

Aves biodiversity in Wonorejo fish pond (Surabaya, Indonesia): the conservation status of endemic and migration aves

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ABSTRACT

Wonorejo fish pond, Surabaya, East Java, Indonesia, is one of stopover place during shorebird's migration. The migration happened between April to September. Birds are one of the most important components in the ecosystem, which its role is to support the life cycle of organisms. The objective of this study is to find out the abundance of variety of aves and its conservation status in Wonorejo Pond during migration month. The method that used in this research is *Indices Ponctuels d' Abondance (IPA)*, and Shannon-Wiener index to analyze the abundance index. The conservation status of the aves refers to Regulation of Ministry of Environment and Forestry No.P106 and International Union for Conservation of Nature and Natural Resources (IUCN) Red list of Threatened Species. The research was conducted for 4 days in May 2019, and the results are there were 578 birds observed from 25 aves species. One of the species, *Rhipidura javanica*, considered as protected species according to Regulation of Ministry of Environment and Forestry No. P106, while the conservation status of the other 24 species are not protected. According to IUCN Red List of Threatened Species, 25 species that observed included in least concern category. The abundance index of Wonorejo Pond is $H' = 1.8412$, which fall under medium category.

Key words : Aves, Biodiversity, Conservation, Migration, Wonorejo, Mangrove

Introduction

Every year more than one million shore birds migrates to and from Australia, flying in non-breeding condition from their native habitat to find food in the winter and come back to their native habitat to breed (EPA, 2005). Migration time starts in March, when the northern hemisphere is experiencing winter, the birds will migrate to the southern hemisphere and they will fly back to their native habitat in September which is summer, to breed (Howes *et al.*, 2003). Wonorejo is one of wetland area in Surabaya, located on the east coast of the city which

covers 50 hectares and consists of fish pond area and riverine mangrove forests that affected by intertidal zone, so it provides a large area for birds to forage. Wonorejo, especially the fish pond area is selected as the research place because Wonorejo fish pond is one of the Important Bird Area (IBA) that was appointed by Birdlife Indonesia with A4iii criteria, which means the area is stopover place for the migrant birds to find food. That status was appointed in 2004 because every year, Wonorejo fish pond would be a stopover place for more than 10.000 pairs of birds, especially shorebirds (Birdlife Indonesia, 2011).

Methods

Time and Location

This research was conducted 9, 21, 23, and 30 May, 2019 in Wonorejo Fishpond, Surabaya, East Java, Indonesia. The data were collected once a day in the afternoon, started from, 03.00 PM to 6.30 PM.

Research Tools

Tools that used in this research were binoculars, measure tape, camera, guidebook titled "Burung-burung di Sumatra, Kalimantan, Jawa, Bali" written by John Mckinnon *et al.*, hand counter, compass, GPS, field notes, and watch.

Data Collection Method

The bird watching method that was used in this research was Indexes Ponctuelds' Abondance (IPA). The IPA counts by the French ornithologist consist of establishing a network of points regularly distributed through the habitat to be studied (Cooperider, 1986). Data collection started with 5 observing stations that used as a bird watching area. The birds identified in every observing station visually or through the birds sound.

Observing Stations

The total distance of all observing stations is about 300 meters. There were 5 observing stations with the interval range of 50 meters and the observation radius of 50 meters.

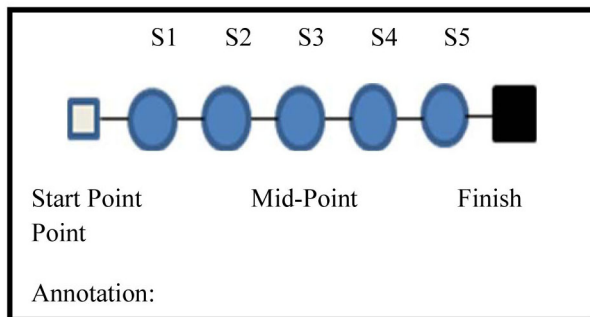


Fig. 1. Observation station scheme

Bird Species Data Collection

Observing time per station are 10 minutes and the time to move from one station to the other are 10 minutes. The data that collected consist of observation time, cloudiness, bird species, total individuals per bird species, time the birds were spotted, and

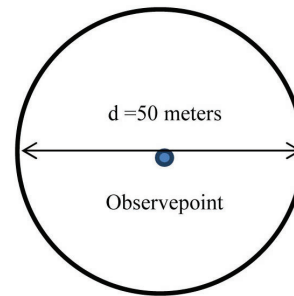


Fig. 2. Observation radius scheme

bird activity.

Data Analysis

Determine Abundancy Index

Abundancy index is used to perceive the abundancy of fauna in the research location. Abundancy index is determined based on Shannon-Wiener (1963) formula as below:

$$H' = - \sum \left(\frac{ni}{N} \ln \frac{ni}{N} \right)$$

H' value	Annotation
H' > 3.0	High abundancy
1.6 < H' < 3.0	Medium abundancy
1.0 < H' < 1.5	Low abundancy

Annotations:
 H' = abundancy index
 Ni = total individual per bird species
 ln = natural logarithm
 N = total individual aves

Determine Conservation status

The conservation status in this research refers to Regulation of Ministry of Environment and Forestry No. P106 about protected flora and fauna, and International Union for Conservation of Nature and Natural Resources (IUCN) red list of threatened species (animal, plant, and fungi).

Results and Discussion

Annotations:
 LC: Least Concern
 The result after collecting data for four days is the abundancy index of Wonorejo fishpond fall under medium category (H' = 1.8412) with total 25 bird species from 578 birds that observed. *Rhipidura javanica* is species that observed and included in protected category according to Regulation of Min-

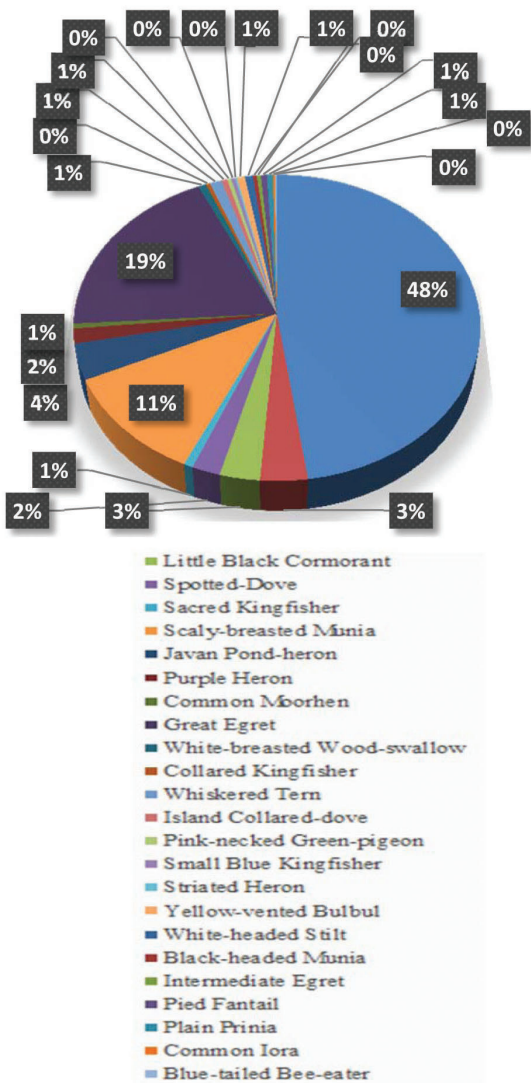


Fig. 3. Biodiversity Diagram



Fig. 4. Purple Heron



Fig. 5. Common Moorhen



Fig. 6. White-headed Stilt

istry of Environment and Forestry No. P106, while the other 24 species fall under not protected category. According to IUCN Red List of Threatened Species, 25 aves species that observed fall under least concern category.

The migrant birds usually could be recognized by banding on their foot, but there were no migrant birds found during observation because the observation was held in the middle to the end of May, which is according to shorebird migration cycle by Howes (2003) April – June is the time when shorebirds migrate to their native habitat to pre-mating, so the migrant birds were less and hard to observe. Abundancy index in Wonorejo fishpond in May 2019 also decreased compared to August 2018 which was 2.08, and in October 2018 which was 2.42 (Siregar, 2018). The reservoir dredging using excavator around fishpond area was also the reason why the abundancy index decreased.

Table 1. Observed Aves Species

No	ENG	LATIN	Conservation Status		
			PERMENLHK P.106	IUCN	Σ
1	Little Egret	<i>Egretta garzetta</i>	Not Protected	LC	277
2	Glossy Swiftlet	<i>Collocalia esculenta</i>	Not Protected	LC	20
3	Little Black Cormorant	<i>Phalacrocorax sulcirostris</i>	Not Protected	LC	17
4	Spotted-Dove	<i>Streptopelia chinensis</i>	Not Protected	LC	12
5	Sacred Kingfisher	<i>Todiramphus sanctus</i>	Not Protected	LC	4
6	Scaly-breasted Munia	<i>Lonchura punctulate</i>	Not Protected	LC	65
7	Javan Pond-heron	<i>Ardeola speciose</i>	Not Protected	LC	22
8	Purple Heron	<i>Ardea purpurea</i>	Not Protected	LC	9
9	Common Moorhen	<i>Gallinula chloropus</i>	Not Protected	LC	3
10	Great Egret	<i>Egretta Alba</i>	Not Protected	LC	111
11	White-breasted Wood-swallow	<i>Artamus leucorhynchus</i>	Not Protected	LC	4
12	Collared Kingfisher	<i>Todiramphus chloris</i>	Not Protected	LC	2
13	Whiskered Tern	<i>Chlidonias leucopterus</i>	Not Protected	LC	6
14	Island Collared-dove	<i>Streptopelia bitorquata</i>	Not Protected	LC	3
15	Pink-necked Green-pigeon	<i>Treron vernans</i>	Not Protected	LC	2
16	Small Blue Kingfisher	<i>Alcedo coerulescens</i>	Not Protected	LC	2
17	Striated Heron	<i>Butorides striatus</i>	Not Protected	LC	1
18	Yellow-vented Bulbul	<i>Pycnonotus goiavier</i>	Not Protected	LC	4
19	White-headed Stilt	<i>Himantopus leucocephalus</i>	Not Protected	LC	4
20	Black-headed Munia	<i>Lonchuraleucoga stroides</i>	Not Protected	LC	2
21	Intermediate Egret	<i>Egretta Intermedia</i>	Not Protected	LC	2
22	Pied Fantail	<i>Rhipidura javanica</i>	Protected	LC	3
23	Plain Prinia	<i>Prinia inornate</i>	Not Protected	LC	1
24	Common Iora	<i>Aegithina tiphia</i>	Not Protected	LC	1
25	Blue-tailed Bee-eater	<i>Merops philippinus</i>	Not Protected	LC	1
Σ Individuals					578

Table 2. Biodiversity Result

Place	Biodiversity index	Category
Wonorejo Fishpond, Surabaya	1.841253	Medium

Conclusion

Aves abundance index during the month of migration (end of May) is 1.8412 and be falls into medium category. During observation, there are 25 species of aves that was spotted from total 578. Of all the spotted aves species, *Rhipidura javanica* is the only protected species, according to Regulation of Ministry of Environment and Forestry No.P106, while the other 24 species were unprotected species. Meanwhile, according to IUCN Red List of Threatened Species, there were 25 species that falls into the least concern category.

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