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Population status and distribution of Ibisbill *Ibidorhyncha struthersii* (Vigors, 1832) (Aves: Charadriiformes: Ibidorhynchidae) in Kashmir Valley, India

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Abstract: A field study was carried out for the first time in Kashmir Valley to investigate the population status and distribution of Ibisbill. The initial reconnaissance surveys conducted across Kashmir Valley, indicated that the Lidder River in district Anantnag and Sindh River in district Ganderbal harbor populations of Ibisbill. During the intensive study carried out in the river Sindh from September 2017 to August 2018, the mean population size was maximum (36±8.63) at Stretch I and minimum (3±1.35) at stretch II. The seasonal population of Ibisbill was maximum (25.66±18.44) in the autumn and minimum (10±9.35) in the winter. The present study indicated that river Sindh provides an ideal habitat for Ibisbill, and was most widely used by the bird. We recommend further intensive research studies on the lesser known aspects of ecology and biology of this enigmatic species for long term conservation planning in the region.

Keywords: Distribution, Ibisbill, Kashmir, population status, Sindh.

Ibisbill *Ibidorhyncha struthersii* is a large wader inhabiting the shingle bed rivers of central Asia and Himalaya. It is distributed from the Pamirs and the Himalaya to the Tibetan Plateau with some populations occurring west to Turkistan and east of northern Myanmar (Ali & Ripley 1969; Pierce 1986). The ideal breeding habitat of the Ibisbill comprises rivers with shingle beds on either side at the altitudinal range of 1,700–3,400 m with intermittent stretches of sand and silt, boulders, cobbles, and pebbles (Ye et al. 2013). The Ibisbill is a resident bird of the Himalayan rivers and migrates to lower altitudes in winter. Until now there is very limited scientific information available on the global population status, distribution pattern, and general behavior of Ibisbill (BirdLife International 2020). In the Indian subcontinent, few natural history records mention that the distribution of Ibisbill is restricted to a few places in the Himalaya with localised records of its sightings (Grimmett et al. 2011).

Ibisbill occurs in small flocks occupying small islands and river beds in the Himalaya. The population size has not been quantified globally, however, China is known to have a population of less than 100 breeding pairs (Brazil 2009) and in Nepal Ibisbill population is estimated to be between 100–250 (Inskipp et al. 2016). There are no population estimates available for India, therefore the present study has been a pioneer attempt to understand, assess and generate baseline data on the current population status and distribution of the Ibisbill in Kashmir Valley.

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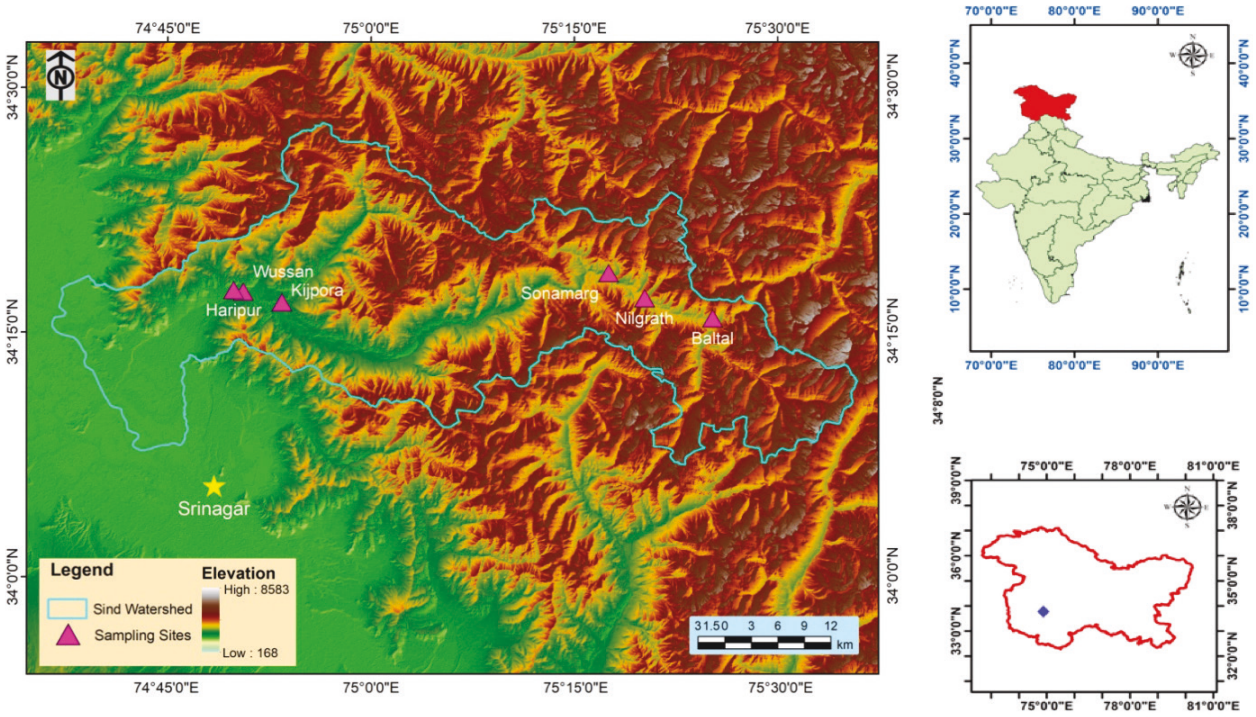

Image 1. Map of the study area.

Methods

Study area

River Sindh, located in district Ganderbal of Jammu & Kashmir at an average elevation of 1,619m is spread across a basin area exceeding 1,559km^2 (Dada et al. 2013). The river originates from Panjtarni snowfields (4,250m) and is further substantiated by the water flow from the Amarnath (5,003m), Kolahoi (5,425m), and Thajwas Glacier (3,000m) (Image 1). In the upper and middle reaches, river Sindh is a fast-flowing torrential river whereas in the lower reaches the river is calmer (Siraj 2018). The river comprises of small islands all along its course dominated by the presence of huge stones in the upper stretches and mainly of cobbles, pebbles, sand, and silt at lower reaches which serve as an ideal habitat for riverine birds including the Ibisbill.

Population monitoring

Preliminary surveys were conducted in all the major rivers of Kashmir Valley, viz., river Lidder (district Anantnag), river Sindh (district Ganderbal), river Vishew (district Kulgam), Madhumatti stream (district Bandipora) to assess the occurrence and distribution of Ibisbill in the valley following survey methodology by Shrubb et al. (1991) and Wilson et al. (2001). Ibisbills were detected in only two rivers; Sindh River and Lidder River with a very few sightings (n= 4 individuals) from the latter. Therefore, subsequent surveys were concentrated only on river Sindh from September 2017 to August 2018.

For the purpose of this study, river Sindh was divided into three stretches, viz., stretch I (Wayuil to Mammar), stretch II (Mammar to Kullan), and stretch III (Kullan to Baltal). For understanding the distribution pattern of Ibisbill in Sindh river, nine transects were laid randomly covering a total length of nearly 60km along the entire riverbank across the three stretches. For accomplishing the status assessment, six study locations (Appendix 1) were delineated along the entire riverbank based on the presence of Ibisbill and they were surveyed on regular basis (Image 1). A total of 72 surveys were conducted in all the four seasons; autumn (September to November), winter (December to February), spring (March to May), and summer (June to August). Observations were made using a pair of binoculars (Nikon Aculon A211 10x50) in the morning hours. During the surveys, individuals were counted at each location following the widely used line transects (Burnham et al. 1980; Bibby et al. 2000).

Results

Ibisbills were sparsely distributed in river Sindh from 34.287–34.258 N and 75.828–75.412 E. The bird occupied only the shingle river bed areas with small pebbles and cobbles, small boulders and moderate flow of water. It was generally present in flocks of 2 to

Table 1. Population status of Ibisbill during the year 2017–2018 in Sindh River.

Study site	Elevation (m)	Year	Autumn	Winter	Spring	Summer	Mean± SE
Stretch I	1,680–1,930	2017–2018	62	29	24	31	36.5±8.63
Stretch II	1,930–2,257	2017–2018	2	1	2	7	3±1.35
Stretch III	2,257–2,859	2017–2018	13	0	7	32	13±6.87

SE—Standard error

Table 2. Encounter rate of Ibisbill during the year 2017–2018 in Sindh River.

Study site	Year	Autumn	Winter	Spring	Summer	Mean± SE
Stretch I	2017–2018	1.47	0.69	0.57	0.73	0.86±0.20
Stretch II	2017–2018	0.04	0.02	0.04	0.16	0.07±0.03
Stretch III	2017–2018	0.30	0	0.16	0.76	0.30±0.16

SE—Standard error

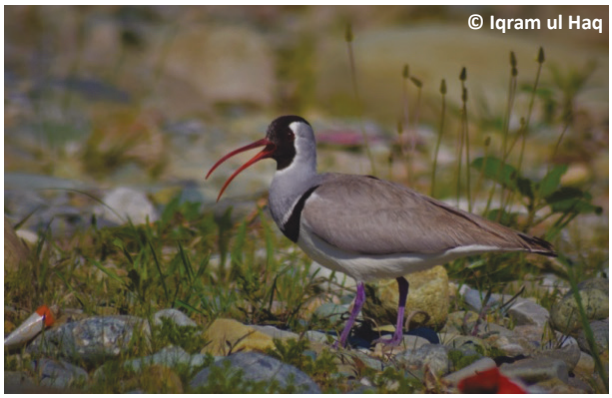

Image 2. Ibisbill adult in Sindh River.

Image 3. Ibisbill juvenile in Sindh River.

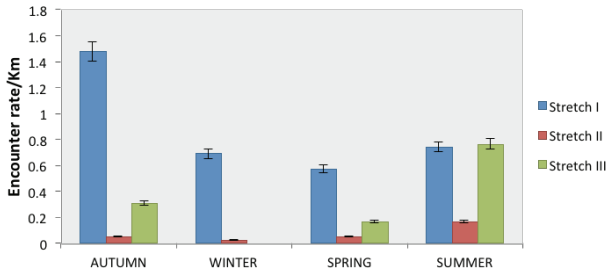

Image 4. Encounter rate in different seasons at all the three stretches in Sindh River.

5, however, in autumn season they were found in larger flock size (>10 birds). On the onset of breeding season, Ibisbill dispersed and the bird became territorial, with a single pair occupying a patch (ca. 50x100 m; n= 8) of the river.

The mean (±SE) population size of Ibisbill was found to be highest (36±8.63) at stretch I and lowest (3±1.35) at stretch II (Table 1). The maximum number (25.66±18.44 SE) of Ibisbill was documented in the autumn season, whereas least (10.33±9.35 SE) in the winter season in Sindh River. Representative images of adult and juvenile are provided in Image 2 and 3, respectively.

The Ibisbill encounter rate was higher (0.86 ± 0.20 individuals/km) at stretch I and lower (0.07 ± 0.03 individuals/km) at stretch II among all the four seasons (Table 2).

The seasonal encounter rate was higher (1.47 detections/km) in autumn at stretch I and lower (0.02 detections/km) at stretch II in winter (Image 4). As the bird does not exhibit sexual dimorphism, we were not able to calculate the male-female ratio in any of the seasons.

Discussion

Ibisbill typically inhabit freshwater shingle bed high altitude rivers of Himalaya (Ali & Ripley 1969) and central Asia (Knystautas 1996). The distribution of Ibisbill is sparse along the river Sindh, such pattern of distribution

can be attributed to the habitat specificity of the bird. Shingle banks with cobbles, pebbles and moderate flow of water appear to be the ideal habitat for birds as these habitat conditions provide the most suitable feeding and breeding grounds (Knystautas 1996). Similar observations have also been recorded by Pierce (1986) while observing the Ibisbill in Nepal. Moreover, Ibisbill can also be also found in agricultural fields near the river for feeding during summer (Haq et al. 2021).

In river Sindh, the average population of Ibisbill was highest at stretch I, as it had the ideal habitat characteristics best suited for the bird. The population of Ibisbill was lowest at stretch II due to the reason that stretch II had areas covered with large stones and increased flow of water and boulder pattern not perfectly suitable for the bird. Besides having large range in central Asia, the population of Ibisbill is low and the bird occurs only at restricted places owing to its special habitat requirement (Ye et al. 2013).

The size of flocks was differing according to the season and the altitude. The size of flocks ranged 2–5 individuals in nonbreeding season except for autumn in which the bird was found to occur in flock size of more than 10 individuals. In breeding season, the bird became territorial, with a single pair occupying a patch of the river. This possibly might be an ecological strategy used by the birds for their survival.

The congregation of the birds in autumn season at lower altitudes firmly indicates the altitudinal migration of the bird, presumably, due to limited availability of food resources and harsh weather conditions at higher elevations as they remain frozen or snow-covered during winter. The altitudinal migration of the Ibisbill in also supported by Shreshta & Lakhay (2000) who studied Ibisbill in Rapti River, Nepal. Kirby & Lack (1993) observed similar patterns of movement in other waders, viz., Golden Plovers *Pluvialis dominica* and Northern Lapwings *Vanellus vanellus*.

Our findings reveal that the river sustains a resident population of Ibisbill and provides baseline information on the status, distribution and occupancy of the bird in a limited number of study sites in the Kashmir Valley. The study also reports congregational behavior in Ibisbill for the first time which occurs in autumn season. We, therefore, recommend a more advanced and intensive studies on the ecology of Ibisbill in the region including use of satellite telemetry or geo tagging to better understand its movement patterns and behavioral aspects.

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Appendix 1. GPS coordinates of the six sites along the Sindh River.

	Study site	GPS coordinates
1	Haripur	34.287^{0}N, 75.828^{0}E
2	Wussan	34.281^{0}N, 74.853^{0}E
3	Kijpora	34.268^{0}N, 74.885^{0}E
4	Sonamarg	34.304^{0}N, 75.291^{0}E
5	Nilgrath	34.289^{0}N, 75.323^{0}E
6	Baltal	34.258^{0}N, 75.412^{0}E

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