

## AMPHIBIAN FAUNA OF KHASI HILLS, MEGHALAYA

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### INTRODUCTION

Owing to the high rainfall and humidity one should expect a rich Amphibian fauna in Khasi Hills and our study has fully justified this. In all, we have examined 862 specimens of both adults and juveniles which yielded 20 species.

There are a few recent accounts of Amphibia from Khasi Hills. Roonwal and Kripalani (1961) have described *Philautus cherrapunjiae* from Cherrapunji. Yazdani and Chanda (1971) have described *Ansonia meghalayana* from the same area. Collection and study of more examples of this species have enabled Pillai and Yazdani (1973) to erect a new genus *Bufoides* to accommodate it. Pillai and Chanda (1973) described another new species from Shillong, viz. *Philautus shillongensis*. They have also described two new frogs, *Rana danieli* and *Rana mawphlangensis* both from Khasi Hills (Pillai and Chanda, 1977).

The material on which this report is based has been accumulating in the Eastern Regional Station of the Zoological Survey of India, Shillong for a period of 14 years from 1959 to 1973. We have not included all the collection data as is customary in a taxonomic paper of this kind but relevant details are given at the appropriate places. Colour pattern is given for most species and notes wherever necessary. References wherein full description of the species is given are indicated under each species. Keys for genera and species dealt with are also given.

In addition to these 20 species, atleast five more species—records of Amphibia are available in literature from Khasi Hills and which are not represented in our material. These are *Amolops formosus* (Günther, 1875), *Rana kuhli* Dum. & Bibr., 1841, *Rana leptoglossa*

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(Cope, 1868), *Rana assamensis* Sclater, 1892 and *Rhacophorus nigropalmatus* Boulenger, 1895. Including these, the total number of species known from Khasi Hills goes upto 25. The prevailing climatological conditions are so congenial to their life that the list presented here does not appear to exhaust its wealth of Amphibian fauna. More intensive surveys are likely to increase the number of species further.

The commonest forms as judged from the number of specimens and diversity of localities are *Rana limnocharis*, *Bufo melanostictus* and *Rana cyanophlyctis* which together constitute about 90% of the bulk of the material. While *B. melanostictus* is stable and exhibits little variation within the species, the other two species of *Rana* exhibit intra-specific variations. The colour pattern in *R. limnocharis* presents considerable diversity particularly with reference to the vertebral line which may be totally non-existent or very conspicuously broad. In *R. cyanophlyctis*, on the other hand, such variations embrace more characters like body profile, tuberculation, glandular fold, tympanum etc.

Out of the many localities in Khasi Hills which yielded Amphibian material, two viz. Cherrapunji and Mawphlang deserve special mention. Both these places have yielded six species each presumably because of little disturbance from human agencies. Cherrapunji with its very high rainfall has hills and plateau strewn with large boulders and temporary pools which provide ideal habitat for concealment and breeding. A virgin forest sheltered by hills and cut up with streams provides ideal ecological conditions in Mawphlang for a rich Amphibian fauna. Both these localities are sure to yield more species.

The colour given for the species is that in the preserved state.

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#### LIST OF AMPHIBIANS FROM KHASI HILLS

The following families, genera and species (Gorham, 1974) are represented in the material studied.

Class AMPHIBIA

Order ANURA

Family PELOBATIDAE

Genus (1) *Megophrys* Kuhl & V. Hass

1. *Megophrys monticola* Kuhl. & V. Hass

Genus (2) *Leptobrachium* Tschudi

2. *Leptobrachium hasselti* Tschudi

## Family HYLIDAE

Genus (3) *Hyla* Laurenti

3. *Hyla annectens* (Jerdon)

## Family BUFONIDAE

Genus (4) *Bufo* Laurenti

4. *Bufo melanostictus* Schneider  
5. *Bufo himálayanus* Günther

Genus (5) *Bufoides* Pillai & Yazdani

6. *Bufoides meghalayana* (Yazdani and Chanda)

## Family RANIDAE

Genus (6) *Amolops* Cope

7. *Amolops afghanus* (Günther)

Genus (7) *Rana* Linnaeus

8. *Rana limnocharis* Wiegmann  
9. *Rana cyanophlyctis* Schneider  
10. *Rana alticola* Boulenger  
11. *Rana danieli* Pillai & Chanda  
12. *Rana mawphlangensis* Pillai & Chanda  
13. *Rana laticeps* Boulenger  
14. *Rana gerbillus* Annandale  
15. *Rana livida* (Blyth)

## Family RHACOPHORIDAE

Genus (8) *Philautus* Gistel

16. *Philautus cherrapunjiae* Roonwal and Kripalani  
17. *Philautus shillongensis* Pillai and Chanda  
18. *Philautus andersoni* (Ahl)

Genus (9) *Rhacophorus* Kuhl

19. *Rhacophorus leucomystax* (Kuhl)  
20. *Rhacophorus reinwardtii* (Sch gel)

## SYSTEMATIC ACCOUNT

1. *Megalophrys monticola* Kuhl. & V. Hass., 1822

1882. *Megalophrys montana*: Boulenger, *Cat. Batr. Sal. Brit. Mus.* : 442.

1923. *Megalophrys montana*: V. Kampen, *Amph. Indo-Austr. Arch.* : 8.

A single example of this Pelobatid toad is available in the collection, obtained from Shillong Peak, the highest point in the Khasi Hills with an altitude of 1960 metres.

Skin of upper parts smooth, granulate in front of and behind tympanum, with a few warty tubercles on flank; upper eyelid with a raised margin and an angular process about its middle. Upper parts brown, head dark grey. Lower parts with brown blotches. A white tubercle on each side of breast.

Our specimen which measures 48 mm from tip of snout to vent is a male.

2. *Leptobrachium hasselti* Tschudi, 1838

1882. *Leptobrachium hasselti*: Boulenger, *Cat. Batr. Sal. Brit. Mus.* : 441.

1923. *Megalophrys hasselti*: V. Kampen, *Amph. Indo-Austr. Arch.* : 13.

We have a single example of a large-headed and frail-limbed specimen which agrees well with the descriptions of the species.

Mid-dorsal skin smooth with whitish tubercles laterally. Ashy-grey above with symmetrical brown and black patterns and spots. A triangular patch with its base touching the two upper eyelids. Black canthal and temporal streak, the latter encircling the brownish tympanum. Flanks with rows of black spots, limbs barred. Belly white, throat faintly mottled, the pre-humeral part darker. A distinct fatty hump above vent.

The specimen measures 37 mm from tip to vent and is a male. It was taken from Burhalang near Nongpoh (alt. 650) on 26-6-1965.

3. *Hyla annectens* (Jerdon, 1890)

1882. *Hyla annectens* Boulenger, *Cat. Batr. Sal. Brit. Mus.* : 382.

1890. *Hyla annectens* Boulenger, *Fauna Brit. India* : 509.

Four specimens, three from Mawphlang (27-6-63 and 9-12-64) and one from Urman (19-2-70) are being referred to *Hyla annectens*.

Upper parts slate-coloured a brownish streak from nostril to front of eye; a black lateral streak upto groin, ending often in two or three black spots with interconnections. Hind parts of thighs (sometimes

front also) with conspicuous black spots on white or yellowish background. Hind margin of tibia similarly marked in some.

The largest example measures 41 mm from tip of snout to vent.

#### 4. *Bufo melanostictus* Schneider, 1799

1882. *Bufo melanostictus*: Boulenger, *Cat. Batr. Sal. Brit. Mus.* : 306.

● 1923. *Bufo melanostictus*: V. Kampen, *Amph. Indo-Austr. Arch.* : 80.

92 adults and 166 juveniles are available from the following localities:— Barapani, Bishnupur, Lawsohtun, Mawblang, Motinagar, Maidan Laban, Polo ground, Risa Colony, Sericulture garden, Upper Shillong, Umshing, Umran, Shillong Peak and Old Barapani Road.

#### 5. *Bufo himalayanus* Günther, 1864

1882. *Bufo sikkimensis* Boulenger, *Cat. Batr. Sal. Brit. Mus.* : 305.

To this species we refer a single example of a small toad collected from Mawphlang on 14-8-1973 and measuring 35 mm from tip of snout to vent.

Dorsally black and brown, head more brownish than black; a faint vertebral line from hind end forwards upto middle of dorsum. Belly and throat yellowish with conspicuous black spots, often confluent giving an irregular "wormy" pattern. Beset with pointed tubercles on the dorsal part of body and limbs. Parotoids and some of the larger tubercles with a tinge of red. Coarsely granulated ventrally.

#### 6. *Bufoides meghalayana* (Yazdani & Chanda, 1971)

1971. *Ansonia meghalayana* Yazdani & Chanda, *J. Assam Sci. Soc.*, 14 (1): 76.

1973. *Bufoides meghalayana* Pillai & Yazdani, *J. zool. Soc.* 25 : 65.

17 examples of this rock toad are available from Cherrapunji collected from cavities in rocks while breeding.

#### 7. *Amolops afghanus* (Günther, 1858)

1882. *Rana afghana* Boulenger, *Cat. Batr. Sal. Brit. Mus.* : 60.

1920. *Rana latopalmata* Boulenger, *Rec. Indian. Mus.*, 20 : 217.

We have no hesitation in referring a single example of frog collected from Nongkrem Hill, Shillong on 20-1-1969 to *Amolops afghanus*.

Skin smooth dorsally but strongly warty on sides. Dark olive above, spotted and marbled with black and grey.

The specimen is a male measuring 62 mm. from snout to vent.

8. *Rana limnocharis* Wiegmann, 1835

1920. *Rana limnocharis*: Boulenger, *Rec. Indian, Mus* : 28.

1973. *Rana limnocharis*: V. Kampen, *Amph. Indo-Austr. Arch.* : 167

290 adults and 54 juveniles collected all the year round from 25 localities agree well with *Rana limnocharis* forma *typica*.

The colouration is variable. Ground colour ranges from light brown to black. The two limbs of the V-shaped mark connecting the orbits are often transversely across. Mid-dorsal white line present or absent. When present it may be very thin and faint or broad and conspicuous. Similar white lines have been seen to run along the thighs and in a few right upto the heel.

The largest example is a female of head and body 52 mm from Shillong Peak. The collection localities are:—Barapani, Cherrapunji, Decame, Lailad, Laitker, Laityigew, Lalchand Basti, Mawblank, Mawmluh, Mawpat, Mawphlang, Mawroh, Myllem, Nongkrem, Polo, Pynthermukrah, Risa Colony, Sericulture garden, Shella, Umroi, Umshing, Umtynger, Umphrynai, Upper Shillong, Weilo.

9. *Rana cyanophlyctis* Schneider, 1799.

1882. *Rana cyanophlyctis*: Boulenger, *Cat. Batr. Sal. Brit. Mus.* : 17.

1920. *Rana cyanophlyctis*: Boulenger, *Rec. Indian Mus.* : 12.

We have examined 179 examples of this species. Majority of specimens agree with the descriptions of this species except a few, the most notable being 5 specimens collected from Upper Shillong on 6-11-1962 and 3 specimens from Shella on 20-7-1973. The variations exhibited by these 8 examples are as under. The profile of the waist is not in conformity with the rest in being more "toad-like", the width of the body being greatest at its junction with the thighs. In typical *cyanophlyctis* this part is narrower than the rest of the trunk. The eyes protrude more and the eyelids are more superior than lateral owing to a less broad upper eyelid and broader lower eyelid. In the majority of examples we have examined the slits are lateral and the lower lids narrow with the result that the slits are fully visible in side profile. On the other hand, in examples from Upper Shillong and Shella the slits are partly or not visible at all from sides. The supra-tympanic fold is not distinct and at best appears as a whitish band or a row of white spots while in typical forms it is a distinctly elevated glandular fold. The tympanum in the eight examples is also smaller being about half the diameter of orbit. The skin of upper parts is smooth without granulations or the characteristic warts tipped with minute asperites. When the limb is folded at right angles to the body the heels definitely overlap while in typical examples the heels

do not meet or they just meet but not overlap. It is tempting to describe these eight specimens under a new taxon but we refrain from doing so because the genus *Rana* shows considerable range of variations and it will not be desirable to erect a new species or subspecies without detailed morphometric studies on populations from wider areas.

We, therefore, include them under *Rana cyanophlyctis* without assigning them a separate status.

The material of *R. cyanophlyctis* has been collected from Burnihat, Barapani, Bishnupur, Lalchand Basti, Mawroh, Mawlai, Motinagar, Myllem, Nonglayer, Oakland (Botanical garden), Polo, Pynthermukrah, Shella, Shillong Peak, Umran, Umsning, Umtham, Umtynger, Upper Shillong.

#### 10. *Rana alticola* Boulenger, 1882.

1912. *Rana alticola*. Annandale, *Rec. Indian Mus.* : 8.

1920. *Rana alticola*: Boulenger *Rec. Indian Mus.* : 166.

*Rana alticola* is represented in our material by a single example from Cherrapunji measuring 47 mm from snout to vent, donated by Shri J. H. Bourne.

The dorso-lateral folds appear to be more widely separated than is usual for the species ( $4\frac{1}{2}$  times in total length as against 6 to  $6\frac{1}{2}$  times). Colour lost due to long preservation. Pale brownish above, not spotted. Folds edged with brown. Lower parts pale.

Adults of this species are extremely rare compared to the tadpoles which are abundant and common.

#### 11. *Rana danieli* Pillai & Chanda

1977. *Rana danieli* Pillai and Chanda, *J. Bombay nat. Hist. Soc.*, 74.

Two species from Mawphlang (60 mm, & 40 mm) and one from Nongkrem (61 mm) belong to the above species.

#### 12. *Rana mawphlangensis* Pillai & Chanda

1977. *Rana mawphlangensis* Pillai & Chanda, *J. Bombay nat. Hist. Soc.*, 74.

A single example of a female (90 mm) collected from Mawphlang is available.

#### 13. *Rana laticeps* Boulenger, 1882.

1882. *Rana laticeps*, Boulenger *Cat. Batr. Sal. Brit. Mus* : 20.

1920. *Rana laticeps*, Boulenger *Rec. Indian Mus.* : 67.

Three small frogs measuring 36 mm, 31 mm & 27 mm collected from Mawphlang on 7-5-1969 undoubtedly belong to *Rana laticeps*.

Skin above brown or grey, marbled with dark. Dark-bordered warts and tubercles present, sometimes arranged in longitudinal rows. A white strip below the supratympanic fold. A dark bar connects the eyes, a faint inverted V-mark at the level of forelimbs. Outer part of arms with a pair of whitish tubercles. Lower parts smooth, white except throat which has brown irregular patches ending abruptly at shoulder level.

All three are females.

#### 14. *Rana gerbillus* Annandale, 1912

1912. *Rana gerbillus* Annandale, *Rec. Indian Mus.* : 10.

1920. *Rana gerbillus*: Boulenger, *Rec. Indian Mus.* : 207.

To this species we assign a small specimen (23 mm) collected from a stream at Mawblang near Cherrapunji on 7-1-1970. One of us (R. S. P.) has collected several larger examples of this species from the Siang District (Abor Hills), Arunachal Pradesh wherefrom this species was originally described by Annandale (1912). The present example, though juvenile, resembles the Abor Hill specimens very well.

*Rana gerbillus* is known hitherto from Abor Hills and Darjeeling only and its occurrence in Khasi Hills constitutes a new record.

#### 15. *Rana livida* (Blyth, 1855)

1890. *Rana livida* Boulenger, *Fauna Brit. India* : 462.

1920. *Rana livida*: Boulenger, *Rec. Indian Mus.* : 214.

Four examples (two large and two small) of this species are available in the collections.

Back uniform bluish-grey or slate-coloured with or without a row of large spots which become progressively smaller towards the interorbital region. The spots are absent in the two smaller specimens where the background colour itself is very dark. Sides sepia brown, tympanum with circular whitish rim. Limbs brownish with conspicuous white marbling. Lower parts white except in male where throat and chest are light brown and belly and thighs granulate. This male (47 mm) is more deeply coloured, with a black patch on the front part of the arm. Pad on thumb much larger than that on female of about the same size (45 mm).

The four examples were collected from Chandmari, Shillong on 7-6-1967 and measure 88, 75, 47 and 45 mm. The last but one is a male.

**16. *Philautus cherrapunjiae* Roonwal & Kripalani, 1961**

1961. *Philautus cherrapunjiae* Roonwal & Kripalani, *Rec. Indian Mus.* : 325.

This species was erected by Roonwal and Kripalani (1961) on the basis of recently metamorphosed young ones from Cherrapunji. In spite of our best efforts we failed to collect the adult of this species which is still unknown. But we have collected a young frog from Mawblang, near Cherrapunji on 29-9-1970. This example (figured in Pillai and Chanda, 1973) measures 16.4 mm from tip of snout to vent and is slightly larger in size and more advanced than any of the material which the original authors had.

**17. *Philautus shillongensis* Pillai and Chanda, 1973**

1973. *Philautus shillongensis* Pillai and Chanda, *Proc. Indian Acad. Sci.* 78 (1) : 30.

8 examples of this small-sized species are available in the collections, all from Malki forest, Shillong. Grey to black, a dark band connecting the eyelids; a 'V' shaped lightmark; pale ventrally.

The largest example is 20 mm from tip of snout to vent and smallest 10 mm. The frogs were collected in the cold months of January and February and were hibernating in caked earth.

**18. *Philautus andersoni* (Ahl, 1927)**

1882. *Ixalus tuberculatus* Boulenger, *Cat. Batr. Sal. Brit. Mus.* : 104.

24 specimens collected from three localities in Shillong (Nongthymmai, Motinagar & Malki forest) are being identified as *Philautus andersoni*, originally described from Kakhyen Hills. This species has subsequently been collected from Abor Hills (Siang District) by Annandale (1912).

Like the previous one, *Philautus andersoni* also is small in size, the largest example in the collection being 18 mm from snout to vent. Dorsal side and flanks light grey to dark, beset with tubercles and warts with white tips; belly and thighs strongly granulate with whitish blotches. An X-shaped large mark joining the eyes to groins is present in all with varying degrees of intensity; dark bar connecting eyes. One example has the entire upper side black while in two others the median dorsal parts is white separating the 'X' mark. Limbs with transverse bars.

19. *Rhacophorus leucomystax* (Kuhl, 1829)

1882. *Rhacophorus maculatus* Boulenger *Cat. Batr. Sal. Brit. Mus.* : 83.  
 1912. *Rhacophorus maculatus himalayensis* Annandale, *Rec. Indian Mus.* 8 : 14.  
 1923. *Rhacophorus leucomystax* V. Kampen, *Amph. Indo-Austr. Arch.* : 246.

Three examples of tree frogs available in the collection, all from Shillong, are identified as *Rhacophorus leucomystax*, better known in literature as *R. maculatus*.

Upper parts grey, brown or darkish; sometimes spotted with irregular blotches; a canthal and temporal black streak often edged with white on upper side; white spots on flank and hind part of thigh; limbs with transverse bars. Ventrally white or yellow; belly and thigh granulate.

The largest example in the collection measures 57 mm and the smallest 33 mm in head and body.

Another four examples of the species showing a different and distinctive colour pattern are being referred to the var. *quadrilineata* (Boie). Two larger examples are brownish above while the other two are pale. Four dark longitudinal bands are present in all the upper side of head and body in varying degrees of clarity. These bands, in the preserved condition, appear paler in comparison to the dark canthal supratemporal streaks.

The localities and size of these examples are as follows:—Fruit Garden (54 mm), Insectory building compound (50 mm), Maidan Laban (46 mm) and Umran (37 mm).

20. *Rhacophorus reinwardtii* (Schlegel, 1837)

1890. *Rhacophorus bimaculatus* Boulenger, *Fauna Brit. India* : 472.  
 1852. *Rhacophorus bimaculatus* Boulenger *Cat. Batr. Sal. Brit. Mus.* : 90.

This species is represented in the collection by three examples, one from a tree at Pynursla, the second from Mawblang and a small example from Cherrapunji. The first example was leafy green at the time of collection. In spirit the dorsal surface is pinkish and the ventral side immaculate. Behind the arm on flank the characteristic large black spots are very prominent. The number of spots is variable. The Pynursla specimen which is largest (55 mm from snout to vent) has two large spots on the right and three smaller ones on the left side. The example from Mawblang has two spots each on both sides while the Cherrapunji specimen has only one spot on each side. The anterior spot when present is larger than those behind. Skin on upper side smooth, belly and thighs white and beautifully granulated.

**KEY TO THE GENERA OF AMPHIBIA (ANURA) OCCURRING IN KHASI HILLS**  
(Those with single species are indicated in paranthesis).

- |  |                                 |             |
|--|---------------------------------|-------------|
| 1. Intercalary ossicle between two distal phalanges present      |                                 | .2          |
| — Intercalary ossicle absent                                     |                                 | .3          |
| 2. Vomerine teeth present  | <i>Rhacophorus</i>              |             |
| — Vomerine teeth absent  | <i>Philautus</i>                |             |
| 3. Vomerine teeth present  |                                 | .4          |
| — Vomerine teeth absent  | ..                              | 7           |
| 4. Disc on fingers much larger than tympanum                     | <i>Amolops (afghanus)</i>       |             |
| — Disc on fingers if present, small, never larger than tympanum* | ..                              | .5          |
| 5. Pupil horizontal  |                                 | .6          |
| — Pupil vertical   | <i>Megophrys (monticola)</i>    |             |
| 6. Fingers free, tongue deeply notched and bifid                 | ..                              | <i>Rana</i> |
| — Fingers webbed at base, tongue only slightly nicked            | <i>Hyla (annectens)</i>         |             |
| 7. Skin of upper parts warty                                     | ..                              | .8          |
| — Skin of upper parts not warty                                  | <i>Leptobrachium (hasselti)</i> |             |
| 8. Parotoid glands present                                       | <i>Bufo</i>                     |             |
| — Parotoid glands absent   | <i>Bufoides (meghalayana)</i>   |             |

**KEY TO SPECIES OF AMPHIBIA (ANURA) OCCURRING IN KHASI HILLS**  
(Those with two or more species under each genus).

A. Genus *Bufo*

- |   |    |                      |
|---|----|----------------------|
| Head with distinct bony ridges, tympanum distinct |    | <i>melanostictus</i> |
| Cranial ridges indistinct, tympanum hidden        | .. | <i>himalayanus</i>   |

B. Genus *Rana*

- |   |      |                |
|---|------|----------------|
| 1. Discs of toe-tips, if present, without groove                                  |      | .2             |
| — Discs of toe-tips with a crescentic or horse-shoe-shaped circum—marginal groove |      | .6             |
| 2. A distinct dorso-lateral glandular fold present from behind eye to vent        |      | <i>danieli</i> |
| — Dorso-lateral folds absent  | .... | .3             |

- |   |        |                         |
|---|--------|-------------------------|
| 3. Tympanum very distinct                                       | ..     | .4.                     |
| -. Tympanum indistinct  | ...    | . <i>laticeps</i>       |
| 4. Outer metatarsal tubercle present                            | .....  | . <i>limnocharis</i>    |
| -. Outer metatarsal tubercle absent                             |        | .5                      |
| 5. Inner metatarsal tubercle prominent, pointed and digitiform  | ...    | . <i>cyanophlyctis</i>  |
| -. Inner metatarsal tubercle moderate, not digitiform           |        | . <i>mawphlangensis</i> |
| 6. Dorso-lateral glandular fold absent                          | .      | . <i>livida</i>         |
| -. A distinct dorso-lateral fold from above tympanum to hip     | .....  | . 7                     |
| 7. Fingers with large discs, that of third as large as tympanum | ... .. | . <i>gerbills</i>       |
| -. Fingers with small discs                                     | ... .. | . <i>alticola</i>       |

C. Genus *Philautus*

- |  |        |                        |
|--|--------|------------------------|
| 1. Skin of dorsum devoid of tubercles and warts  | .....  | .2                     |
| -. Skin of dorsum beset with tubercles and warts | .. ..  | . <i>tuberculatus</i>  |
| 2. Toes three-fourth webbed                      | .. ... | . <i>cherrapunjiae</i> |
| -. Toes free                                     | .. .   | . <i>shillongensis</i> |

D. Genus *Rhacophorus*

- |   |      |                      |
|---|------|----------------------|
| Fingers webbed to discs, one to three conspicuous black spots on axilla | . .. | . <i>reinwardtii</i> |
| Fingers with rudimentary webbing, no spots on axilla                    |      | . <i>leucomystax</i> |

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