SHORT COMMUNICATION

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EFFECT OF HABITAT DEGRADATION ON BREEDING WATER BIRDS AT KALLAR KAHAR LAKE DISTRICT CHAKWAL

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ABSTRACT

Degradation in the wetland ecosystem can change water bird species composition, particularly breeding fauna, by influencing habitat use for nesting and breeding activities. Kallar Kahar Lake is on the brink of drying. Eastern marshy area of the lake which had served as a perfect retreat for *Egretta garzetta* (little egret)*, Ardea cinerea* (grey heron)*, Ardea purpurea* (purple heron)*, Gallinula chloropus* (common moorhen) and *Porphyrio porphyrio* (purple moorhen) has now been completely dried. It has been heavily infested with dried *Phragmites sp*. offering roosting sites to *Corvus splendens* (house crows) and *Acridotheres tristis* (common myna). Reduced freshwater supplies into the lake, excessive growth of reeds and land encroachment are responsible for the current degraded state of the lake. The reeds cover had an estimated 25 and 13 nests per hectare of *Nycticorax nycticorax* (black-crowned night heron) and *Egretta garzetta* (little egret) respectively during April-May, 2009. Some wading birds such as *Himantopus himantopus* (black-winged stilt) were found breeding in the vegetation in the 2010.

Key words: Degradation, ecosystem, habitat, breeding fauna

INTRODUCTION

Habitat destruction is manifested in three different forms viz; degradation, fragmentation and outright loss (Hunter and Gibbs, 2007). In recent years habitat loss has attained a paramount importance for being the most severe threat to wildlife across the globe (Brooks *et al*., 2002 and Smith and Smith, 2003). Over 90 % of globally threatened birds and over 86 % of the other bird species are threatened mainly due to degradation and habitat loss which is attributed to the destruction of huge areas of natural habitats such as wetlands. Human activities such as over-grazing, deforestation, bush fires, mining, and urbanization are amongst the principle causes of habitat destruction (Kauzeni and Kiwasila,1994; Kideghesho *et al*, 2006 and Mwalyosi, 1992).

In comparison to terrestrial habitats, freshwater habitats and their associated species are more threatened (McAllister *et al*. 1997, Ricciardi and Rasmussen, 1999). Unfortunately, contribution from Asian countries in general and from Pakistan in particular has not been very impressive during recent past regarding inland wetlands, their associated wildlife and their conservation. The representation of scientists based in tropical Asia has been extremely low until recently (1992–2001) in international journals dealing with freshwater ecology and limnology. Scientists from tropical Asia have authored fewer than 2% of more than 4500 papers dealing with freshwater biology; 57% of them have been published in *Hydrobiologia*. Less than 0.1% of freshwater biology papers dealt with the conservation of biodiversity in tropical Asian fresh waters (Dudgeon, 2003). Likewise, only 7 % of the papers published in *Conservation Biology* form 1997 to 2001 had some relation to freshwater species and habitats with the main focus on amphibian decline and impacts of exotics on amphibians (Abell, 2002). In Pakistan, diversity of wetland dependent flora and fauna, such as water birds, is affected by habitat degradation due to siltation, deforestation and land reclamation (WWF, 2000).

Black-crowned night heron (*Nycticorax nycticorax*) inhabits fresh, brackish or saline waters with aquatic vegetation for roosting and nesting (del Hoyo *et al.*,1992), showing a preference for islands or predator-free areas for nesting sites (Kushlan and Hancock, 2005). Black-crowned night heron breeds during March – September at Lake Van Basin, Turkey. The species is known repair and re-use nests from the previous year. The number of eggs varies from 1 to 6 per nest (Durmuş and Adizel, 2010). In Pakistan, the species breeds in lakeside tree groves (Rawal Lake, Islamabad) and dense reed beds (Haleji Lake, Thatta). Little egret inhabits margins of shallow lakes, rivers, streams and pools, open swamps and marshes and may nest on the ground in protected sites and in reedbeds (Kushlan and Hancock, 2005). In Pakistan, little egrets are associated with large water bodies such as lakes and marshes. Black-winged stilt typically breeds in shallow freshwater and brackish wetlands with sand, mud or clay substrates (Fasola and Alieri, 1992).

Kallar Kahar Lake has always been a source of attraction for ornithological studies. Ali and Akhter (2005) recorded thirty different bird species from the lake. Ali (2007) reported 25 water bird species whereas

Azam *et al.,* (2008) and (2009) recorded 23 and 30 water bird species, respectively, from the lake. Rais (*in press*) recorded as many as 342 individuals of six species of ducks and 440 individuals of other 23 species of water birds during 2008-2009. Ali *et al* (2007) has described recent records of white headed ducks a globally endangered species in Pakistan.

MATERIALS AND METHODS

Study Site: The Kallar Kahar Lake is located in District Chakwal, Punjab Province at a distance of 25 km north to Chakwal city. It covers an area of 133.50 hectares, and is located between 32 46 30.31 North latitude and 72 42 23.80 East longitude at an altitude of 554 meters above sea level. Kallar Kahar is an **Inland permanent saline/brackish lake.** It is fed by numerous freshwater springs at the base of hills. Runoff from catchment areas is also a source of water to the lake. Although, the water of the springs is fresh but salt in the bedrock of the lake turns it brackish.

Study Design: The lake was regularly visited monthly from October 2008 to August 2009 and additional surveys were undertaken during February-April, 2010. Studied water birds include *Nycticorax nycticorax* (black-crowned night heron), *Egretta garzetta* (little egret) and *Himantopus himantopus* (black-winged stilt). Individuals of the selected species were counted on either side of lake's boating area (N 32 46 167, E 72 42 291) for two hours before the sunset using binoculars (8x38). Breeding evidences were gathered by surveying the vegetation along the edge of the lake using paddle boats during 2008-09 while vegetation area was observed through spotting scope (15x60) during 2010. Birds were identified by using field guides by Mirza (2007) and Grimmett *et al*. (2009). Cyber Shot (Sony), 8.2 mega pixel and15X zoom was used for taking pictures of the birds and habitat.

RESULTS AND DISCUSSION

Kallar Kahar Lake is on the brink of drying while its eastern side (Vantage point= N 32 46 383, E 72 42 887), approximately 100 hectares in area, has completely dried that had marshy area during February-March, 2009 and served as a perfect retreat for *Egretta garzetta* (little egret)*, Ardea cinerea* (grey heron)*, Ardea purpurea* (purple heron)*, Gallinula chloropus* (common moorhen) and *Porphyrio porphyrio* (purple moorhen). The area is now heavily infested with abundant dried *Phragmites* offering roosting sites to *Corvus splendens* (house crows) and *Acridotheres tristis* (common myna).

Main factors for degradation of the lake habitat include reduced freshwater flow into the lake, excessive growth of *Phragmites*, land encroachment and its subsequent conversion into shops, hotels and restaurants. Adverse effects of eutrophication such as deterioration in water quality, accumulation of peat layer along the edge of the lake, enormous growth of hydrophytes and reduction in the surface area of lake etc. are also evident at Kallar Kahar Lake. These factors have greatly altered the ecological conditions of the lake, thereby, affecting water bird species composition particularly the breeding species. It is believed that following a rainy season water level of the lake may replenish.

Table 1: Comparison of number† and breeding evidence of selected water bird species at Kallar Kahar Lake during 2009 and 2010

		February		March		April	
	Occurrence (in Salt Range)	**2009**	**2010**	**2009**	**2010**	**2009**	**2010**
Egretta garzetta (Little egret)	Resident	80×	06×	100*	10×	70*	08×
Nycticorax nycticorax (Black-crowned night heron)	Summer breeding	08×	00×	91*	32×	22*	13×
Himantopus himantopus (Black-winged stilt)	Summer breeding	08×	25×	16×	30*	10×	300*

†number represents maximum total count undertaken for two hours before sunset not an estimate of the population
*= Breeding evidence found; ×= Breeding evidence not found

Degradation in the wetland ecosystem can change water bird species composition, particularly breeding fauna, by influencing habitat use for nesting and breeding activities. During February-April 2010 black-crowned night heron and little egret were less abundant (Table 1) and no breeding evidence of these species was found whereas Rais *et al* (*in press*) reported a mixed-colony of breeding night herons and little egrets with 25 and 13 nests, respectively, per hectare of *Phragmites* reeds from Kallar Kahar Lake during April-May, 2009. Most of the breeding colony was confined to south-west and western side of the lake. However, wading birds such as *Himantopus himantopus* (black-winged stilt) were recorded in greater number during February-April 2010 than February-April 2009 (Table 1). Breeding of black-winged silt was observed as early as March, 2010 while the species did not breed during February-April 2009 (Table 1). This is attributed to the current degraded state of the lake, as conditions have changed at the lake. Saturation level in the *Phragmites* reeds has decreased

exposing mud suitable for nesting for the black-winged stilt which is not suitable for little egret and black-crowned night heron.

Invasive species had very high impact on wetlands over the last century across the world (MEA, 2005). Kallar Kahar Lake was found to be affected by invasive bird species such as *Corvus splendens* (house crows), *Acridotheres tristis* (common myna) and *Milvus migrans* (black kite) which are attracted to the garbage emanating from unregulated tourism practices and nearby hotels and restaurants dumped in the immediate vicinity of the lake. This has also lead to the homogenization of species diversity of lake ecosystem and surrounding cities and town. It is hoped that the lake would recover from present degraded condition after rainy season during July-August, 2010.

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