yellow, white or orange coloured mid dorsal line; upper flank coffee brown with dark spots, lower part light brown; loreal and temporal region fawn with brown band on canthus rostralis and tympanic fold; brown spots on upper lip; tympanum light fawn with its dorsal half dark brown; forelimbs, thigh, shank and foot fawn with darker bands, posterior part of the thigh brown with white marblings; throat, chest, belly and thigh white to light fawn; margins of throat light fawn white with large brown spots; *Fejervarya* line present.

Tadpole : Size up to 15-24 mm in length; whitish to cream coloured body with pigments on sides of head, body and back, tail less pigmented; tail obtusely pointed and black, depth of muscular portion less than half the total depth, tail crest unequal upper being more wider than lower; spiracle opening directed backwards and upwards (Fig. 26).



Fig. 26. Habit of the tadpole of *Fejervarya limnocharis* (Gravenhorst, 1829)

Distribution : Bangladesh, Brunei Darussalam, Cambodia, China, Hong Kong, India, Indonesia, Japan, Lao People's Democratic Republic, Macau, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Singapore, Sri Lanka, Taiwan (Province of China), Thailand and Viet Nam. In India : Throughout.

Materials from Nagarjunasagar Srisailem Tiger Reserve : Some examples (exact numbers not known) from Mannanur, Mahbubnagar District and Tiger Valley, Nalgonda District in National Zoological Collection, Zoological Survey of India, Kolkata (Sarkar *et al.*, 1993). No vouchers were collected during the present study.

Remarks : Common ranid frog in Nagarjunasagar Srisailem Tiger Reserve, frequently encountered in different locations of the Tiger Reserve, found it to be more common in and nearby large waterbodies and agriculture lands on plateaus and foothills. Calls were heard throughout the study period along the agriculture fields and waterbodies. Murthy (1968) and Sarkar *et al.* (1993) record its presence from the Tiger Reserve from Nagarjunakonda and its vicinity in Guntur district, Nagarjunasagar area in Nalgonda district and Mannanur in Mahbubnagar district. No voucher specimens were collected during the study. Further, this species has also been observed by CS at different localities of Nagarjunasagar Srisailem Tiger Reserve, viz., Mannanur, Farahabad, Vatvarlapally, Egalapenta, Domalpenta, Bilakal, Umamaheshwaram, Amrabad, Ippalapally, Maddimadugu (all in Mahbubnagar district); Vijaypuri North, Nagarjunasagar, Nagarjunakonda (all in Nalgonda district); Vijayapuri south, Anupu (all in Guntur district), Sunnipenta, Srisailem, Shikaram, Hathakeswaram, Thummalabailu, Rollapenta, Pecheruvu, Chinna Manthanala, Pedda Manthanala and Bairlutu (all in Kurnool district).

2004 *IUCN Status* : Least Concern [LC].

IV. Family RHACOPHORIDAE Hoffman, 1932 "1858"

1932. Rhacophoridae Hoffman, S. Afr. J. Sci., 29 : 581. (For the purpose of priority Rhacophoridae takes the date of Polypedatidae Gunther, 1859 "1858").

Synonymy : Polypedatidae Günther, 1858; Polypedatina Mivart, 1869; Polypedatinae

Boulenger, 1888; Rhacophorinae Laurent, 1943; Racophoridae Hellmich, 1957 (Incorrect subsequent spelling); Philautinae Dubois, 1981; Philautini Dubois, 1987 "1986"; Rhacophorini Dubois, 1992.

Type genus : *Rhacophorus* Kuhl and van Hasselt, 1822.

Diagnostic characters : Pectoral girdle firmisternal; vertebral column diplasiocoelous (rarely procoelus); diapophyses of sacral vertebra cylindrical; upper jaw toothed, lower jaw toothless; ear fully developed; Eustachian tube present; no palatal folds; coracoradialis not attached to the procoracoid-clavicular bar or feebly attached at its mesial extremity; insertion of semi-tendinosus passing dorsal to the gracilis; intercalary phalanges present; pupil horizontal; larva with horny mandibles and labial teeth; spiraculum sinistral.

Remarks : Representatives of this family, including the tree, bush and flying/gliding frogs, are distributed in sub-Saharan Africa, Madagascar, Sri Lanka, India, Nepal, China (south), Myanmar, Laos, Vietnam, Cambodia, Thailand, Malaysia, Indonesia, Philippines and Japan.

This family is represented by one species belonging to the genus *Polypedates* Tschudi, 1838 in Nagarjunasagar Srisailam Tiger Reserve.

I. Genus *Polypedates* Tschudi, 1838

1838. *Polypedates* Tschudi, *Class. Batr.*, : 75.

Synonymy : *Polypedotes* Tschudi, 1838 (Incorrect subsequent spelling); *Trachyhyas* Fitzinger, 1843.

Type species : *Hyla leucomystax* Gravenhorst, 1829

Diagnostic characters : Pupil horizontal; tongue free and deeply notched behind; vomerine teeth in two close set strong oblique series; tympanum distinct; fingers free with rudimentary web; toes not completely webbed; tips of the fingers and toes dilated in to regular discs; outer metatarsals separated by web; omosternum cartilaginous, slightly formed at the base; sternum bony; terminal phalanges of fingers and toes 'Y' shaped; intercalary ossification between penultimate and terminal phalange present.

Distribution : Bangladesh, Cambodia, China (south), India, Indonesia, Sri Lanka, Malaysia, Myanmar, Nepal, Laos, Thailand and Vietnam.

Remarks : This genus is represented by one species occurring in Nagarjunasagar Srisailam Tiger Reserve.

19. *Polypedates maculatus* (Gray, 1834)

1834. *Hyla maculata* Gray, *III Ind. Zool.* : 82.

Synonymy : *Hyla maculata* Gray, 1833; *Bürgeria maculata* Tschudi, 1838; *Rhacophorus*

leucomystax maculatus Wolf, 1936; *Rhacophorus (Rhacophorus) maculatus himalayensis* Dubois, 1987 "1986"

Common name : Common Tree Frog.

Type Species : Not found.

Type locality : "Bengal" [India and Bangladesh].

Measurements : SVL 30-85 mm.

Diagnostic characters : Head slightly broader to almost equal in length; skin on the head free; nostrils nearer to the tip of the snout than to the eye; snout pointed, projecting beyond the mouth; canthus rostralis angular; loreal region oblique and concave; interorbital width slightly wider than the upper eyelid; tympanum distinct, about three fourth the diameter of the eye; fingers with rudimentary web and lateral dermal fringe, tips with large adhesive pads with circum-marginal grooves, first finger sub equals second, subarticular tubercles prominent, glandular supernumerary on ventral aspects of metacarpals, palmer tubercle elongated; toes long, thin with tips bearing adhesive pads with circum-marginal grooves, three-fourth webbed, two phalanges of the fourth toe free, subarticular tubercles prominent, longer than wide; inner metatarsal tubercle ovoid; outer metatarsal tubercle absent; tibio-tarsal articulation reaches beyond the eye and up to the tip of the snout; heels overlap when the tibiae are folded at right angles to the long axis of the body; skin smooth dorsally; supratympanic folds continued some way behind the shoulders; ventral sides feebly granular except the upper thigh that is coarsely granular; anal fold present (Fig. 27; Photo Plate IVD).



Fig. 27. Habit of the adult of *Polypedates maculatus* (Gray, 1834)

Colouration : Variably coloured dorsally; normally greenish or brownish, some specimens spotted with brown or black and some with hour-glass shaped mark; frequently 'W' shaped interorbital mark present; loreal and temporal region are dark brown to black; limbs cross barred, hinder side of the thigh light brown with yellow lateral spots bordered with brown; ventral side white to yellowish; vocal sacs internal.

Tadpole : Up to 44 mm in length; brown or yellowish throughout irregularly mottled with dark brown pigments; tail acutely pointed, depth of muscular portion more than half the total depth, tail crest transparent and equal in size; spiracle opening directed backwards and upwards (Fig. 28).

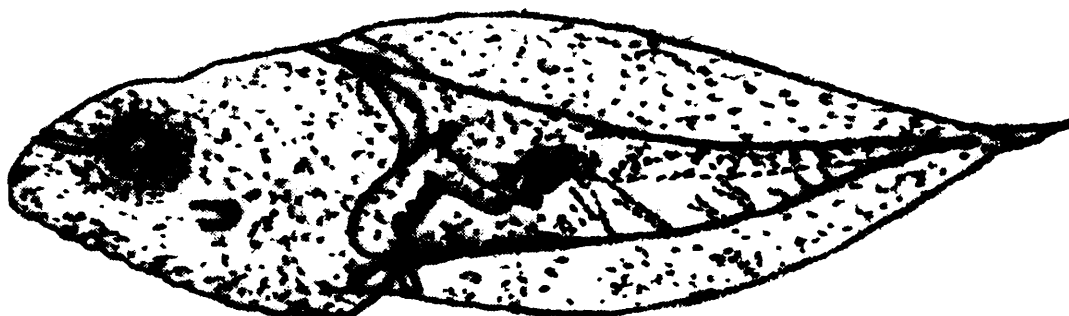


Fig. 28. Habit of the tadpole of *Polypedates maculatus* (Gray, 1834)

Distribution : Bangladesh, Bhutan, India, Nepal and Sri Lanka. In India : Throughout, except northwestern region.

Materials from Nagarjunasagar Srisailem Tiger Reserve : During the present survey 2 examples were collected: 1 ex. ERM Labs, 7.6.2003 [FBS/ZSI/N/1140]; 1 ex. Shikaram Dwaram, 14.6.2003 [FBS/ZSI/N/1161].

Remarks : The only rhacophorid species found in Nagarjunasagar Srisailem Tiger Reserve. It was frequently encountered in different locations of the Tiger Reserve, was found to be more common nearby large waterbodies within forested tracts and was frequently encountered inside human dwellings. Calls were heard throughout the study period. Murthy (1968) and Sarkar *et al.* (1993) do not record its presence from the any locations either in Tiger Reserve or from Nallamala Hills. We collected two voucher specimens from Sunnipenta and Shikaram Dwaram in Kurnool district. Further, this species has also been observed by CS at different localities of Nagarjunasagar Srisailem Tiger Reserve, viz., Mannanur, Farahabad, Vatvarlapally, Bilakal, Umamaheshwaram, Egalapenta, Domalpenta, Amrabad, Ippalapally, Umamaheshwaram, Maddimadugu (all in Mahbubnagar district); Vijaypuri North, Nagarjunasagar (all in Nalgonda district); Vijayapuri south, Anupu, Nagarjunakonda (all in Guntur district), Sunnipenta, Srisailem, Shikaram, Hathakeswaram, Thummalabailu, Rollapenta, Pecheruvu, Chinna Manthanala, Pedda Manthanala and Bairluty (all in Kurnool district). This constitutes the first report of this species in Nallamala Hills, Eastern Ghats.

2004 IUCN Status : Least Concern [LC].

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Plate – I



B



D



A



C

A. Marbled Toad, *Bufo stomaticus* (Family Bufonidae); B. Common Toad, *Bufo melanostictus* (Family Bufonidae); C. Ferguson's Toad, *Bufo scaber* (Family Bufonidae); D. Pianted Kaloula, *Kaloula taprobanica* (Family Microhylidae)
(Photo A by Sanjay Molur; Photos B, C & D by C. Srinivasulu)

Plate – II



B



D



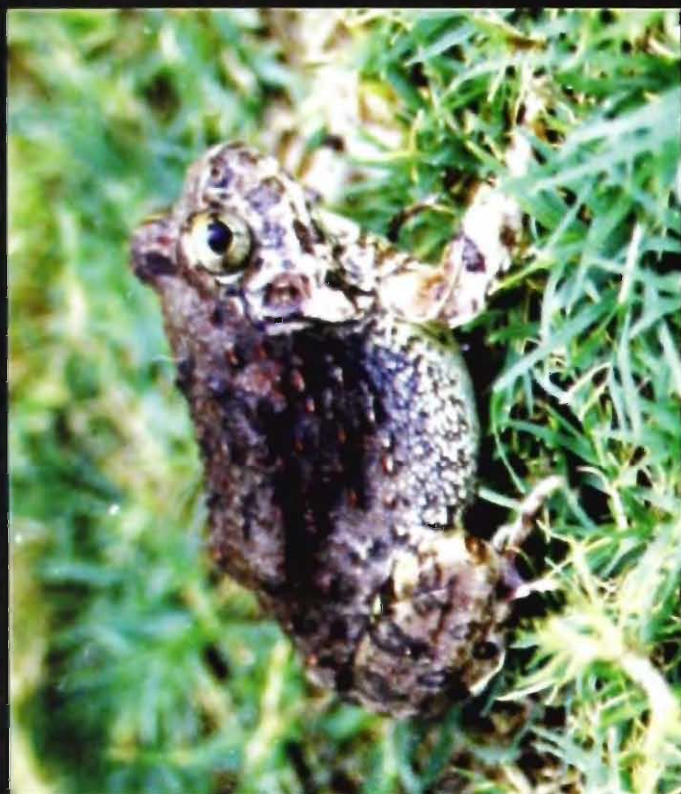
A



C

A. Grey Balloon Frog, *Uperodon globulosus* (Family Microhylidae); B. Marbled Balloon Frog, *Uperodon systoma* (Family Microhylidae); C. Ornate Narrow-mouthed Frog, *Microhyla ornata* (Family Microhylidae); D. Red Narrow-mouthed Frog *Microhyla rubra* (Family Microhylidae)
(All Photos by C. Srinivasulu)

Plate – III



B



D



A



C

A. Short-headed Burrowing Frog, *Sphaerotheca breviceps* (Family Ranidae); B. Dobson's Burrowing Frog, *Sphaerotheca dobsoni* (Family Ranidae); C. Roland's Burrowing Frog, *Sphaerotheca rolandae* (Family Ranidae); D. Skittering Frog, *Euphlyctis cyanophlyctis* (Family Ranidae)
(All Photos by C. Srinivasulu)

Plate – IV



B



D



A



C

A. Green Frog, *Euphlyctis hexadactylus* (Family Ranidae); B. Jerdon's Bull Frog, *Hoplobatrachus crassus* (family Ranidae); C. Cricket Frog, *Fejervarya limnocharis* (Family Ranidae); D. Common Tree Frog, *Polypedates maculatus* (Family Ranidae)
(Photo A by Sanjay Molur; Photos B, C & D by C. Srinivasulu)