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Number of species and conservation status of Kingfishers: Alcedinidae of District Swabi Khyber Pakhtunkhwa, Pakistan

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ABSTRACT

Khyber Pakhtunkhwa (KPK) is province of Pakistan has diverse geography and climate that support a wide range of habitats ranging from green lush forest to north and arid plains to south. The Himalayan, Karakorum and Hindu Kush mountains supporting alpine meadows, subtropical and temperate forests. Indus River and Kabul River flow through this region that create wetlands, fertile valleys and grassy lands. These diverse habitats are hot spots of biodiversity and iconic for wildlife that support a rich verity of endangered and endemic flora and fauna. The present study was conducted from 2024 to 2025 in tehsil Razzar, district Swabi Khyber Pakhtunkhwa, Pakistan to investigate the Kingfishers fauna and ecological threats that decline their population in this region. We visited agriculture areas, wetlands, marshy places, ponds and local drainage of Adina, Yar Hussain and Ismailia of tehsil Razzar district Swabi on daily bases. We reported five different species: Common Kingfisher (*Alcedo atthis*), White throated Kingfisher (*Halcyon smyrnensis*), Black-Capped Kingfisher (*Halcyon pileata*), Pied Kingfisher (*Ceryle reduis*) and crested Kingfisher (*Megaceryle lugubris*). We observed the drastic decline in the abundance of all the species of Kingfishers studied across the sites with a rapid decline in Pied Kingfisher and slower decline in White-Throated Kingfisher. The population of Kingfishers in this region were decline near in future. The major causes of the decline are habitat loss, pollution, predation, food scarcity, climatic changes and anthropogenic activities. This study suggests that Kingfisher assemblages are declining along with the health status of the habitat. Urgent action is needed to help in designing and implementing effective management strategies for the sustainability of wetlands in the region.

Keywords: Diverse geography, arid plains, Adina, habitat loss, climatic changes, hot spots

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Introduction

The Kingfishers are the order Coraciiformes, family Alcedinidae, widely distributed in tropical regions of Asia, Africa, and Oceana but also found in America and Europe [1]. The family Alcedinidae (Kingfishers) is divided into three subfamilies, the water kingfishers (Cerylinae), the river kingfishers (Alcedininae), and the tree kingfishers (Halcyoninae) that contain 19 genera and 119 species [2]. The kingfishers different from other Avifauna as have short legs, long and pointed bill with large head, small stubby tail and bright colorful wings that shows little sexual dimorphism displayed by color, size and weight [3]. Kingfishers are predators and consumed a verity of preys including Fish, small frogs and toads, lizards, snakes, small rates, birds and invertebrates such as grasshoppers, crustaceans, annelids, worms, mollusks, spiders, centipedes, and worms. The river kingfishers mostly live in the banks of running waters i.e., river, streams, waterfalls and slow running pools that wait patiently for prey and dive on water sharply to secure the prey. Water king fishers are specifically hunt the fishes and generally found around lakes, marshes, and other still water bodies [4]. Above the water, they hovering for few minutes and focused on prey and then dive in water to capture it. The most abundant kingfishers are the tree Kingfishers (61%) that are least specializing in fishing and partially found an aquatic habitat that mostly found in trees and forest that consumed verity of prey. The trees Kingfishers making nest in the threes in small holes in trees, old unused woodpecker nest and cavity produced in termite nest [5]. The river and water kingfishers excavated 2-3 meter vertical tunnel in bank of rivers, ponds, and muddy hills. Kingfishers play vital role in the sustaining of the integrity of wetland ecosystems and act as key regulators of insects, caterpillars, frog, fish, reptiles, crabs and mollusks [6]. Healthy kingfisher's population indicating high quality of habitats sustaining fish population and invertebrate abundance. Anthropogenic activities rise the industrial development, agriculture, urbanization that destroyed the natural ecosystem by discharging untreated toxic wastes to wetlands [7]. King fisher fauna are affected by human interferences either directly or indirectly by habitat fragmentation, habitat degradation, pollution, prey depletion, urbanization and global climate change [8]. Gradual degradation and loss of wetland areas have adversely altered the distribution and richness of Kingfisher fauna as they are either completely or partly dependent on wetland microhabitats [9]. The climatic changes affected the population of Kingfishers and other birds i.e., Air and water temperature, humidity, pH, salinity, water depth, water quality, turbidity, vegetation cover, prey availability and predation pressure are some of the key contributors determining the assemblages of wetland birds[10]. The population of Kingfishers are also declined by the increase of predation i.e., other birds, snakes mangoes, varanus consumed their eggs and young one. The food scarcity and lake of the availability of food decline the pied Kingfishers because they specifically depends on fish population [11].

Pakistan is located in both Palearctic and oriental zoogeographic region and is a hot spot of bird's diversity due to its varied climate and landscape. Pakistan has wide range of habitats, wetlands, grassy areas, estuaries, lakes, streams, waterfalls and manmade water reservoir [12]. Khyber Pakhtunkhwa (KPK) is province of Pakistan has diverse geography and climate that support a wide range of habitats ranging from green lush forest to north and arid plains to south. The Himalayan, Karakorum and Hindu Kush mountains supporting alpine meadows, subtropical and temperate forests. Indus River and Kabul River flows through this region that create wetlands, fertile valleys and grassy lands [13]. The present study provide the guide line for researchers to investigate the Kingfishers fauna and their conservation and management of district Swabi Pakistan.

Materials and methods

Study area

The selected area of the present study was tehsil Razzar district Swabi Khyber Pakhtunkhwa, Pakistan. The Swabi district is subdivided into four tehsils i.e., Razzar, Lahore, Swabi and Topi. Razzar tehsil located from the north of Lahore tehsil, the south of district Buner, the East of district Mardan and the west of tehsil Swabi. We selected three villages of tehsil Razzar i.e., Yar Hussain, Adina and Ismailia.

Sampling

We visited the wetlands, marshy areas, local water drainage, eucalyptus forest, road sides, agriculture areas, municipal and grassy areas of Yar Hussain, Adina and Ismailia from 7.00AM-6.00PM. There are three large streams flowing in the boarder of Adina and Yarhussain and merging with each other in Ismailia village that provide ideal habitat for Kingfishers. We collected data by using two methods i.e., indirect and direct. In the direct method we visited the study area and collected the data every day from morning - evening while an indirect method we interviewed the farmers, wild staff, hunters, and elder peoples of the village. The number of Kingfishers species were recorded and identified through available standard Avifaunal Keys.

Threats and Conservation

We visited the selected area on daily bases and observed the feeding habit, nesting, predation, pollution, urbanization and the anthropogenic activities that affected the Kingfishers fauna of tehsil Razzar district Swabi Khyber Pakhtunkhwa, Pakistan

Results and discussion

Number of species

We reported five different Kingfishers species from Adina, Yar Hussain and Ismailia of tehsil Razzar district Swabi Khyber Pakhtunkhwa, Pakistan (Table 1, Figure 1).

Table 1: The Kingfishers fauna of tehsil Razzar district Swabi Khyber Pakhtunkhwa, Pakistan.

Sr. No.	Class	Order	Family	Subfamily	Species name	Common name
1	Aves	Coraciiformes	Alcedinidae	Alcedininae	*Alcedo atthis*	Common Kingfisher
2	Aves	Coraciiformes	Alcedinidae	Halcyoninae	*Halcyon smyrnensis*	White throat kingfisher
3	Aves	Coraciiformes	Alcedinidae	Halcyoninae	*Halcyon pileata*	Black capped kingfisher
4	Aves	Coraciiformes	Alcedinidae	Cerylinae	*Ceryle reduis*	Pied Kingfisher
5	Aves	Coraciiformes	Alcedinidae	Cerylinae	*Megaceryle lugubris*	Crested kingfisher

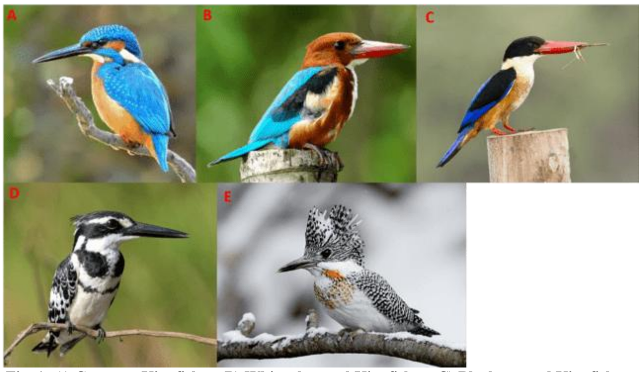

Fig. 1: A) Common Kingfishers B) White-throated Kingfishers C) Black-capped Kingfisher D) Pied Kingfishers E) Crested Kingfisher

Conservation issues and threats of Kingfishers

We observed the wetlands, agriculture areas, grassy barren land, eucalyptus forest and three large streams that flowing from Adina-Yar Hussain and merged in village Ismailia. We searched out the nests, eggs, young one and adults of Kingfishers. We observed common issues and threats that are given below.

Destruction of nests and nestlings

Kingfishers construct nests to make horizontal tunnels in wall of ponds streams and rivers or in tree holes or used the old woodpecker nest. Children and kids capture the nestlings, break their eggs and fill up the nest tunnels that cause mortality and decline their population. Due to urbanization the walls of river, roadsides and local drainage are cemented that Kingfishers cannot construct the nest (Figure 2)

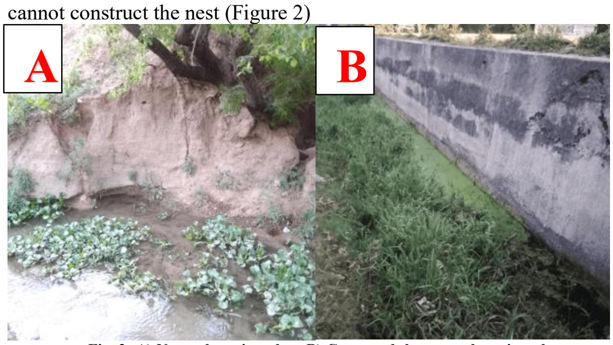

Fig. 2: A) Natural nesting place B) Cemented the natural nesting place

Predation

The most common threats to kingfisher fauna is predation. Other birds such as crow, eagle etc. and animals like Snake, Varanus and mangrooses consumed their eggs and young ones. The pied kingfishers are easily hunted especially when hovering on the surface of pond (Figure 3).

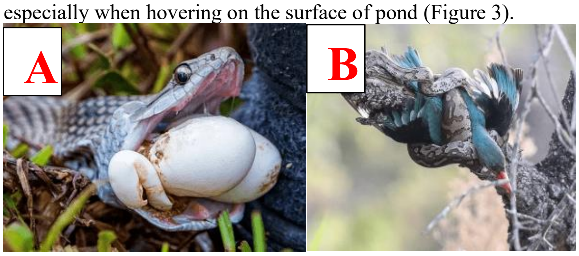

Fig. 3: A) Snake eating eggs of Kingfisher B) Snake capture the adult Kingfisher

Food availability

Pied kingfishers specifically feed on fishes and not consumed insects, frogs, worms and mollusks. Over fishing declined the population fish in river, ponds and streams that leads to decline the pied Kingfishers from this region (Figure 3).

Fig. 4: A-B) Feeding area of Kingfishers

Habitat loss

The population of district Swabi increased every year. The agriculture and barren areas covered by schools, hospital, houses and roads destroyed the nature ecosystem of this region.

Deforestation and cleaning of shrubs and bushes

In the selected area three to five years ago have eucalyptus forest, large barren area and many wetlands that provide opportunity for feeding and breeding grounds to Kingfishers. The forests were removed, the shrubs and bushes were cut and converted to agriculture land. The marshy areas and wetland were filled from soil for construction of houses.

Fig. 5: A-B) Deforestation leads to habitat loss

Trapping

The fish farmer trapped the Kingfishers and kill it to protect from fish hunting which cause to decline Kingfisher fauna in this area. Illegal trapping, shooting and hunting was also reported as threats to other species in the area.

Natural disaster

Heavy rain fall, strome and flood can also kill the kingfishers and destroyed their eggs that lead to decline their population.

Natural Died

Infertility of eggs and nestling mortality were reported in both common kingfisher and white throated kingfishers during the present study.

Pollution and increase of air temperature

Industrial and agriculture wastes can pollute the water of wetland that is a common threat to Kingfishers. Global warming and greenhouse effect increased and raise the air temperature which have negative impact on Kingfisher fauna in this region.

Conclusion

The present study was conducted from 2024 to 2025 in tehsil Razzar, district Swabi Khyber Pakhtunkhwa, Pakistan to investigate the Kingfishers fauna and ecological threats that decline their population in this region. We reported five different species: Common Kingfisher (*Alcedo atthis*), White throated Kingfisher (*Halcyon smyrnensis*), Black-Capped Kingfisher (*Halcyon pileata*), Pied Kingfisher (*Ceryle reduis*) and crested Kingfisher (*Megaceryle lugubris*). We observed the drastic decline in the abundance of all the species of Kingfishers studied across the sites with a rapid decline in

Pied Kingfisher and slower decline in White-Throated Kingfisher. The major causes of the decline are habitat loss, pollution, predation, food scarcity, climatic changes and anthropogenic activities.

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