

Diversity, Threats and Conservation Status of Amphibian in Pakistan: A Review

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Research Article

Abstract

The current study was conducted at the University of Gujrat during 2016. Amphibians are diverse group of vertebrates that play vital role in the ecosystem, there is co-evolutionary relationship between frogs and biodiversity of plants and animals, their lives are interlinked. Frogs eat mosquitoes, bio indicator, mostly used dissection animal, acts as biological pest control, help in medical advances, food for birds, fish and monkeys and their larvae filter drinking water. They look and sound cool, and kids like them. But the population of frogs decline rapidly due to human activities, habitat destruction, uses of pesticides and unawareness of people about the importance of frogs. Biodiversity of frogs is at greater rate of extinction. There is need of conservation to save the frogs as they are beautiful creature and pay their great role in ecosystem and food chains.

Keywords: Biodiversity of frog; Ecological indicators; Biological control; Threats; Conservation.

1. Introduction

Pakistan covers an area of 796,095 km² between longitude 60° 52' to 75° 22' towards East and latitude 24° to 37° towards North, from snowy mountains of highest peaks of world as Himalayas in the North and to dry coast of the Arabian sea in the South. Northern and western mountains are inhabited by frogs. Tableland of Balochistan and Sind and Punjab arid plains provide a wide range of habitats and co-inhabiting with wide biodiversity of species of amphibians and reptiles [1].

It is clear that a proper and systematic biodiversity conservation planning strategies are highly important for the improvement, maintenance and sustainability of any protected area (Foundation for Ecological Security) [2].

Therefore, protection of this beautiful diversity of life

is one of the most important keys to the maintenance of their services, which are beneficial to human being and health [3]. Study of flora and fauna through an ecological gradient in nature reserve was made by, study showed that wetlands had the maximum zoological diversity as results of adaptation force by natural actions, as socio-economic examination reveal that eco-tourism organization raise from public to private, to raise off greater benefits to the resident [4]. The numerical conclude that wetlands support 87% livings of the inhabitant, moreover also subsidize positively to welfare outside the area as 70% hydropower of the country rely on water regulation. Wetlands were the important source of a number of streams, added to their biological and ecological worth [5].

Amphibians are experiencing hardships due to numerous pressures, but their number decline so rapidly due to diseases, loss of habitat and alteration in habitats, fertilizer and pesticide stressors [6-8].

Amphibian declines are a basis for concern in their own right, but it might be an indicator of greater environmental problems with possibly systemic suggestions. Decline in amphibian population can be a tool indicator of imminent loss of freshwater and aquatic ecosystem services globally [9,10].

However, according to it is difficult to predict environmental dynamics, making forecasting the nutrients and energy flow cycles that are associated with pond-breeding amphibians between aquatic and terrestrial ecosystems even more challenging of risk [11].

2. Literature Review

Pakistan is generally an amphibian-poor country because of its prevailing dry environmental patterns. However, with the humid riparian conditions in the Indus Valley, torrent sand streams in the northern Himalayan sub-mountainous region and

the subterranean water channels in the western Balochistan highland there are 25 Amphibian species known from Pakistan [12-14].

The aridity and most dry conditions persisting in Pakistan makes it an amphibian poor land as compared to India and Southeast Asia. The insufficient humidity in plains is primarily due to weak trickle in the Indus River and its branches, but floods and streams in the sub-Himalayas and western mountains provide super habitat to resident species; sub-terranean karez channels in highland of Balochistan support and nourish local species. The 24 species of anuran in three cosmopolitan families Bufonidae, Microhylidae, Ranidae and wide ranging Tibeto-Himalayan family Megophryidae, have been recorded within ranges of Pakistan [15].

Recently advance study by in amphibian taxonomy is based on phylogenetic study of the living species of amphibians making the use of modern biochemical techniques linking morpho-anatomical characterization with DNA sequencing from mitochondrial transcription, etc. [16]. This advance methodology surfaces commonalities between taxonomic categories amalgamating and joining classical groups. It has changed the previous concept of taxonomic categories of pre and post belonging genera completely, that was based on comparative morphological character differences between taxa.

2.1 List of amphibians identified in Pakistan region

Amphibian species in Pakistan reported by and check list proposed by with changes is given below with their synonymic species history as given [13,16].

Family Bufonidae

Genus Bufo (Laurenti, 1768)

Bufo stomaticus (Lütkin, 1862)

Bufo livaceus (Blanford, 1874)

Genus Duttaphrynus Frost, 2006

Duttaphrynushi malayanus (Günther, 1864)

Duttaphrynus melanostictus hazarensis (Khan, 2000)

Genus Pseudepidalea (Frost, 2006)

Pseudepidalea latastii (Boulenger, 1882)

Pseudepidalea surda (Boulenger, 1891)

Pseudepidaea pseudoraddei (Mertens, 1971)

Pseudepidalea zugmayeri (Eiselt and Schmidtler, 1973)

Pseudepidalea siachinensis (Khan, 1997)

Pseudepidalea baturae (Stöck, 1999)

Family Megophryidae

Genus Stutiger (Theobald, 1868)

Scutigernyi ngchiensis (Fei, 1977)

Family Microhylidae

Genus Microhyla Tschudi, 1828

Microhyla ornata (Duméril and Bibron, 1841)

Genus Uperodon Duméril and Bibron, 1841

Uperodon systoma (Schneider, 1799)

Family Ranidae

Genus Allopa (Ohler and Dubois, 2006)

Allopa hazarensis (Dubois and Khan, 1979)

Allopaabar moachensis (Khan and Tasnim, 1989)

Genus Chrysopaa (Ohler and Dubois, 2006)

Chrysopaa sternosignata (Murray, 1885)

Genus Euphlyctis (Fitzinger, 1843)

Euphlyctis cyanophly ctiscyanophlyctis (Schneider, 1799)

Euphlyctis cyanophly ctisseistanica (Nikolsky, 1900)

Euphlyctis cyanophlyctismi crospinulata (Khan, 1997)

Genus Fejervarya (Bolkay, 1915)

Fejervarya limnocharis (Boie, 1834)

Fejervarya syhadrensis (Annandale, 1919)

Genus Hoplobatrachus (Peters, 1863)

Hoplobatrachus tigerinus (Daudin, 1802)

Genus Nanorana (Günther, 1896)

Nanorana vicina (Stoliczka, 1872)

Genus Sphaeroteca (Duméril and Bibron, 1841)

Sphaeroteca breviceps (Schneider, 1799)

2.2 Ecological concerns of frogs

Amphibian biodiversity decline is a cause for concern in their own right, but it might be an indication of great environmental problems with possibly systemic consequences.

Amphibian declines may be an indicator of the great loss of freshwater and aquatic ecosystem services all around the world [9,10]. The decline of amphibians also results in the loss of extensive ecosystem services, a concern that has received little attention. While it is a critical concern to threaten to the global amphibian loss, we should also know what we are losing in terms of related ecosystem services. By considering the important contributions of amphibians to ecosystems it can help prioritize and garner support for the conservation measures, and the living and nonliving factors associated with the potential loss of amphibian species can be predicted [17].

According to discuss several general characteristics of various valuable indicator species. Basically Indicator sampling should be easy, sensitive to stresses on the system, and answer to stress in an expected manner [18]. These responses should be anticipatory of an impending change in the whole ecosystem and they should be useful in predicting changes that can be averted by management. Indicators should provide useful information about changes to the whole system rather than a specific habitats or locations and have a known response to anthropogenic stresses and natural disturbances and changes and the response should have low variability in result.

When inspecting the pesticide impact on amphibian life, it is valuable that we make the changeover from the foundational laboratory studies to more natural and genuine experimental settings. For other pesticides, this shift has been made by doing experiments in outdoor aquatic mesocosms [19,20].

According to report on the status of species of amphibian around the world, found that 43% of these species are suffering from population decline, 32.5% are threatened and 122 species are probably extinct. Most of the losses are in recent years, having occurred since 1980 [21]. The also study that the rapidly declining species distribution in environment was non-random and species of neotropical area are badly affected due to lose of biodiversity [21].

Study as result of Alexander et al. [22] shows that moisture and temperature effect amphibian physiology, behavior and ecology because amphibians has to sustain moist skin for exchange of oxygen and ionic and temperature affects rate of metabolism. As a result, scientists have seriously focuses on the impacts of environmental factors in population decline of amphibians. There is lack of direct links between species population drops, mortality and climate change, connections between climate changes and other contributing factors are likely [23].

3. Conclusion

Study of different research paper reveals that the climate of Pakistan is hot in dry desert, temperate in northwest, cold in arctic in north that is not unfavorable for the growth of biodiversity of amphibians. Polluted water from home sewage, industrial pollutants in waste and agricultural runoff in the form of pesticides; inadequate natural freshwater resources, deforestation, soil erosion, desertification are the major causes of biodiversity loss. Total 22 species are reported in Pakistan out of which nine are endemic.

4. Recommendation

Man has no right to exterminate what Allah has created. Wetlands and protected areas should be reserved to support biodiversity of frogs on this earth. Pollution sources should be reduced to save such beautiful creature of nature to maintain natural ecosystem stability and maintaining of food chains all over the world.

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