

1-24-2018

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### Recommended Citation

faiz, a. h., tariq, g., & Bagaturov, M. F. (2018). STATUS AND DISTRIBUTION OF AMPHIBIANS IN TOLIPIR NATIONAL PARK, PAKISTAN, *Journal of Bioresource Management*, 5 (1).

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## STATUS AND DISTRIBUTION OF AMPHIBIANS IN TOLIPIR NATIONAL PARK, PAKISTAN

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### ABSTRACT

The herpetofauna was surveyed from January to December 2018 along the elevation gradient 1367 m to 2617 m, asl in Tolipir National Park. The whole area was sampled by taking 52 quadrates. Three amphibian species were recorded using the visual encounter method in an area of 52 km<sup>2</sup>. This study provides baseline data for spatial distribution of amphibians in Tolipir National Park and provides previously unavailable baseline information for use in the development of a preliminary conservation schedule.

**Key words:** Amphibian, Tolipir, National Park, *Bufo stomaticus*

### INTRODUCTION

Amphibians are considered as one of the indicators of ecosystem integrity because they rapidly disappear in the face of habitat degradation (Cabrera-Guzmán and Reynoso, 2012). They are sensitive to environmental changes and gathering of information on their distribution, conservation, and ecology is a priority of the International Union for the Conservation of Nature (Campos and Magnusson, 2010).

Despite the importance of baseline data, no specific studies are known from Tolipir National Park (Pakistan) or for the encompassing Tolipir tract. However, inferences about the possible presence of different vertebrate species in this region can be drawn from the available literature on the habitat, biology and distribution ranges of different species for Pakistan/Indian subcontinent (Khan, 2006). The present study describes the distribution and abundance of amphibians in Tolipir National Park (TNP) to establish baseline data for future conservation and needs assessments and

management plans for TNP (Pawar et al., 2007; Urbina-Cardona et al., 2006).

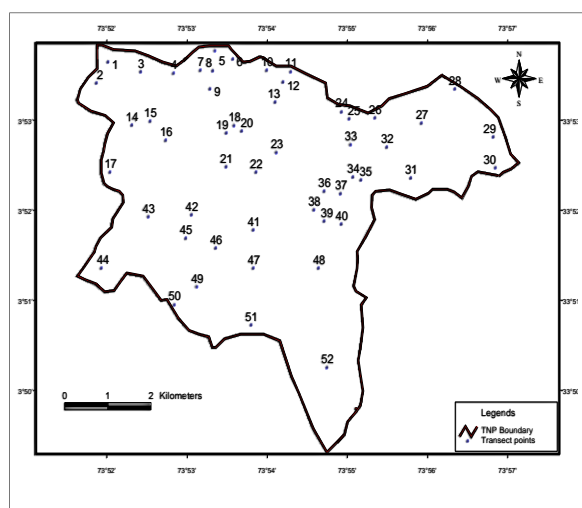
### MATERIALS AND METHODS

#### Study area

Tolipir National Park (33°N, 73°E) is in Forest Compartments 9, 10 and adjacent areas of the administrative district of Poonch, Azad Jammu and Kashmir. The area is monsoon-influenced and receives its highest seasonal maximum rainfall during May-August with minimum rainfall recorded occurring during September-November.

Fifty-two quadrats were surveyed randomly (diameter = 33.33 m) in such a way to present whole sampling of Tolipir National Park (TNP) (Figure 1). The position of quadrats was marked with GPS (Garmin Foretrex 401). The study was conducted from 1 February 2013 to 12 September 2013. Amphibians were detected in each quadrat using active, diurnal searches following a visual encounter survey (VES) with five people (Heyer et al., 1994). Searches were

conducted on sunny days between 09:00 and 14:00 hours and on clear evenings between 18:00 and 20:00 hours. Diurnal searches consisted of walking slowly through each quadrant, thoroughly examining sunny patches of habitat, gently raking through leaf litter, and turning over logs, boulders and rock cervices. When amphibians were observed, they were identified to the lowest possible taxon, the number of individuals was tabulated and the altitude was recorded. The animals were photographed as they were encountered. When a specimen could not be identified, it was captured, humanely euthanized, and preserved in a 70% aqueous solution of formalin for later identification (Khan et al., 2006).



**Figure 1: Map of TNP showing location of different quadrat stands established for the reptile sampling (for GPS coordinates of different points refer) (source: Arc View 3.3 and Google Earth Pro 4.2)**

## RESULTS

There are 24 anuran amphibian species (Khan, 2010) known from Pakistan. Three species and two families (Bufonidae and Discoglossidae) of amphibians were present at the park during the survey (Appendix).

## DISCUSSION

Tolipir National Park represents an important harbor for many species of amphibians. The data deficient species require significant status investigations to help establish their conservation status. The adequacy of sampling site was evaluated by plot a frequency accumulation curve and resulting curve was not flattened which indicated that no more species were added (Figure 2). The amphibian density of Tolipir National Park is relatively poor and represented by only 3 species: *Bufo stomaticus*, *Duttaphrynus melanostictus hazarensis* and *Allopaa barmoachensis*. This low level of amphibian density can be explained by the harsh environment and high altitude of their habitat.

Conservation status according to IUCN (IUCN Red list, 2015) is least concerned for both of toad species *Bufo stomaticus* and *Duttaphrynus melanostictus*. The latter species is presented in TNP with subspecies *D. m. hazarensis* distinguished by Khan (2001) on the basis of shape of parotid glands; fingers and head morphology as well as color features. This may also be the highest altitude population found in its natural range (Bangladesh, Bhutan, Brunei Darussalam, Cambodia, China, Hong Kong, India, Indonesia, Lao People's Democratic Republic, Malaysia, Maldives, Myanmar, Nepal, Pakistan, Singapore, Sri Lanka, Taiwan, Thailand and Vietnam) which explains the low density of population. *Allopaa barmoachensi* is of uncertain conservation status and unsure taxon which by some authors has been synonymized to *Nanorana hazarensis* (Dubois, 1992; Ohler and Dubois, 2006). However, the references followed in this study (Chanda, 2002; Khan, 2006), treated them as separate species until more detailed taxonomic study of diagnostic characters can be provided further. The sighting trends of amphibians were: *Duttaphrynus melanostictus hazarensis* 6%,

*Bufo stomaticus* 5% and *Allopaa barmoachensis* 5%.

## CONCLUSION

This study provides baseline information of the amphibian community in TNP. Amphibians are particularly sensitive to micro-climate and to any type of exploitation that eliminates habitats, potentially damaging the balance between these species and their ecosystems. This information can be used as reference for evaluating the need for conservation and effectiveness of future conservation approaches at the site.

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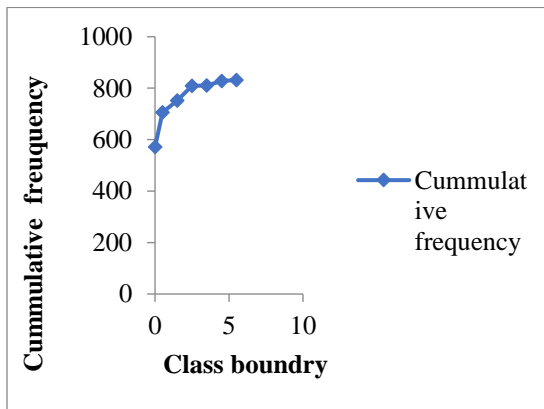
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## APPENDIX 1

**Table 1. Density of amphibians in Tolipir National Park (LC: Least concern; DD: Data deficient (IUCN, 2018))**

Common Name	Scientific Name	D=No. of individuals/area <sup>2</sup>	Conservation Status
<b>Family Bufonidae</b>			
Maidani gauk	<i>Bufo stomaticus</i>	27	LC
Asian common toad	<i>Duttaphrynus melanostictus hazarensis</i>	32	LC
<b>Family Discoglossidae</b>			
Kashmir nadi maindak	<i>Allopaa barmoachensis</i>	27	DD

## APPENDIX 2



**Figure 2: Frequency accumulation curve for sampling sites.**