UNDERSTORY BIRDS OF GUNUNG SILAM, SABAH, MALAYSIA

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Abstract

An assessment of the understory birds was conducted at Gunung Silam, Sabah, Malaysia. Gunung Silam is located on the eastern end of Segama Highlands, east of Sabah. The site selected for the study was near the telecommunication transmission tower. Twenty black mist nets with four shelves (2.5 m x 12 m, 35 mm mesh) were deployed during the study period that made up 1060 net units. A total of 28 birds were caught (including two recaptures) representing 12 species. 62% of the birds were captured in the morning and 32% in the afternoon. Great Argus (*Argusianus Argus*) calls were heard from three different locations. Owls were spotted three times during the spotlighting exercise.

Introduction

Gunung (mount) Silam is situated at 5^0N, 119^0E at the eastern end of Segama Highlands. It is a small coastal hill made up of ultra basic rocks of and its peak is about 884 m asl. This primary forest is made up of vegetation that is sparse and stunted due to poor soils and also contained toxic elements such as, magnesium, chromium, cobolt and nickel. The ecological studies of Gunung Silam on environment, forest structure and floristics and on forest processes have been presented by Proctor *et al* (1988) and Proctor *et al* (1989) respectively. A hydrological observations of Gunung Silam have been carried out by Bruijnzeel *et al* (1993) and the account of invertebrates in the litter and soil of Gunung Silam was presented by Leakey *et al* (1987).

The climate of Gunung Silam is influenced by sea and there is no marked dry or wet season. Mean annual rainfall recorded near sea level from a station at the base of Gunung Silam for 1971 to 1983 was 2011 mm (Proctor *et al* 1988). The mean minimum temperature recorded in 1984 by Proctor *et al* (1988) was 23.4^0C and 18.8^0C at 10 m and 884 m asl respectively. The corresponding maximum temperatures recorded at those places were 31.7^0C and 27.7^0C. The mean daily wind speeds recorded by Proctor *et al* (1988) were 1.5 m s^{-1} and 2.6 m s^{-1} at 12 m asl and 886 asl respectively.

An understory assessment of bird community was conducted at Gunung Silam, Sabah Malaysia for five days (11 September 1995 to 15 September 1995). This article presents the results and discussions of the assessment. Some discussions on the capture rates and times are also included.

Study Site

An area near the telecommunication transmission tower on Gunung Silam was selected as our study site (Figure 1). The area is drained by a small creek; dry during the dry season and a small concrete dam used for regulating the storm water draining down towards the asphalt road below the hill. The density of trees as recorded by Bruijnzeel *et al* (1993) was about 1078 ha^{-1} and the crown diameter was 3.5 m^2 ha^{-1}. Plant species richness in the area was 91 species per 0.24 ha which was dominated by Myrtaceae (Bruijnzeel *et al* 1993). A personal observation revealed that there was less undergrowth as compared to the secondary forests elsewhere and climbers including thorny rattans were less frequently found.

Materials and Methods

Twenty black mist nets with four shelves (2.5 m x 12 m, 35 mm mesh) were deployed starting from the afternoon of 11 to 15 September 1995. The distance between each net was about 20 m and they were erected 0.5 above the ground. As far as possible the nets were set under the close canopy to avoid sunflects reach the ground and thus silhouette the mist nets. Cuttings of undergrowth were kept to a minimum as cuttings were only made along the net line.

The nets were activated in the morning at 0630 hours until 1830 hours in the evening except on 11 September 1995 (the day when the nets were set up). The nets were checked every two hours. Even though the capture rate is low at noon (Karr 1979), we continued to activate the nets throughout the day until evening since our base camp was nearby and the nets were checked regularly. The captured birds were immediately identified after each checking time with the aid of King *et al*. (1975), MacKinnon *et al.* (1993), Smythies (1981) and Lekagul *et al* (1991). All captured birds were weighed with a Pesola spring balance, measured using steel ruler (total length, wing span, wing length - flat straightened wing, tail length, head-bill length, exposed culmen length and tarsus length), sex and ringed before released at the captured sites. The numbered (each ring has different number) aluminum rings belong to University Malaysia Sarawak (UNIMAS). The date and time of capture were also recorded. The recaptured birds were recorded and released.

Results and Discussion

Birds studies using mist nets do not include all species of understory birds especially those that are rare (Wilson *et al.* 1976). The method employed underestimated the birds present in the area and moreover, this study was only a short term study (five days). Ideally, other additional census methods such as, visual/auditory censuses would supplement this study and more data could have been generated. From our field experience the difficulty of observing rainforest species from the forest floor coupled with their diversity necessitates considerable field experience before an accurate census can be attempted. Otherwise, the census results would be unreliable and bias. Holmes *et al* (1990) and MacKinnon *et al* (1993) discuss the problems of censusing rainforest birds and Karr (1976) recommends as many methods as possible in carrying out bird census.

During the five-day netting period a total of 1060 net units were deployed and 28 birds were caught (including two recaptures) comprising 12 species (Table 1). Thus, the relative density of the understory birds at silam is 0.03 bird/net unit. A net unit is equivalent to one 2.5 m x 12 m mist net activated for one hour. The relative abundance for each species of bird is presented in Table 1.The sex ratio for the little spiderhunter and yellow-breasted flowerpecker was 1:2 and 1:1 respectively. The short-tailed babbler and red-eyed bulbul caught in the mist nets were both males (Table 2).

Two birds, Little spiderhunter (*Arachnothera longirostra*) and Yellow-breasted flowerpecker (*Prionochilus maculatus*) were captured just after the nets were activated on the first day (11 September 1995). Eight birds comprising three species were caught on 12 September 1995 and they included two Little spiderhunters, two Short-tailed babblers (*Trichastoma malaccense*) and four Grey-throated babbler (*Stachyris nigriceps*). A total of five birds were caught on the third day (13 September 1995) which included one Little spiderhunter, one red-eyed bulbul (*Pycnonotus brunneus*), one rufous-tailed shama (*Trichixos pyrrhopygus*), one White-rumped shama (*Copsychus malabaricus*) and one Rufous-winged flycatcher (*Philentoma pyrhopterum*). On the fourth day (14 September 1995), a total of nine birds were caught and one recaptured Grey-throated babbler. The species included one Little spiderhunter, one Yellow-breasted flowerpecker, two Grey-throated babbler, one Chestnut-

Table 1. Species, number of birds captured and relative abundance

Taxon	Number	Recapture	Relative abundance
Columbidae			
Little Green pigeon (*Treron olax*)	1	0	0.04
Eurylaimidae			
Green broadbill (*Calyptomena viridis*)	1	0	0.04
Pycnonotidae			
Red-eyed bulbul (*Pycnonotus brunneus*)	2	0	0.07
Timalidae			
Grey-throated babbler (*Stachyris nigriceps*)	6	2	0.21
Short-tailed babbler (*Trichastoma malaccense*)	2	0	0.07
Chestnut-backed scimitar babbler (*Pomatorhinus montanus*)	1	0	0.04
Muscicapidae			
Rufous-winged flycatcher (*Philentoma pyrhopterum*)	3	0	0.11
Turdidae			
White-rumped shama (*Copsychus malabaricus*)	1	0	0.04
Rufous-tailed shama (*Trichixos pyrrhopygus*)	1	0	0.04
Nectariniidae			
Purple-naped sunbird (*Hypogramma hypogrammicum*)	1	0	0.04
Little spiderhunter (*Arachnothera longirostris*)	5	0	0.18
Dicaeidae			
Yellow-breasted flower pecker (*Prionochilus maculatus*)	2	0	0.07
Total	28	2	

Table 2. Date, capture time, sex and body weight of the captured birds

Species	Date	Time (hr)	Sex	Weight (gm)
Little spiderhunter	11.09.95	1500	F	10
Yellow-breasted flowerpecker	11.09.95	1730	M	6
Little spiderhunter	12.09.95	0930	M	12
Little spiderhunter	12.09.95	1130	F	12
Grey-throated babbler	12.09.95	1530	F	17
Grey-throated babbler	12.09.95	1655	M	18
Grey-throated babbler	12.09.95	1655	M	18
Grey-throated babbler	12.09.95	1655	ud	15
Short-tailed babbler	12.09.95	0930	F	27
Short-tailed babbler	12.09.95	0930	F	21
Little spiderhunter	13.09.95	1300	M	14
Red-eyed bulbul	13.09.95	1300	F	28
Rufous-tailed shama	13.09.95	1300	F	43
White-rumped shama	13.09.95	1300	F	37
Rufous-winged flycatcher	13.09.95	1300	F	17
Little spiderhunter	14.09.95	1000	F	10
Grey-throated babbler	14.09.95	1000	F	12
Grey-throated babbler	14.09.95	1000	ud	15
Rufous-winged flycatcher	14.09.95	1000	M	19
Rufous-winged flycatcher	14.09.95	1000	M	16
Yellow-breasted flowerpecker	14.09.95	1000	F	8
Red-eyed bulbul	14.09.95	1000	F	28
Purple-naped sunbird	14.09.95	1000	M	12
Little green pigeon	15.09.95	1000	M	114
Little green pigeon	15.09.95	1000	M	134
Green broadbill	15.09.95	1000	M	47

Key

ud - undetermined
F - Female
M - Male

backed scimitar babbler (*Pomatorhinus montanus*), one red-eyed bulbul (*Pycnonotus brunneus*), two Rufous-winged flycatcher and one Purple-naped sunbird (*Hypogramma hypogrammicum*). The final day of the mist netting exercise (15 September 1995) resulted in three birds captured and one bird recaptured namely, one Green broadbill (*Calyptomena viridis*), two Little green pigeon (*Treron olax*) and one White-chested flycatcher (recaptured) (Table 2).

Wilson *et al.* (1976) mentioned that the number of new species captured in the mist nets declined on the third day of mistnetting. After two days of misnetting at the same place, there was a drastic reduction in the number of captures (Karr 1979, Wong 1986). However, in this study, the number of captures peaked on the fourth day where ten birds were caught including one recapture (Table 2). Only two birds were captured on the first day because the nets were activated only in the afternoon. For the rest of the days, the activated time allocated was equal.

The time of day has some effects on capture rate and species captured. Deslauriers *et al* (1991) found that there was a significant differences among species in mean capture times across years and sites for spring migrating passerines. In the analysis of capture time for this study, 62% of the birds were captured in the morning and 32% in the afternoon. The highest captures were noted during the mid-morning which was about 0930 hours to 1030 hours. However, the relationship between capture time and capture success would give a better result if this study was extended and the nets were moved to another study site.

Calls of Great argus (*Argusianus argus*) were heard from three different areas during the study period. One call was heard near the road to the telecommunication transmission tower. Three traps were set at the location where we believed the tracks were most likely used by *A. argus.* The traps were deactivated after two days because there were no more calls from the place. This was probably due to the disturbances caused by other researchers in the area.

In the spotlighting exercise, owls were spotted three times at different places. However, It was not possible for us to identify the owls at night from a distance of about 150 m from the road to the top of the tree where the owls were perching.

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