

A BRIEF SURVEY ON BIRDS FROM PULAU PERHENTIAN BESAR, TERENGGANU

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Abstract: Island avian biodiversity is an important component where islands may act as centers for certain species that can only survive in those isolated ecosystems. A total of 57 observations for 11 species representing 7 families and 1 individual from 1 species representing 1 family through mist-netting method were recorded at Pulau Perhentian Besar, Terengganu from 13th to 20th September 2015 to add to the inventory of the diversity of birds. The most observed bird was the *Ducula bicolor* (Pied Imperial Pigeon) and the *Copsychus malabaricus* (White-rumped Shama) with a total number of 26.32% observations. Only one individual representing 9.09% species from 14.29% family was caught through mist-netting method which is the White-rumped shama (*C. malabaricus*).

Keywords: Birds, diversity, island, point count, South China Sea.

Introduction

The ecological role importance of small islands that line the coast of peninsular Malaysia was discussed by Cronk (2001) which addressed these islands serve as habitats for endemic, endangered and migratory species (Turner *et al.*, 2002). However, limited research has been carried on the many forested islands surrounding peninsular Malaysia. The previous island research has only been focused on herpetofauna (Bowles, 1997), forest structure (Kohira *et al.*, 2001), land use and cover distribution (Baban & Wan Yusof, 2001), and forest recreation (Jussoff & Hassan, 1996). Among all the islands, Pulau Tioman has been studied extensively as significant studies have been conducted on herpetofauna (Grismer *et al.*, 2004), bird inventories (Sodhi *et al.*, 1999), butterflies (Quek *et al.*, 1999), mammals (Lim *et al.*, 1999), and the flora and vegetation of Pulau Tioman (Latiff *et al.*, 1999). The distribution of birds in Pulau Perhentian of Terengganu was documented by (Tamblyn *et al.*, 2005) and followed by Burton *et al.* (2014).

Study Area

The Pulau Perhentian Archipelago is located 21 km off the mainland of Peninsular Malaysia, Terengganu, consists of 11 small islands with the largest island known as Pulau Perhentian Besar (approximately 867 hectares) and Pulau Perhentian Kecil (approximately 524 hectares). These islands except Pulau Perhentian Kecil are both inhabited and serve as tourism attractions. Additional islands to the west of Pulau Perhentian Kecil are Pulau Susu Dara Besar, Pulau Susu Dara Kecil, Pulau Rawa and Pulau Takong Laut as well as other smaller islands.

Pesiu *et al.* (2015) stated that the Perhentian Besar was covered with several plant species such as trees, climbers, palms and shrubs forming a dense forest floor and heavily covered canopy. The Pulau Perhentian are known as granite islands, which consist of hilly slopes joining the sea and granite tors protruding out forming cliffs and outcrops. The granite bedrock only allows the development of thin and rocky soil, however, deeper soils are known to have develop in more sheltered valley



Figure 1: Map of Pulau Perhentian Besar (▲1)

area. Most of the island of Perhentian Besar consist of virgin forests comprising of mainly Dipterocarp forest, with both *Dipterocarpus* and *Shorea* species being found (Tamblyn *et al.*, 2005). The islands and their surrounding waters have been gazetted as Marine Parks. Our study site consists of old secondary forest that stretches from the sandy rocky adjacent to the coastal area until the hilly rocky area of the island (Pesiu *et al.*, 2015).

Materials and Methods

Point Count

Point count is a technique of an observer recording all encountered individuals through observation and vocalization during a given time and remaining still at one location (Bibby *et al.*, 1998). Point count was chosen because it allowed observers to locate and observe birds through standing at a fixed location in a fixed time which aid in identifying birds that are difficult to spot. Point count also benefit in causing less disturbance to the area observed. A starting point for each point count, a random compass bearing was chosen and then marked.

The intervals between point counts are 100 m apart and the total distance for this point count is 1 km. The total numbers of point count stations are 10 stations. Point count is usually conducted in a radius of 25 m because it is not possible to observe species further than this distance (Watson *et al.*, 2004). Point count is usually done for a period of 10 minutes (Marsden *et al.*, 2001). Point count was conducted twice a day which is from 0630 until 1000 hours in the morning and 1600 until 1900 hours in the evening. The instrument used for point count is the Bushnell marine waterproof binoculars (7 x 42 magnification).

Mist-netting

Mist net has contributed to the improvement of bird catching techniques over the years (Karr, 1979). According to Bibby *et al.* (1998), standard mist netting techniques can be practiced to survey the less noticeable species that is missed during point count. Five mist nets with four shelves (9 x 2.5 m) with 36 mm mesh size were placed at canopy level using a slingshot and shoot over tall trees and while five mist nets with 12 m long, 2.5 m high and 36 mm mesh

size 16x16 mm were placed understorey based on their accessibility and activities. Nets were opened from 0630 until 1830 hours (modified from Zakaria & Rajpar, (2010)). These times depend on the weather conditions and mist nets will be closed during heavy rain conditions. Mist nets were checked every two hours intervals and closed before dusk. Mist nets data were recorded such as their height (according to their strata level in the canopy) and GPS positions. Birds captured were placed in cloth bags before being measured and morphological measurements were measured by using digital calipers, brooding patch stage, moulting stage and the nets that they were captured were also recorded. Bird identification were aided by Jeyarajasingam (2012) and Robson (2002).

Results and Discussion

A total of 57 sightings were recorded through point count consisting of 11 species from 7 families. Only one individuals from one species (Table 2) were recorded through the mist-netting method which is the *Copsychus malabaricus*. The highest number of observations were the *Ducula bicolor* and *C. malabaricus* both with a total of 26.32% (Table 1) observations. This is followed by *Hirundo tahitica* with a total number of 12.28% observations. The abundance of *C. malabaricus* and *D. bicolor* in this island is because *C. malabaricus* is an insectivorous that forage on the lower storey in disturbed and primary forest (Jeyarajasingam & Strange, 1993) and *D. bicolor* is a common coastal bird that feeds on fruiting trees (Jeyarajasingam & Strange, 1993). *H. tahitica* is also a fairly common resident in an open country habitat, especially in the coastal (Jeyarajasingam & Strange, 1993) and it is also an aerial insectivore (Shi, 2012).

Large imperial pigeon such as the *D. bicolor* are fundamentals forest fruit seeds dispersers, the seeds will be swallowed whole and later defecated to be consumed by the *Caloenas nicobarica* using a grit-filled muscular gizzard to grind the seeds up (Phillipps & Phillipps, 2014). This shows the

interspecific relationship between the pigeons on this island. The *Ducula bicolor*'s current population is decreasing because this species has been seriously affected by hunting pressure (Tamblyn *et al.*, 2005). Their dependency on island habitats, mangrove forests and coastal zones has also affected its survival due to habitat loss. The *Caloenas nicobarica* is a ground dwelling bird and it feeds on fruiting trees and seeds dispersed by other pigeons such as the *D. bicolor*. Its current population is decreasing due to trapping for food such as its meat, pet trade, gizzard stone, island clearing for plantations, island developments and the increasing numbers of invasive species (Tamblyn *et al.*, 2005).

Caloenas nicobarica has been found on Perhentian Besar, which raises importance on this island as *C. nicobarica* is the closest relative to Dodo. Sightings of *C. nicobarica* has been seen on the jungle trail from Teluk Keke, Perhentian Besar. The presence of Nicobar Pigeon on the island is very interesting because studies and analysis by researches from Oxford University has identified that *C. nicobarica* closest relative is the Dodo (Shapiro *et al.*, 2002).

C. nicobarica populations are present in the the Perhentians, Redang and Pulau Yu between May and November. Tamblyn *et al.* (2005) however have stated that the number of these birds has been decreasing over the years due to vegetation clearing and hunting. Thailand's menu also serve the meat of the *C. nicobarica* (Singh, 2004).

D. bicolor is also facing a threat due to habitat destruction and human encroachment. They have been reports from the locals about huntings using guns on the islands which targets the meat of *D. bicolor*. Due to the heavy thunderstorm in the late evening and sometimes in the early afternoon, our point count sessions were limited.

Five migratory birds are observed throughout this survey which are the *Lanius cristatus* (Brown shrike), *Lanius tigrinus* (Tiger Shrike), *Oriolus chinensis* (Black Naped

Table 1: Taxonomic list of bird species observed through point count method in Pulau Perhentian Besar, Terengganu

No	Family Species	Common Name	n	Relative Abundance (%)	Strata level	Notes	IUCN
Laniidae							
1	<i>Lanius cristatus</i>	Brown Shrike	5	8.77	Understorey (2m)	Perching on branch	LC
2	<i>Lanius tigrinus</i>	Tiger Shrike	1	1.75	Understorey (1m)	Perching on twigs	LC
Oriolidae							
3	<i>Oriolus chinensis</i>	Black-naped oriole	6	10.53	Understorey (7m)	Perching on Rhu tree	LC
Muscicapidae							
4	<i>Copsychus malabaricus</i>	White-rumped shama	15	26.32	Understorey (5m)	Perching and calling on branch	LC
5	<i>Copsychus saularis</i>	Oriental Magpie Robin	3	5.26	Understorey (2m)	Perching on small branch	LC
Hirundinidae							
6	<i>Hirundo tahitica</i>	Pacific swallow	7	12.28	Understorey (1m)	Perching on rope and wires	LC
Acciptridae							
7	<i>Haliteetus leucogaster</i>	White-bellied Sea Eagle	2	3.51	Canopy (15m)	Soaring up the sky and foraging on fish	LC
Columbidae							
8	<i>Ducula bicolor</i>	Pied Imperial-pigeon	15	26.32	Canopy (15m)	Perching on tall trees on hills	LC
9	<i>Caloenas nicobarica</i>	Nicobar Pigeon	1	1.75	Understorey (0m)	Foraging on forest floor	NT
Scolopacidae							
10	<i>Actitis hypoleucos</i>	Common Sandpiper	2	3.51	Understorey (0m)	Foraging on sand	LC
			57	Total number of observations			
			10	Total number of species			
			7	Total number of families			

LC: Least Concern NT: Near Threatened VU: Vulnerable EN: Endangered CR: Critically Endangered
n: Number of observations IUCN: International Union for Conservation of Nature (2014)

Table 2: Taxonomic list and measurements (mm) of bird species captured through mist-netting method in Pulau Perhentian Besar Terengganu

Family	Species Name	Common Name	sex	BL	BW	BD	TR	TA	WL	WS	TL	WT (g)	BP	MS	NOTE
Muscicapidae	<i>Copsychus malabaricus</i>	White-rumped shama	M	16	4	5	20	135	95	284	247	34	1	P10, P9, P8, S3	UMN 3

M: Male, BL: Bill length, BW: Bill width, BD: Bill depth, TR: Tarsus length, TA: Tail length, WL: Wing length, WS: Wingspan length, TL: Total length, WT: Weight, BP: Brooding Patch, MS: Moulting Stage, UMN 3: Underscored Mist Net 3, P: Primary feather, S: Secondary feather

Oriole), the *Actitis hypoleucos* (Common Sandpiper) and the *Ardeola bacchus* (Chinese Pond Heron). The *L. cristatus* is a common migrant that arrives in Peninsular Malaysia during September and leaves to breed in Eastern Palaearctic by May while the *L. tigrinus* is a migrant winter visitor which arrives at the end of August and leaves to breed by May in the Eastern Palaearctic (Jeyarajasingam & Strange, 1993). The *O. chinensis* is a common resident in the coastal areas and consists of migrants from islands to far inland (Davison & Fook, 2003). The *Actitis hypoleucos* is a common migrant and non-breeding winter visitor from Palaearctic, Africa, Oriental, Australasia (Jeyarajasingam & Strange, 1993; Davison & Fook, 2003) that can be observed in Peninsular Malaysia throughout the year. The *Ardeola bacchus* that is a migrant from China and often found in freshwater swamps, rice fields, lakes, and along the coast (Davison & Fook, 2003). The *L. tigrinus* and *L. cristatus* always visits open country areas and often perch at low bare branch in the forest edge while the *O. chinensis* prefers to stay hidden inside lower canopy. The *A. hypoleucos* is known for its characteristic which is bobbing its tail while feeding along the water's edge (Davison & Fook, 2003).

When compared with nearby islands such as Pulau Redang and Pulau Tioman, Pulau Tioman has the most species of birds which are 148 species altogether followed by Pulau Redang with a total of 46 species and the least species of birds come from Pulau Perhentian with a total of 31 species (Tamblyn *et al.*, 2005) based on the consolidated checklist constructed (Table 3).

We surveyed only a small portion of the island which is in Teluk Keke area and on the trail towards fauna bay. Other areas are not covered such as the Flora and Fauna bay at the other side of the island, thus additional surveys during other seasons are warranted in order to document both resident and migratory bird species that are present in this island.

Conclusion

D. bicolor and *C. malabaricus* were the most observed species in Pulau Perhentian Besar due to its abundant food resources such as insects and fruiting trees. Mist-netting method lack in results due to the weather constraint where the island face thunderstorm at that period. Perhaps choosing more suitable areas to place mist, decreasing frequent relocation of mist nets and sampling during clearer days should be done in the future to increase the capture rate of birds using mist-netting method. The island has been a shelter for many species of birds including the Near Threatened species which is the *C. nicobarica*. Conservation action should be taken upon this island to preserve its natural wildlife. Hunting for bird meat should be prohibited as it is the main threat towards the decreasing number of birds on the island. Initiative and mitigation measures must be taken upon invasive species such as domestic cats and rats that propose a threat towards birds especially ground-dwelling bird (e.g. *C. nicobarica*). Future researches could access all the Perhentian archipelagos besides increasing their sampling efforts to further discover new species that is present in the Perhentian

Table 3: Consolidated Checklist of Birds in Pulau Perhentian collaborated with Tamblyn et al. (2005)

Family/ Scientific Name	Common Name	Resident (R) / Migrant (M)	Conservation Status (IUCN, 2014)	(WCA, 2010)
Ardeidae				
<i>Egretta sacra</i>	Pacific reef egret	R	LC	TP
<i>Ardeola bacchus</i>	Chinese Pond Heron	M	LC	TP
Accipitridae				
<i>Haliaeetus leucogaster</i>	White-bellied Sea Eagle	R	LC	TP
Rallidae				
<i>Amaurornis phoenicurus</i>	White-breasted waterhen	R,M	LC	P
Scolopacidae				
<i>Actitis hypoleucos</i>	Common Sandpiper	M	LC	TP
<i>Gallinago species</i>	Common or Pintail Snipe	M	LC	TP
Laridae				
<i>Sterna sumatrana</i>	Black-naped Tern	R	LC	TP
Columbidae				
<i>Ducula bicolor</i>	Pied Imperial Pigeon	R	LC	TP
<i>Chalcophaps indica</i>	Emerald Dove	R	LC	P
<i>Caloenas nicobarica</i>	Nicobar Pigeon	R	NT	TP
Apodidae				
<i>Apus affinis</i>	House Swift	R	LC	TP
<i>Collocalia fuciphaga</i>	Edible Nest Swiftlet	R	LC	TP
<i>Collocalia esculenta</i>	Glossy Swiftlet	R	LC	P
<i>Cypsiurus balasiensis</i>	Asian Palm Swift	R	LC	TP
Alcedinidae				
<i>Todiramphus chloris</i>	Collared Kingfisher	R,M	LC	TP
<i>Halcyon pileata</i>	Black Capped Kingfisher	M	LC	TP
Hirundinidae				
<i>Hirundo rustica</i>	Barn Swallow	M	LC	TP
<i>Hirundo tahitica</i>	Pacific Swallow	R	LC	TP
<i>Hirundo concolor</i>	Dusky Crag Martin	R	LC	TP
Oriolidae				
<i>Oriolus chinensis</i>	Black Naped Oriole	R,M	LC	TP
Muscicapidae				
<i>Copsychus saularis</i>	Oriental Magpie Robin	R	LC	P
<i>Copsychus malabaricus</i>	White Rumped Shama	R	LC	P
Phylloscopidae				
<i>Phylloscopus borealis</i>	Arctic Warbler	M	LC	TP
Motacillidae				
<i>Motacilla flava</i>	Yellow Wagtail	M	LC	TP
<i>Dendronanthus indicus</i>	Forest Wagtail	M	LC	-
Laniidae				
<i>Lanius Igrinus</i>	Tiger Shrike	M	LC	TP
<i>Lanius cristatus</i>	Brown Shrike	M	LC	TP
Sturnidae				
<i>Aplonis panayensis</i>	Asian Glossy Starling	R	LC	-
Nectariniidae				
<i>Nectarinia jugularis</i>	Olive-backed Sunbird	R	LC	TP
<i>Nectarinia sperata</i>	Purple-throated Sunbird	R	LC	-
<i>Arachnothera longirostra</i>	Little Spiderhunter	R	LC	TP

M: Migrant, R: Resident, LC: Least Concern, NT: Near Threatened, TP: Totally Protected, P: Protected, WCA: Wildlife Conservation Act 2010

islands. Meanwhile, remaining forest in Pulau Perhentian should be protected under Environmental Quality Act (EQA) and Wildlife Conservation Act (2010) to protect the forest and threatened wildlife in Pulau Perhentian such as the Pied Imperial Pigeon and Nicobar Pigeon. Observation of migratory birds will also be an interesting study especially during the monsoon season (September-November).

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One Pied Imperial Pigeon (*Ducula bicolor*) on a branch at Pulau Perhentian Besar, 16th September 2015 (ca. 1735 hours).

Photo courtesy: Mazrul Aswady