ASM Sc. J., 16, Special Issue 1, 2021 for SCIEMATHIC2019, 13-19

Birds of Tanjung Laboh, Johor

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Malaysian wetland is important in sustaining a diverse range of avian communities by providing continuous food sources for them. A study ran from July till September 2018 in Tanjung Laboh, Batu Pahat Johor with the main objective to list out species of bird presence within the coastal line, pond and grassland ecosystem. In total, 30 species from 15 families of birds were observed. Three of them listed Vulnerable under the IUCN red list including Lesser adjutant (*Leptoptilos javanicus*), Large Green-pigeon (*Treron capellei*), and Javan Myna (*Acridotheres javanicus*). Tanjung Laboh shoreline structured with intertidal mudflat and mangrove ecosystem sustain large numbers of waterbirds were dominated mainly by Common Redshank (*Tringa totanus*) followed by Grey Heron (*Ardea cinerea*) and Kentish Plover (*Charadrius alexandrinus*). While for pond, natural pond favoured more for the bird to live in as compared to the man-made pond with the highest individual observation = 702 observations. Ponds in Tanjung Laboh house a huge group of Pacific Swallow (*Hirundo tahitica*) indicates a high presence of insects, the main food sources for them. Further survey on avian diversity in the wetland is in need in order to quantify the remaining optimal ecosystem for the avian community of wetland.

Keywords: Birds checklist; wetland; mangrove; coastal; pond; grassland; ecosystem

I. INTRODUCTION

Despite its small size, Malaysia hosts myriad bird species with a total count of 814 species (Lepage, 2018). Wetland, ecosystem important in sustaining a diverse array of birds, provides continuous food sources and breeding grounds for bird survivorship. Approximately 6% of the earth's land surface is covered with wetland (Ramsar, 2007), where Malaysia is blessed to host 5.19 million ha of wetland area (Ibrahim *et al.,* 2013). Water is the primary factor that controls the environment of wetlands. Wetland is also defined when there are any waterlogged areas covered with a variety of aquatic vegetation (Rajpar & Zakaria, 2011). Wetland can be natural or man-made, permanent or temporary and it is integrated with the riverine and coastal zone (Ramsar, 2007).

Under the National Wetland Policy, wetland can be classified into three categories which are marine and coastal wetland, inland wetland, and man-made wetland (Ramsar, 2002). In this study, mangrove and intertidal ecosystems, natural and man-made ponds will be the primary ecosystem studied for bird diversity.

Malaysian coastal line supports high resident and migrant waterbirds and raptors where some areas are known to be important breeding and feeding grounds for them. This area is dominated mainly by mangrove forests acting as a natural barrier that protects the coastal line from harsh tide waves. In addition, the mangrove area also served as an important refuge and breeding grounds for many marine lives which become food sources for birds. Plants in Mangroves forest developed special features to adapt well in muddy soil and saline tidal water. They mainly come

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from four types of plant genera namely Avicennia, Sonneratia, Rhizophora, and Bruguiera. Mangrove forest accommodates bird species from groups of herons, kingfishers, woodpeckers, and warblers (Jeyarajasingam, 2012).

The pond is an integral component of the hydrological system and performs a diverse role in the biosphere (Kumar & Padhy, 2015). A pond is either a natural or an artificial body of water that is enclosed and can occur naturally or is man-made. Pond ecosystem differs from other water ecosystems. Unlike the river ecosystem, which is categorised under the lotic system, the pond ecosystem falls under the lentic ecosystem since the water remains stagnant relatively for a longer period (Laura, 2016). Proper pond water management can mitigate climate change impact, provide water for recreation, irrigation, and livestock watering, alleviate flooding, reduce diffuse pollution from intensive agriculture and urban run-off, recharge aquifers, and capture heavy rainfall events (EPCN, 2008). Pond ecosystem is very important, and for that reason, it is necessary to take care and protect them. It serves as a habitat for many different types of fishes, birds, plants, and crustaceans as well as insects such as dragonflies, damselflies, and pond skaters (Laura, 2016).

Tanjung Laboh accommodates large numbers of birds especially waterbirds. Baseline data on the bird's checklist documented from this study will be very helpful in assisting conservation studies in the future endeavour since no documentation on birds was done in Tanjung Laboh before. As this survey ran within the migratory season, indirectly migratory species took into account as well. The direct observation technique implemented as Tanjung Laboh is an open area where this technique will be the most viable to conduct. It is hoped that the data obtained from this survey which showed a positive distribution of waterbirds can be utilised for proper future development planning to sustain the lives of waterbirds in this area.

II. MATERIALS AND METHOD

A. Study Sites

Tanjung Laboh (latitude 1020 57' 17" East, longitude 10 49' 8" North), located in Senggarang under the jurisdiction of Batu Pahat district. This area lies in the middle of the extending South-west Johor coast IBA site. The South-west Johor coast is well known as an important breeding and feeding ground for coastal birds and an important pit-stop for migratory birds to boost up their energy before continuing their migration (International Birdlife, 2019). Tanjung Laboh comprises various ecosystems including coastal mangroves, intertidal mudflats, grassland, and pond (natural and man-made). Observation carried out along the coastal line of Tanjung Laboh, representing the coastal mangrove and mudflat ecosystem, together with a few grassland and pond areas (Plot 1 and 2: man-made pond, Plot 3: natural pond).

Figure 1. Location of Tanjung Laboh in Johor, Malaysia. Plot 1 (1.749°N 102.989°E), Plot 2 (1.749°N 102.9871°E) and Plot 3 (1.751°N 102.9853E) represent pond observation areas. (Resources: Google map)

B. Sampling Method

Direct observation techniques (Active method) were used in this study from July till September 2018 to identify bird species inhabiting Tanjung Laboh. Direct observation will be the most optimal technique to census birds in an open area of Tanjung Laboh. In addition, most sites established in this study are inhabited by waterbirds and seabirds that fly at high elevations where it is beyond the ability to capture them using a passive method of mist netting. Observation was aided by binocular (10x50 magnification) and species identification were based on standard field guide by Allen Jeyarajasingam: A field guide to the bird of Peninsular Malaysia and Singapore (2012) and David R. Wells: The birds of the Thai-Malay Peninsula (2010).

III. RESULTS AND DISCUSSIONS

A total of 30 species of birds from 10 Orders and 15 Families were observed in Tanjung Laboh comprised of waterbirds families including Scolopacidae (Waders and sandpipers),

Charadriidae (Plovers and lapwings), Ciconiidae (Stork), and Ardeidae (Heron), waterbird from family Anatidae (Ducks, geese, and swans), land birds from families Accipitridae (Kite, Buzzard, and Eagle), Columbidae (Doves and pigeons), Meropidae (Bee-eater), Alcedinidae (Kingfisher), Rallidae (Rails), Sturnidae (Mynas), Nectariniidae (Sunbirds), Ploceidae (Weavers), Corvidae (Crows, magpies, and nutcrackers), Hirundinidae (Swallow) and Picidae (Woodpeckers). Among these species, 3 of them listed Vulnerable under the IUCN red list of Threatened Species including Lesser Adjutant (*Leptoptilos javanicus*), Large Green-pigeon Adjutant (*Treron capellei*), and Javan Myna (*Acridotheres javanicus*) while the rest listed as Least Concern.

Table 1. List of birds observed in Tanjung Laboh wetlands

Order / **Family**	**Scientific Name**	**Common Name**	**IUCN**
Accipitriformes Accipitridae	*Elanus caeruleus*	Black-winged Kite	LC
	Butastur indicus	Grey-faced Buzzard	LC
	Haliastur indus	Brahminy Kite	LC
	Haliaeetus leucogaster	White bellied Sea-Eagle	LC
Anseriformes Anatidae	*Dendrocygna javanica*	Lesser Whistling-duck	LC
Charadriiformes Scolopacidae	*Actitis hypoleucos*	Common Sandpiper	LC
	Tringa totanus	Common Redshank	LC
Charadriiformes Charadriidae	*Vanellus indicus*	Red-wattled Lapwing	LC
	Charadrius alexandrines	Kentish Plover	LC
Ciconiiformes Ciconiidae	*Leptoptilos javanicus*	Lesser Adjutant	VU
Columbiformes Columbidae	*Streptopelia chinensis*	Spotted Dove	LC
	Treron capellei	Large Green-pigeon	VU
	Geopelia striata	Zebra Dove	LC
Coraciiformes Meropidae	*Merops philippinus*	Blue-tailed Bee-eater	LC
Coraciiformes Alcedinidae	*Todiramphus chloris*	Collared Kingfisher	LC
	Halcyon smyrnensis	White-throated Kingfisher	LC
Gruiformes Rallidae	*Amaurornis phoenicurus*	White-breasted Waterhen	LC
Passeriformes Sturnidae	*Acridotheres javanicus*	Javan Myna	VU
	Acridotheres tristis	Common Myna	LC
Passeriformes Nectariniidae	*Cinnyris ornatus*	Ornate sunbird	LC
Passeriformes Ploceidae	*Ploceus philippinus*	Baya Weaver	LC
Passeriformes Corvidae	*Corvus splendens*	House Crow	LC
Passeriformes Hirundinidae	*Hirundo tahitica*	Pacific Swallow	LC

Pelecaniformes Ardeidae	*Egretta garzetta*	Little Egret	LC
	Butorides striata	Green-backed heron/Little Heron	LC
	Ardea alba	Great White Egret	LC
	Ardea purpurea	Purple Heron	LC
	Ardea cinerea	Grey Heron	LC
Piciformes Picidae	*Chrysocolaptes guttacristatus*	Greater Flameback	LC
	Picoides canicapillus	Grey-capped woodpecker	LC

A. Shoreline

Tanjung Laboh shoreline dominated with intertidal mudflat and mangrove ecosystem. Common redshank ranked with the highest observation of 48 individuals followed by Grey Heron, 44, and Kentish Plover, 43 individuals while Great Egret spotted the least with only 2 individuals. From the observation, birds spotted higher during low tide compared during high tide, similar result from study ran by (Norazlimi & Ramli, 2014; Ramli & Norazlimi, 2016) because accessibility to food sources is higher during low tides (Burger *et al.,* 1977). Some birds foraged for food sources in mudflat areas during ebb tide namely species of Lesser Adjutant, Grey Heron, Great and Little Egret. These species shared similar morphology by having long legs, thus enabling them to forage during ebbing time where mudflat area covered with the shallow sea water level. In comparison between three different sampling plots established along the coastal area of Tanjung Laboh, it showed that plots with more vegetation and lesser disturbance recorded a higher abundance of bird species. The distribution, diversity, and density of birds are strongly influenced by the vegetation types and structure of the study area (Rajpar & Zakaria, 2011). In addition, disturbance give a huge impact on the abundance of waterbirds and shorebirds especially associated with human disturbance (Ramli & Norazlimi, 2017).

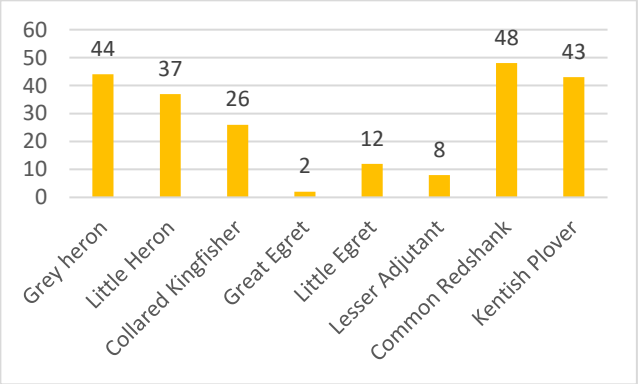

Figure 2. Total observation for each species present along the shoreline

B. Pond

Three ponds areas were established in Tanjung Laboh representing two man-made ponds (Plot 1 and 2) and one natural pond (Plot 3). A total of 1362 individuals consisting of 20 species were recorded. Pacific swallow dominated the pond areas in Tanjung Laboh with 622 individual observations followed by Common and Javan Myna with 162 and 108 individual observations each. Common sandpiper recorded the least among species observed in pond areas. The presence of a large group of Pacific swallow indicates that study areas abundance with insect population which is the main food resource for this species. Pond areas will be the most optimal ecosystem for Pacific swallow as they prefer to forage near freshwater and brackish wetland ecosystem (David & Holly, 1998).

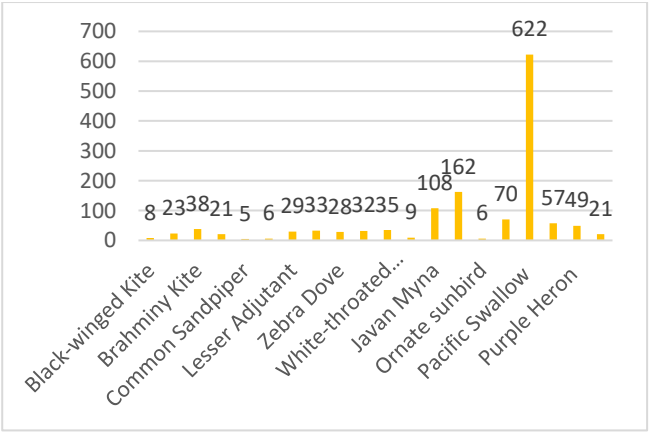

Figure 3. Total observation for each species present in pond areas

The abundance of bird population is at the highest in the natural ponds in Plot 3 as compared to the man-made ponds with 702 individual observations followed by Plot 2 and 3 with 538 and 122 each. Plot 1 recorded with the least bird population as a result of disturbance from the development areas near this plot. This supports the

statement made by Morelia *et al.* (2018) where species richness and densities decline with the development of buildings within a particular area. Most of the species recorded in Plot 1 are metropolitan birds including Spotted and Zebra dove, Javan, and Common Mynas where most of the time these species are found in a modified human ecosystem such as open country, garden, orchid, and plantation (Jeyarajasingam, 2012). Plot 2 which is also a man-made pond however able to support higher numbers of bird species as compared to Plot 1. The water level in this pond is relatively shallow thus supporting a wider range of bird species as it is accessible not only for diving but also for non-diving waterbirds (Guadagnin & Maltchik, 2007). Pond 3 which is the natural pond supports the highest bird population due to the larger pond size. The larger wetland has a bigger habitat heterogeneity, therefore, more breeding and feeding grounds serve within the area (Ma *et al.,* 2010). Pond 3 has a clear water body where favoured habitat for the Pacific swallow to live in. Unfortunately, the surrounding areas of pond 3 might not be healthy and dirty as the house crow population is very high with 70 individual observations. The high density of rubbish stimulate the proliferation of house crow where food leftovers from the wet market and stalls are among food sources for them (Jeyarajasingam, 2012). The presence of dumping sites from human leftovers in Tanjung Laboh attracts the house crow more to this area. Excessive numbers of house crows which are an introduced species might disturb the occurring resident birds in this area.

Table 2. Observation for each species present at different pond areas

Common Name	**Plot 1**	**Plot 2**	**Plot 3**	**Total**
Black-winged Kite	/	2	6	8
Grey-faced Buzzard	/	13	10	23
Brahminy Kite	5	15	18	38
White-bellied Sea-Eagle	/	13	8	21
Common Sandpiper	/	/	5	5
Red-wattled Lapwing	/	6	/	6
Lesser Adjutant	/	20	9	29
Spotted Dove	10	18	5	33
Zebra Dove	4	16	8	28
Blue-tailed Bee-eater	/	/	32	32
White-throated Kingfisher	6	18	11	35
White-breasted Waterhen	/	9	/	9
Javan Myna	29	38	41	108
Common Myna	28	63	71	162
Ornate sunbird	/	/	6	6
House Crow	/	14	56	70
Pacific Swallow	40	166	416	622
Green-backed heron/Little Heron	/	57	/	57
Purple Heron	/	49	/	49
Grey Heron	/	21	/	21
Total	**122**	**538**	**702**	**1362**

C. Refuge Site for Migratory Birds

The western coast of Peninsular Malaysia is known to be a refuge site for migratory birds. Mangrove and mudflat ecosystems along this coast protect the coastal line from harsh tide waves besides serve as an important breeding and feeding ground for birds. In tropical regions, the coastal mudflats, estuaries, and a variety of freshwater wetlands provide shorebirds with abundant food resources (Jeyarajasingam, 2012). Here in Tanjung Laboh most waterbirds namely Little and Great Egret, Purple, Little and Grey Heron, Common Sandpiper, Kentish Plover, and Common Redshank are among migrants with an additional of raptor species of Grey-faced Buzzard, passerine bird namely Blue-tailed Bee-eater and Collared Kingfisher. Birds migrate due to seasonal change affecting food production in their native and harsh weather condition in the northern hemisphere. Some raptors make moves back and forth in a long-distance between breeding and wintering areas each year. Malaysia serves as a wintering and stopover site for migratory birds along the East Asian-Australian flyway (Chong, 2014).

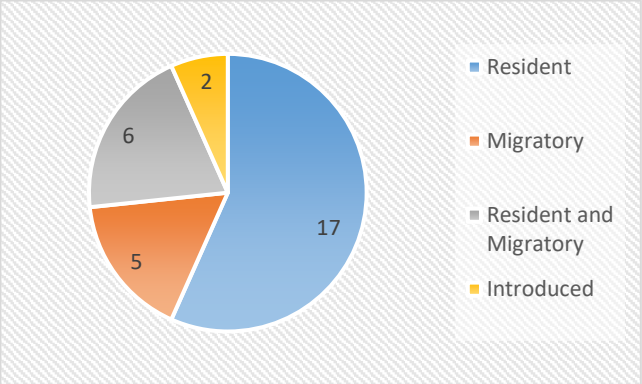

Figure 4. Partition of bird in Tanjung Laboh based on residency status

IV. CONCLUSION

Shoreline, pond, and grassland ecosystems in Tanjung Laboh support a relatively high diversity of birds with a total of 30 species from waterbirds to land birds. Shoreline dominated with shorebirds where most of the time can be observed forage for crustaceans along the seashore during low tide. Yet, species with long legs namely Lesser Adjutant, Grey Heron, Great and Little Egret spotted start to forage during ebb tide. Ponds areas are dominated by land birds with the highest composition of pacific swallow and mynas. Bird recorded higher in undisturbed areas and larger pond sizeable to accommodate large diversity of birds. However, the presence of a house crow in this area indicates unhealthy environmental conditions of these pond areas in Tanjung Laboh. As Tanjung Laboh has a future development plan, it is important to emphasise sustainable development with consideration on effective management and conservation action for the continuous presence of bird diversity within this area. With that, Tanjung Laboh eternally provides numerous services for living things and its surrounding.

V. ACKNOWLEDGEMENT

Special thanks to Universiti Tun Hussein Onn Malaysia (UTHM) for providing a platform to perform our research on the Biodiversity of Avian community in Tanjong Laboh, Batu Pahat, Johor. Upon the accomplishment of this paper successfully, many people have best owned their blessings and supports. We dedicate our gratitude to any parties involved directly or indirectly in making this paper a success.

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