Journal of Asia-Pacific Biodiversity 12 (2019) 311–315

Contents lists available at ScienceDirect

Journal of Asia-Pacific Biodiversity

journal homepage: http://www.elsevier.com/locate/japb

Short Communication

Does predation pressure drive heronry birds to nest in the urban landscape?

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ARTICLE INFO

Article history:
Received 22 October 2018
Received in revised form
22 January 2019
Accepted 17 February 2019
Available online 23 February 2019

Keywords:
Breeding
Heronry
House crow
Predation
Urban ecosystem

ABSTRACT

Predation is an important selective force that determines breeding success in all animals. Animals adopt a range of antipredatory strategies to overcome predation pressure in the breeding site, which is also a major predation ground. Birds mitigate this pressure through parental care, colonial or group nesting, and selecting habitats that are predicted to hold less number and diversity of predators. Heronry birds' increasing use of urban habitats for breeding has been suggested as a measure to avoid predation pressure, despite quantitative support for this argument is lacking. We tested this hypothesis by comparing diversity, abundance, and frequency of predation attempts of birds of prey on heronries of wild (mangrove forest) and urban habitats. The house crow (*Corvus splendens*), brahminy kite (*Haliastur indus*), and black kite (*Milvus migrans*) were the major birds of preys in mangrove forests and urban areas. The predators partitioned the nest resources; the kites preyed the chicks, and the crows preyed the eggs. The abundance of avian predators and the frequency of successful predation of eggs and chicks were significantly lower in urban heronries compared with mangroves. Our results suggest that predation might be a reason for the birds to switch to urban habitats for breeding.

Introduction

Predation is one of the most important selective pressures that shape communities in almost all types of ecosystems (Caro 2005). Both plants and animals are susceptible to this selective force. Successful breeding is important for any species to maintain a healthy population. A good nesting site generally provides protection from predators and adverse climatic conditions. It also offers stable resources for nesting, breeding, foraging, and feeding (Thompson 1977; Beaver et al 1980; Gibbs 1991; Evans et al 2015; Minias et al 2015; Manikowska-Ślepowrońska et al 2016). However, nest predation for any animal concerned has a negative effect on its reproduction and population structure (Holt et al 2008; Arzel et al 2015; Madden et al 2015; Veitch et al 2016). The intensity of nest predation varies substantially among prey species; nesting habitat, nest site, nest density, levels of parental care, and nesting season determine nest predation (Martin 1993, 1995; Martin et al 2000; Rodewald 2002).

The breeding success in water birds particularly depends on interspecies and intraspecies relationships in colonies, access to food resources, and predator pressure (Frederick and Collopy 1989). Water birds that use trees to construct nests set up simple exposed nests at the upper canopy level of large trees. Colonial water birds choose nesting sites after careful evaluation of the prevailing safety conditions (Van Eerden et al 1995). Heronry is group nesting of single or multiple species of colonial water birds such as herons, cormorants, and egrets, which shows spatial and temporal clumping of nests during the breeding season (Urfi et al 2005; Roshnath et al 2013). It has been suggested that group nesting can significantly reduce predation pressure in nests and nestlings of heronries or rookeries (Rubenstein 1978; Krause and Ruxton 2002; Riehl and Jara, 2009) because when animals aggregate, the per capita predation risk decreases because of dilution effect (Wrona and Dixon 1991; Riehl 2011; Beauchamp 2014). Thus, in colonially breeding birds, the intensity of nest predation varies with the number, spacing, synchrony, or intraseasonal timing of nests (Gochfeld 1980; Wittenberger and Hunt 1985; Hatchwell 1991; Bellinato and Bogliani 1995; Gaston and Elliot 1996). Even though

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Peer review under responsibility of National Science Museum of Korea (NSMK) and Korea National Arboretum (KNA).

https://doi.org/10.1016/j.japb.2019.02.007