DIVERSITY AND ABUNDANCE OF BIRD COMMUNITIES IN ENDAU-KLUANG WILDLIFE RESERVE, JOHOR, MALAYSIA

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ABSTRACT

A bird fieldwork survey was conducted for 5 days at Endau-Kluang Wildlife Reserve, Johor Forest Reserve on the 29th October to 2nd November 2008. This is one of the field work activities that were conducted by Sabah Parks' research team in the participation of wildlife survey which was organized by Department of Wildlife and National Parks. Two techniques were adopted namely general observation and point sampling methods during the course of survey. The occurrence of bird communities within the research site is relatively low. A total of 72 species in 24 families were successfully recorded from both general observation and point sampling. The results of point sampling gave that a conservative density estimates 0.7 birds per 60 m^2 occupied the understorey of logged forest below 2.5 m in the survey area. However, these results are only preliminary and more censuses are needed over time for a proper assessment and monitoring.

Keywords: Birds, Endau-Kluang, Fieldwork Survey

INTRODUCTION

Endau-Kluang Wildlife Reserve is under the administration of Johor's state government. The area of 101, 174 ha along the northern boundary of the state of Johore was gazatted in 1933, by Notification No. 827. Part of the area was logged that were permitted between 1962 and 1963 (Steven, 1968). The reservation area was known as a natural habitat for many large mammal species including Sumatran Rhino (*Dicermocerus sumatrensis)*, Gaur (*Bos gaurus)*, Elephant (*Elephas maximus)*, Tiger (*Panthera tigris)*, Wild Pig (*Sus srofa)* and Deer (*Cervus timorensis)*. This area comprised of lowland depterocarp forest with a variation of vegetation at different micro habitat. It creates a unique environment that allows various fauna and flora to flourish in abundance. This research was primarily aimed at providing an additional baseline data to document specifically of the birds' diversity in general as well as to provide an additional biodiversity checklist of Endau-Kluang Wildlife Reserve.

Study Area

This survey was carried out within the logged forest near Lamakoh River about 3 hours drives from Department of Wildlife and National Parks head office in Kluang, Johor town, where located at N 02^0 29' and E 103^0 26' lies 35 m above sea level. It is situated in the remote place accessible by old logging road and limited accessibility only by four-wheel-drive vehicles. The study area is characterized as a mix of primary patches, secondary patches, and cleared areas. The past heavy logging activities have changed the natural forest structure. Signs of old logging roads are still apparent. Pioneer trees

are dominated mainly by *Macaranga spp.* (Euphorbiaceae) abundantly growing along the edge of old logged road and various species of ferns cover the ground layer of open canopy. Lambert (1992) assumed that secondary forest habitat is known to provide abundant amount of food resources due to the various types of micro habitat and the fact that open canopy enables the regenerating plants to access sunlight for photosynthesis and bear fruits. The open habitat also enables easier encounters and sightings of birds, which results in more records. The weather for the duration of the survey period was hot.

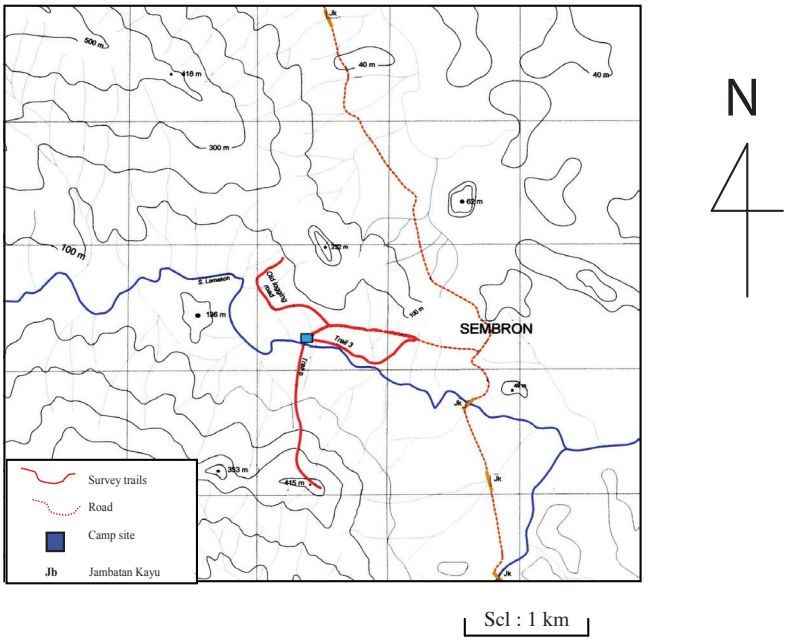

Figure 1. Location of Study Site, N 02^0 29' and E 103^0 26'

Figure 2. Lamakoh River - Study site

METHODOLOGY

This survey was conducted along the trails at three locations: 1) near the Lamakoh River 2) along the old logged road and, 3) on ridge top (see Figure 1). Each trail was chosen to represent a different type of microhabitat in the forest surrounding, which is generally high dense on undergrowth with very few large tree relatively young and regenerating vegetation.

Data collection in the field involved two techniques namely general observation and point sampling. Data recording was conducted from 0800 – 1300 h and the afternoon session was from 1400 – 1700 h for 5 consecutive days in the field.

General observation is an independent procedure without specific rules in recording birds' species that are identifiable by observers through direct sight or vocal. This procedure is intended to produce 20 species checklists of birds as recommended by MacKinnon and Phillipps (1993) as one of the relevant methodology suit for the tropical rainforest. This simple method is useful to estimate bird abundance and predict total species number for a particular site in a short observation period that suited our fieldwork.

Point sampling (Fuller and Langslow, 1984; Rodgers, 1991) procedure requires observer to sit quietly at randomly selected points in the forest for a five-minute period after every ten minutes interval walking, observing any birds which visualize within the point. Birds observed were recorded in term of species, estimated distance from observer, estimated height from the ground, individual number, status (resident/migratory) and other observation on bird behavior. To estimate the population density used the formula;

$$D=\frac{N\ (10{,}000^2)}{\pi r^2}$$

D: density
N: no of birds
A: area in (ha)
r: radius or distance from the point.

However, the birds which appear outside of the research area were also recorded for check list purpose. The observation was conducted by using binoculars (Leica 10 x 40BA), notebook, pen/pencil, stopwatch and a reference bird books such as A Field Guide To The Birds of Thailand and South-East Asia by Craig Robson, (2000).

RESULTS

General Observation

A total of 7 checklists of 20 species of birds were successfully obtained during the five consecutive days of fieldworks. The cumulative total number of species from these checklists is 71 of 140 birds were recorded. The species discovery curve is shown in Figure 3. The curve indicates that the occurrence of bird communities within the research site is relatively low.

The most frequent species recorded in the checklist were the Black-naped Monarch (*Hypothymis azurea)*, Blue-crowned Hanging Parrot (*Loriculus galgulus)*, Greater Racket-tailed Drongo (*Dicrurus paradiseus)*, Hairy-backed Bulbul (*Tricholestes criniger)* and Little Spiderhunter (*Arachnothera longirostra)* with 5 records respectively, followed by Asian Fairy Blue Bird (*Irena puella)*, Emerald Dove (*Chalcophaps indica)*, Great Argus (*Argusianus argus)*, Raffles's Malkoha (*Phaenicophaeus chlorophaeus)* and Rhinoceros Hornbill (*Bucerus rhinoceros)* with 4 records respectively. Five species were recorded three times, including the Yellow-bellied Bulbul (*Alophoixus phaeocephalus)*, Purple-napped Sunbird (*Nectarinia sperata)*, Grey-and-buff Woodpecker (*Hemicircus concretus)*, Dark-necked Tailorbird (*Orthotomus atrogularis)* and Ashy Tailorbird *Orthotomus ruficeps.*

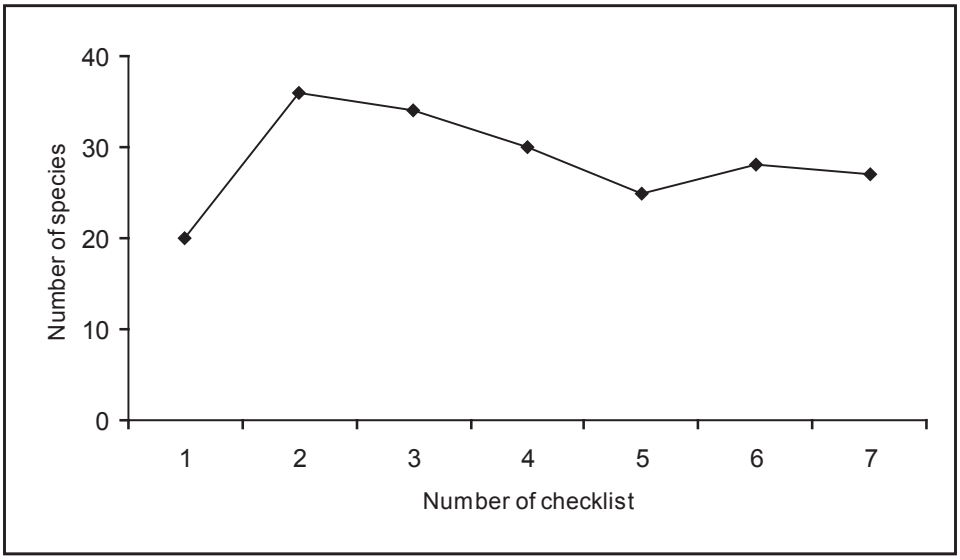

Figure 3. Bird's species discovery curve for 7 checklists of 20 species in the study site.

Point Sampling

A total of 71 points were randomly selected from various forest micro-habitats and 26 observations point were made upon N=63 birds from 24 species. It gave that a conservative density estimate 0.7 birds per 60 m^2 occupied the understorey of logged forest below 2.5 m. Mean observation records for each point sampling were 0.9 birds, with 45 sampling points were shown negative. The most frequent species record was the Little Spider Hunter *Arachnothera longirostra* with 7 records followed by Ashy Tailorbird *Orthotomus ruficeps* with 4 records and Greater Racket-tailed Drongo *Dicrurus paradiseus* and Sooty-capped Babbler *Malacopteron affine* with 3 records respectively. The highest population density was estimated that within a hectare below 2.5 m of forest under storey was occupied by the Cream-vented Bulbul and Stripped Tit-Babbler with 795 birds respectively and the lowest density was the Purple-naped Sunbird and Red-eyed Bulbul with 14 birds respectively. The comparison of population density of 25 species that occupied forest under story within a hectare in the research site is shown in Table 1.

Table 1. Estimated density indicated for 24 species of point sampling observation.

Species	**No of individual (N)**	**Frequency of recorded (f)**	**Radial distance (R), m**	**Mean radial distance (r=R/f), m**	**Density estimate (individual per/Ha.^{2})**
Cream-vented Bulbul *Pycnonotus simplex*	4	1	4 m	4 m (50.3 m^2)	795
Stripped Tit-Babbler *Macronous gularis*	4	1	4 m	4 m (50.3 m^2)	795
White-chested Babbler *Trichastoma rostratum*	4	1	5 m	5 m (78.6 m^2)	509
Sooty-capped Babbler *Malacopteron affine*	6	3	18 m	6 m (113.14 m^2)	530
Plain Flowerpecker *Dicaeum concolor*	1	1	3 m	3 m (28.2 m^2)	354
Black-naped Monarch *Hypothymis azurea*	1	1	3 m	3 m (28.2 m^2)	354
Ashy Tailorbird *Orthotomus ruficeps*	5	4	27 m	6.8 m (145.3 m^2)	344
Little Spiderhunter *Arachnothera longirostra*	7	7	59 m	8.43 m (223.4 m^2)	313
Chestnut-rumped Babbler *Stachyris maculate*	4	1	7 m	7 m (154 m^2)	260
Black-throated Babbler *Stachyris nigricollis*	2	1	5 m	5 m (78.6 m^2)	254
Golden-fronted Leafbird *Chlorophsis aurifrons*	2	1	5 m	5 m (79 m^2)	253
Rufous-tailed Tailorbird *Orthotomus sericeus*	1	1	6 m	6 m (113.14 m^2)	88
Rufous-winged Philentoma *Philentoma pyrhopterum*	1	1	6 m	6 m (113.14 m^2)	88
Red-billed Malkoha *Phaenicophaeus javanicus*	3	2	18 m	9 m (254.6 m^2)	79

Greater Racket-tailed Drongo *Dicrurus paradiseus*	4	3	45 m	15 m (707.14 m^2)	57
Raffles's Malkoha *Phaenicophaeus chlorophaeus*	1	1	8 m	8 m (201.14 m^2)	50
Yellow-bellied Bulbul *Alophoixus phaeocephalus*	2	1	12 m	12 m (452.6 m^2)	44
Buff-necked Woodpecker *Meiglyptes tukki*	3	2	31 m	15.5 m (755.1 m^2)	40
Dark-necked Tailorbird *Orthotomus atrogularis*	2	2	28 m	14 m (616 m^2)	33
Teckkell's Blue Flycatcher *Cyornis tickelliae*	2	1	14 m	14 m (616 m^2)	33
White-rumped Shama *Copsychus malabaricus*	1	1	12 m	12 m (452.6 m^2)	22
Scarlet-rumped Trogon *Harpactes duvaucelii*	2	1	20 m	20 m (1257.14 m^2)	16
Purple-naped Sunbird *Hypogramma hypogrammicum*	1	1	15 m	15 m (707.14 m^2)	14
Red-eyed Bulbul *Pycnonotus brunneus*	1	1	15 m	15 m (707.14 m^2)	14

Notes: Density estimates, $D=\underline{N(10,000^2)}/\pi r^2$; (r=radius or distance from the point).

Records of note

There were some interesting observations during a week of survey period. First, the sighting of Rail Babbler *Eupetes macrocerus* is important due to the general scarcity of this species in Malaysian forest. This bird was observed searching foods on the ground in the bushy vegetation close to the tributary. The sighting of Blue-winged Leafbird *Chlorophsis cochinchinensis* is often encountered as scarce or rare. Three migratory species were sighting of a pair of Rufous-chested Flycatcher (*Ficedula dumetoria)* hunting for insects at low ground, Grey Wagtail (*Motacilla cinerea)* seeing foraging on the open rocky river bank and the Eastern Crowned-Warbler (*Phylloscopus coronayus)* was observed foraging among the dense foliage in the middle of the canopy layer. Crested Serpent Eagle (*Spilornis cheela)* which was the only species of bird of prey was encountered. The only Malaysian Eared Nightjar (*Eurostopodus temminckii)* was recorded representing the nocturnal birds.

DISCUSSION AND CONCLUSION

During this bird's survey, the fruiting tree found scarcely is assumed that it will effect to the abundance of birds. The most apparent general trend was a scarcity of frugivores birds. This was evidenced by the relative absence of common frugivores, such as Pigeons and Barbets. However, it was recorded less within the survey area. Kimura (2002) reported on Mount Kinabalu in Sabah that some period of major frugivorous species decreased in the lowland and increased in the highland during the fruitless period in the lowland. Moreover, it was reported (Corlett, 1990; Leighton & Leighton, 1983; Loiselle & Blake, 1991, Wich & van Schaik, 2000) that in the tropical regions, seasonal horizontal and altitudinal movements of frugivorous birds and mammals are tracking fruits resources.

Frequency of observation was also relatively low but it was high in term of species richness where a 203 birds comprised of 72 species in 24 families were recorded from both general observation (N=140) and point sampling (N=63) as shown in the appendix I. This number was represented by 5 main birds' group namely canivorous, frougivorous, omnivorous, insectivorous, nectarivorous. However, 50% of the species numbers (N=36) were insectivorous that commonly encountered during this survey period followed by omnivorous (N=12) and nectarivorous (N=7). It assumed that the timing of fruiting on the trees affects result that these groups are quite different. Hornbills as a large birds group found were scarce, only Rhinoceros Hornbill (*Buceros rhinoceros)* and Wreathed Hornbill (*Rhyticeros undulates)* were heard and seen on a few occasions. It is important to note that the general activities of some of the birds for example Bulbuls, prefer more in the open canopy rather than in the dense under growth of forest and also in the canopy layer rather than on the close ground layer.

The tropical avian fauna occupying the forest in Malaysia is extremely rich, both in terms of the numbers of species and in terms of the diversity of life styles and ecological distribution. However, the information is incomplete, and it is certain that additions will be made to all the faunal lists. Sampling needs to be carried out in more localities both in the lowland and highland environment.

The breeding habits of a number of species are unknown. Perhaps the most urgent need is to study population dynamic. As it is true for birds that it is lack of study for population dynamic in most tropical areas and the population biology of these in Malaysia is virtually little known. Department of Wildlife and National Parks have made a good start in West Malaysia region for some of the birds but much remains to be done on population sizes, fluctuations, movements of individuals which related to the habitat change and fruiting or flowering season. All of these are needed for sound conservation practices.

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APPENDIX

Appendix 1.

List of encountered birds during the survey period

	FAMILY	Common Name	*Scientific Name*
1	**ACCIPITRIDAE**		
		Crested Serpent-Eagle	*Spilornis cheela*
2	**PHASIANIDAE**		
		Great Argus	*Argussianus argus*
3	**COLUMBIDAE**		
		Emerald Dove	*Chalcophaps indica*
4	**PSITTACIDAE**		
		Blue-crowned Hanging Parrot	*Loriculus galgulus*
		Blue-rumped Parrot	*Psittinus cyanurus*
5	**CUCULIDAE**		
		Red-billed Malkoha	*Phaenicophaeus javanicus*
		Black-bellied Malkoha	*Phaenicophaeus diardi*
		Chestnut-breasted Malkoha	*Phaenicophaeus curvirostris*
		Raffles's Malkoha	*Phaenicophaeus chlorophaeus*
6	**CAPRIMULGIDAE**		
		Malaysian Eared Nightjar	*Eurostopodus temminckii*
7	**APODIDAE**		
		Black-nest Swiftlet	*Collocalia maxima*
		House Swift	*Apus affinis*
8	**TROGONIDAE**		
		Scarlet-rumped Trogon	*Harpactes duvaucelii*
	HEMIPROCNIDAE		
		Whiskered Treeswift	*Hemiprocne comata*
9	**MEROPIDAE**		
		Blue-throated Bee-Eater	*Merops viridis*

10	**BUCEROTIDAE**		
		Wreathed Hornbill	*Aceros undulatus*
		Rhinoceros Hornbill	*Bucerus rhinocerus*
11	**CAPITONIDAE**		
		Brown Barbet	*Calorhamphus fuliginosus*
		Lineated Barbet	*Megalaima*
		Blue-eared Barbet	*Megalaima australis*
12	**PICIDAE**		
		Buff-necked Woodpecker	*Meiglyptes tukki*
		Grey-and-Buff Woodpecker	*Hemicirus concretus*
		Checker-throated Woodpecker	*Picus mentalis*
13	**CAMPEPHAGIDAE**		
		Black-winged Flycatcher-Shrike	*Hemipus hirundinaceus*
		Scarlet Minivet	*Pericrocotus flammeus*
		Lesser Cuckoo Shrike	*Coracina fimbriata*
14	**CHLOROPSEIDAE**		
		Greater Green Leafbird	*Chlorophsis sonnerati*
		Blue-winged Leafbird	*Chlorophsis cochinchinensis*
15	**PYCNONOTIDAE**		
		Black-crested Bulbul	*Pycnonotus melanicterus*
		Black-headed Bulbul	*Pycnonotus atriceps*
		Cream-vented Bulbul	*Pycnonotus simplex*
		Hairy-backed Bulbul	*Tricholestes criniger*
		Red-eyed Bulbul	*Pycnonotus brunneus*
		Spectacled Bulbul	*Pycnonotus erythropthalmos*
		Yellow-bellied Bulbul	*Alophoixus phaeocephalus*
16	**TIMALIIDAE**		
		Black-throated Babbler	*Stachyris nigricollis*
		Chestnut-rumped Babbler	*Stachyris maculate*
		Chestnut-winged Babbler	*Stachyris erythroptera*
		Rail Babbler	*Eupetes macrocerus*
		Scarly-crowned Babbler	*Malacopteron cinereum*
		Sooty-capped Babbler	*Malacopteron affine*
		Striped Tit-Babbler	*Macronous gularis*
		White-chested Babbler	*Trichastoma rostratum*
		Chestnut-backed Schmitar Babbler	*Pomatorhinus montanus*
		White-bellied Yuhina	*Yuhina zantholeuca*

17	**TURDIDAE**		
		White-rumped Shama	*Copsychus malabaricus*
18	**SYLVIIDAE**		
		Eastern Crowned-Warbler	*Phylloscopus coronatus (M)*
		Ashy Tailorbird	*Orthotomus ruficeps*
		Dark-necked Tailorbird	*Orthotomus atrogularis*
		Rufous-tailed Tailorbird	*Orthotomus sericeus*
19	**MUSCICAPIDAE**		
		Asian Brown Flycatcher	*Muscicapa dauurica*
		Asian Paradise Flycatcher	*Terpsiphone paradisi*
		Black-naped monarch	*Hypothymis azurea*
		Rufous- chested Flycatcher	*Ficedula dumetoria (M)*
		Maroon-breasted Philentoma	*Philentoma velatum*
		Teckell's Blue-Flycatcher	*Cyornis tickelliae*
		Rufous-winged Philentoma	*Philentoma pyrhopterum*
20	**MOTACILLIDAE**		
		Grey Wagtail	*Motacilla cinerea (M)*
21	**NECTARINIIDAE**		
		Ruby-cheeked Sunbird	*Anthrepres singalensis*
		Little Spiderhunter	*Arachnothera longirostra*
		Fork-tailed Sunbird	*Aethopyyga christinae*
		Purple-naped Sunbird	*Hypogramma hypogrammicum*
		Red-throated Sunbird	*Anthreptes rhodolaema*
		Rubby-cheeked Sunbird	*Anthreptes singalensis*
		Spectacled Spiderhunter	*Arachnothera flavigaster*
22	**DICAEIDAE**		
		Plain Flowerpecker	*Dicaeum concolor*
		Crimson-breasted Flowerpecker	*Prionochilus percussus*
23	**DICRURIDAE**		
		Black Drongo	*Dicrurus macrocerus*
		Greater Racket-tailed Drongo	*Dicrurus paradiseus*
24	**ORIOLIDAE**		
		Dark-throated Oriole	*Oriolus xanthonotus*
		Asian Fairy Blue Bird	*Irena puella*