NOTEBOOK

If you go, I'll stay: nest use interaction between Asian Woollyneck *Ciconia episcopus* and Black Kite *Milvus migrans* in Nepal

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Introduction

Nest-site selection can determine the fate of altricial chicks such as those of raptors and storks. The Black Kite *Milvus migrans* is one of the most common birds of prey in Eurasia and Africa. It occupies habitats ranging from the completely natural to the fully urban and makes use of a wide variety of nest-sites (Ferguson-Lees & Christie 2001, BirdLife International 2020a); its diet includes carrion as well as live birds, fish, mammals, amphibians and invertebrates. The Asian Woollyneck *Ciconia episcopus* is one of the least studied storks in Asia. It is usually found near wetlands, including rivers, lakes, floodplains, marshes, jheels, paddyfields and flooded pastures; it feeds on small birds, fishes, amphibians and invertebrates and frequently nests on trees, but is known occasionally to use artificial structures (Hancock *et al*. 1992, Vaghela *et al*. 2015, BirdLife International 2020b). The two birds may be regarded as sympatric species, having similar feeding and nesting ecology. In the mid-hills of Nepal, Asian Woollyneck breeds from January to May (our ongoing study), which overlaps with the breeding season of Black Kite (Ferguson-Lees & Christie 2001). During our ongoing study of Asian Woollyneck we observed interesting interactions in nest use between these two species.

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Plate 1. Asian Woollyneck *Ciconia episcopus* on Nest 1, Argha, Arghakhanchhi district, western mid-hills of Nepal, 5 May 2017.

Plate 2. Black Kite *Milvus migrans* using the same nest in 2018. Red cloth was added to the centre of the nest but is not visible in this image, 15 April 2018.

Observations

Nest 1

In April 2017, an Asian Woollyneck nest was found at a height of 31 m in the bole of a 36 m tall Simal *Bombax ceiba* tree located by the Khakabesi River in Argha (825 m), Arghakhanchhi district, western mid-hills of Nepal. The nest was made of dry twigs, grasses and straw with green leaves at the centre, where the eggs were placed; two young fledged in May 2017. The following year, during our regular monitoring in April 2018, we found the nest occupied by a pair of Black Kite. The nest materials were the same, except for the addition of red cloth to the nest. We also observed a pair of Asian Woollyneck roosting in the same tree after 18h00 each day. No aggressive interactions were observed between the species. As our monitoring was focused on Asian Woollyneck we do not know the outcome of the Black Kites' breeding attempt. In April 2019, we continued our monitoring and saw to our surprise that the nest had been completely destroyed and another nest was being built by Asian Woollynecks 1 m above the old site, on a branch of the same tree. Two chicks successfully fledged from this nest.

Nest 2

In April 2018, we found another Asian Woollyneck nest, only about 900 m north of Nest 1 on the bank

Plate 3. A pair of Asian Woollyneck allopreening on Nest 2, 18 April 2018.

Plate 4. A new nest being constructed by Asian Woollyneck in 2019 to replace the original Nest 1, 15 June 2019.

Plate 5. Two Black Kites on Nest 2 in 2019. Plastic and paper can be seen both inside and outside the nest, 15 June 2019.

of the same river (854 m). It was built on a branch at a height of 29 m in a 32 m tall Mango *Mangifera indica* tree; three chicks were fledged successfully that year. Nesting materials were the same as used in Nest 1 by Asian Woollyneck in 2017. Then, in April 2019, Nest 2 was occupied by Black Kites, with white paper and plastic added in the centre of the nest.

Discussion

We discussed both nests with local people; they informed us that in 2018 three Asian Woollyneck eggs in Nest 1 were predated by Yellow-throated Martin *Martes flavigula*—a common resident in the area. The nest was abandoned by the storks soon after its predation but they returned only four days later. We assume that this four day period was the time when the Black Kites occupied the abandoned nest. The non-aggressive behaviour of the Asian Woollynecks at Nest 1 in that year may have been because they were unable to lay a replacement clutch. Nijman & Heuts (2000) described such situations as 'pay-off asymmetry' between the competitors, where the individual who values the resource more has greater motivation to fight for it: the Black Kites needed a nest for breeding in 2018. In 2019 the Asian Woollynecks needed the nest-site for breeding and could have defended it against the Black Kites if necessary, and may even have done so. The outcome of competitions depends on resource holding potential, which includes characteristics of birds such as large size, good body condition, or experience that gives an individual greater fighting ability (Lozano 1994). If they were the same pair of Asian Woollyneck that abandoned the nest in 2018, it is justifiable to change the position and height of the nest due to the risk of further predation. After a nest predation, some birds re-nest in areas with increased cover or increased height above the ground (Beckmann & McDonald 2016). The local people told us that the Asian Woollynecks were not seen at Nest 2 after June 2018, when they finished breeding. As a recently constructed road passes very close to this nest, they could have abandoned it due to disturbance (as has occurred at other nest-sites during our study). The Black Kites from Nest 1 might have re-located to Nest 2. Even if they are different pairs, our observation confirms that Black Kites will occupy abandoned nests.

At both nests taken over by Black Kites, they decorated the refurbished nest with anthropogenic materials—plastics, paper and red cloth. Such behaviour increases the conspicuousness of the nest and may serve as a warning to intruders, providing them with potential information such as the social dominance and fighting capabilities of the owners (Sergio *et al*. 2011, Canal *et al*. 2016).

Interspecific competition between sympatric species is determined by the availability of resources in a shared habitat (Dhondt 2012). Both these nest-sites are close to settlements, farmland and a river, which together are capable of providing sufficient food resources for both species. Within 1 km of the river, trees over 20 m tall are at a premium, which may compel the Asian Woollynecks to compete for a nesting site; the situation is different for Black Kites, which nest at lower heights. Nest-building is energetically and temporally costly (Collias & Collias 1985, Mainwaring *et al*. 2014), hence Black Kites tend to re-use old nests where possible; likewise, Asian Woollynecks normally re-use nests in successive breeding years, which limits the opportunities for Black Kites to take over their nests.

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