

# Association of Critically Endangered Bengal Florican with other bird species in two sites of Manas, Assam, India

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## ABSTRACT

Birds and animals group together for diverse benefits, including anti-predator, foraging, and reproductive advantages. Present study is aimed to know association of Bengal florican with other bird species found in two different habitats, one is natural and other human intervened based on association analysis in Manas National Park and understand potential benefits derived from these associations. This study was carried out in two sites one in natural habitat of Bengal florican Kuribeeel inside Manas National Park and other one in Koklabari Agricultural Farm outside Manas National Park which is man made habitat. Study was conducted from morning 0530 - 1000 hrs and afternoon 1500 hrs - 1700 hrs in 100 m radius circular plots, centre on the interactions of 50 m by 50 m regular grid in Bengal florican territories. Fourteen bird species found to associate with Bengal florican, of which nine species in Kuribeeel, and thirteen species of birds in Koklabari seed farm. From association analysis, it is found that Bengal florican had stronger interspecific associations with Indian peafowl in the natural habitat (Kuribeeel). However, in Koklabari seed farm Bengal florican was found to associate with Red wattle lapwing. In this study, association strengths of Bengal florican with other bird species follow different trends in the two study sites.

**Key words:** Bengal florican, Manas National Park, bird species, association, foraging, natural habitat

## INTRODUCTION

Many species of birds associate with other animals and birds in order to enhance their foraging opportunity (Alcock, 1997). Birds and animals group together for diverse benefits, including anti-predator, foraging, and reproductive advantages. In a non-reproductive, foraging context, group formation is thought to confer two main benefits – increased foraging efficiency, and decreased predation risk (Morse, 1977).

In birds and mammals, inter-specific groups or associations can be composed by closely related species or by species belonging to different Orders. It is frequently assumed that these associations occur because they provide the participants some evolutionary benefit over those that do not mix, and functional advantages are thus attributed to such associations (Morse, 1977; Berner and Grubb, 1985; Terborgh, 1990; Stensland, Angerbjörn and Berggren, 2003; Sridhar, Beauchamp and Shanker, 2009). Functional explanations usually fall within two major, non-exclusive categories: foraging advantages (individuals benefit from the mixed species association by summing up their capacities to locate patchy food resources; Krebs, 1973; Stensland *et al.*, 2003) and anti predator benefits (individuals benefit from the association by increasing their abilities to detect and deter predators; Terborgh, 1990; Sridhar *et al.*, 2009).

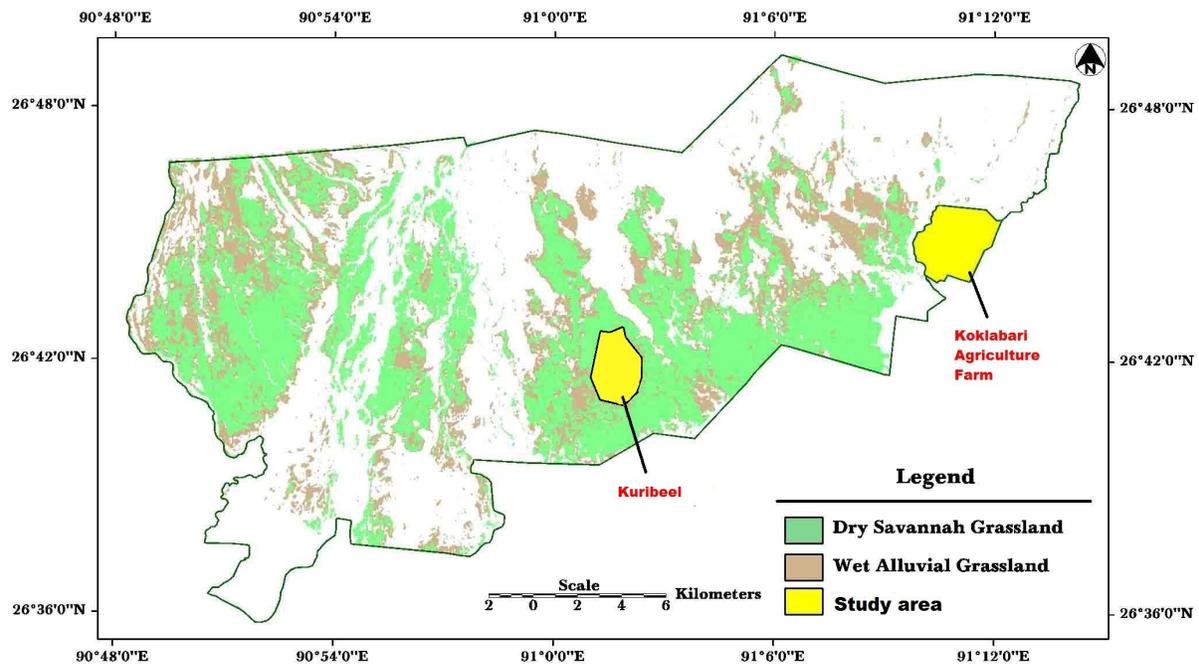
Bengal florican *Houbaropsis bengalensis* is a critically endangered grassland bird. In fact very limited information is available regarding Bengal florican association with other bird species. The present study

is aimed to know the association of Bengal florican with other bird species found in two different habitats, one is natural and other human intervened based on association analysis in Manas National Park and to understand the potential benefits derived from these associations. Bengal floricans are territorial during its breeding season and is easily detected by frequent territorial flight displays. The breeding season of Bengal florican starts from February and lasts till early part of July. During the breeding season the male Bengal floricans establish individual territories in the open areas in short grasslands. Therefore, the present study was conducted during the breeding season of Bengal florican.

## Study area

The study was carried out in two sites one in natural habitat of Bengal florican Kuribeeel inside Manas National Park and other one in Koklabari Agricultural Farm outside Manas National Park which is man made habitat (agricultural land). Manas National Park (26°35'-26°50'N, 90°45'-91°15'E) is the core area of Manas Biosphere Reserve with an area of 500 sq. km., located in Baksa and Chirang districts of the Bodoland Territorial Council (Figure 1). The National Park is surrounded by Reserve Forests to its east and west. The Manas National Park is located at the junction of Indo-Gangetic, Indo-Malayan and Indo-Bhutan realms and is a key conservation area in the *Jigme Dorji-Manas-Bumdeling* conservation landscape in the eastern Himalayan ecoregion (Wikramanayake *et al.*, 2001). It is also recognized as an Important Bird Area for its outstanding

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**Figure 1.** Map showing the study sites in Manas.

avifaunal diversity and significant population of some globally threatened species (Birdlife International, 2003). The grassland of Manas National Park are the second largest in the entire North-East India (Choudhury, 2003). Among the vegetation types, the wet alluvial grassland, which covers about 42.84% of the area of the Park, and one of the few intact patches left anywhere in the Indo-gangetic plain, deserves special mention (Lahkar *et al.*, 2006).

Koklabari Agriculture Farm (KAF) had been a habitat intervened by human interferences mainly agriculture and livestock grazing. KAF (N 26°45'15.6" E 091°11'38.3") is situated on eastern boundary of Bhuyanpara Range of Manas National Park. KAF was set up in the year 1971 and its total area is about 9 sq. km. A joint venture of Central Government and State Government, it was named as the Central Seed Farm and presently it is known as Koklabari Agriculture Farm (KAF).

## MATERIALS AND METHODS

Birds were surveyed between (February – July) 2009 and (February – July) 2010 in circular plots of 100 m radius, centre on the intersections of a staked 50 m by 50 m regular grid pattern in Bengal florican territories. Bird presence in each plot was determined during 10 minute observation period. All observations conducted from morning 0530 hrs to 1000 hrs and in the afternoon 1500 hrs to 1700 hrs. Bray–Curtis Cluster Analysis Single Link dendrogram was used to show the association of Bengal florican with the other bird species. The bird species were identified using key provided by Grimmett *et al.* (1998).

## RESULTS AND DISCUSSION

A total 14 species of birds found to associate with Bengal florican. Out of which, nine species in Kuribeel and

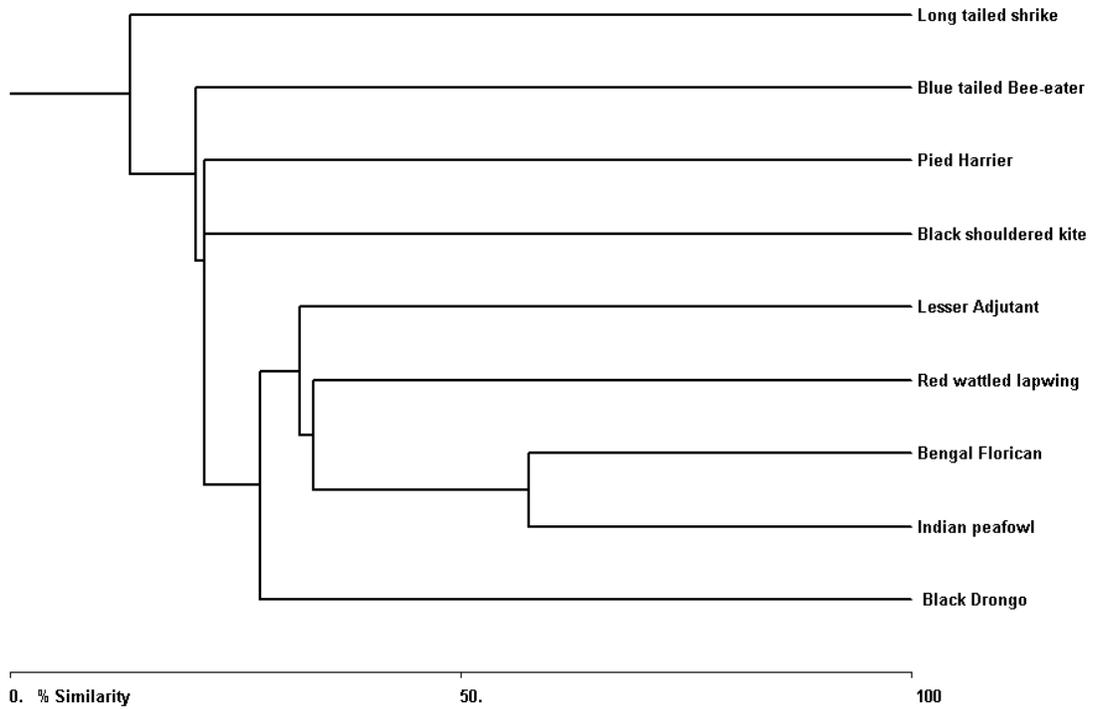
and thirteen species of birds in Koklabari seed farm. The bird species are as follows: Blue tailed bee-eater *Merops philippinus*, Indian peafowl *Pavo cristatus*, Common kestrel *Falco tinnunculus*, Purple heron *Ardea purpurea*, Black drongo *Dicrurus macrocercus*, Asian open bill *Anastomus oscitans*, Pied harrier *Circus melanoleucos* Greater adjutant *Leptoptilos dubius*, Long tailed shrike *Lanius schach*, Black shouldered kite *Elanus caeruleus*, Grey back shrike *Lanius tephronotus*, Lesser adjutant *Leptoptilos javanicus*, Cattle egret *Bubulcus ibis*, Red wattle lapwing *Vanellus indicus*.

In this study, the association strengths of Bengal florican with other bird species follow different trends in the two study sites.

From the association analysis, it is found that Bengal florican had, stronger interspecific associations with Indian peafowl in the natural habitat (Kuribeel) followed by Red wattle Lapwing and Lesser Adjutant Stork. On the other hand, in Koklabari seed farm Bengal Florican was found to associate with Red wattle lapwing followed by Black Drongo, Asian Open bill and Lesser Adjutant Stork (Figure 2 and 3). Bengal floricans are omnivorous and known to feed on various seeds, grain, tender shoots of grass and insects like grasshoppers, ants, beetles and even frogs. In burned areas, the Bengal florican is also seen eating burned seeds. (Brahma *et al.*, 2009). Moreover, the bird species that are found associated with florican the Red wattle Lapwing is omnivorous species, Lesser Adjutant Stork and Asian Open bill are carnivore where as Black Drongo is an insectivorous bird.

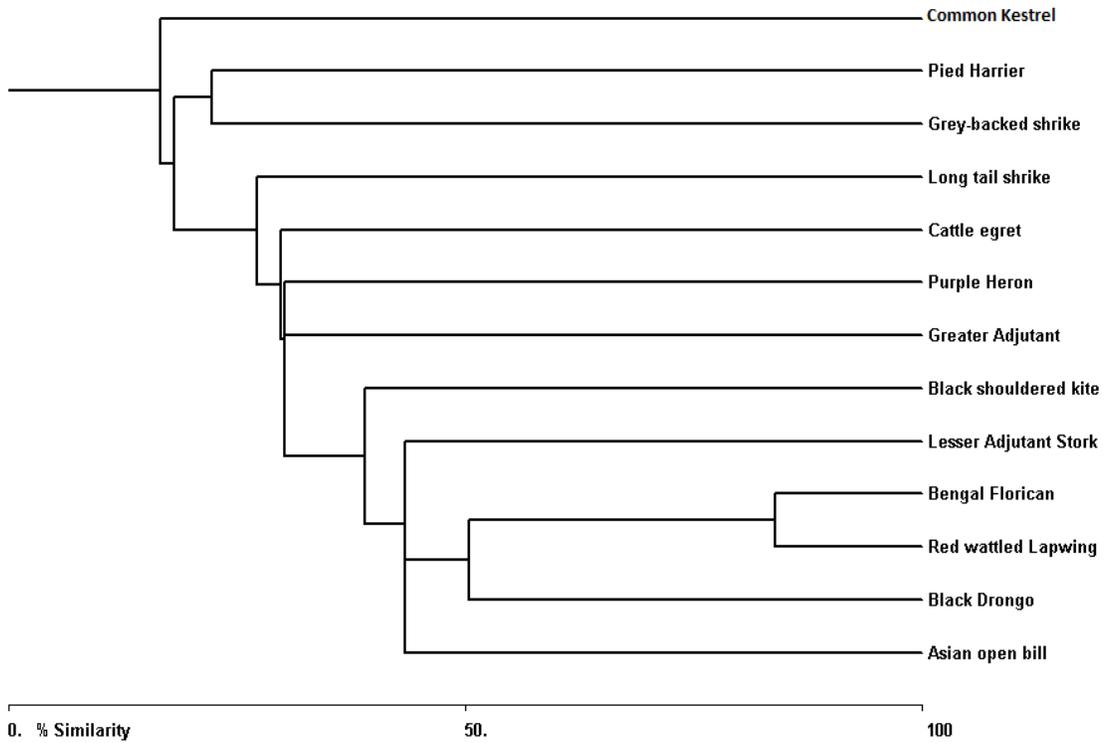
As for the foraging advantages, an animal in a mixed species assemblage could learn about the location of irregularly distributed food patches by watching the foraging activities of nearby hetero-specifics or by following them (Krebs, 1973; Giraldeau and Beauchamp, 1999). In the seasonally changing agricultural mosaic of sown, ploughed, stubble and fallow fields, associations of Bengal florican with Red wattle lapwing could enhance

Bray-Curtis Cluster Analysis (Single Link)



**Figure 2.** Association of Bengal Florican with other birds in Kuribeel.

Bray-Curtis Cluster Analysis (Single Link)



**Figure 3.** Association of Bengal Florican with other birds in Koklabari Agricultural Farm.

the predator risk as Red wattle lapwings are very vocal and starts calling with slightest of disturbance in the habitat. In addition, Indian peafowl were not found in the KAF as there are no roosting trees for them. Hence in absence of Peafowl which shows a close association of Bengal florican in Kuribeeel, Bengal florican shows strong association with Red wattle lapwing in KAF.

Although our results suggest anti-predator benefits are a likely explanation for these mixed-species associations. However foraging advantages could not be ruled out and that would require further investigation. In fact, other studies have highlighted that protection from predators is not always a sufficient cause for mixed-species flocking, and support the view that either increased feeding efficiency or predation protection or combination of both encourage animals to forage in mixed species groups (Berner and Grubb, 1985).

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