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UNDERSTOREY BIRD SPECIES COMPOSITION IN PRIMARY AND LOGGED FOREST WITH SPECIAL REFERENCE TO INSECTIVOROUS/FRUGIVOROUS BIRDS IN SUNGAI LALANG FOREST RESERVE, SELANGOR

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ABSTRACT

In Malaysia, the major cause of forest disturbance is through logging activities. Logging is known to affect the distribution and abundance of forest food resources, which are necessary for wildlife existence. The objective of the study is to determine bird species composition with reference to insectivorous/frugivorous group in two forest types; primary forest (VJR) and 10-year-old-logged forest (Compartment 33) of Sungai Lalang Forest Reserve, Selangor. The method used was mist netting. A total of 58 individuals of understorey insectivores/frugivores birds were recorded in primary forest and 106 individuals were recorded in 10-year-old logged forest. In terms of species composition 10 species of understorey insectivore/frugivore were recorded in primary forest whereas 16 species were recorded in 10-year-old logged forest. It was found that the number of individuals of understorey insectivores/frugivores birds were higher in 10-year-old logged forest compared to primary forest. Therefore, in conclusion, in terms of species composition, logged forest contained higher number of bird species than primary forest.

Keywords: Understorey insectivores/frugivores, mist-netting, Primary forest, 10-year-old logged forest

INTRODUCTION

In Malaysia, the major cause of forest disturbance is through the activities of logging. According to Zakaria Zakaria and Mat Desa (In Press), Zakaria and Francis, 2001) and Leighton (1982), logging activity will influence the distribution and abundance of food sources and it is frequently correlated with the behavior pattern of birds and other animal species. Logging activities can affect the forest microclimate by exposing the mid-canopy of the forest and thus increase the temperature and decreasing humidity. Thus species that are intolerant to the changing conditions will rapidly disappear and activity of some species may be severely limited by temperature fluctuations (Johns, 1983; Zakaria and Francis, 2001). One of the significant impacts of primary forest destruction on bird populations is a decrease in species number and change of bird community (Blankespoor, 1991).

It has been suggested that understorey species are affected the most when the forest structure is altered (Nordin and Zakaria, 1997). According to Zakaria and Francis (2001) birds in tropical forest adapt to microclimatic conditions by moving between the many vertical strata of the forest. However, certain groups of birds are able to tolerate disturbance such as that caused by logging. A number of large bird species has declined in logged forest. This was probably because many of their preferred trees are high canopy species that supply them with food and nesting sites. Due to logging activities, those mature fruit bearing trees were likely cut down and also had caused significant impact on the surrounding trees during the process of felling and harvesting (Zakaria and Francis, 2001). Not only was the impact due to tree felling, but also the removal or the absence of birds on logging area might be correlated with human activities such as hunting and poaching (by netting) especially large sized bird species. The smaller species may be more tolerant of differences in fruit availability and also may be better able to move around in the more scrubby regenerating forest vegetation (Nordin and Zakaria, 1997).

MATERIALS AND METHODS

The study was conducted at Sungai Lalang Forest Reserve, Semenyih, Selangor. Two compartment namely compartment 24 (Primary Forest) and compartment 33 (10-year-old logged forest) was chosen as the study sites. The primary forest covers an area of 82 ha while the 10-year-old logged forest (compartment 33) covers an area of 387 ha. The compartment 33 was logged using selective logging method from 1988

until 1991. Based on 60 cm – 55 cm dbh cutting limit, a total of 36,620.92m³ of timber has been extracted from the area. Both of the study sites are considered a hill forest.

The technique used to obtain the information on bird species was mist-netting method. The nets were placed in random locations in both study area. This technique was used since mist-net is the most and widely used method or gathering quantitatively reliable data on forest understory birds in the humid tropics (Fogden, 1972; Karr, 1980 and Wong, 1986).

RESULTS AND DISCUSSION

A total of 58 individuals of understory insectivores/frugivores birds were recorded in primary forest and 106 individuals were recorded in 10-year-old logged forest (Table 1). In terms of species composition 10 species of understory insectivore/frugivore were recorded in primary forest whereas 16 species were recorded in 10-year-old logged forest. Results also showed that the insectivores/frugivores was significantly different between primary and logged forest ($t=3.03$; $P<0.01$).

Table 1 also showed that 10-year-old logged forest contained higher number of species composition and number of individuals of understory insectivore/frugivore birds compared with primary forest. The highest number of individuals recorded in both areas was from the bulbuls species (Pycnonotidae) where, 52 individuals from 7 species of bulbul were recorded in primary forest whereas 95 individuals from 11 species were recorded in 10-year-old logged forest. From these results the 10-year-old logged forest recorded higher number of bulbuls species than primary forest.

The bulbuls species was recorded higher in 10-year-old logged forest than primary forest because they are considered as secondary species (species that present in large number in logged forest but recorded less in primary forest). They were able to survive in open area (Zakaria, 1998). Moreover, they also capable to feed on insect and small fruit produced from secondary plants in logged forest (Zakaria and Nordin, 2000b). Previous study (Johns, 1989; 1997; Zakaria et. al, (1999); Zakaria and Nordin, 1998; Zakaria and Zamri Rosli, 2002; Zamri Rosli and Zakaria, 2002) also stated that the bulbul species were recorded higher in logged forest compared to primary forest.

The most abundant species recorded in primary forest was *Criniger bres* followed by *Pycnonotus plumosus* and *Pycnonotus finlaysoni* whereas, in 10-year-old logged forest the dominant species was recorded from *Criniger bres* followed by *Pycnonotus plumosus* and *Pycnonotus brunneus* (Table 2).

The edge effect was higher in logged forest mainly due to fragmentation of the forest habitat produced due to logging activities. Forest edges have been shown to attract a greater number of birds due to an increase in the variability of microhabitat and food sources (Zakaria and Francis, 2001). An increased in the edge (ecotone) effects is expected to increase the number of rapid growing secondary plants that frequently produce flower nectar and fruits (Zakaria and Mat Desa, 2001). This in turn, may cause the insectivore/frugivore (bulbuls) or other colonising species to be attracted to such areas (logged areas) in search of food search for food.

Studies carried out by Zakaria and Zamri (2002) and Zakaria and Francis (2001) also showed that the bulbul population increased significantly in logged forests. A total of 346 individuals of these species were found in an edge forest compared to 133 individuals in an interior forest in Bubu Forest reserve, Perak (Dayang, 1995). Meanwhile, Zakaria and Nordin (1998) recorded 671 bulbul individuals in a logged forest and 550 individuals in a virgin forest. The finding indicated that bulbul species adapted well in the disturbed area. Similar findings were also reported by Zakaria and Nordin (1998). These species are capable of tolerating the changes in environment and microclimate (Johns, 1988).

Other insectivores/frugivores family such as Torgonidae, Eurylimidae, Columbidae, Pittidae, Estrildidae and Corvidae did not showed any significant different as these group affected less from logging activities. The study conducted indicated that the insectivore/frugivore especially from the family of pycnonotide survived better in logged forest compared to primary forest (Johns, 1983, 1989; Zakaria and Nordin, 1998,). Generally, studied have shown that the understory insectivore/frugivore was belong mainly by the bulbul species. The changes in microclimate (temperature and humidity) and over-exposure of canopy cover were the factors that caused the differences in species composition and individuals between primary and logged forest insectivore/frugivore birds.

Table 1: Number of species and individuals of understory insectivore/frugivore recorded in Primary and 10-year-old logged forest in Sg. Lalang Forest Reserve

Family	Primary forest		10-year-old logged forest	
	No. of species	No. of individuals	No. of species	No. of individuals
Torgonidae	0	0	1	1
Eurylimidae	0	0	1	1
Pycnonotidae	7	53	11	95
Columbidae	1	3	1	6
Pittidae	1	1	0	0
Estrildidae	1	1	1	2
Corvidae	0	0	1	2
Total	10	58	16	106

Table 2: Total number of understory insectivore/frugivore recorded in primary and 10-year-old logged forest in Sg. Lalang Forest Reserve

FAMILY	Primary Forest	10-year –old logged forest
Common name		
Species name		
TROGONIDAE		
Scarlet-rumped Trogon (<i>Harpactes duvaucelii</i>)	0	1
EURYLAIMIDAE		
Banded Broadbill (<i>Eurylaimus javanicus</i>)	0	1
PYCNONOTIDAE		
Grey-cheeked Bulbul (<i>Criniger bres</i>)	24	18
Olive-winged Bulbul (<i>Pycnonotus plumosus</i>)	3	8
Yellow-bellied Bulbul (<i>Criniger phaeocephaeus</i>)	2	2
Hairy-backed Bulbul (<i>Hypsipetes criniger</i>)	0	1
Red-eyed Bulbul (<i>Pycnonotus brunneus</i>)	1	8
Spectacled Bulbul (<i>Pycnonotus erythrophthalmos</i>)		
Grey-bellied Bulbul (<i>Pycnonotus cyaniventris</i>)	0	1
Yellow-vented Bulbul (<i>Pycnonotus goavier</i>)	0	4
Cream-vented Bulbul (<i>Pycnonotus simplex</i>)		
Stripe-throated Bulbul (<i>Pycnonotus finlaysoni</i>)	3	6
Black-headed Bulbul (<i>Pycnonotus atriceps</i>)		
COLUMBIDAE		
Green-winged Pigeon (<i>Chalcophaps indica</i>)	1	0
PITTIDAE		
Hooded Pitta (<i>Pitta sordida</i>)	0	1

CORVIDAE	1	2
Crested Jay (<i>Platylophus galericulatus</i>)		
ESTRILDIDAE	1	2
White-bellied Munia (<i>Lonchura leucogastra</i>)		

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