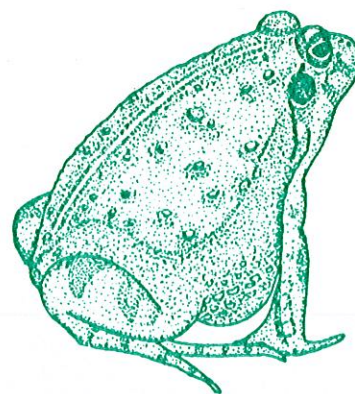


# frog leg



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## Some new distribution sites of Amphibians in Rajasthan

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Rajasthan is the second largest state in India, occupying an area of about 342274 sq. km. It stretches between 23°3'N to 30°12'N lat. and 69°30'E to 78°17'E long. It forms the eastern extremity of the great arid and semi-arid belt of the world. A striking geological feature of Rajasthan is the presence of the Aravallis. Area west of Aravallis is more arid than area east of this mountain chain.

Since this state is the most arid area in the country, amphibians are poorly represented in Rajasthan. So far, only ten species have been listed (Sekar, 1991; Dutta, 1980, 97; Inger & Dutta, 1986; Mansukhani & Murthy, 1964; Sharma, 1992, 95, 96, 97). Some new localities of occurrence of different species have been mentioned below which will help to make the distribution maps of different species of amphibians in Rajasthan.

Distribution of Amphibians in Rajasthan

Family: Ranidae: Genera 4, Species 5.

### (1) *Occidozyga hexadactyla*

Known places of distribution: Jaipur District.

### (2) *Occidozyga cyanophlyctis*

Known places of distribution: Districts of Ajmer, Barmer, Bikaner, Ganganagar, Jaipur, Jhunjhunu, Nagaur, Pali, Sikar, Udaipur, Jaisalmer, Jodhpur and Sirohi.

New records:

Kota District: Karneshwar Mahadeo (N.H.12), Jagpura (Radi).

Bharatpur District: Halena, Hantra, Deeg, Nagaur

Banswara District: Pathak Nursery Banswara

Chittorgarh: Bhagya Baori Sitamata Sanctuary

Bhilwara District: Bhilwara

Alwar District: Tiger Project Sariska, Dhakwasan nullah Tatarpur, Babapir Pond-Mohammadpur

Sawai Madhopur District: Panchana Dam, Tiger Project Ranthambhore.

This species is common in canal system of Indira Gandhi Canal in western Rajasthan. I observed seven individuals in a khala (water course) on 3.x.98 near new bus stand Bikaner and seven more individuals in 682 RD Forest Nursery in same district on 4.x.98. This species is also present in seepage wet-lands of IG Canal area.

### (3) *Hoplobatrachus tigerinus*

Known places of distribution: Districts of Ganganagar, Udaipur, Sirohi, Dungarpur, Banswara, Jaipur, Nagaur, Bharatpur, Alwar, Dausa and S. Madhopur.

New records:

Pali District: Ranakpur, Sadri, Bali.

Rajsamand District: Kumbhalgarh Sanctuary, Bhim.

Ajmer District: Pushkar

Bhilwara District: Bhilwara

Chittorgarh District: Chittorgarh.

### (4) *Limnonectes limnocharis*

Known places of distribution: Districts of Jaipur, Nagaur, Pali, Sirohi, Udaipur.

New records:

Kota District: Karneshwar Mahadeo (N.H.12), Jagpura (Radi).

Chittorgarh District: Sitamata Temple in Sitamata Sanctuary.

Dungarpur District: Gap Sagar.

Rajsamand District: Kumbhalgarh Sanctuary.

### (5) *Tomopterna breviceps*

Known places of distribution: Jodhpur, Nagaur, Udaipur, Jaipur, Pali & Sirohi.

New Records:

Ajmer District: Railway crossing near Kishangarh. Dungarpur District: Gap Sagar, Patela Forest Nursery.

Chittorgarh District: Beejmata Temple (Out skirts of Sitamata sanctuary).

Family: Microhylidae: Genera 2, Species 2.

### (6) *Microhyla ornata*

Known places of distribution: Districts of Pali, Sirohi, Udaipur and Chittorgarh  
New records:

Ajmer District: Railway crossing near Kishangarh.

### (7) *Uperodon systoma*

Known places of distribution: Districts of Jaipur, Udaipur

New records:

Alwar District: Ditches along Bijwar Chauhan-Shahjahanpur Road. Adjoining to Bijwar chauhan, this species is also seen in Rewari district of Haryana.

Family: Rhacophoridae: Genus 1, species 1.

### (8) *Polypedates maculatus*

Known places of distribution: Sitamata Sanctuary, situated at the border of Udaipur and Chittorgarh districts. Probably this species is also present up to Mt. Abu in the west and up to Kota-Baran Districts in the east.

Family: Bufonidae: Genus 1, Species 2.

### (9) *Bufo melanostictus*

Known places of distribution:

Districts of Jaipur, Sirohi, Udaipur.

This species is common in southern part of the state but relatively rare in northeastern part.

New Records:

Dungarpur District: Patela Forest Nursery

Banswara District: Banswara

Rajsamand District: Kumbhalgarh Sanctuary

Pali District: Ranakpur temple

Chittorgarh District: Beejmata temple, outskirts of Sitamata Sanctuary.

### (10) *Bufo stomaticus*

Known places of distribution:

Districts of Bikaner, Ganganagar, Jaipur, Udaipur, Ajmer and Sirohi.



## Amphibian rich areas of Rajasthan

Distt.	Place	Main causes of amphibian richness
Sirohi	Mt. Abu.	Cool and moist conditions, dense forest cover.
Udaipur	Phulwari Sanctuary and adjacent area.	Moist condition, dense vegetation.
Rajsamand	Kumbhalgarh. Sanctuary	Moist condition in many pockets dense vegetation
Chittorgarh	Sitamata Sanctuary	Moist condition, dense forest
Bharatpur	Keoladeo National Park	Amphibians of water in moist habitat
Kota, Baran & Jhalawar	Hadoti Area	Network of perennial rivers, dense forest.

In near future, areas along Indra Gandhi Canal will be rich in amphibian fauna since suitable habitat is developing rapidly. Amphibian species of northern India are likely to migrate along the canal in Rajasthan.

## New records:

Alwar District: Santdas Temple, Harsauli, Tatarpur

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### A preliminary survey on amphibian fauna of Jambughoda Wildlife Sanctuary, Gujarat

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The amphibian fauna of the Gujarat State has not been extensively studied except by Sarkar (1984). The amphibian fauna of Kutch region was studied by Stoliczka (1872), McCann (1938) and Soman (1960). South Gujarat amphibians were studied by Daniel and Shull (1963). Naik and Vinod (1992) have documented amphibian of the Shoolpaneshwar Wildlife Sanctuary and Bhatt et. al. (1999) listed amphibians of Gir forest. Also, amphibian of Gujarat State have been listed by Naik and Vinod (1993a) and Vyas (1996), based on primary observation.

**Study area:** The Jambughoda Wildlife Sanctuary (JWS) is an area of 130.38 sq. km of dry deciduous hilly forest, located in between 20°21'-22°30'N lat. and 73°35'-73°45'E' long. in the Panchmahal District and Vadodara District of central Gujarat. JWS is located on the western end of the Vindhya Hill range.

**Climate:** Three distinct seasons — Monsoon starts from mid June and continues till September. Rainfall data over the last five years indicates that the average rainfall in the area is approximately less than 1000 mm. Winter is from the month of December to

March (temperature range 30-10°C). Temperature rises again in summer season from the month of April to mid June, with range between 30-40°C.

A random survey was made in all important water bodies and perennial rivulets and streams, also each possible moist pockets of the forest was extensively explored during this work. The entire area was rapidly assessed within 14 days with (8 hrs/day) in the second week of January and first week of August 1998. The relative abundance of each species was determined on basis of availability/sighting of the species. The specimens were identified by using the diagnostic keys, given by Boulenger (1890) and Daniel (1963a, 1963b and 1975) and nomenclatures adopted here from Das and Dutta (1998).

Biogeographical situation of JWS and average moderate rainfall does not sport a diverse amphibian fauna. Totally, ten species from seven genera belonging to four families of anuran amphibian were recorded during the study. The species habit composition shows three aquatic and fossorial, terrestrial and semi-aquatic each of two species and one species of arboreal frogs occurring in the area.

According to Ranjit Daniels (1992) and Dutta (1997) *L. keralensis* is distributed in Western Ghats from Tamil Nadu (Kanyakumari District) to Maharashtra, and Naik and Vinod (1993b) have recorded the species from Gujarat (Shoolpaneshwar Wildlife Sanctuary, Bharuch District). Present record of *L. keralensis* from the JWS shows further northern range extension of the species.

I am very thankful to Mr. Mihir Dave, Vadodara for accompanying me during field trips.

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# Systematic list of amphibians of the Jambughoda Wildlife Sanctuary.

Species	Status
<b>Family Bufonidae</b>	
<i>Bufo melanostictus</i>	Common
<i>Bufo stomaticus</i>	Common
<b>Family Microhylidae</b>	
<i>Microhyla ornata</i>	Uncommon
<b>Family Ranidae</b>	
<i>Euphlyctis cyanophlyctis</i>	Abundant
<i>Euphlyctis hexadactylus</i>	Uncommon
<i>Hoplobatrachus tigerinus</i>	Uncommon
<i>Limnonectes keralensis</i> *	3 specimens collected from Kada Dam.
<i>Limnonectes limnocharis</i>	Abundant
<i>Tomopterna breviceps</i>	Uncommon
<b>Family Rhacophoridae</b>	
<i>Polypedates maculatus</i>	Uncommon

\*Dutta (1997) mentioned Ranjit Daniel (1996) view that the species records of outside from Western Ghats are unconfirmed. The species is closely related to *L. limnocharis* complex.

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## Amphibians in and around Gauhati University, Guwahati, Assam

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The amphibian diversity of Guwahati City is not well known compared to mammals and birds. This city, being the "Gateway of northeast India" has witnessed large scale deforestation, hill cutting and land filling of wetlands, swamps and marshy areas in the last two decades, causing measurable loss of biodiversity as well as destruction of amphibian habitat. As an attempt to find out the amphibian diversity of the city, Jalukbari was selected and survey was completed as part of M.Sc. dissertation work. The survey was carried out from May to October, 1997.

Jalukbari is situated on the western boundary of Guwahati (91°40'E and 26°09'N). The Gauhati University (GU) Campus (area c. 233 ha.) is unique in its location between the mighty River Brahmaputra to the north and Deep or Beel Sanctuary to the south. The area is characterised by marshy area with fragmented wetlands, plains and hills. The National Highway 37 runs through the campus.

Vegetation pattern of the hills comprises of degraded deciduous forest and planted teak forest. Most of the open plains are planted with indigenous and exotic species of plants and small patches of paddy scattered here and there. The temperature varies from 7°C in winter to 38°C in summer. The average annual rainfall is 2500 mm and relative humidity varies from 45% to 90%.

Specimens were collected from different habitats such as hills, pools, swamps, paddy, grassland, etc. located in and around GU Campus. Specimens were caught by hand preferably at night (from 1900-2300 hrs.) with the help of torch light. Net was used to capture water dwelling and agile species. Subsequently, the specimens were kept in marked polythene bags and the habitat and locality of collection were noted in the field book. In the laboratory, the specimens were photographed, anaesthetized, measured and preserved in 8% formalin for further study.

Identification of specimens were confirmed by S.K. Dutta and Zoological Survey of India personnel in Calcutta.

Thirty specimens were collected during the survey, which recorded eight species

under eight genera and four families, viz.

**Family Bufonidae**

*Bufo melanostictus*

**Family Microhylidae**

*Microhyla ornata*

*Uperodon globulosus*

**Family Ranidae**

*Euphlyctis cyanophlyctis*, *Hoplobatrachus tigerinus*, *Limnonectes limnocharis*, *Rana taipehensis*

**Family Rhacophoridae**

*Polypedates leucomystax*

During the study *L. limnocharis* was found to be the abundant species in the study area, while the *U. globulosus* could not be spotted and is incorporated here as per earlier record (Chanda, 1994). The *R. taipehensis* is also found to be rare and only one specimen was collected.

## Acknowledgement

The first author is grateful to Dr. Rathin Barman, Simanta and Ramen for their assistance during the field study. We are also grateful to Dr. S.K. Dutta for confirming the identification of the species and for going through the manuscript.

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## Ecology of the anurans of Barak Valley, Assam

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The northeastern region of India is the home for about fifty-four different species of anurans (Chanda, 1994). However, no published information is available until now on the anuran biodiversity and ecology from Barak Valley districts of South Assam. The Barak Valley comprises three districts, viz., Cachar, Hailakandi, and Karimganj. The area has a subtropical monsoon climate with high humidity during most parts of the year and is unique in having different types of freshwater habitats like ponds, lakes, marshes, swamps, bogs etc. with thick tropical vegetation and provides an excellent habitat for amphibians.

Due to the lack of baseline data on the biodiversity of anurans in Barak Valley it is difficult to design detailed/advanced studies on amphibians.

The present study therefore, aims at making an inventory of the anuran species in Barak Valley and studying the



different ecological aspects of adults and larval anurans. Adults and tadpoles have been collected from different parts of this valley and are being identified with the help of Zoological Survey of India, Calcutta. Till date seven different species have been identified belonging to 4 genera and 4 families, viz.

#### Family Ranidae

*Euphylyctis cyanophlyctis*, *Hoplobatrachus tigerinus*, *Limnonectes limnocharis*, *Rana taipehensis*

#### Family Microhylidae

*Microhyla ornata*

#### Family Bufonidae

*Bufo melanostictus*

#### Family Rhacophoridae

*Polypedates leucomystax*

The tadpoles have been collected from various breeding grounds and are reared to adult stage to be identified later. Already, tadpoles of six species have been identified by rearing, though the tadpoles of *Rana taipehensis* could not be detected as yet. This survey will help us to identify the habit, habitat, breeding season and site and also highlight the distribution status of the different species. From the survey conducted between November 1996 to December 1998, it has been seen the *Euphylyctis cyanophlyctis*, *Limnonectes limnocharis* and *Bufo melanostictus* are abundant. *Microhyla ornata* and *Polypedates leucomystax* may be considered rare while *Rana taipehensis* is very rare. Only two specimens of *Rana taipehensis* were captured and another one sighted in a marshy area with thick vegetation of water cress (*Enhydra flactuans* and *Colocasia esculenta*). This species has so far been recorded from this single site. The investigation is expected to be significant in view of the widespread habitat destruction going on due to urbanisation and increasing human settlements, construction of roads, buildings, bridges etc., deforestation and various agricultural activities. It is likely that more intensive survey of hill streams and reserve forest areas will reveal more varieties of anurans.

As the focus on the amphibian studies in India has remained mostly limited to survey, distribution and taxonomy, it is felt essential to investigate the ecology of the larvae and adults. Our study, therefore, includes the feeding ecology, life history of various species, predation, growth and competition.

Tea production and agriculture are the major occupations in the Barak Valley districts and both use various pesticides and fungicides for pest management. It is necessary that the NOEC (No Observed Effect Concentration) of these pesticides/fungicides be determined and their effect

on the other non-target organisms be assessed. For example, endosulphan is applied in tea gardens at a dosage of 2.5 ml/ltr and 1.5 ml/ltr in paddy fields, while our study reveals that 0.0032 ml/ltr of Endosulphan is sufficient to kill 50% of the tadpoles of *Microhyla ornata* within 24 hours. Further experiments in this direction is being carried out which we expect will yield significant results from the view of environmental degradation due to unlimited use of chemical pesticides.

Another important outcome of the present study may be the presence of a species complex and of polytypic species, which will be important from biosystematic point of view. There are also edible varieties of frogs used as food and medicine by some ethnic groups in the valley and its neighbouring areas. Finally, an avowed objective of the present study is to try to design conservation measures as well as provide baseline data for further research.

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#### ABSTRACT

Decline and damage in amphibian protein profiles due to common fertilizer in natural population of *Bufo melanostictus* (Schneider)

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M.Sc. Project Dissertation

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Amphibians are essential components of our agriculture system as they are natural protective agents for removing unwanted parasites and pests. The abundance of amphibians in any paddy field is a indicator of healthy yield. Even though their utility is high, their number has slowly started declining largely due to the pesticidal introduction and human activities. Besides these factors hitherto unexplored and unthought of fertilisers which are used to promote agriculture yield have also the adverse effects. One such fertiliser which has been internationally recognised is Urea.

Keeping this in view the current experiments were designed to see whether the damages affect the protein activities which will indirectly express the gene activity. Any change in the protein genotypes will reflect gene alteration in the genome.

*Bufo melanostictus* showed profound

affect in the blood protein phenotypes after the administration of urea. The loss of the globulin molecule fraction indicate that the effect is on gene locus responsible for synthesising globulin in RBC. The albumin fraction did not show changes in their relative mobility as compared to the control.

Liver tissues phenotypes band patterns in the individuals of *Bufo melanostictus* after the administration of urea showed the band no. 2,3,4 phenotypes indicating the urea toxicity and degree of detoxifying agents in the body, the relative mobility of the bands matched with the control which is a sign of standard protein fractions.

The muscle tissue like the blood had exhibit high degree of genotoxic effect on the protein fraction in the urea treated individuals. A total number of 3-4 bands of low intensity of staining are comparable with the control fractions. The band no. 4 has highly reduced activity.

The above data from the three tissues highlight the genetic damage in *Bufo melanostictus* due to urea. On comparison, liver seems to be stronger than other tissues examined. The study requires further comprehensive survey and advance techniques in localising the effect of urea on sequences of DNA at the molecular level.

# frog leg

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