RESEARCH ARTICLE

Functional contribution of bats in environment

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Manuscript details:	ABSTRACT
Available online on http://www.ijlsci.in ISSN: 2320-964X (Online) ISSN: 2320-7817 (Print) Editor: Dr. Chavhan Arvind Cite this article as: Ramteke AV (2016) Functional contribution of bats in environment, Int. J. of Life	Bats have evolved an incredibly rich diversity of behavioral, roosting and feeding habits. Different feeding habits of bats i.e. insectivorous, frugivorous, nectarivorous, omnivorous and carnivorous contribute its specific role towards the ecosystem. Out of all the bats around the World, approximately seventy percent are insectivorous, nearly thirty percent nectar or fruit eater, ten species are carnivorous, two species are fish-eater and only three species are the common vampire. Bats are all nature's most beneficial animal and flora and fauna are affected by their absence, threatening the entire ecosystem from rainforests to deserts. Today, these valuable mammals often go unnoticed because of their minimum roost sites. So it is very necessary to provide for their habitat protection conservation and monitoring of roosts.
<i>Sciences</i> , A6: 192-194.	amidst provider for their habitat protection, conservation and monitoring of roosts amidst providing all the relative information to local localities about their role in the maintenance of ecosystem stability. Keywords: Microchiroptera, Megachiroptera, Lingual Papillae, Ecosystem
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No Derives License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.	INTRODUCTION The papillary morphology of tongue of Megachiropteran as well as Microchiropteran bats plays an effective role in ecosystem services i.e. pollinating flowers, dispersing seeds and insect-pest suppression as well as Guano as a natural fertilizer. The tongue of Insectivorous bats (<i>Hipposideros speoris, Taphozous longimanus</i>) and frugivorous (<i>Rousettus leschenaulti</i>) is covered by filiform, fungiform and circumvallate papillae. Birt <i>et al.</i> , (1997) noticed the tongue of six species of Australian bats like <i>Syconycteris australis, Nyctimene robinsoni, Pteropus poliocephalus, P. alecto, P. conscipicillatus</i> and <i>P. Scapulatus</i> have adapted according to their habits. The tongue and papillae structure of this megachiropteran and microchiropteran bats supports their role in pollination, seed dispersal and insect-suppression. In this paper, we are to understand the role and contribution of bats contributed in ecosystem stability.

MATERIAL AND METHODS

Preserved material was used for this work. For histological study, the tongue was fixed in different fixative. Alcoholic Bouins, Aqueous Bouins and 10% formalin for 24 hours, then washed overnight in running tap water and

dehydrated by passing through different grades of ethyl alcohol, cleared in xylene and embedded in paraffin. The sections were cut at 5-7um with the help of rotary microtome. For routine histological observations were stained with Haematoxyline-Eosin method.

RESULT

In present research paper, we consider the role of megachiropteran frugivorous bat (Cynopterus sphinx and Rousettus leschenaulti) and microchiropteran insectivorous bats (Hipposideros speoris and Taphozous longimanus) on ecosystem. The tongue of insectivorous and frugivorous bats was covered by different types of papillae i.e. filiform, fungiform and circumvallate papillae. Anterio-dorsal surface of tongue of insectivorous bats specially consists of mixture of filiform papillae, i.e. scale-like, tricuspid and few pointed hook-like papillae. Variety of filiform papillae in insectivorous bats are modified for insectivorous feeding habits and provided a major value to ecosystem. Scale like papillae are the main characteristic feature of insectivorous bats because it is specially developed for catching insect easily during flight. Anterior tip of megachiropteran bat, *Cynopterus* sphinx and Rousettus leschenaulti was circular. A cluster of large sized mechanical tricuspid papillae encircled by smaller tricuspid papillae were observed near the anterior tip (Park and Hall, 1951). Numerous large sized fungiform papillae were scattered among filiform papillae. For frugivorous feeding habits the main role of large sized and number of mechanical tricuspid filiform papillae are important for grasping. Similarly, the numerous fungiform papillae are important for the taste sensation of varieties of food (Ramteke et al., 2012c). Fruit-eating bats have three circumvallate papillae and insectivorous bats have two circumvallate papillae (Son et al., 2000 and Gregorin 2003). Diversity of feeding habits like insectivorous, frugivorous, omnivorous and carnivorous are directly reflected on the morphological structure of tongue and arrangement of mechanical and gustatory papillae.

DISCUSSION

The present research paper is focused on the histological structure of lingual papillae of tongue of various feeding habits of bats and which may involved

in a number of beneficial services for environment. Ecosystem services depend upon the ecosystem and their constituted organism. But, highly modified environment constantly struggle to maintain the species of native flora and fauna because their diversity is very essential for the proper functioning of communities. Natural ecosystem throughout the world, have become increasingly threatened by human-generated factor such as Urbanization, mining, deforestation and pollution.

Bats also provide many ecosystem services i.e. food, guano (faecal matter of bat) for fertilizer and through contribution to medicine and culture. Two families of bats i.e. Phyllostomidae (New World bats) and Pteropodidae (Old World Bats) contain over 100 species of fruit eaters are responsible for dispersing seeds. Enormous seeds are dispersed by frugivorous bats throughout the forest each night (Ramteke et al., 2012b). The tropical almond tree, Terminalia catappa is an example of a bat-dispersed tree with many human uses. This tree is dispersed by *Cynopterus* bats throughout Asia. In India, where it provides shades, fuel-wood and edible nuts. Six plant families (Sapotaceae, Mrytaceae, Moraceae, Combretaceae, Febaceae and Sapindaceae) were particularly important to flying foxes in Samoa. Flower-visiting bats provide two important benefits to plants. They deposit large amounts of pollen and a variety of pollen genotypes on plant stigmas as compared with many other pollinators (such as insects). Bat, potentially is more reliable visitor and has the ability to carry large pollen loads at a considerable distances as dispersers in tropical and subtropical habitats throughout the world (Von. Helversen, 2003). Such cycle of rainforest regeneration might never take place without bats (BCI, 1989).

Insectivorous bats are the natural predators, which provide the benefits to the agro forestry by pestsuppression service (Ramteke *et al.*, 2012a). Out of the approximately 900 insectivorous bat species, the Brazilian free-tailed bat, *Tadarida brasiliensis*, are known to consume a wide variety of prey items (including 12 orders and 35 families). Moths (Lepidoptera) are their primary food source and other agricultural pests such as Corn earworm or cotton bollworm moth and tobacco budworm moth (Cleveland 2006). Bats by maintaining insect population provides an important ecosystem services to the farmers (Estrada and Coates-Estrada 2002). Highly adapted insectivorous bats such as *Miniopterus scheribersi fuliginosus* and *Pipistrellus savii* (Park and Lee 2009), *Rhinopoma kinneari* and *Scotophilus heathi* (Agarwal and Gupta 1982), were especially important for agricultural as well as Coffee plantation. Indian Horse-shoe Nose bat *Hipposideros speoris* is aerial insectivorous bat belong to family Rhinolophidae of sub-order Microchiroptera are successively migratory bat towards the open land space and increased the cultivation rate yield (Ramteke *et al.,* 2012d). Migratory process, greater adaptation gives super beneficial profit to the farmers (Benton 2003).

Guano (Faecal matter) of bats is used as fertilizer on agricultural crops due to its high concentration of nitrogen and phosphorous as primary limiting nutrients for most plant life. The percentage of synthetic pesticide also become minimized from farmers and safer the human health risks from harmful toxicity. So, protection of migratory pathways and critical feeding areas of migrants must be major conservation goals of environment. Only increased efforts are needed to educate government agencies, industries, international corporations and the general public awareness about the functional contribution of bats in environment.

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