



Checklist and Distribution of Amphibian fauna in Sindh, Pakistan

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Received 12th November 2013 and Revised 9th March 2014

Abstract: Present study discovers and describes bio-taxonomic diversity in amphibian fauna of Sindh province, Pakistan. Fourteen districts of Sindh were surveyed thoroughly from January 2010 to December 2012 for collection of amphibians. Amphibian specimens were collected and taxonomically examined and identified by using morphometric and concerned authentic literature. It was determined that only four anuran species belonging to two Families (Bufonidae and Ranidae) exist in study area. This paper illustrates distribution of all the recorded species for better knowledge of their biogeographic existence and habitat preference in Sindh.

Keywords: Amphibians, Systematics, Diversity, Biogeography, Sindh, Pakistan.

1. INTRODUCTION

Present research was inspired by the glorious work of Khan, 1968, 1985, 1987, 2002, 2004, 2006, 2008, 2010 that motivated to record different amphibian species and their distribution in some main adjoining areas of Sindh Province.

Approximately 6,500 amphibian species are recorded worldwide (Frost, *et al.* 2006) amongst which 24 species contained in four families viz: Bufonidae, Megophryidae, Microhylidae, and Ranidae are reported from some areas of Pakistan (Khan and Ahmed, 1987; Khan and Mufti, 1994). Sindh has previously been studied by Kalsoom, *et al.* 2012a, 2012b, 2013a, 2013b which reported the existence of two amphibian species (*Hoplobatrachus tigerinus* and *Euphlyctis cyanophlyctis*) from Jamshoro and Matiari Districts and three amphibian species (*Hoplobatrachus tigerinus*, *Euphlyctis cyanophlyctis* and *Bufo stomaticus*) from District Larkana.

The previous work needed to be updated and expended; hence present study was designed for the new documentary of amphibian species and their random distribution in 14 districts of Sindh province, most of which are studied for the first time for amphibian diversity record.

2. MATERIALS AND METHODS

Fourteen districts of Sindh were surveyed thoroughly from January 2011 to December 2013 for collection of amphibians. The geographical information for all the studied districts is mentioned in (Table 1).

Table 1: Geographical area and Global positioning System of each Study Site

Study Sites	Area (2km)	GPS coordinates
Ghotki	6975	27°49'N 69°39'E
Kashmor	2592	28°26'00"N 69°35'06"E
Shikarpur	2512	28°00'N 68°40'E
Larkana	7423	27°33'36"N 68°13'35"E
Jacobabad	5278	28°16'48"N 68°25'48"E
Dadu	19,070	26°20'N 67°35'E
Jamshoro	11,517	25.43212°N68.263171°E
Hyderabad	3,198	25°15'N 68°45'E
Mirpurkas	2991	25°33'02N 069°00'11E
Sukkur	5165	27°40'N 69°30'E
Matiari	3035.142	25°36'00"N 68°26'24"E
Nawabshah	4,502	26°35'N 68°10'E
Badin	6,726	24°40'N 69°00'E
Tharparkar	19,638	24°44'24"N 69°48'00"E

All the study sites were land marked at distance of 20 square meters (2km) for better search of amphibians. Scoop net was used for capturing specimens and then collected and kept into aquarium until examined morphologically.

Morpho-metrical parameters including body weight, dorsal body color, ventral body color, dorsal patches pattern, mid-dorsal line present / absent, body length (snout-vent), fore limbs length, hind limbs

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length, head wide/narrow, snout wide/pointed, eye diameter, tympanum diameter, loreal shape, canthus shape, fingers pointed / not, fingers length, inter orbital space narrow / wide, tibio-tarsal articulation shape, toes blunt / pointed, web full / partial were measured by using Electronic Balance, Metric ruler and Divider. Authentic Taxonomic literature Boulenger, 1890; Smith, 1935; Minton, 1966; Das and Dutta, 1998; Dubois and Ohler, 1995; Khan and Baig, 1988; Khan, 2002, 2004, 2006, 2008, 2010 contributed in identification of amphibian specimens.

Each diverse specie collected from studied areas was preserved in formalin solution (Formaldehyde 10% + Water 90%) stored in glass jars separately containing Scientific Labeling and housed in Vertebrate Biology Laboratory of Department of Zoology, University of Sindh, Jamshoro. whereas same specimens of already preserved specie were released alive in the fields after morphological study.

3. RESULTS

Fourteen districts of Sindh were surveyed thoroughly from January 2010 to December 2012 for collection of amphibians. Total one thousand five hundred eighty (1580) amphibian specimens were captured from or near the ponds, ditches and river tributaries of study areas. The collected specimens were identified as four anurans including three species of Family Ranidae viz: *Hoplobatrachus tigerinus*, *Euphlyctis cyanophlyctis* and *Allopa hazarensis* and one species of Family Bufonidae i.e. *Bufo stomaticus* (**Fig. 1**). Geographical distribution of each species in sindh province is indicated by (**Fig. 2**). The systematics of all the recorded amphibian species is arranged here according to Khan, 2010.

Kingdom Animalia: Linnaeus, 1758.
Phylum chordata: Haeckel, 1874
Sub Phylum vertebrata: Cuvier, 1812

Class amphibia: Gray, 1825
Order Anura: Merrem, 1820
1. Family Bufonidae: Gray, 1825
Genus *Bufo*: Laurenti, 1768
Species *Bufo stomaticus*: Lutken, 1864
2. Family Ranidae: Rafinesque, 1814
a. Genus *Hoplobatrachus*: Peters, 1863
Species *Hoplobatrachus tigerinus*: Daudin, 1802
b. Genus *Euphlyctis*: Fitzinger, 1843
Species *Euphlyctis cyanophlyctis*: Schneider, 1799
c. Genus *Allopa*: Ohler and Dubois, 2006
Species *Allopa hazarensis*: Dubois and Khan, 1979

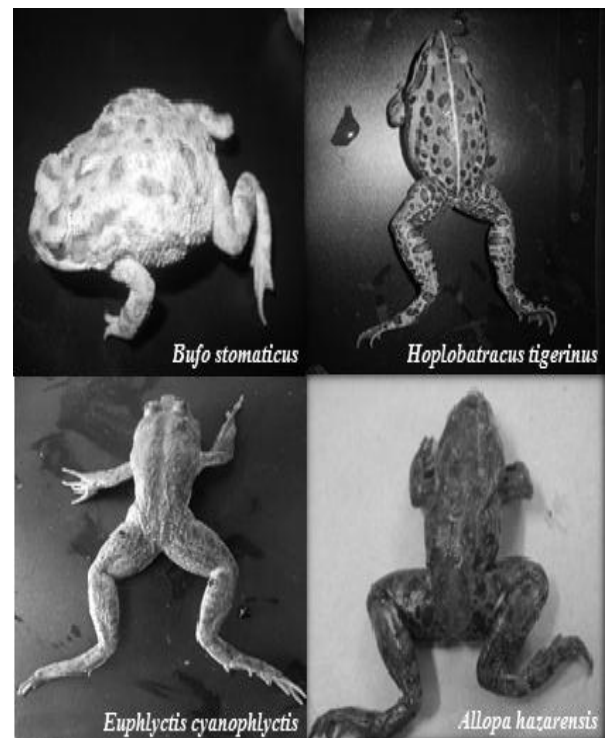


Fig 1: Amphibian diversity in Sindh, Pakistan.

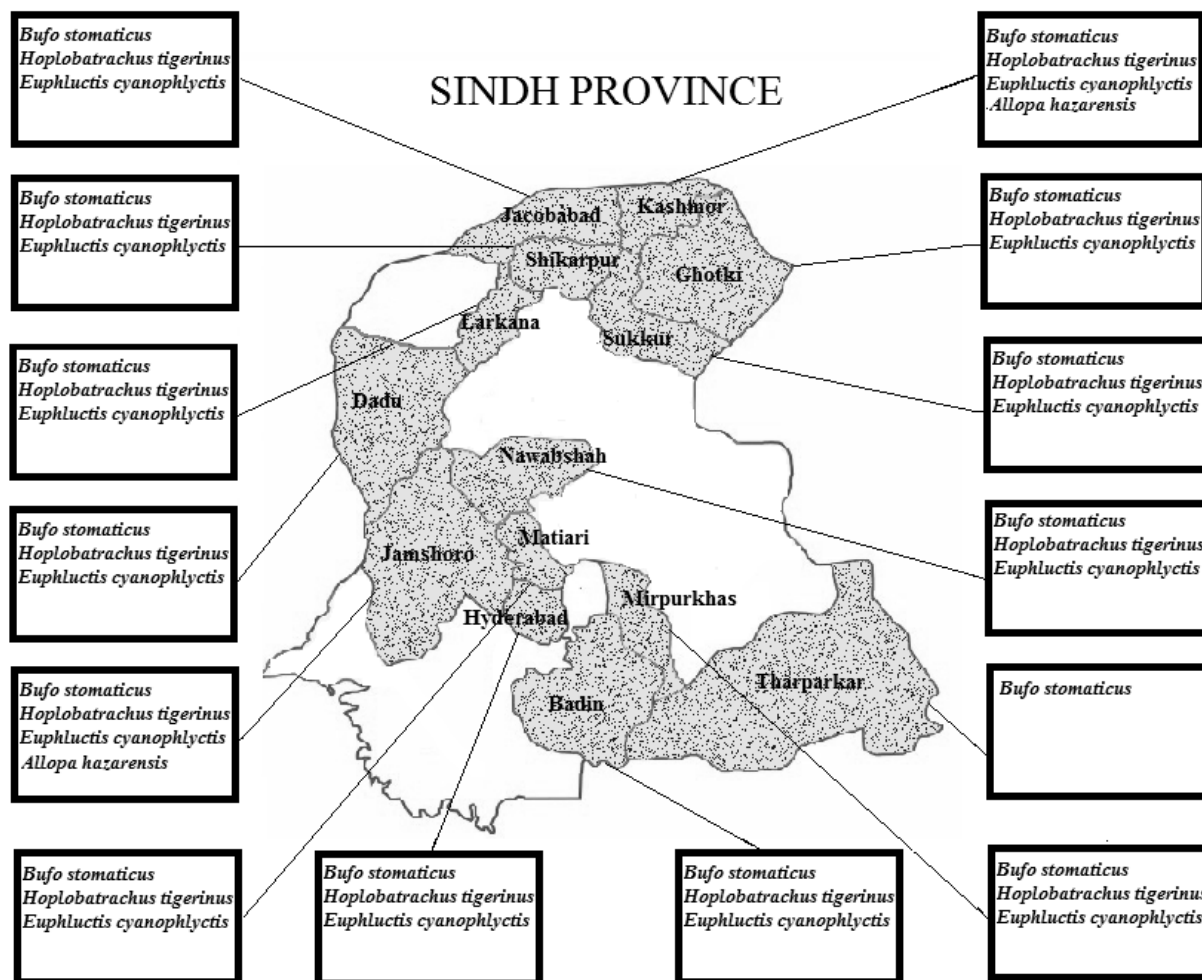


Fig. 2: Geographical distribution of Amphibians in Sindh, Pakistan

4.

DISCUSSION

Jacobabad, Kashmor, Ghotki, Sukkur, Dadu, Nawabshah, Hyderabad, Mirpurkhas, Badin and Tharparkar districts of Sindh Province were explored for the first time for present study however other districts like Larkana, Shikarpur, Jamshoro and Matiari have already been reported (Kalsoom, *et al.* 2012a, 2012b, 2013a, 2013b) and also researched for present study.

Only one species "*Bufo stomaticus*" was recorded from District Tharparkar because of its highly arid environmental condition and shortage of water reservoirs therefore this area might not be preferred by highly aquatic amphibians. But *B. stomaticus* being semi aquatic could still well survive in water shortage areas. However the areas in vicinities of Tharparkar viz: Badin, Mirpurkhas, Hyderabad, Nawabshah and Matiari were found to contain three amphibian species. District

Matiari and Larkana were recorded to contain same amphibian diversity as reported before (2013a, 2013b), new findings could not be achieved from these areas. *Allopa hazarensis* was recorded to exist only in the Jamshoro and Kashmor districts which are located at a wide distance from each other, but could not be found in areas between them (Fig. 1-2).

Sindh province is determined to contain poor amphibian diversity as compared to other areas of pakistan (Khan, 2010) this may result due to mass deforestation and habitat destruction in Sindh Province.

ACKNOWLEDGEMENT:

We are thankful to Dr. Muhammad Sharif khan from University of California for his help in identification of amphibian species and Higher Education Commission of Pakistan for Financial support to carry out present study.

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