

BIRDS (CLASS AVES: LINNAEUS, 1758) OF INDUS RIVER DELTA, SINDH, PAKISTAN

DHANI BUX MASHORI

Department of Zoology, University of Sindh, Jamshoro, Pakistan.

KALSOOM SHAIKH *

Department of Zoology, University of Sindh, Jamshoro, Pakistan.

*Corresponding Author Email: kalsoom.shaikh@usindh.edu.pk

ABDUL REHMAN SHAIKH

Department of Zoology, University of Sindh, Jamshoro, Pakistan.

ALI RAZA SOOMRO

Government Degree College K.N. Shah, Sindh, Pakistan.

GHULAM MURTAZA MOROOJO

Department of Zoology, University of Sindh, Jamshoro, Pakistan.

SHAKEELA ABRO

Department of Zoology, University of Sindh, Jamshoro, Pakistan.

SABA SOOMRO

Department of Zoology, University of Sindh, Jamshoro, Pakistan.

Abstract

Birds have diverse forms, fascinating appearance and peculiar distribution and they are beauty of wetlands along with ecologically and economically beneficial. Indus river delta is an important wetland and prominent abode to variety of avifaunal species that are unknown to the world. For discovering avifaunal diversity and their status, we explored the world's 5th largest delta that lies in Sindh province of Pakistan. Altogether 15 avifaunal species are recorded belonging to genera: *Phalacrocorax* (Brisson, 1760), *Himantopus* (Linnaeus, 1758), *Galerida* (F. Boie, 1828), *Larus* (Linnaeus, 1758), *Phoenicopterus* (T. Forster, 1817), *Sternula* (F. Boie, 1822), *Pluvialis* (Brisson, 1760), *Mycteria* (Linnaeus, 1758), *Vanellus* (Brisson, 1760), *Accipiter* (Brisson, 1760), *Calidris* (Merrem, 1804), *Limosa* (Brisson, 1760) under families: Accipitridae, Alaudidae, Ardeidae, Charadriidae, Ciconiidae, Laridae, Phalacrocoracidae, Phoenicopteridae, Recurvirostridae and Scolopacidae. These species are reported for the first time from Indus River Delta. The conservation status of majority of species is of Least Concern (LC), but few species are declared as Near Threatened (NT) by the International Union for the Conservation of Nature (IUCN).

Keywords: Avifauna, Diversity, Conservation, Wetland, Sindh.

INTRODUCTION

Indus River is one of the longest rivers in the world. It rises from Tibet Region of China at an elevation of approximately 18,000 feet, later it joins numerous tributaries of which first major tributary that it joins is the Zaskar River. The Indus River is then joined by its notable tributary the Shyok River and is then fed by mighty glaciers on the slopes of the Karakoram Range, the Nanga Parbat massif, and the Kohistan highlands. The Shyok

river, Shigar river, Gilgit river, and other streams carry glacial meltwater into the Indus. Astor River, joins Indus river as a left-bank tributary and Indus river then meets Kābul River joins the Indus just above Attock. After receiving the waters of the Punjab Rivers, the Indus becomes much larger, and near Tatta the Indus branches into distributaries that form a delta and join the sea at various points south-southeast of Karachi. The delta covers an area of 3,000 square miles (7,800 square km) or more (and extends along the coast for about 130 miles (210 km)). The uneven surface of the delta contains a network of existing and abandoned channels. The Indus delta has elongated protruding distributaries and low sandy beaches.

The Indus River Delta forms at the site where the freshwater of Indus River flows into the marine water of Arabian Sea. It lies mostly in the southern Sindh province of Pakistan, however it has a small portion lying in the Kutch Region of the western tip of India. The delta covers an area of about 41,440 km², and is approximately 210 km (130 mi) across where it meets the sea, though its active part is approximately 6,000 km² in area (Altaf, 2005). It is world's 5th largest delta system and consists of 7th largest mangrove forest system of the world (Coleman et al., 2008). This delta embraces world's largest arid mangrove forests and a huge biodiversity. The climate of delta is dry as it receives the rainfall between 25 and 50 centimeters in a year (Anthony et al., 1997).

Indus River Delta creates a complex system of habitats such as swamps, mudflats, creeks, estuaries, marshes and mangroves forests for variety of avifauna, that prefer to dwell here as migratory or even resident. This is an important abode for migratory water birds and also preferred by the permanent resident bird species. This area is rich in fish diversity represented by *Channa marulius*, *Barilius modestus*, *Clupisoma naziri* and *Rita rita*. Due to harboring huge biodiversity, the Indus river Delta was designated as a Ramsar Wetland in 2002 (Coleman et al., (2008).

Considering the international importance of Indus River Delta, we aimed to delve into avifaunal diversity that's dependent on this delta for its life support system.

MATERIAL AND METHODS

At the coordinates of 24.65°N 67.30103°E: 24.65°N 67.30103°E the Indus river delta lies with area of about 16,000 square miles (41,440 km²), and is approximately 130 miles across where it meets the sea.

Surveys were conducted from January to December, 2021 in and around the wetland from early morning to late evening (morning, 06:00– 10:00hr to evening, 17:00– 20:00 hr) for maximum sighting of birds using a pair of binoculars (Model: 133450, Bushnell).

The scientific literature used for the methodology of surveys and identification of species include: (BirdLife International, 2019, 2017, 2012; Clements, 2007; McCaffery et al., 2010; Jonsson, 1996); Boyd, 1987; Jobling, 2010; Harrison, 1966; Jobling, 2010; Dunning, 1992; Rookmaaker & Pieters, 2000; Ali, 1993; Amat et al., 2011; Hancock & Kushlan,

2010; Sangster et al., 2002; Symons, 1917; Hayman et al., 1986; Saini, 1972; Sundar, 2006; Jha, 2002.

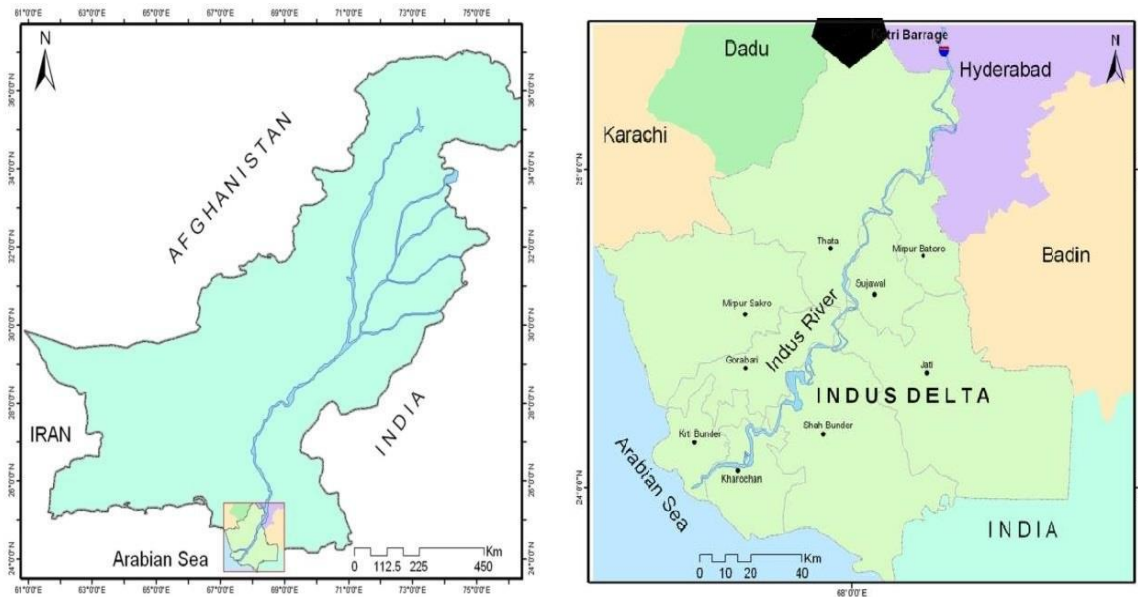


Figure 1: Map of Indus river delta

RESULTS AND DISCUSSION

From the wide Ramsar wetland “Indus River Delta” (Figure 1), flocks of 15 diverse avifaunal species: *Limosa Limosa* (Linnaeus, 1758), *Limosa lapponica* (Linnaeus, 1758), *Himantopus himantopus* (Linnaeus, 1758), *Larus cachinnans* (Pallas, 1811), *Galerida cristata* (Linnaeus, 1758), *Phalacrocorax carbo* (Linnaeus, 1785), *Phalacrocorax roseus* (Pallas, 1811), *Egretta garzetta* (Linnaeus, 1766), *Calidris minuta* (Leisler, 1812), *Calidris temminckii* (Leisler, 1812), *Sternula albifrons* (Pallas, 1764), *Mycteria leucocephala* (Pennant, 1769), *Pluvialis fulva* (Gmelin, 1789), *Vanellus indicus* (Boddaert, 1783) and *Accipiter badius* (Gmelin, 1788) were recorded (Figure 2-3). Nine of these species are Migratory birds, while their conservation status and feeding habit is elaborated in Table 1.



Figure 2: (A) *L. limosa* (B) *L. lapponica* (C) *H. Himantopus* (D) *L. cachinnans* (E) *G. cristata* (F) *P. carbo* (G) *P. roseus* adult (H) *P. roseus*



Figure 3: *E. garzetta* (J) *C. minuta* (K) *S. albifrons* (L) *M. leucocephala* (M) *C. temminckii* (N) *P. fulva* (O) *A. badius* (P) *V. indicus*

Table 1: Status of avifaunal species of Indus River Delta.

Scientific Name	Common Name	Family	Order	Status on IUCN Red List	Status as Migratory/Resident	Diet
<i>Limosa Limosa</i>	Black-Tailed Godwit	Scolopacidae	Charadriiformes	NT	Migratory	Omnivore
<i>Limosa lapponica</i>	Bar-tailed Godwit	Scolopacidae	Charadriiformes	NT	Resident	Omnivore
<i>Calidris temminckii</i>	Temminck's Stint	Scolopacidae	Charadriiformes	LC	Migratory	Carnivore
<i>Calidris minuta</i>	Little Stint	Scolopacidae	Charadriiformes	LC	Migratory	Carnivore
<i>Himantopus himantopus</i>	Black Winged Stilt	Recurvirostridae	Charadriiformes	LC	Migratory	Carnivore
<i>Galerida cristata</i>	Crested Lark	Alaudidae	Passeriformes	LC	Resident	Omnivore
<i>Larus cachinnans</i>	Caspian Gull	Laridae	Charadriiformes	LC	Migratory	Carnivore
<i>sSternula albifrons</i>	Little Tern	Laridae	Charadriiformes	LC	Resident	Carnivore
<i>Phalacrocorax carbo</i>	Greater Cormorant	Phalacrocoracidae	Suliformes	LC	Migratory	Carnivore
<i>Phoenicopterus roseus</i>	Greater Flamingo	Phoenicopteridae	Phoenicopteriformes	LC	Migratory	Omnivore
<i>Egretta garzetta</i>	Little Egret	Ardeidae	Pelecaniformes	LC	Migratory	Carnivore
<i>Pluvialis fulva</i>	Pacific Golden Plover	Charadriidae	Charadriiformes	LC	Migratory	Omnivore
<i>Vanellus indicus</i>	Red Wattled Lapwing	Charadriidae	Charadriiformes	LC	Resident	Omnivore
<i>Mycteria leucocephala</i>	Painted Stork	Ciconiidae	Ciconiiformes	NT	Resident	Carnivore
<i>Accipiter badius</i>	Shikra	Accipitridae	Accipitriformes	LC	Migratory	Carnivore

NT=Near Threatened, LC=Least Concern

The huge occurrence of diverse avifaunal species shows the importance of Indus River Delta as preferred habitat not only for permanent residence as well as migratory abode (Figure 1). The migratory birds of the Delta include: *Limosa Limosa*, *Calidris temminckii*, *Himantopus himantopus*, *Galerida cristata*, *Larus cachinnans*, *Phalacrocorax carbo*, *Phoenicopterus roseus*, *Egretta garzetta*, *Accipiter badius*. Meanwhile, *Limosa lapponica*, *Calidris minuta*, *Sternula albifrons*, *Pluvialis fulva*, *Vanellus indicus* and *Mycteria leucocephala* were recorded as permanent residents of this wetland (Figure 2-3).

Limosa limosa (Black-Tailed Godwit) was previously described as *Scolopax limosa*, as it was placed in genus *Scolopax* under family Scolopacidae (sandpipers) and order Charadriiformes (wader birds) (Clements, 2007). Later it was designated as member of genus *Limosa* representing three subspecies *L. l. limosa* (Linnaeus, 1758) (European black-tailed godwit), *L. l. islandica* (Brehm, 1831) (Icelandic black-tailed godwit) and *L. l. melanuroides* (Gould, 1846) (Asian black-tailed godwit). This species is reported from other areas of Pakistan, however its presence in delta is being reported through present study for the first time. The status of this national bird of the Netherland is determined in Indus River Delta as migratory; it comes to marshes especially for breeding. The conservation status of *L. limosa* is listed as Near Threatened as its population declines around 25% within last 15 years (Tucker & Heath, 1995).

Limosa lapponica (Bar-tailed godwit) represents five subspecies viz: *L. l. lapponica* (Linnaeus, 1758), *L. l. lapponica* (Linnaeus, 1758), *L. l. taymyrensis* (Engelmoer & Roselaar, 1998), *L. l. menzbieri* - Portenko, 1936), *L. l. anadyrensis*) and *L. l. baueri* (Naumann, 1836). This distinct species is Near Threatened (NT) worldwide and its population decline was first noticed in 1930. Therefore, this species is conserved under the Wildlife Act, 1953 (McCaffery et al., 2010).

Calidris temminckii (Temminck's stint) a small wader bird of family Scolopacidae under order Charadriiformes was recorded from the wetland as migratory bird that prefers to breed in bogs and marshes of Europe and Asia (Jonsson, 1996), however its worldwide occurrence is considered as Least Concern (LC). There is no documentation of this species to occur in Pakistan before present study (Figure 1). *Calidris minuta* (Little Stint) is another small wader bird of genus *Calidris* recorded from Indus River Delta, though its status is recorded as Resident with Least Concern (LC) status however its population status is decreasing in many areas. This species with Temminck's stint produces a hybrid that has been reported from the Netherlands. In the Delta, many flocks of Little Stint were observed on each survey. *C. minuta* a long-distance migrant is also a small wading bird and alike *Calidris temminckii* it also breeds in Europe and Asia (Jonsson, 1996).

The taxonomy of *Himantopus himantopus* (black-winged stilt) has remained contentious so far as it was considered as subspecies of *H. himantopus*. Its breeding habitats include marshes, shallow lakes and ponds. This species acts as migratory as well resident; populations that move to the ocean coasts in winter are migratory in nature, while those living in warmer regions are generally resident or short-range vagrants. The nature of this

species varies from place to place (Boyd, 1987; Jobling, 2010), however in Indus River Delta, Black Winged Stilt occurs as migratory bird with Least Concern (LC) status.

Galerida cristata was placed in the genus *Alauda* until establishment of new genus *Galerida* in 1821 (Harrison, 1966). The crested lark is categorized as Least Concern (LC) by the IUCN Red List of Threatened Species (Jobling, 2010), however in Europe it has been recorded to drastically decline since 1982 (Armstrong, 1973). This Passeriformes species stays in Indus River Delta as migratory bird though it is considered as non-migratory, and sedentary in some parts such as in Great Britain (BirdLife International, 2012). The *G. cristata* breeds in temperate regions including Eurasia and occurs in all arid environments and this bird is usually observed in cereal fields. This avifaunal species is sometimes recorded from small, sandy patches, docks and airfields (Hayman & Hume, 2001).

Larus cachinnans (Caspian gull) is recorded to breeds in Central Asia, however non-breeding range of the species is still uncertain. *L. cachinnans* winters in southwestern Asia from the Persian Gulf to northwestern India (Dunning, 1992). Its status at the delta was recorded as migratory, while its population status is considered as Least Concern (LC).

Sternula albifrons was described by the German naturalist Peter Simon Pallas in 1764 and gave the *Sternula albifrons* a binomial name *Sterna albifrons* (Rookmaaker & Pieters, 2000). Little Tern being strongly migratory sea bird prefers the coasts and waterways of Europe and Asia especially in their temperate and tropical areas. Its wintering destinations include subtropical and tropical oceans (Higgins & Davies, 1996). Their population status is stable as there are no any reports mentioning them as declining or vulnerable. Their status in Indus River Delta was also recorded stable throughout the period of study.

Phalacrocorax carbo (Greater cormorant) is a widespread member of the cormorant family "Phalacrocoracidae" belonging to order Suliformes (Ali, 1993). It dwells on the sea, and freshwater lakes as well as in estuaries where fish is well available (Heather & Robertson, 2005). The Pairs of *P. carbo* use the same nest site to breed year after year (Hauber, 2014). The status of this species is detailed in Table 1.

Phoenicopterus roseus was described by Peter Simon Pallas in 1811, though it was considered the same species as the American flamingo (*Phoenicopterus ruber*). But due to difference in colour of plumages of body, head, neck, and bill, the *P. ruber* and *P. roseus* are established as separate species. It is widely distributed of the flamingo family Phoenicopteridae of order Phoenicopteriformes however it has no subspecies (Amat et al., 2011). It lives as resident of shallow lagoons and mudflats.

Egretta garzetta (little egret) is a small heron species belonging to family Ardeidae (order Pelecaniformes). It represents three subspecies: *E. g. garzetta*, *E. g. nigripes* and *E. g. immaculate*. It dwells in variety of habitats including the lakes, ponds, canals, rivers as well as lagoons, marshes and all other kinds of wetlands such as flooded land. It mostly

dwells in mangrove parts in the coasts, swamp lands, reefs and sandy beaches as well as in mudflats (*Hancock & Kushlan, 2010*).

Pluvialis fulva often winters in Asia especially Southeast Asia and Australasia, and is very rare vagrant to Western Europe (Sangster et al., 2002). It is found more regularly on beaches and mudflats and resembles American Golden-Plover with many morphological characteristics. Its breeding plumage shows black belly and face with mottled white sides and under-tail coverts and a white stripe down the side of the neck that continues onto the sides of the chest and flanks. While, nonbreeding plumage is duller grayish-brown overall with a variable golden wash, often quite bright.

Vanellus indicus (red-wattled lapwing) is a wader bird also known as Asian lapwing or large plover. They make nest on ground birds as they are not perching birds like other lapwings (Symons, 1917). Being ground birds, their eggs and hatchlings remain threatened to wide variety of predators (Hayman et al., 1986). Their breeding sites include West Asia, and eastwards across South Asia. This species usually migrates in spring and autumn and spreads out widely in the monsoons (Ali & Ripley, 1980). *V. indicus* is reported to decline in its western range, however is abundantly distributed in almost all wetlands in South Asia (Saini, 1972).

Mycteria leucocephala (Painted stork) is a Near Threatened (NT) wader bird of family Ciconiidae of order Ciconiiformes. Its wide distribution is recorded from the plains of Asia. They do not prefer dry areas, dense forests and higher hill regions for dwelling. They preferred habitats include freshwater wetlands, irrigation canals and crop fields, especially rice fields (*Sundar, 2006*). They exhibit seasonal migration, however they usually reside permanently in most regions (Tiwary & Urfi, 2016).

Accipiter badius commonly known as shikra a small bird in the family Accipitridae. It has wide distribution in Asia and Africa where it is also known the little banded goshawk. The African forms of *A. badius* characterize a separate species as some distinct characteristics are found in their morphology. shikra bird has some similar morphological characteristics to other sparrowhawk species (Jha, 2002).

CONCLUSION

The Indus River Delta embraces a huge diversity of resident and migratory birds viz: *Limosa Limosa*, *Limosa lapponica*, *Himantopus himantopus*, *Larus cachinnans*, *Galerida cristata*, *Phalacrocorax carbo*, *Phalacrocorax roseus*, *Egretta garzetta*, *Calidris minuta*, *Calidris temminckii*, *Sternula albifrons*, *Mycteria leucocephala*, *Pluvialis fulva*, *Vanellus indicus* and *Accipiter badius* were recorded from the wetland. The status of all species except *Limosa Limosa*, *Limosa lapponica* and *Mycteria leucocephala* (Near Threatened) is Least Concern (LC). Indus River Delta sustains diverse avifaunal species of carnivorous and omnivorous birds.

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