



Mammalian Diversity Recorded along River Beas in Punjab, India

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Abstract: Present communication pertains to survey on mammalian diversity along the river Beas from 2018-19 to 2020-21 during autumn and spring seasons. Mammalian diversity has been influenced by habitat loss because of cultivated areas along the rivers and other anthropogenic activities. Twelve species of mammals have been identified comprising of one vulnerable and one near threatened species along the river Beas. There is need to restore, rejuvenate and protect wild habitats along the course of river Beas.

Keywords: River Beas, Mammalian diversity, Punjab

Large mammals are often described keystone species that maintain stability of ecosystem and have impact on biodiversity. Rapid agricultural expansion and economics growth has been instrumental in changing habitats, distribution pattern, range and diversity of mammals in India (Das et al 2006). In Punjab, there is intensive agriculture and substantial increase in area under crops in last five decades (Anonymous 2022). Habitat fragmentation and habitat loss has affected distribution of animal fauna in Punjab State (Dinesh et al 2021, Kumar et al 2021, Sethy et al 2021). The Beas River is a river in north India. It rises in the Himalayas in central Himachal Pradesh, India, and flows for some 470 kilometers before merging with the Sutlej River at Harike Wildlife Sanctuary, situated south of Amritsar in Punjab. The river flow through extensively cultivated landscape. Other than crop cultivation, the vegetation composition along the river banks comprises of different types of grasses, shrubs and indigenous trees. The habitat heterogeneity and a complex land-water association make a floodplain able to maintain disproportionately high biodiversity. In spite of its vital importance, the information on the mammalian biodiversity along river bank is incomplete. Keeping this in view, surveys were conducted from 2018-19 to 2020-21 to study mammalian diversity along River Beas.

MATERIAL AND METHODS

This study was conducted from 2018-19 to 2020-21 during autumn and spring seasons. Mammalian diversity was studied at different sites along River Beas bank at Dhillwan (31.5100°N, 75.3354°E) of district Kapurthala; Goindwal Sahib (31.3638°N, 75.1370°E), Chamba kalan (31.2083°N, 75.0093°E) and Harike (31.1689°N, 74.9428°E) of district Tarntaran; Talwara (31.9311° N, 75.8941°E) and

Tanda (31.6648° N, 75.6303° E) of district Hoshiarpur; Alampur (31.4963° N, 75.5306°E) and Bhet (31.7689°N, 75.5322°E) of district Gurdaspur. Mammalian species seen were photographed and identified (Atwal et al 1984). Rodent species were identified on the basis of characteristic burrow entrances; all the burrow entrances were closed in the evening and next day reopened and active burrows were counted. Number of active rodent burrows gives a rough estimate of rodent population (Singla et al 2022). Transect sampling method was used relying on visual counts for survey of large mammals (Buckland et al 2015). Mammalian species were identified as per the "Book of Indian Animals" by Prater (1971).

RESULTS AND DISCUSSION

During the study period in 2018-19, different species of rodents, wild boar, blue bull, black naped hare, Indian grey mongoose and palm squirrel were recorded. Stray animals like cows and dogs were spotted at locations during most of the observations at Talwara, Dhillwan, Goindwal Sahib and Harike. Survey of wheat crop after sowing during this period on the bank of River Beas in villages of district Tarntaran revealed the presence of three rodent species i.e., *Bandicota bengalensis*, *Mus booduga* and *Rattus melta*. Number of burrows ranged from 19.15 to 28.73/ha indicating high rodent population density. At pre-harvest stage, survey of wheat crop fields in districts Gurdaspur, Hoshiarpur, Amritsar and Tarntaran near riverbank revealed the presence of four rodent species i.e., *B. bengalensis*, *Tatera indica*, *M. booduga* and *R. melta*. However, at this stage, rodent population density was medium with number of rodent burrows ranging from 2.29 to 8.90/ha. Survey in paddy crop fields revealed very low rodent infestation and number of

burrows were only 1.89/ha. Foot prints and damage of Blue Bull, Wild Boar and Indian Hare were also noted in villages of district Gurdaspur, Amritsar and Hoshiarpur near river Beas. In 2019-20, four rodent species, blue bull and wild Boar were recorded near riverbank at different locations surveyed. In addition, Rhesus Macaque, Common Indian mongoose, Indian hare, feral horse, palm squirrel were also recorded. In 2020-21, survey of rodent diversity and damage in paddy fields near riverbank and along riverbank indicated presence of three rodent pest species. Population density was low to high rodent infestation in these fields. Number of burrows were less in monsoon season. Wild boar was also recorded in villages near river bank of district Gurdaspur, Tarntaran and Amritsar. However, Blue Bull was seen only near river bank at Dhilwan. In addition, Indian jackal and feral horses were also recorded (Table 1). During present study, survey of wheat and paddy crop fields near River Beas in villages of district Gurdaspur, Hoshiarpur, Amritsar and Tarntaran revealed medium to high population density of different rodent species like *B. bengalensis*, *T. indica*, *M. booduga* and *R. meltada* in wheat and low population density in paddy crop fields. Singla and Babbar (2010) also reported four rodent species with high rodent infestation in wheat crop fields in comparison to paddy in Punjab. Blue bull was also located along River Beas in villages of district Gurdaspur, Amritsar and Hoshiarpur. Earlier studies also reported that blue bull

prefers to live near water areas and in the habitat dominated by plants like *Sisso* (*Dalbergia sisso*), saguwan (*Tectona grandis*), eucalyptus, poplar, *Jamun* (*Eugenia jambolana*) (Aryal 2007). Indian jackal and feral horses were also recorded during the survey.

Mudappa and Choudhury (2016) had assessed status of Indian Grey Mongoose and added to IUCN list of Least Concern. Present investigation has confirmed that the sightings of Indian Grey Mongoose are becoming rare and rarer as per author s surveys carried out in last two and half decades. The population is declining at regional level in intensive agricultural scenario of Punjab State. Rhesus macaque was noted in groups of 2-5 individuals per sighting at Talwara and mostly in spring season. Farmers were also enquired about human-macaque conflict in crop fields which they replied in negative. Anand et al (2021) observed high feeding intensity of rhesus macaque on cultivated crops in human modified landscapes in North India. It was further mentioned to be positively correlated to the presence of deciduous forest stands in vicinity of crop fields.

Numerous hares (3 to 5 in numbers) were sighted in river side grass patches and sometimes in fallow fields along the River Beas at locations namely Goindwal Sahib in district Tarntaran, Talwara and Tanda falling in district Hoshiarpur. In the surveyed areas, natural enemies of hare like Mongoose and stray dogs were at Goindwal Sahib and Talwara.

Table 1. List of mammals recorded along River Beas

Species	No. of individuals per sighting	Locations	IUCN status	IWPA status schedule
Palm Squirrel <i>Funambulus pennanti</i> (Wroughton 1905)	2-5	Goindwal Sahib, Chamba kalan, Harike, Bhet, Talwara, Tanda	Least concern	IV
Soft Furred field Rat <i>Rattus meltada</i> (Gray 1837)	2-14 burrows/acre	Dhilwan, Talwara, Tanda	Least concern	IV
Indian Mole Rat <i>Bandicota bengalensis</i> (Gray 1835)	7-29 burrows/acre	Dhilwan, Goindwal Sahib, Chamba kalan, Harike	Least concern	IV
Indian Gerbil <i>Tatera indica</i> (Hardwicke 1807)	7-17 burrows/acre	Dhilwan, Bhet, Talwara, Tanda	Least concern	V
Common Indian Field Mouse <i>Mus booduga</i> (Gray 1837)	4-11 burrows/acre	Goindwal Sahib, Dhilwan, Bhet	Least concern	IV
Golden Jackal <i>Canis aureus</i> (Linnaeus 1758)	1-2	Chamba kalan, Harike	Least concern	II
Indian Grey Mongoose <i>Herpestes edwardsii</i> (E. GeoffroySaint-Hilaire 1818)	1-2	Goindwal Sahib, Chamba kalan, Harike, Bhet, Talwara	Least concern	II
Black Naped Hare <i>Lepus nigricollis</i> (F. Cuvier 1823)	3-5	Goindwal Sahib, Dhilwan, Tanda	Least concern	IV
Wild Boar <i>Sus scrofa</i> (Linnaeus 1758)	2	Dhilwan, Bhet, Tanda	Least concern	III
Rhesus Macaque <i>Macaca radiata</i> (E. Geoffroy 1812)	2-5	Talwara	Vulnerable	II
Blue Bull <i>Boselaphus tragocamelus</i> (Pallas 1766)	4-10	Dhilwan	Least concern	III
Feral Horse <i>Equus</i> sp. Linnaeus 1758	4-6	Talwara, Harike	Near threatened	I

Predator prey conflict between Indian Hare and Indian Mongoose was observed on one occasion at Talwara, where their chase in wild vegetation ended in hare disappearing in some burrow or natural pit. Golden Jackal was recorded moving adjacent to tall wild grasses along banks of River Beas in locations at village Chambakalan and at Harike falling in district Tarntaran. Jackal was noted solitary on two occasions in severe summer days in June month near the water line in riverine habitat. It was quick to disappear in more than 6 feet tall grasses on slightest disturbance. Farmers working in adjoining fields have narrated that they often hear howling of Jackals near wild vegetation edges for food searches. Srinivas and Jhala (2021) had mentioned that three species of wild canis occur in India which include two species of wolves namely Indian wolf (*Canis lupus pallipes*), Himalayan wolf (*Canis himalayensis*) and one species of Golden Jackal (*Canis aureus*). In India, Golden Jackal is protected under Schedule II (part II) of the Indian Wildlife (Protection) Act, 1972. The act provides complete protection for Schedule I and Schedule II species and heavy penalties are prescribed for any offence. As per IUCN list, grey wolves and golden jackals are considered as least concern (Boitani et al 2020, Hoffmann et al 2020). Workers stated that wild Canis species are getting threatened by increasing populations of stray dogs. Competition for food resources, shelter and anthropogenic threats might pose threat to wolf and jackal populations and irreversibly impact their survival (Jhala and Giles 1991, Chawla et al 2020). Feral Horse *Equus* sp. were observed in group of 4 to 6 in riparian zone along the River Beas at Talwara. One group was at Harike and these feral horses were noted grazing in river side area in proximity to small pools and islands. More than two groups were recorded at Talwara in summer season, there occurrence near river water pools and riparian zone seemed to be because of water requirement, grasses and isolated/undisturbed habitats. Changmail et al (2021) reported feral horse distributed in grasslands along riverine habitats and in wetlands dominated by different grass species in Dibru Saikhowa National Park in Northeast India.

Small populations of wild Boar inhabiting uncultivated areas along the river Beas at Dhilwan, Bhet and Tanda. There were incidences of wild boar damage to tuberous crops, sugarcane and cereal crops in study areas. Yasmita-Ulman et al (2020), observed that negative human-wildlife conflict interactions in agroforestry systems originates mainly from intolerance of land owners to crop depredations by small mammals like rodents and Indian hare. Diversity of mammalian species in India and their populations are under threat due to anthropogenic activities and human settlements. Intensive agriculture and urbanization are

proven threats to habitats of smaller mammals like civets, mongoose, jungle cats and wild boars (Michael and Joonu 2021, Singh et al 2021). Bhat and Bhat (2022) had reported 18 species of mammalian comprising two vulnerable, and three near-threatened species from Ghatiga on Bustard Sanctuary, Madhya Pradesh.

Twelve species of mammals were recorded inhabiting wild vegetation blocks/patches for sheltering/hiding and foraging purposes along River Beas. There are needed urgent and timely interventions to strengthen already existing wild vegetation blocks/small forests for conservation of mammalian diversity in River Beas Conservation Reserve.

CONCLUSION

Habitat niches inhabited by mammalian species along River Beas deserve attention of conservationists and ecologists for their restoration and rejuvenation involving all stakeholders.

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AUTHOR CONTRIBUTION

Dr Tejdeep Kaur Kler was Principal Investigator of River Beas Project under whose mandate work was done. Dr Tejdeep Kaur Kler and Dr B K Babbar carried out surveys, compiled data and wrote manuscript. Sachin Kumar involved in surveys and recording data. Dr Shammi Kapoor was convener of River Beas Project under which study was conducted and helped in experimental designing. Dr Priya Katyal was involved in field surveys and data compilation.

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