Distribution of Pycnonotidae at Padang Chong Forest Reserve, Perak

Manoshini Appanan[1*], *Mohammad Shahfiz* Azman[1], *Nor Hazwani* Ahmad Ruzman[1], *Anis Zafirah* Zam Beri[1], *Muhammad Asyraff* Azahar[1], *Noor Faradiana* MD Fauzi[1], *Muhammad Syaridzwan* Baharudin[1], *Azrul Ekhuan* Eliah[2], and *Mohd Faiz* Kamaruzzaman[2]

[1]Zoolog Branch, Forest Biodiversity Division, Forest Research Institute Malaysia, 52109 Kepong, Selangor Darul Ehsan
[2]Hulu Perak District Forestry Office, Jalan Sultan Abdul Aziz, 33300 Gerik, Perak Darul Ridzuan

Abstract. There is not much information on avifauna especially Pycnonotidae at Padang Chong Forest Reserve (PCFR). Therefore, the main objective of this study is to identify and document species from Pycnonotidae family at PCFR. A total of five sampling sessions were carried out from June to November 2022. Surveys were carried out at two plots along the gradient from the border of PCFR namely Plot 1 (500 m) and Plot 2 (1 km) each plot consist of transect line 100 m x 100 m (1 ha). Ten mist nets were deployed at each plot for five consecutive days per sampling session. Binoculars and cameras were aided for observation purposes. As a result, a total of 25 individuals from 9 species were recorded where 10 individuals (Plot 1) and 15 individuals (Plot 2) respectively. Species, Grey-bellied Bulbul were mostly recorded (8 individuals), followed by Spectacled Bulbul and Hairy-backed Bulbul (5 individuals), Grey-cheeked Bulbul (2 individuals), and Buff-vented Bulbul, Stripe-throated Bulbul, Cream-vented Bulbul, Black-headed Bulbul, and Olive-winged Bulbul are recorded one individual. Based on the species accumulative curve, the species composition is not reaching the plateau which indicates more sampling sessions are needed for Pycnonotidae at PCFR. In Plot 1, two bulbul species were recorded namely Spectacled Bulbul (LC) and the Grey-cheeked Bulbul (VU). In Plot 2 recorded the presence of Buff-vented Bulbul (NT), Stripe-throated Bulbul (LC), Cream-vented Bulbul (LC), and Hairy-backed Bulbul (LC). PCFR plays its role in providing a habitat for avifauna and resources to survive. Therefore, conservation efforts must be taken immediately to ensure this reserve is preserved and conserved.

1 Introduction

There are 137 species of bulbuls, globally, of which 39 species have been identified in Southeast Asia [43]. Jeyarajasingam [38] stated that there are 25 species of bulbuls in Peninsular Malaysia and Singapore. Of these, several species known as threatened species according to the IUCN RedList including Straw-headed Bulbul (*Pycnonotus zeylanicus*) -

* Corresponding author: manoshini@frim.gov.my

Critical Endangered (CR) and Grey-cheeked Bulbul (*Alophoixus tephrogenys*) - Vulnerable (VU).

Bulbuls are a medium-sized birds belonging to the Pycnonotidae family which have broad, rounded wings and fluffy plumage [38,43]. The majority bulbuls are characterized by various shades of brown, olive, yellow, or grey and between both sexes, male and female species. Bulbuls are gregarious birds, often seen congregating in small groups of a single species or a mix of species while foraging in fruiting trees. Their diet consists mostly of berries and tiny fruit, although they may also consume insects, nectar and buds [38,43]. Forest inhabitants, usually forage in the canopy [38].

Based on the previous studies, Pycnonotidae family was mostly distributed at several forest reserves in Perak. Seven species of bulbuls were recorded by Mohd Taib et al. [41] in Pulau Pangkor; eight species were recorded by Azman et al. [2] in the Kerian River Basin and 20 species were recorded by Chye et al. [35] in Belum-Temengor.

However, information on Pycnonotidae from Padang Chong Forest Reserve (PCFR) is lacking and scarce. Therefore, this study aims to provide a preliminary checklist of Pycnonotidae family at PCFR. Furthermore, this information is important to support stakeholders with the empirical information on Pycnonotidae species, including their habitat and distribution, for further conservation actions and maintaining the richness of avifauna at these sites.

2 Methodology

2.1 Study Area

Padang Chong Forest Reserve (PCFR) is a secondary lowland forest, located at Hulu Perak District, Perak (Figure 1) bordering Kedah, Malaysia, and Thailand. This study was conducted at PCFR, Compartment 12. There were two plots established: Plot 1- 500 m from the border of PCFR (N 05°41'03.4", E 101°01'11.0") the elevation is 431m and Plot 2- 1000 m from the border of PCFR (N05°41'19.1", E 101°00'58.0") the elevation is 440m. According to PLANMalaysia [42], PCFR been classified as ecological linkage A-PL2 (CFS1-PL4) in Perak (HS Padang Chong – HS Sungai Kuak – HS Lapang Nenering).

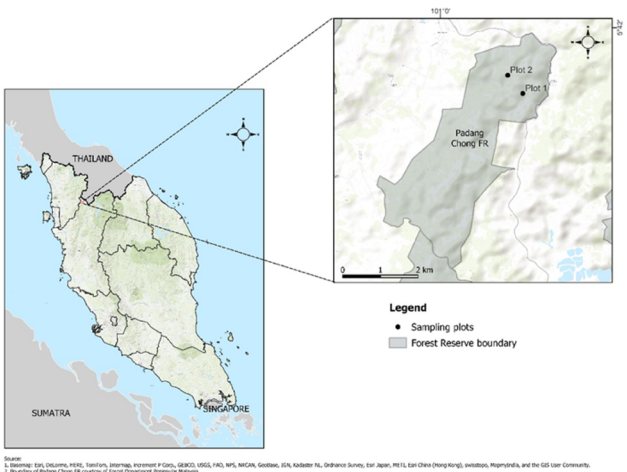

Fig. 1. Location of study sites at Padang Chong Forest Reserve, Perak.

2.2 Field Sampling Method

A total of five sample sessions were conducted from June to November 202. Surveys were conducted at two plots, Plot 1 (500 m) and Plot 2 (1 km) along the gradient from the PCFR border. Each plot is made up of a transect line measuring 100 m x 100 m (1 ha). At each plot, a total of 10 mist nets (12 m x 2.6 m x 30 mm) were set up at a height of approximately 0.3 m and 0.5 m from the ground. Mist nets were placed randomly, especially at potential fly paths. Nets were opened 24 hours for five consecutive nights to record both diurnal and nocturnal birds. The nets were checked every two hours starting from 0800 to 1130 hours, then continue from 1630 to 1930 hours. All observed bulbuls were also identified and recorded by Robson [43], Lim et al. [40] and Jeyarajasingam [38].

2.3 Measurement of Avifauna

Cloth bags were used as a temporary placement for the captured birds to transport. All captured birds were measured, identified, photographed, and released back to their original locations. Several measurements were taken, including tarsus (T), bill length (BL), bill width (BW), bill depth (BD), head bill (HB), total length (TL) tail (TA), wingspan (WS), wing length (WL), and live weight (g), as well as observations the bird's body conditions. The use of binoculars and cameras aided in observation. Captured individuals were identified by Robson [43], Lim et al. [40] and Jeyarajasingam [38] based on the morphological of the birds.

2.4 Data analysis

Species accumulation curve (SAC) indicates the total number of species obtained from the first day of sampling. The main purpose of SAC is for determining the sampling effort sufficiency according to Krebs [39].

3 Result and Discussion

From these surveys, there were 25 individuals representing nine species were documented, with 10 individuals (Plot 1) and 15 individuals (Plot 2), respectively. Grey-bellied bulbul (*Ixidia cyaniventris*) were the most frequently observed species (eight individuals), followed by Spectacled bulbul (*I. erythropthalmos*) and Hairy-backed bulbul (*Tricholestes criniger*) with five individuals, respectively.

Table 1. No of individuals of bulbuls documented in PCFR from five sampling sessions.

No	Scientific name	Common name	IUCN Status	Sampling Sessions				
				1	2	3	4	5
1	*Ixidia cyaniventris*	Grey-bellied bulbul	NT[b]	1	2	3		2
2	*Alophoixus tephrogenys*	Grey-cheeked bulbul	VU[c]	1	1			
3	*Ixidia erythropthalmos*	Spectacled bulbul	LC[a]	1	4			
4	*Tricholestes criniger*	Hairy-backed bulbul	LC		2	1	1	1
5	*Pycnonotus finlaysoni*	Stripe-throated bulbul	LC	1				
6	*Lole charlottae*	Buff-vented bulbul	NT	1				

7	*Pycnonotus simplex*	Cream-vented bulbul	LC	1		
8	*Brachypodius atriceps*	Black-headed bulbul	LC		1	
9	*Pycnonotus plumosus*	Olive-winged bulbul	LC			1

[a]LC: Least Concern
[b]NT: Near Threatened
[c]VU: Vulnerable

Table 2 shows the distribution of bulbuls based on Plot 1 and Plot 2 at PCFR. A total of nine species have been identified. There were four species recorded at Plot 1 and seven species of bulbuls recorded at Plot 2. Of these, two species, *Ixidia cyaniventris* and *Tricholestes criniger* were recorded at both plots.

Table 2. Distribution of bulbuls at PCFR.

No	Scientific name	Common name	Present Study	
			Plot 1	Plot 2
1	*Ixidia cyaniventris*	Grey-bellied bulbul	x	x
2	*Alophoixus tephrogenys*	Grey-cheeked bulbul	x	
3	*Ixidia erythropthalmos*	Spectacled bulbul	x	
4	*Tricholestes criniger*	Hairy-backed bulbul	x	x
5	*Pycnonotus finlaysoni*	Stripe-throated bulbul		x
6	*Lole charlottae*	Buff-vented bulbul		x
7	*Pycnonotus simplex*	Cream-vented bulbul		x
8	*Brachypodius atriceps*	Black-headed bulbul		x
9	*Pycnonotus plumosus*	Olive-winged bulbul		x

The species accumulation curve (SAC) was used to determine whether the sampling size of bird species acquired from PCFR was representative to the actual number of bulbul species to ensure that the results were complete. The x-axis represents the number of the species, whereas the y-axis represents the sampling days for plot 1 and plot 2.

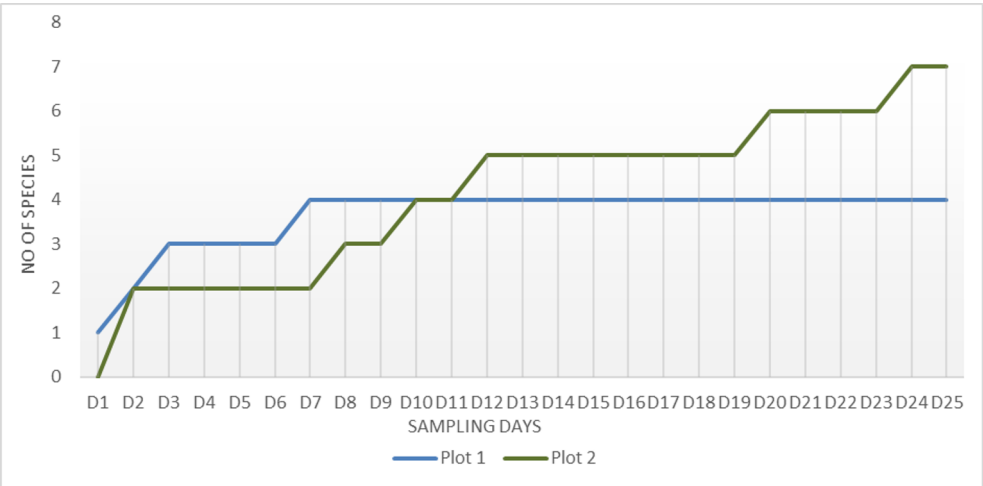

Fig. 2. Species Accumulation Curve (SAC) from Plot 1 and Plot 2 at PCFR.

In figure 2, the species accumulation curve at both plots were indicating additional species each day. However, for Plot 1 it has reached its asymptote starting from Day 7. Meanwhile, Plot 2 still indicates additional species even after Day 24 of samplings. Based on our observation, there are taller trees that create closer canopy cover compared to Plot 1 which has more open canopy. This is because Plot 2 is located 1000m from the forest edge. The food resources for birds alter with the fragment size due to the edge effects, since invertebrates might not survive well in edge habitat, which is often warmer and drier than the forest interior mainly because they are easily dehydrated [44]. Based on the species accumulation curve pattern, sampling efforts are still needed especially at Plot 2 which did not reach the asymptote indicating there are more unrecorded species present.

4 Conclusion

The survey presented the preliminary checklist of Pycnonotidae family at PCFR. A total of nine species of bulbuls; Grey-bellied bulbul, Grey-cheeked bulbul, Spectacled bulbul, Spectacled bulbul, Hairy-backed bulbul, Stripe-throated bulbul, Buff-vented bulbul, Cream-vented bulbul, Black-headed bulbul, and Olive-winged bulbul were documented in both Plot 1 and Plot 2 at PCFR. We also believe there are still yet many species to discover. Based on the species accumulation curve, more sampling efforts are still required according to the patterns shown in Figure 2 especially for Plot 2 to cover the diverse forest.

We would like to express our heartfelt appreciation to the Perak Forestry Department and Hulu Perak District Office for their permission and assistance throughout the studies. We would also like to express our sincerest gratitude to the Forest Research Institute Malaysia (FRIM) and the Zoology Branch team members for their dedication throughout this study. The assessment was permitted via a wildlife research permit granted by the Department of Wildlife and National Park (B-00297-15-22y).

References

1. Z. Abd Rahim, W.N.W. Ismail, N.A.M. Tamrin, M.H. Ridzuan, M. Daud, M. Adrus, M.T. Abdullah, JWP, **27** (2014)
2. N.M. Azman, N.S.A. Latip, S.A.M. Sah, M.A.M.M. Akil, N.J. Shafie, N.L. Khairuddin, Trop. Life Sci. Res. **22** (2011)
3. N.M. Azman, N.S. Latip, S. Anuar, N.J. Shafie, *Bird communities and feeding guilds from three land use types in Kerian River Basin, Perak*. In The Proceedings of the 2nd Annual International Conference Syiah Kuala University 2012 (Vol. 2, No. 1, pp. 22-24) (2012)
4. BirdLife International. 2017. *Pycnonotus jocosus* (amended version of 2016 assessment). The IUCN Red List of Threatened Species 2017: e.T22712634A119273079. https://dx.doi.org/10.2305/IUCN.UK.2017-3.RLTS.T22712634A119273079.en.
5. BirdLife International. 2016. Pycnonotus leucops. The IUCN Red List of Threatened Species 2016: e.T103834499A104340974. https://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T103834499A104340974.en.
6. BirdLife International. 2016. Pycnonotus squamatus. The IUCN Red List of Threatened Species 2016: e.T22712628A94340285. https://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T22712628A94340285.en.

7. BirdLife International. 2016. Pycnonotus brunneus. The IUCN Red List of Threatened Species 2016: e.T22712743A94347115. https://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T22712743A94347115.en.
8. BirdLife International. 2016. Alophoixus phaeocephalus. The IUCN Red List of Threatened Species 2016: e.T22713152A94361706. https://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T22713152A94361706.en.
9. BirdLife International. 2016. Setornis criniger. The IUCN Red List of Threatened Species 2016: e.T22713158A94362069. https://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T22713158A94362069.en.
10. BirdLife International. 2022. Iole finschii. The IUCN Red List of Threatened Species 2022: e.T22713137A219722927.
11. BirdLife International. 2016. Pycnonotus cyaniventris. The IUCN Red List of Threatened Species 2016: e.T22712631A94340584. https://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T22712631A94340584.en.
12. BirdLife International. 2016. Alophoixus ochraceus. The IUCN Red List of Threatened Species 2016: e.T103821072A94361292. https://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T103821072A94361292.en.
13. BirdLife International. 2019. Pycnonotus simplex. The IUCN Red List of Threatened Species 2019: e.T155218901A155219616. https://dx.doi.org/10.2305/IUCN.UK.2019-3.RLTS.T155218901A155219616.en.
14. BirdLife International. 2017. Hemixos connectens (amended version of 2016 assessment). The IUCN Red List of Threatened Species 2017: e.T103822666A113106245. https://dx.doi.org/10.2305/IUCN.UK.2017-1.RLTS.T103822666A113106245.en.
15. BirdLife International. 2016. Microtarsus melanoleucos. The IUCN Red List of Threatened Species 2016: e.T22712616A94339056. https://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T22712616A94339056.en.
16. BirdLife International. 2016. Euptilotus eutilotus. The IUCN Red List of Threatened Species 2016: e.T22712702A94344035. https://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T22712702A94344035.en.
17. BirdLife International. 2016. Pycnonotus blanfordi. The IUCN Red List of Threatened Species 2016: e.T22712737A94346692. https://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T22712737A94346692.en.
18. BirdLife International. 2016. Tricholestes criniger. The IUCN Red List of Threatened Species 2016: e.T22713161A94362438. https://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T22713161A94362438.en.
19. BirdLife International. 2016. Ixos mcclellandii. The IUCN Red List of Threatened Species 2016: e.T22713207A94365521. https://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T22713207A94365521.en.
20. BirdLife International. 2016. Ixos malaccensis. The IUCN Red List of Threatened Species 2016: e.T22713198A94364769. https://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T22713198A94364769.en.
21. BirdLife International. 2016. Pycnonotus flaviventris. The IUCN Red List of Threatened Species 2016: e.T103826151A104338610. https://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T103826151A104338610.en.

22. BirdLife International. 2016. Pycnonotus montis. The IUCN Red List of Threatened Species 2016: e.T103827210A104339614. https://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T103827210A104339614.en.
23. BirdLife International. 2020. Alophoixus tephrogenys. The IUCN Red List of Threatened Species 2020: e.T103821318A175771433. https://dx.doi.org/10.2305/IUCN.UK.2020-3.RLTS.T103821318A175771433.en.
24. BirdLife International. 2016. Pycnonotus finlaysoni. The IUCN Red List of Threatened Species 2016: e.T103833866A94344875. https://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T103833866A94344875.en.
25. BirdLife International. 2016. Pycnonotus plumosus. The IUCN Red List of Threatened Species 2016: e.T103834549A94346461. https://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T103834549A94346461.en.
26. BirdLife International. 2016. Brachypodius atriceps. The IUCN Red List of Threatened Species 2016: e.T103836079A94339713. https://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T103836079A94339713.en.
27. BirdLife International. 2017. Alophoixus ruficrissus (amended version of 2016 assessment). The IUCN Red List of Threatened Species 2017: e.T103821125A113104434. https://dx.doi.org/10.2305/IUCN.UK.2017-1.RLTS.T103821125A113104434.en.
28. BirdLife International. 2016. Hypsipetes leucocephalus. The IUCN Red List of Threatened Species 2016: e.T103823996A94366953. https://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T103823996A94366953.en.
29. BirdLife International. 2019. Pycnonotus pseudosimplex. The IUCN Red List of Threatened Species 2019: e.T155219571A155220740. https://dx.doi.org/10.2305/IUCN.UK.2019-3.RLTS.T155219571A155220740.en.
30. BirdLife International. 2016. Hemixos cinereus. The IUCN Red List of Threatened Species 2016: e.T103822693A104137578. https://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T103822693A104137578.en.
31. BirdLife International. 2016. Pycnonotus goiavier. The IUCN Red List of Threatened Species 2016: e.T22712731A94346183. https://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T22712731A94346183.en.
32. BirdLife International. 2016. Pycnonotus erythropthalmos. The IUCN Red List of Threatened Species 2016: e.T22712747A94347338. https://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T22712747A94347338.en.
33. BirdLife International. 2016. Iole charlottae. The IUCN Red List of Threatened Species 2016: e.T22713170A94362975. https://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T22713170A94362975.en.
34. BirdLife International. 2021. Pycnonotus zeylanicus. The IUCN Red List of Threatened Species 2021: e.T22712603A183176477. https://dx.doi.org/10.2305/IUCN.UK.2021-3.RLTS.T22712603A183176477.en.
35. L.K. Chye, Landscape, **14** (2010)
36. N.S. Hudin, H. Bachu, A.H. Hairuman, S. Ferdiana, G. Gebremichael, EDUCATUM Journal of Science, Mathematics and Technology, **6** (2019)
37. R. Ilias, H. Tak, JWP, **26** (2009)
38. A. Jeyarajasingam, A field guide to the birds of Peninsular Malaysia and Singapore. Oxford University Press (2012)

39. C.J. Krebs, Ecological Methodology. Addison Welsey Educational Publishers. Inc., Menlo Park, Califórnia (1999)
40. K.S. Lim, D.L. Yong, K.C. Lim, A Field Guide to Birds of Malaysia & Singapore. John Beaufoy Publishing Limited (2020)
41. F.S. Mohd Taib, G. David, A.N.D.Y. Lee, K.H. Low, K.S. Lee, M.F Yusoff, A.R. Yaacob, Malaysian Forester, **82** (2019)
42. PLANMalysia, Pelan Induk Rangkaian Ekologi Central Forestspine (PIRECFS). Diterbitkan oleh Jabatan Perancangan Bandar dan Desa (PLANMalaysia), Putrajaya. Bil 1/2022 (2022)
43. C. Robson, Field guide to the birds of South-East Asia. Second Edition. Bloomsbury Publishing Plc (2014)
44. L. Zanette, P. Doyle, S.M. Trémont, Ecol. **81** (2000)