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Research Article

BATRACHOFAUNA DIVERSITY OF DHALTANGARH FOREST OF ODISHA, INDIA

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ABSTRACT

Small forests are often ignored. Their faunal resources remain hidden due to negligence. But they may be rich in animal diversity. Considering this, I have started an initial study on the batrachofauna diversity of Dhaltangarh forest. Dhaltangarh is a small reserve protected forest of Jagatsingpur district of Odisha in India of geographical area of 279.03 acre. The duration of the study was 12 months. Studies were conducted by systematic observation, hand picking method, pitfall traps & photographic capture. The materials used to create this research paper were a camera, key to Indian amphibians, binocular, & a frog catching net. The study yielded 10 amphibian species belonging to 4 families and 7 genera. It was concluded that this small forest is rich in amphibians belonging to Dicroglossidae family. A new amphibian species named Srilankan painted frog was identified, which was previously unknown to this region.

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INTRODUCTION

Batrachology is a sub-discipline of herpetology. It is the study of amphibians. Amphibia is a major class of vertebrate included under phylum Chordata. Amphibia refers to “double life”, or life in water and on land. Class Amphibia includes the salamanders, frogs, toads, and caecilians. All amphibians have very moist skin and produce shell less eggs. They are therefore incredibly dependent on water for reproduction. Amphibians are ectothermic and have permeable skin; they rely upon their external environment for regulating body temperature and moisture loss (Duellman and Trueb, 1986; Zug *et al.*, 2001 and Pough *et al.*, 2004). They are both gill & lung breathers—usually gills in the larval stage, replaced by lungs in the adult.

They inhabit a variety of life zones. Except oceans, they can be found from deserts to the subpolar region, from sea level to snow line, every imaginable type of freshwater, from the ground up to the highest treetop (Kohler, 2000).

There are 3 orders of amphibians Apoda, Urodela & Anura (Kotpal, 2001). Apoda are limbless amphibians. Order Urodela are characterized by having a true tail. They include salamanders and Newts. Order Anura is comprised of the frogs and toads. The distinguishable characteristics of this order is the absence of a tail in the adult form and the presence of tympanum. Order Anurans are the most diverse and widespread of the 3-extant amphibian order.

Amphibians are referred to as an indicator species because they are particularly sensitive to changes in their environment and monitoring their status is a way to assess ecosystem health (Welsh and Oliver, 1998; Sheridan and Olson 2003; Malhotra and Thorpe, 1999). Amphibians play a very important role in the food chain of both terrestrial and aquatic ecosystems. The general ecological importance of amphibians lies in them being predators acting as primary and secondary carnivores on insects, some of which are crop pests or disease vectors (Behangana, 2004). Amphibians are valuable for natural biological pest control (Kanaujia *et al.*, 2017).

There are more than 5100 extant amphibian species have been described (Glaw *et al.*, 1998) and the number increases at a yearly rate of approximately 70 to 100 newly discovered species (Glaw & Köhler 1998). Amphibians seem to have once again reached a level of diversity comparable to their first “golden age”, the Carboniferous and the Permian (Kohler, 2000). With approximately 4500 valid species, Anurans are by far the most species-rich amphibian group (Kohler, 2000). India houses 314 amphibian species out of which 279 belong to order Anura (Dinesh *et al.*, 2011). About 138 species of amphibians are endemic to India (Maiti & Maiti, 2011). Odisha is home to 26 amphibian species (Dutta *et al.*, 2009). Only anuran amphibians have so far been reported in Odisha.

In most of the parts of the earth batrachologists are trying to provide the actual assessment of amphibians. In India, also many works have been done accurately and many new species were

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discovered. Many obatrachologists of Odisha also did some assessment of the batrachofauna in an excellent way.

Dutta *et al.*, 2009 reported 21 anuran species from Similipal Biosphere Reserve. *Kaloulataprobatica* was reported from a tree hole in a mangrove swamp at Bhitarkanika, Odisha by Sengupta *et al.*, 2009. 14 Amphibian species have been reported by Jena *et al.*, 2013 from Bhitarkanika mangroves, Odisha. Sahu *et al.*, 2014 reported 14 amphibian species from Gandhamardan Hills Range of Western Odisha. Five amphibian species were reported by Rout *et al.*, 2015 from Kuldhia Wildlife Sanctuary, Mayurbhanj, Odisha. Pradhan, 2016 reported 16 amphibian species from Satakosia tiger sanctuary (STS) of Central part of Odisha. Dutta, 2007 reported 14 species of amphibian fauna from Dhamra Port site in the district of Bhadrak in Odisha.

A wildlife study was performed in the Dhaltangarh RPF of Odisha. But it was a preliminary step to assess the batrachofauna of the desired forest. The work was carried out by me and it yielded an interesting checklist of anuran diversity.

MATERIALS AND METHODS

Study Area

The Odisha state of India has a geographical area of 155,707 sq. km. The recorded forest area of this state is 52,472 sq. km (State Forest Report, 1999).

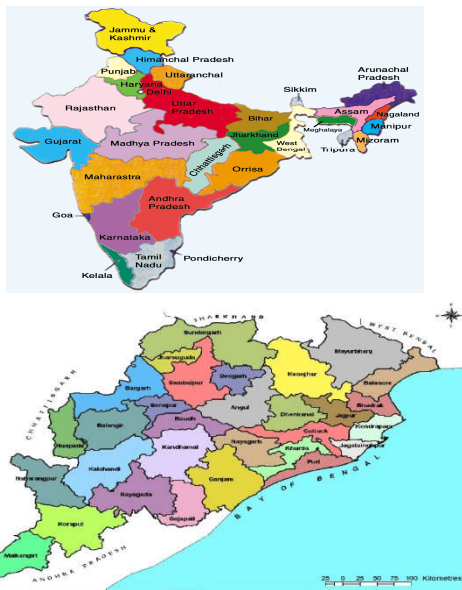


Figure 1 Map showing Dhaltangarh Reserve Protected Forest present in Jagatsinghpur district of Odisha, India

Jagatsinghpur district is one of the coastal districts of Odisha which lies between 19° 58' & 20° 23' N latitude and between 86° 30' & 86° 45' E longitudes. Dhaltangarh is a small forest of Jagatsinghpur. It is in Raghunathpur block of Jagatsinghpur district, located 15 kilometers away from Jagatsinghpur town. It is a reserve protected forest, under the control of Cuttack forest division. It is located on the shore of dead Hansua river, between longitude 20° 31' 29.5" & 20° 31' 49.6" N and latitude 86° 24' 29.41" & 86° 23' 22.96" E (Google Map). It has a total geographical area of 279.03 acre. A canal named Taladanda No-8, is going through this forest. The forest is surrounded by 10 villages named-Ramchandrapur, Deulisahi, Ganailo, Nalibara, Pandra, Kakudia, Balansa, Mundala, Gopalpur & Brahmanbadi. Two villages are situated inside the forest named- Badagada & Sanagada. During summer the temperature is more than 27° C and the minimum temperature is recorded during winter as 15°C. Scattered grasslands, Deer park, Lord Gopinath Temple and Dhruva's birth place are the fascinating attraction of this forest. Dhaltangarh is an excellent habitat of many rare flora and fauna. More than 50 species of plants are seen here out of which many have a great medicinal value. Dhaltangarh is dominated by plants like teak, thorny bamboo, coromandel ebony, Indian gooseberry etc.



Figure 2 Board showing area of Dhaltangarh



Figure 3 Board showing way to forest office



Figure 4 Hansua river, on the shore of which Dhaltangarh is located

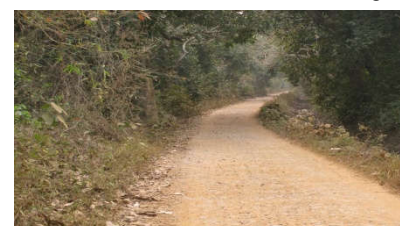


Figure 5 Road passing through Dhaltangarh

Faunal diversity of this forest ranges from invertebrates like several spiders, scorpions to vertebrates like deer.

METHODOLOGY

Fieldwork was conducted from May 2016 to April 2017, with a total of 50 days of sampling in the region. The study was focused on amphibian diversity of Dhaltangarh. The study area covers an area of 279.03 acre. Specimen records were made in diurnal and nocturnal visual searches (Crump and Scott Jr 1994; Martins and Oliveira 1998), and by pitfall traps associated with drift-fences (Cechin and Martins 2000). Traps were installed in 10 sampling places. Active searches were made in 3 water bodies of the forest (pond). To capture aquatic amphibians a net fitted with a metal ring fit at the end of long bamboo pole was used. Terrestrial and arboreal amphibians were collected by hand. The captured specimens were observed thoroughly, photographed, measured and released back. Larger specimens were photographed at the site. Smaller specimens were captured and taken to the nearer forest office and photographed for study in greater details. Collections of amphibian species were done along the river banks, canal, ponds, swampy areas, forest trails, forest floor and around human habitations.

Individuals were photographed with aid of Nikon 5600 DSLR Camera. Survey was carried out in the morning mostly from 06:00am to 9 am and in the evening, mostly from 5:00 pm to 8.00pm. Few late-night surveys extending upto sunrise were also conducted to find nocturnal species. Forest staffs and people living in villages were interviewed to get more information about Batrach of auna. All species encountered are identified using keys and other publications (Boulenger, 1890; Smith, 1935, 1943; Dutta, 1997; Daniels, 2002; DanielsRJR, 2005; Chanda, 2002). Only those species with confirmed identification are listed in this paper.



Figure 6 Frog catching net

RESULTS AND DISCUSSION



Figure 7 *Duttaphrynus melanostictus*



Figure 8 *Duttaphrynus stomaticus*



Figure 9 *Polypedates maculatus*

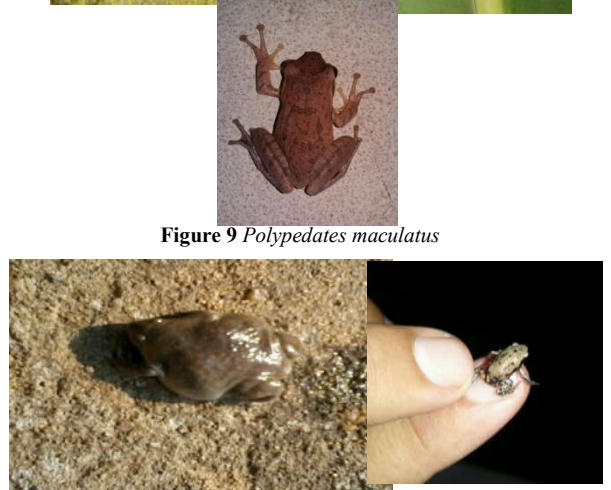


Figure 10 *Uperodon globulosus* adult and its froglet



Figure 11 *Kaloula taprobanica*



Figure 12 *Microhyla ornate*



Figure 13 *Hoplobatrachus tigernius*



Figure 14 *Hoplobatrachus crassus*



Figure 15 *Fejervarya syhadrensis*



Figure 16 *Fejervarya sp.*



Figure 17 Unidentified species

During the study period, 10 species of anurans were encountered. From the survey and assessment work, it was found that the amphibian species present are belonging to a single order, 4 families and 7 genera. (Table 1). The common names, scientific names and taxonomic authority are given in table 2 along with their IUCN status.

Table 1 Species systematic position

Family	Genus	Species	
Bufonidae	<i>Duttaphrynus</i>	<i>melanostictus</i>	
		<i>stomaticus</i>	
Rhacophoridae	<i>Polypedates</i>	<i>maculatus</i>	
		<i>uperodon</i>	
Microhylidae	<i>Kaloula</i>	<i>taprobanica</i>	
		<i>Microhyla</i>	<i>ornata</i>
			<i>tigerinus</i>
Dicroglossidae	<i>Hoplobatrachus</i>	<i>crassus</i>	
		<i>Fejervarya</i>	<i>syhadrensis</i> <i>sp.</i>

All the amphibians found belong to order Anura. In amphibians, the most speciose family was Dicroglossidae. Four species belong to Dicroglossidae, three to Microhylidae, two belong to Bufonidae and one to family Rhacophoridae were recorded. The percentage of all the families of amphibians are mentioned in the figure 18.

Among the amphibians the most commonly encountered was *Duttaphrynus melanostictus*. In Dhaltangarh forest species like common toad, tree frog and Indian bull frog are of common occurrence. But species like Sri-Lankan painted frog and Indian balloon frog are rarely seen. These two species are rarely seen due to their burrowing secretive habits. Sri-Lankan painted frog was identified for the first time in this area.

Large numbers of amphibians are killed when crossing roads especially during monsoon.

Table 2 Species scientific name along with taxonomic authority, English name and IUCN status (L.C-Least concerned)

Sl no	Scientific name	Taxonomic authority	English name	Iucn status
1	<i>Duttaphrynus melanostictus</i>	Schneider,1799	Common toad	L.C
2	<i>Duttaphrynus stomaticus</i>	Lutken,1862	Indian marbled toad	L.C
3	<i>Polypedates maculatus</i>	Gray,1834	Tree frog	L.C
4	<i>Uperodon globulosus</i>	Gunther,1864	Indian balloon frog	L.C
5	<i>Kaloula taprobanica</i>	Parker,1934	Sri-Lankan painted frog	L.C
6	<i>Microhyla ornata</i>	Dumeril and Bibron,1841	Ornate narrow mouthed frog	L.C
7	<i>Hoplobatrachus tigerinus</i>	Daudin,1802	Indian bull frog	L.C
8	<i>Hoplobatrachus crassus</i>	Jerdon,1854	Jerdon's bull frog	L.C
9	<i>Fejervarya syhadrensis</i>	Annandale,1919	Indian cricket frog	L.C
10	<i>Fejervarya sp.</i>			

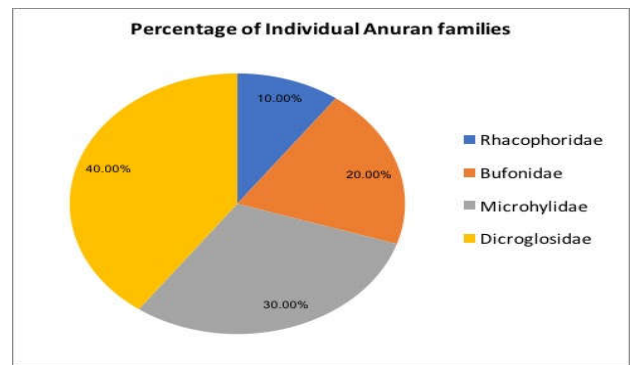


Figure 18 Pie chart showing percentage of different Anuran families present in Dhaltangarh forest

Amphibians are especially sensitive to environmental pollutants because of their permeable skin and eggs. The main types of pollutants include pesticides, organic matter and vehicular exhaust. Some chemical compounds act as endocrine disrupters and can interfere with hormone signals during sensitive development periods of amphibians.

CONCLUSION

Major causes of loss of amphibians in the Dhaltangarh RPF are forest fire based habitat loss, destruction of forest by local people and vehicular passage. Many frogs die due to vehicular movements mostly during the monsoon. Some local people were found to feed on the Indian Bull frog which is the cause of their depletion. The local people depends upon this forest for firewood collection and they use the forest as the grazing field of their cattle. This cause the destruction of the forest. As the amphibians are the integral part of forest ecosystem, any harm to them will deplete not only their population but also affect the entire biodiversity of Dhaltangarh forest. Hence steps should be taken for conservation of Amphibians along with conservation of forest.

Acknowledgement

This report titled "Batrachofauna diversity of Dhaltangarh Forest of Odisha, India" is an outcome of a study of 12 months with collection of information through direct observation, survey, discussion with forest officials and people of the forest. One of the challenges faced during compilation of this project was lack of availability of any consolidated information.

I am thankful to my brother Sanjib, for his support in making this project possible. Needless to say, my field work was possible with the cooperation of the concerned village communities & forest officials.

I hope the report will be very useful at least in view of the absence of any consolidated information about the status of Dhaltangarh. Last but not the least, I thank my mum for getting involved in my topic to make the topic qualitative.

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