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Research Paper

**OCCURRENCE OF AMPHIBIAN (ANURANS) IN GARDHI VILLAGE,
GONDA, UTTAR PRADESH**

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Abstract

Amphibians are widely distributed animals. They are the first tetrapod's emerge form water. Due to presence of special features they can survive in both water and land. Various genus of amphibian play an important role in maintenance energy flow in an ecosystem. They prefer to survive near the water bodies like ponds, paddy fields, ditches, marsh etc. In recent year's deterioration of water bodies due to anthropogenic activities like release of industrial waste and extensive use of chemical fertilizer, pesticides causes decline in amphibian population. Medically amphibians are very important for humans as they play an important role in controlling the population of various mosquito species like *Anopheles*, *Aedes* and *Culex* which are main vector of serious disease like malaria, yellow fever and dengue in human population.

Key words: *Amphibian, tetrapod's, ecosystem, pesticide, anura.*

INTRODUCTION

Anurans are most diversely distributed with regard to number of species and ways of living all across the world. The best temperature range that suited to them is 20°-30°C that is the reason they mostly live there in hiding themselves. They mostly move out in cooler time of day or in Night time. In India there are 200 species of frogs, toads and tree frogs are found [13]. Anurans life cycle get affected by habitat changes ,most studies relating environmental drivers to amphibians communities have focused on temperate zones [19]. Anurans communities could be altered by landscape alteration by habitat loss, fragmentation and isolation and also by degradation of habitat [7]. Amphibians are both prey and predator and played a very important role in the ecosystem [17]. They are best pest controller. They play a vital role in human's life; they control disease spread by mosquito genera.

MATERIALS AND METHODS

Study Area

Gardhi is small village located in tehsil Mankapur of Gonda District (Plate-1, Fig 1). This is the area which comes in Uttar Pradesh, India. Total geographical area covered by this village is 321, 74 hectares. The district Gonda lies in 26° 47' and 27°20' north latitude and 81° 46' east longitude. In north it is surrounded by Balrampur district and at west gets bounded by Bahraich district and at the east surrounded by Srawasti.

Frogs Sampling

In the selected sampling regions anurans were sampled in the morning, evening and night time. In crop land there is farming of bitter gourd, lady finger, bottle guard and bitter guard. Area covered by this land is 1500 square meter it was like a kitchen garden.

The observation was done from month of July to September 2021. The frogs and toads were captured manually; capture them by hand wearing gloves so that their skin not comes in direct contact. It was a tough task to capture them for taking weigh length and breadth handled with much care. It was not easy to capture them using a mosquito net to capture them but the frogs have strong toes that tear up the net and ran away so they were captured by hands wearing gloves and after taking measurement they were released back to their places. While capturing them the point should be taken in consideration that don't press them tightly or squeeze them.

RESULTS

Frogs are usually lives in water or near water. In the study area Gardhi village, there are three species of anurans are recorded within which two are of frogs and one is of toad. The three species of amphibians that are recorded are *Hoplobatrachus tigerinus*, *Duttaphrynus melanostictus* and *Polypedates maculatus* (Plate 1; Fig 2, 3, 4). They belong to a three different families that's, Dicoglossidae, Bufonidae, Rhacophoridae (Table -1).

Table-1: Amphibian species found in study area Gardhi villages, Gonda, Uttar Pradesh, India with their habitat, occurrence, abundance and IUCN status

| Order | Species | Common name | Family | Habitat preference | Number of capture species in study area | | | Abundance (%) at study sites | IUCN status |
|-------|---------------------------------|------------------|---------------|--------------------------|---|-----------|--------------------|------------------------------|-------------|
| | | | | | Crop land | Near pond | Terrestrial Region | | |
| Anura | <i>Hoplobatrachus tigerinus</i> | Indian Bull frog | Dicoglossidae | Water bodies, crop field | 2 | 4 | 7 | 65 | LC* |

| | | | | | | | | |
|---|-------------------------|---------------|---------------------------------------|---|---|---|----|-----|
| (Daudin, 1803) | | | ditch, pool | | | | | |
| <i>Duttaphrynus melanostictus</i> (Schneider, 1799) | Asian common toad | Bufonidae | Dry and wet terrestrial areas, Forest | 1 | 0 | 5 | 30 | LC* |
| <i>Polypedates maculatus</i> (Gray, 1830) | Common Indian Tree Frog | Rhacophoridae | Tree hole, forest | 0 | 0 | 1 | 5 | LC* |
| *LC- Least Concern | | | | | | | | |

The Family Dicroglossidae species *Hoplobatrachus tigerinus* is most commonly seen in study area Gardhi, Motiganj. Table 1 showing the relative abundance of frog species found in village Gardhi, Motiganj. The species *Hoplobatrachus tigerinus* commonly known as Asian bull frog is abundant in number with 45% of abundance; Whereas *Polypedates maculatus* are less abundant with the abundance of 5% (Table-1).

Table-2: Morphometric measurement of the amphibian species

| Genera with body morphology | Length (cm) | Breadth (cm) | Weight (gram) |
|---|-------------|--------------|---------------|
| <i>H. tigerinus</i> | 11.8 | 10.3 | 143 |
| Body elongated, nose (Snout) and head sharp pointed Tympanum circular and bigger in size than eyes, Legs muscular and strong. Body colour yellow greenish, greyish | 10.4 | 8.1 | 137 |
| | 13.5 | 12 | 161 |
| | 10.8 | 9.1 | 148 |
| | 9.1 | 8 | 130 |
| | 11.4 | 10.6 | 144 |
| | 15.4 | 14.8 | 196 |
| | 11.9 | 13.1 | 160 |
| | 10.8 | 9.1 | 137 |
| | 5 | 4 | 11 |

| | | | |
|---|------|------|-----|
| | 3.5 | 2.7 | 7 |
| | 15.5 | 12 | 207 |
| <i>D. melanostictus</i> | 8.1 | 6 | 50 |
| Toad's snout short and not much sharp. | 2.7 | 1.8 | 15 |
| Head covered with bony ridges. | 3.8 | 2.5 | 20 |
| Gap between eyes more. | 9.1 | 7.5 | 136 |
| Tympanum of them is very distinct feature and wide then eye's diameter. Shows variable color patterns plain brick red color to fully black. Common color pale yellow-brown marked boldly with dark spots. | 3.7 | 2.4 | 20 |
| | 8.4 | 6.5 | 55 |
| <i>P. maculatus</i> | ~5.1 | ~3.8 | ~20 |
| Body elongated | | | |
| Toes are webbed with gluey pads. Yellowish spots visible on their body with black border. | | | |
| Skin colour shows different patterns of brown shades; like olive brown, brackish red and yellowish green. | | | |

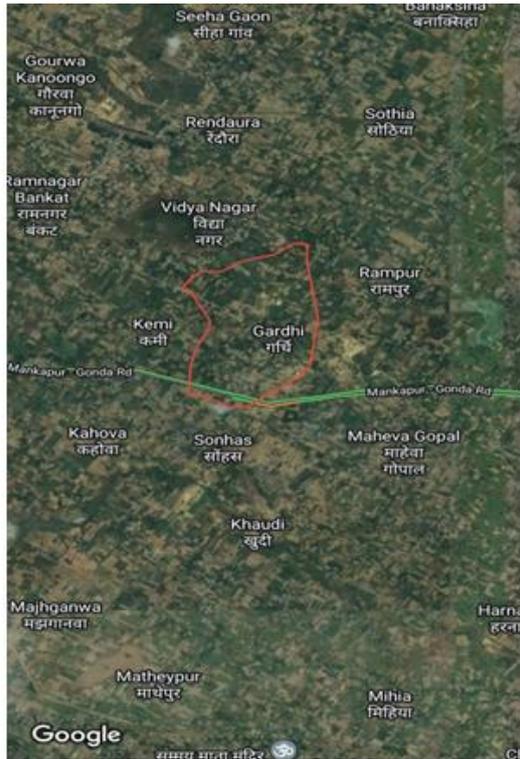


Fig. 1 Satellite map image of village Gardhi, Gonda (Source: google map)



Fig 2. *Hoplobatrachus tigerinus*

(Indian Bull frog)



Fig 3. *Duttaphrynus melanostictus*

Asian common toad



Fig 4. *Polypedates maculatus*

Common Indian Tree Frog

Plate -1

Amphibian species observed in study area

Hoplobatrachus tigerinus (Daudin, 1803) (Plate-1; Fig 2) found in near Grasses field, crop fields during day time and in night found in water logged in India, Pakistan, Nepal, Bangladesh and Madagascar [3]. The body is elongated and used to be fat, nose (Snout)

and head is sharp pointed. Tympanum is circular and bigger in size than eyes, Legs are muscular and strong. Body colour is yellow greenish, greyish. A light or yellow colored mid dorsal line is present tip to snout to the posterior end. Usually they are active in night means are nocturnal but you are able to see them near crop fields, grass fields during day time. Their breeding time is in monsoon season.

Asian common toads (*Duttaphrynus melanostictus*) (Schneider, 1799) (Plate-1; Fig 3), the toad's snout is short and not much sharp. Head is covered with bony ridges. Gap between eyes is more. Tympanum of them is very distinct feature and wide then eye's diameter. There are variable color patterns are found in them they may be plain brick red color to fully black. Common color that is found in them is pale yellow-brown marked boldly with dark spots. Asian common Toads live an average of four years in the wild and up to 10 years in captivity ("Pest Risk Assessment: Asian spined toad (*Bufo melanostictus*") [18]. Asian common toads are widely distributed all over Asia. Asian common toads are generally prefer lowland areas, dense ever green forests, and forest margins riparian areas, dense evergreen forests, gardens, slum areas and where humans have command over agricultural fields. An Asian common toad feeds mainly on insects that are known to be a problem to farmers in India [11, 12, 18].

Polypedates maculatus (Gray, 1830) (Plate-1; Fig 4), Common Indian Tree Frog, body is elongated in appearance, their bone like head tympanum is most suitably distinct much like as eyes, their dermal layer is so smooth, their stomach is fragile with granular structures, and toes are webbed and have gluey pads. There are yellowish spots that are visible on their body with black border. Hamper side of thighs have round yellow spots which are generally distinct by dark brown network [2]. Their skin colour have different patterns of brown shades; like olive brown, brackish red, and yellowish green. They have an ability to jump over walls because they have webbed toes. Their mating calls are short and sudden. It is found in Sri-Lanka, Nepal, Bhutan, western and southern Bangladesh, India mainly in south India they enter in houses and create nuisance.

Genus observed in the study area of village Gardhi showed variation in size and weight depends up on the age of species (Table-2). The largest species of *Hoplobatrachus tigerinus* was 15.4 cm with 196 gram weight whereas largest species of *Duttaphrynus melanostictus* was 9.1 cm long and 136 gram weight.

DISCUSSION

Research conducted in Thattekkad bird Sanctuary [13] showed that 9 species of amphibians were recorded belongs to three different families and single order Anura the plots are cultivated here by nutmeg, cocoa, Papaya, guava, mango, jackfruit, coconut, pepper etc and the vegetation of study area is agriculture mainly people cultivated here seasonal vegetables, rice ,wheat ,mango, guava, papaya. District is also surrounded by forest named Tikri jungle, and here Asian common toad, Indian Bull frog, are found that was also found in Thattekkad bird sanctuary. Vegetation was little bit similar to the Thattekkad bird sanctuary.

Research conducted in the Dandeli Anshi Tiger Reserve [6] is moist Deciduous and tropical semi evergreen type of forests. Bamboo is seen in eastern parts and semi evergreen in western parts. Climate is seasonal with pre monsoon, monsoon and post monsoon. Heavy rain falls here with an average 2500mm (range 1250-4000mm) and Temperature varies from 13 degree Celsius to 37 degree Celsius. Frogs that are found here are similar to Study area is Common Indian Toad, Indian Bull Frog. It showed that they are compatible to survive in both area Dandeli Anshi Tiger reserve and Gardhi, Motiganj. The temperature of study area is average low temperature 10.3 degree Celsius to highest average 30.6 degree Celsius. Rainfall with an average in Gonda is with highest rainfall 222mm in July that considers as wettest month. If compare both areas Dandeli Anshi Tiger reserve and Gardhi Motiganj rainfall fluctuates much but there is little fluctuation in temperature. Frog species *Hoplobatrachus tigerinus* and *Duttaphrynus melanostictus* are commonly found in both areas it showed that they can survive in both areas. Observation in study area shows that the species *Hoplobatrachus tigerinus* and species *Duttaphrynus melanostictus* are mainly found in terrestrial regions that are near crop fields. Evidently frogs act as natural controller of pest who is responsible for destroying the crops [16].

Common Indian Tree Frog, *Polypedates maculatus* that found in the study area Gardhi, Motiganj is one in number and their abundance is very low. The Genus *Polypedates maculatus* is commonly found in Bangladesh, Bhutan, India, Nepal and Sri Lanka. They are found generally in South Asia. In India they are mainly found in Bubneshwar which has tropical savanna climate with annual mean temperature of 27.4 degree Celsius; whereas Uttar Pradesh comes under Agro climatic zone [14]. It is primarily humid subtropical with dry winter. So the environment of Uttar Pradesh is not suitable for them so they are not abundantly found here. Frogs are highly selective to their habitat environment and the study conducted by Junhua *et.al.* in 2021 [20] shows that in the face of future climate change, an increase in habitat fragmentation and decrease in habitat connectivity was predicted.

Frogs and toads are an ecologically important as they play a very important role in ecological balance. They control vectors like mosquitoes and pests. Examination of stomach content reveals that insects are the main food items of *Rana tigrina* that was collected from agricultural fields [16]. In India a general farmer used pesticides for pest control in agriculture but can use frogs as a pest control in these fields [15]. Frogs breed during rainy seasons and their eggs released in the rain water accumulated, but the tadpoles have to face ill effects of pesticides that are used in agriculture fields. India ranked in top in world in frog leg exporting [1]. Frogs can be used as biological indicators as they are sensitive to environment changes. Frogs are the used as indicators of healthy ecosystem, because they lived long and have stable population in randomly distributed habitat [9].

CONCLUSION

Declination in frogs and toads population is matter of concern for environment their number decreases majorly since 1950. More than 120 species are threatened and are on

range of extinction. There are many species of frogs approximately 900 species, are listed as Endangered by IUCN's Red list. More than 500 species of frogs are marked as Critically Endangered. According to IUCN [8] 41% of the world's amphibians are threatened with extinction. Due to lack of adequate information about 161 species out of 342 species of amphibian are still under data deficiency category. As per the IUCN Red List of Threatened Species, the global status of Indian amphibians is 24% Data deficient; 30% Least concern; 9% Endangered; 6% Threatened; 5% critically endangered; 2% near threatened and 0.3 % extinct [8, 10]. Biggest threat to the frog species are habitat loss due to human activities like construction of roads and infrastructure through their habitat increases the declination in their population.

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