



THE BIRD SPECIES IN YOGYAKARTA CITY: DIVERSITY, GUILD TYPE COMPOSITION AND NEST

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ABSTRACT

Ornitholog past studies focused on the natural environment, now they have a lot of studying birds in urban areas. In Java inhabited by 368 species of birds recorded settler and nomad 126 species of birds , but it is not known how many types of them which now lives in urban areas. Bird diversity in the city of Yogyakarta, which was founded in 1755 and now has a population of 388 627 inhabitants, is unknown. The research objective was to determine the diversity, the proportion of community based on the type of bird feed (guild) and bird species nest in the city of Yogyakarta. The study was conducted during the day in April-May 2013 in the 7 villages of 3 subdistricts in the city center Kraton, Gondomanan and Ngampilan. Data collection used Point of Abundance Index method, and analyzed by the Shannon Diversity Index - Wiener ; types of feed directly observed and are determined based on a review of literature and the proportion of bird communities based on guild were analyzed with the use of modified importance value index ; nest observed directly and analyzed descriptively. The results showed in Yogyakarta were found 28 species of birds covered in 11 familia with moderate levels of diversity (diversity index 2.2) and 5 types including protected status that is *Anthresep malacensis*, *Nectarinia jugularis* and *Arachnothera longirostra* (Fam.Nectariniidae), *Alcedo atthis* and *Halcyon cyanoventris* (Fam. Alcedinidae). Composition based on the guild type is graminivorous (46.58 %), nectarivorous (46.51 %), nectrivooous (5.53 %), frugivorous (1.08 %), and 0.29 % piscivorous, and was found at least nine species of birds that nest in the city of Yogyakarta. Therefore, birds in the city of Yogyakarta is quite diverse and populated several protected species, it is necessary to research on biological properties, especially the origins, patterns of reproduction and structural adaptation and behavior.

Keywords : City of Yogyakarta, birds, diversity index, type of feed, nest

INTRODUCTION

In general, the development of human civilization has caused negative impacts on biodiversity, however, many animals appeared to have adapted to environmental stresses created by human civilization. The pressure of the urban environment as a source of food, predators and other threats apparently some kind of animal can grow quickly at close to human existence. Success they thrive in an urban environment has prompted many researchers to conduct studies various aspects of life and even the results of many studies that reveal valuable new information related to the process of evolution and selection process . Therefore adaptation in urban bird runs fast, then it is a laboratory for the study of natural selection. The study of urban birds is very important to know the ecological aspects such as how they obtain food and shelter, and find out the process of natural selection that may be in action.

Ornitholog past studies focused on the natural environment, but now days they have a lot of studying birds in urban areas. In Java inhabited by 368 species of birds recorded settler and nomad 126 species of birds (MacKinnon *et al.*, 2010), but it is not known how many species of them which now lives in urban areas. Based on observations made Ontario *et al.* (1990), variations in the composition of bird species can differ between one city to another, according to the ability of each city in support of bird life as well as the history of the spread

of bird in the city. The existence of community centers in the city can affect the existence of the bird. Urban bird prefers a location away from the center of the crowd. Bird study conducted in urea fertilizer factory PT Kujang shows that the number of bird species and individuals increased with increasing distance from the center of industrial activity (Hernowo and Prasetyo, 1989). City changes can not be avoided . Not only humans who must adapt to these changes, so do the birds . In order to survive, birds have to adapt that of course takes time and has to change his behavior patterns ranging from the behavior of nesting, foraging, to recognize new types of threats that had not previously been encountered .

Yogyakarta city was built in 1755, along with the construction of the Kingdom Ngayogyakarta Hadiningrat by Sri Sultan Hamengku Buwono I at Banyan Forest, an area between the river Code and the river Winongo where the location is visible in terms of defense strategy at that time. Before the Palace was finished, Sri Sultan Hamengku Buwono design guest house which occupies Ambarketawang Limestone area, from where he is always supervise and manage the construction of the palace that is being done. A year later the lane I deign to enter the inaugural New Castle. Thus stood the city of Yogyakarta or with his whole name is Negari Ngayogyakarta. Houses Ambarketawang abandoned by the lane to move to settle in the new palace. Inauguration of which occurred Date October 7, 1756. Now part of the city of Yogyakarta at the center of the city is included in the subdistrict administrative Kraton, and Subdistrict Gondomanan and Ngampilan in the northern part of Yogyakarta Palace. So far studies have not been conducted on birds in urban areas of Yogyakarta is now increasingly populated. The purpose of research is to study the diversity, bird species composition based on guild type, and the types of birds that nest in the city of Yogyakarta, Yogyakarta Special Province.

METHODS AND MATERIALS

Location and Time Research

Place the conduct of research is in the Subdistrict Kraton, Gondomanan, and Ngampilan, Yogyakarta City. The study began on 5 April to 11 May 2013. Observations made at 07:00 to 10:00 and from 15:00 to 17:00 .

Equipment and Materials

Tools and materials used include: binoculars to be used for bird watching , bird species guide book that will help in identifying birds observed, GPS, map of the area which is used to determine the coordinates of the location of data collection, a camera that will be used to documenting activities, and take pictures of birds observed, and the latter is stationery to record the results of data retrieval .

Preliminary investigation involves determining the location of the study by using a map scale of 1 : 10,000. The site covers the Subdistrict Gondomanan (Village Ngupasan and Prawirodirjan), Kraton District (Village Patehan, Panembahan and Duchy) and the District Ngampilan (Village Ngampilan and Notoprajan) and in each village selected three zones namely Zone A : plant abundance; Zone B : plants moderat, and Zone C : plants rare. Each study site will be marked to facilitate the process of observation.

Bird community surveys conducted by the point count method (Point Count) (Bibby *et al.*, 2000) were modified. At the point count method (Point count) data recorded includes names of bird species encountered by the specified time interval (15 minutes). In one sample point at each study site contained 10 point count observations that the distance between the point of observation is more than 100 m to reduce the possibility of individual birds were observed more than once. Assumptions visibility towards the subject is 30 m. Bird watching is done by using a binocular or camera. Bird identification is done by morphological observation, sound, and with field guides (MacKinnon *et al.*, 2010). Protection status of each species encountered in the study area is determined by PP N0 7, 1999 on the Preservation of Fauna and Flora, the existence of migratory bird species based on literature review (MacKinnon *et al.*, 2010), and other protection status under the provisions of the IUCN.

Species diversity was measured using the Shannon-Wiener Diversity Index (Odum, 1971). Interpretation of results Shannon-Wiener Index Diversity of bird species are : > 3 (high diversity, spread the number of individuals of each species of bird communities high and high stability; 1.5 to 3 (moderate diversity, spread the number of individuals of each species of bird being and stability of the community are ; < 1.5 (low diversity , the spread of the low number of individuals of each species of bird communities and low stability). Bird species composition based on patterns determined by adding up the amount of feed Importance Value Index (IVI) similarity of the pattern of each type of feed the birds that were found in each study site , where : $inp = \text{relative density} + \text{relative frequency}$ (Odum, 1971). Bird guild type (feeding patterns) are determined based on literature review (MacKinnon *et al.*, 2010). The types of birds that nest in the study area are directly observed and analyzed descriptively .

RESULT AND DISCUSSION

Diversity of bird species in Yogyakarta City

Table 1 shows that in the city of Yogyakarta at least 28 species of birds found include 11 familia including and 5 species of protected birds i.e. *Anthresep malacensis*, *Nectarinia jugularis* and *Arachnothera longirostra* (Fam.Nectarinidae), *Alcedo atthis* and *Halcyon cyanoventris* (Fam. Alcedinidae). Pictures of some of bird species found in Yogyakarta City are presented in Figure 1 to 8. Shannon-Wiener diversity index is 2.2 or moderate diversity. However, it turns out when the diversity index was calculated for each zone (Zone A : plant abundance; Zone B : plants moderat, and Zone C : plants rare) the result is relatively lower, and the level of diversity in Zone C is the lowest (Table 2).

No	English Name	Bird Species		Subdistrict			Consevation Status
		Familia	Scientific Named	Gondo-manan	Kra-ton	Ngam-pilan	
1	Pink-necked Green-Pigeon		<i>Treron vernans</i>	V	V	-	
2	Large Green-Pigeon Besar		<i>Treron cappelei</i>	V	-	-	
3	Island Collard-Dove	Columbidae	<i>Streptopelia bitorquata</i>	V	V	-	
4	Spotted-Dove		<i>Streptopelia chinensis</i>	V	V	V	
5	Emerlad Dove		<i>Chalcophaps indica</i>	V	-	-	
6	ZebraDove		<i>Geopelia striata</i>	-	V	-	

No	Bird Species			Subdistrict			Consevation Status
	English Name	Familia	Scientific Named	Gondo-manan	Kra-ton	Ngam-pilan	
7	Glossy Swiftlet	Apodidae	<i>Collocalia esculenta</i>	V	V	V	
8	Cave-Swiftlet		<i>Collocalia linchi</i>	-	V	-	
9	Sooty-headed Bulbul	Pycnonotidae	<i>Pycnonotus aurigaster</i>	V	V	V	
10	Yellow-vented Bulbul		<i>Pycnonotus goiavier</i>	V	V	V	
11	Ashy Tailorbird	Silviidae	<i>Orthotomus ruficeps</i>	V	V	V	
12	Common Tailorbird		<i>Orthotomus sutorius</i>	V	-	V	
13	Mountain Tailorbird		<i>Orthotomus cucullatus</i>	-	V	-	
14	Mueller's Bush Wabler		<i>Cettia vulcania</i>	-	V	-	
15	Red-tailed Fantail	Muscicapidae	<i>Rhipidura phoenicura</i>	-	V	-	
16	Brown-throated Sunbird	Nectariniidae	<i>Anthreptes malacensis</i>	V	V	V	Protected
17	Olive-backed Bird		<i>Nectarinia jugularis</i>	V	-	V	Protected
18	Little Spiderhunter		<i>Arachnothera longirostra</i>	-	-	V	Protected
19	Scarlet-headed Flowerpecker	Dicaeidae	<i>Dicaeum trochileum</i>	V	V	-	
20	Oriental White-eye	Zosteropidae	<i>Zosterops palpebrosus</i>	V	V	V	
21	Javan White-eye		<i>Zosterops flavus</i>	V	V	V	
22	Javan Munia	Ploceidae	<i>Lonchura leucogastroides</i>	V	V	V	
23	Scaly-breasted M unia		<i>Lonchura punctulata</i>	V	-	V	
24	White-headed Munia		<i>Lonchura maja</i>	V	V	V	
25	Eurasian Tree Sparrow		<i>Passer montanus</i>	V	V	V	
26	White-vented Myna	Sturnidae	<i>Acridotheres javanicus</i>	V	-	-	
27	Common Kingfisher	Alcedinidae	<i>Alcedo atthis</i>	-	-	V	Protected
28	Javan Kingfisher		<i>Halcyon cyanoventris</i>	-	-	V	Protected

Notes: Zone A : plant abundance; Zone B : plants moderat, and Zone C : plants rare



Figure 1: Eurasian Tree Sparrow (*Passer montanus*) (by Sigit, 2013)



Figure 2: Glossy Swiftlet (*Collocalia esculenta*) (by Sigit, 2013)



Figure 3: White-headed Munia (*Lonchura maja*) (by Sigit, 2013)



Figure 4: Javan Kingfisher (*Halcyon cyanoventris*) (by Sigit, 2013)



Figure 5: Brown-throated Sunbird (*Anthreptes malacensis*) by Sigit, 2013)



Figure 6: Olive-backed Bird (*Nectarinia jugularis*) (by Sigit, 2013)



Figure 7: Spotted-Dove (*Streptopelia chinensis*) (By Surakhman, 2013)

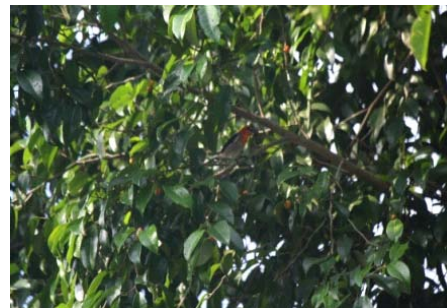


Figure 8: Scarlet-headed Flowerpecker (*Dicaeum trochileum*) (By Surakhman, 2013)



Figure 9: Emerald Dove (*Chalcophaps indica*) (By Surakhman, 2013)



Figure 10: Large Green-Pigeon Besar (*Treron cappelei*) (By Surakhman, 2013)

Tabel 2: Diversity Index of bird species in each zones in Yogyakarta City

No.	Subdistrict	Village	Zone		
			A	B	C
1	Gondomanan	Ngupasan	2,112	1,479	0,842
		Prawirodirjan	1,384	1,885	1,195
		Patehan	1,45	1,276	1,137
2.	Kraton	Panembahan	1,577	1,363	0,977
		Kadipaten	1,265	1,111	1,02
3.	Ngampilan	Ngampilan	1,922	1,913	1,211
		Notoprajan	1,572	1,442	1,500

Note: Zone A : plant abundance; Zone B : plants moderat, and Zone C : plants rare

Bird species composition in Yogyakarta based on guild type

Based on the pattern of feed (guild type), species of birds in the city of Yogyakarta include graminivorous, insectivorous, piscivorous, nectarivorous and frugivorous. The composition is the most graminivorous and insectivorous (Table 3).

Table 3: Composition of bird species in the city of Yogyakarta based on guild type

No.	Guild	Subdistrict			Guild Composition
		Gondomanan	Kraton	Ngampilan	
1.	Graminivorous	45%	51,30%	43,44%	46,58%
2.	Insectivorous	49%	41,45%	49,08%	46,51%
3.	Piscivorous	-	-	0,88%	0,29%
4.	Nectarivorous	3%	6,99%	6,61%	5,53%
5.	Frugivorous	3%	0,26%	-	1,08%

Keterangan: A: tumbuhan banyak; B: tumbuhan sedang; C: tumbuhan sedikit.

Species of birds which nested in the city of Yogyakarta

Only 9 species of the bird species found in the city of Yogyakarta among 28 species are known to nest in this study at various places in the various wards. Pink-necked Green-Pigeon (*Treron vernans*) and Large Big Green-Pigeon (*Treron cappelei*) were observed eating figs in the “Gedung Agung” (Figure 11) was later seen flying toward the west when it was getting dark. Common Kingfisher (*Alcedo atthis*) and Javan Kingfisher (*Halcyon cyanovenris*) were observed in the outskirts of Winongo although not known nest directly, but because it has a habit of his life to maintain territory then indirectly to be expected that they nest on the edge of Winongo (Figure 12).

Table 4: Species of birds which nested in the city of Yogyakarta

No	Bird Species		Nest	
	English Name	Scientific Name	Site	Location
1	Pink-necked Green-Pigeon	<i>Treron vernans</i>	?	?
2	Large Green-Pigeon Besar	<i>Treron cappelei</i>	?	?
3	Island Collard-Dove	<i>Streptopelia bitorquata</i>	In tall bayan trees	Vill. Ngupasan and Kadipaten
4	Spotted-Dove	<i>Streptopelia chinensis</i>	In tall bayan trees	Vill. Ngupasan
5	Emerlad Dove	<i>Chalcophaps indica</i>	?	?
6	ZebraDove	<i>Geopelia striata</i>	?	?
7	Glossy Swiftlet	<i>Collocalia esculenta</i>	Under the bridges, building and houses	Vill. Ngupasan, Ngampilan, Notoprajan, Patehan dan Kadipaten
8	Cave-Swiftlet	<i>Collocalia linchi</i>	Under the bridges, building and houses	Vill. Ngupasan, Ngampilan dan Notoprajan
9	Sooty-headed Bulbul	<i>Pycnonotus aurigaster</i>	?	?
10	Yellow-vented Bulbul	<i>Pycnonotus goiavier</i>	?	?
11	Ashy Tailorbird	<i>Orthotomus ruficeps</i>	?	?
12	Common Tailorbird	<i>Orthotomus sutorius</i>	?	?
13	Mountain Tailorbird	<i>Orthotomus cucullatus</i>	?	?
14	Mueller’sBush Wabler	<i>Cettia vlcania</i>	?	?

No	Bird Species		Nest	
	English Name	Scientific Name	Site	Location
15	Red-tailed Fantail	<i>Rhipidura phoenicura</i>	?	?
16	Brown-throated Sunbird	<i>Anthreptes malacensis</i>	In Palmand coconut trees	Vill. Ngupasan dan Ngampilan
17	Olive-backed Bird	<i>Nectarinia jugularis</i>	?	?
18	Little Spiderhunter	<i>Arachnothera longirostra</i>	?	?
19	Scarlet-headed Flowerpecker	<i>Dicaeum trochileum</i>	?	?
20	Oriental White-eye	<i>Zosterops palpebrosus</i>	?	?
21	Javan White-eye	<i>Zosterops flavus</i>	?	?
22	Javan Munia	<i>Lonchura leuco-gastroides</i>	In trees, small bayan rees and palm trees	Vill. Ngupasan, Ngampilan, Notoprajan dan Panembahan
23	Scaly-breasted Munia	<i>Lonchura punctulata</i>	In trees, small bayan rees and palm trees	Vill. Prawirodirjan, Ngampilan dan Patehan
24	White-headed Munia	<i>Lonchura maja</i>	In trees, small bayan rees and palm trees	Vill. Prawirodirjan dan Notoprajan
25	Eurasian Tree Sparrow	<i>Passer montanus</i>	In houses and "genteng" roofs	Vill. Ngupasan, Prawirodirjan, Ngamilan dan Notoprajan
26	White-vented Myna	<i>Acridotheres javanicus</i>	?	?
27	Common Kingfisher	<i>Alcedo atthis</i>	?	?
28	Javan Kingfisher	<i>Halcyon cyanovenris</i>	?	?



Figure 11: Big old bayan trees in the "Gedung Agung" (bu Surakhmat, 2013)



Figure 12: Winongo River in Subdisrict Ngampilan (by Sigit, 2013)

CONCLUSION

Yogyakarta City at least inhibited by 28 species of birds include 11 familia which diversity index moderate. Among of them 9 species are protected birds, most of them are graminivorous and insectivorous birds, and 9 species build nests in various sites and places in Yoyakarta City.

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