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Ornithology

Urban avifauna diversity in Stellenbosch, South Africa, during the COVID-19 lock-down and observations of inner-city foraging behaviour

James Baxter-Gilbert[1] and Julia L Riley[2,3]

[1]Centre for Invasion Biology, Department of Botany and Zoology, Stellenbosch University, Stellenbosch, Western Cape, 7600, South Africa, ORCID ID: 0000-0002-1283-8893

jx_baxtergilbert@laurentian.ca

[2]Department of Botany and Zoology, Stellenbosch University, Stellenbosch, Western Cape, 7600, South Africa, ORCID ID: 0000-0001-7691-691

[3]Department of Biology, Dalhousie University, Halifax, B3H 4R2, Canada

Abstract

In times of isolation or confinement, making regular natural history observations can not only represent a source of enjoyment, but generates insights into local avian ecology. Here we present an account of the urban bird diversity of Stellenbosch, South Africa, derived from daily observations of species presence collected during the initial two stages of the country's nationwide COVID-19 lockdown period (66 days). A total of 38 bird species were observed during this time, including sightings of urban hunting behavior for birds of prey and greenspace foraging in general. The most commonly seen taxa were typical human-commensal species, including sparrows and doves. Many species were encountered far less frequently, with 21 of the 38 species being observed on less than 10 days. This was most notable for birds of prey (n = 6 species from Accipitriformes and Falconiformes) or African swifts (n = 2 species from Apodiformes), which were recorded only a few times for any given species. Our account provides some relatively niche information regarding the presence of birds from a single city block in South Africa and notes interesting observations of urban foraging behaviour, but also underscores the value of birdwatching during times of uncertainty.

Introduction

For many nature enthusiasts living in cities, recreational activity often involves eco-focused outings beyond an urban center (e.g., hiking or camping), however during times of global crisis, like that of the COVID-19 pandemic, these activities may be curtailed for the sake of public safety (Stiegler and Bouchard 2020; Tomar and Gupta 2020). As such, keen naturalists remaining housebound, either by choice, by law, or by circumstance, may be relegated to less adventurous, albeit still fruitful, pursuits of wildlife sightings from home (e.g., windowsill or backyard birdwatching). On 27 March 2020, South Africa entered into one of the world's most restrictive nationwide lockdowns in response to the COVID-19 pandemic, which required the entire population to remain at home (59 million people; Stiegler and Bouchard 2020). Individuals were only permitted to exit their houses for essential grocery shopping and medical reasons (i.e., all other businesses were closed), and all social and outdoor activities (including personal exercise and dog-walking) were prohibited, also a complete ban on alcohol and tobacco sales was enacted (Stiegler and Bouchard 2020). These actions were essential to limit the spread of the virus and protect the nation's most vulnerable people (Stiegler and Bouchard 2020), but it did leave much of the population longing for recreational activity – whether that be outdoor leisure activities or simply a glass of wine. As such, many individuals took comfort in activities that allowed them to remain connected with nature and occupy their time without leaving the confines of their own home, like birdwatching. We took

this opportunity to undertake a detailed account of urban wildlife, which provided some fine-scale measures of presence/absence on a local scale and included observations of urban foraging behaviour.

Materials and Methods

Between 27 March and 1 June 2020, the period of South Africa's Stage 4 and 5 Lockdown and encompassing the entire period alcohol prohibition was in effect, we made daily observations of the avian diversity present around our apartment, yard (8.5 m x 4.2 m; Fig. 1 a), and parking lot (110 m x 10 m; Fig 1c, 1d) in Stellenbosch, South Africa. This area covered most of a single city block and was located between the University of Stellenbosch and Stellenbosch Correctional Services (allowing for viewing of the prison-yard's vegetable garden; Fig. 1b). Two primary observation periods were used, a morning (between 09:00-10:00) and evening (17:00-18:00) survey. Opportunistic 'windowsill' observations throughout the day were also included. All observations required visual confirmation and identifications were verified using an up-to-date field guide (Sinclair et al. 2011). Tallies were recorded on a personal mobile device and frequency was calculated, and figures produced, using Excel (Microsoft 365).

Results and Discussion

We identified 38 bird species during our 66 day sampling period (Fig. 2). The most commonly sighted birds were Cape Sparrows *Passer melanurus*; *n* = 61/66 days, Laughing Doves *Spilopelia senegalensis*; *n* = 55/66, Speckled Pigeons *Columba guinea*; *n* = 55/66, Cape Turtle Doves *Streptopelia capicola*; *n* = 52/66, and Rock Doves *Columba livia*; n = 43/66. These findings are relatively unsurprising, as all of these species are regularly viewed as anthrophillic and follow similar trends previously reported in South Africa from other urban areas, like Pretoria (van Rensburg et al. 2009). Several species regularly observed were associated with the vegetable garden located across the street in the correctional facility; these were Egyptian Geese *Alopochen aegyptiaca*; *n* = 35/66, Cattle Egrets *Bubulcus ibis*; *n* =30/66; (Fig. 3), and Hadeda Ibis *Bostrychia hagedash*; *n* = 27/66; Fig. 4. The proclivity of these species to use this area for foraging, as well as regular attendance by Red-winged Starlings *Onychognathus morio*, European Starlings *Sturnus vulgaris*, and all of the aforementioned columbids, contributes to the long-held understanding of the value of open vegetated greenspaces in urban areas for avifauna.

Figure 1: The sampling location for all bird observations in Stellenbosch, South Africa, including our yard (A), the Stellenbosch Correctional Facility vegetable garden viewed from our yard (B), the parking lot facing east (C) and west (D).

Notably, although being some of the least frequently sighted birds, the observations of Accipiters and Falcons provided some interesting observations of urban hunting behavior. The most frequently seen birds of prey were African Harrier-hawks *Polyboroides typus*, which were noted on three occasions and had been seen during 2019 to nest on the Stellenbosch University Engineering Building (located 300 m to the east). On two of the three occasions an African Harrier-hawk

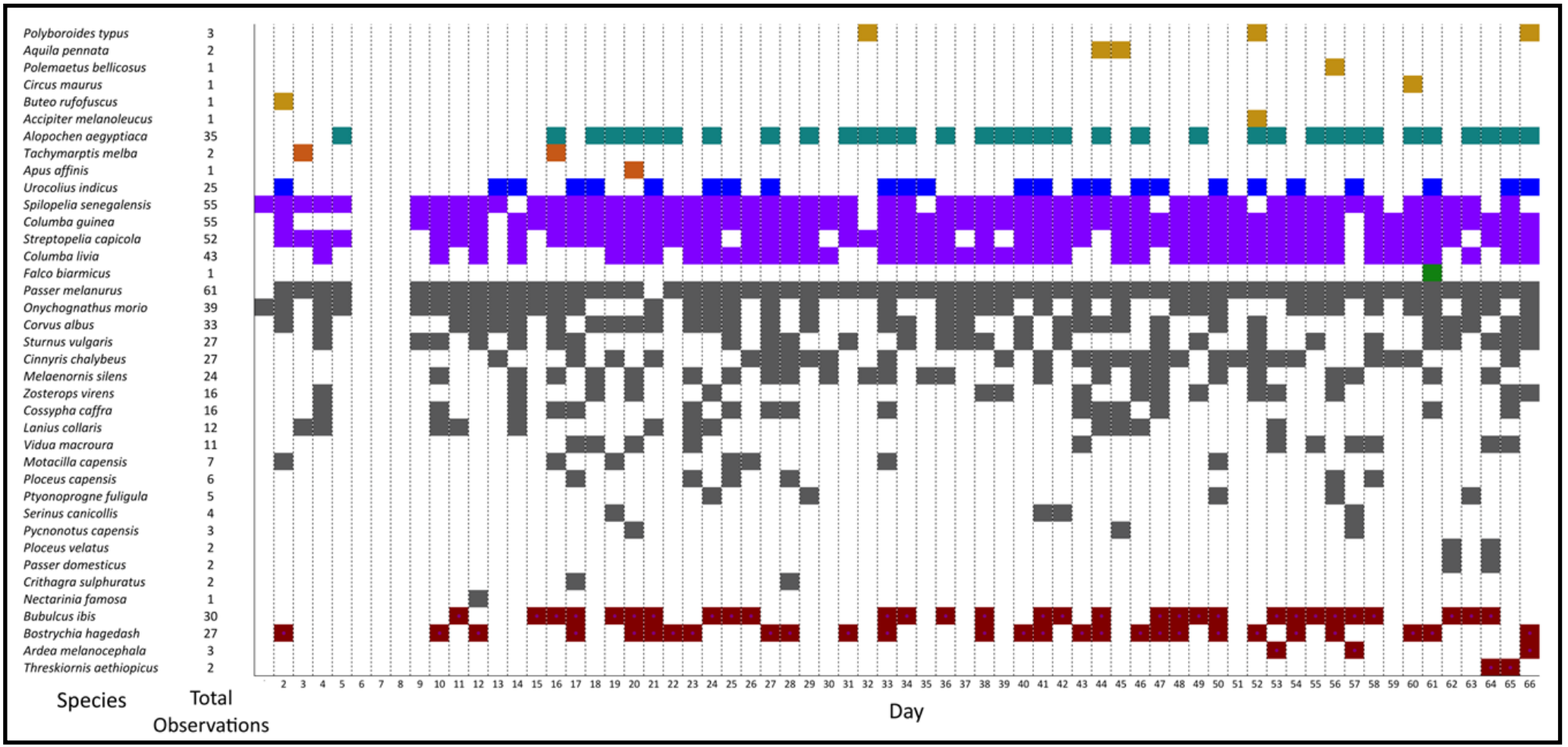

Figure 2: Presence/absence data of the 38 bird species observed, including a tally of the total times each was observed. Points are colored based on the family the species belongs to (Accipitriformes = dark yellow; Anseriformes = turquoise; Apodiformes = orange; Coliiformes = blue; Columbidae = purple; Falconiformes = green; Passeriformes = grey; Pelecaniformes = red).

Figure 3: A Cattle Egret *Bubulcus ibis* foraging within the vegetable garden at the Stellenbosch Correctional Facility.

Figure 4: A Hadeda Ibis *Bostrychia hagedash* foraging for invertebrate prey on a grassy strip alongside a parking lot in Stellenbosch, South Africa, during the COVID-19 national lockdown period.

was seen gripping to the side of a tree and hunting for prey. These trees contained Cape Sparrow nests and are also used for roosting by several other species. Although this style of foraging is common for African Harrier-hawks (Sinclair et al. 2011), both of these trees are planted, non-native ornamental species (i.e., a species of cyprus, Cupresaceae, and a Fan Palm, *Washingtonia* sp.; both seen in Fig. 1d) making their use in foraging by a native predator one of interest. The use of non-native vegetation for nesting has been seen to increase nest predation rates on North American passerines by native predators (Schmidt and Whelan 1999), however further investigation is required to see if similar shifts are occurring in urban populations within South Africa. The other two bird of prey species seen actively hunting were Black Sparrowhawks *Accipiter melanoleucus* and Lanner Falcons *Falco biarmicus*. In both instances these birds were in pursuit of Cape Turtle Doves that were weaving in between the trees and buildings surrounding our parking lot (Fig 1c and 1d) to avoid capture. These observations were made on separate days, both during the evening survey period, and as far as we were able to observe neither resulted in the capture of prey (i.e., the predator broke pursuit and was seen rising above the buildings shortly thereafter). This would suggest that the highly urbanized Cape Turtle Doves have efficiently capitalized on anthropogenic habitat structure (e.g., non-native vegetation, buildings, and fences) to aid in their antipredator responses, which may contribute to their proliferation in human landscapes. These observations provide insights and examples regarding how native bird species, both predators and prey, are using urban habitats to their advantage.

Outdoor recreation and a connection to nature is often noted as contributing to physical and mental health benefits (Triguero-Mas et al. 2015). As such, activities like birdwatching during periods of uncertainty, confinement, or isolation may not only serve as an enjoyable pastime, but also as a means of maintaining one's mental health. Extreme examples of this have been seen with historic accounts of WWII prisoners of war engaging in birdwatching and forming an ornithological society during their internment in Germany (Niemann 2012) or that of Robert Stroud, colloquially known as the 'Birdman of Alcatraz', who during his 54 years of imprisonment became one of the world's leading authorities on avian medicine and husbandry (Pollock 2001). Within the context of the global COVID-19 pandemic, which has resulted in billions of people quarantining and self-isolating, it is not surprising that there has been a measured increase in the amount of people engaging in backyard or windowsill birdwatching (Rice et al. 2020). We feel that house-bound birdwatching and other wildlife viewing activities may not only serve to keep people connected with nature during times of isolation, but also can dramatically increase the amount of citizen scientists capable of recording useful and curious observations of biodiversity, natural history, and the behavior of urban wildlife.

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