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MORPHOMETRIC AND MOLT OF THE CRESCENT-CHESTED BABBLER (*STACHYRIS MELANOTHORAX*) IN CISARUA FOREST, WEST JAVA

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ABSTRACT

Crescent-chested Babbler is endemic to the island of Java and Bali, Indonesia and protected by the Indonesian Government Regulation No. 7/ 1999. Its population is suspected to be declining due to ongoing habitat destruction and fragmentation. Information on its eco-biology is very poorly known. There is a need to obtain the information in order to conserve this species and its habitat. Morphometric and molt stages were recorded from 23 individuals captured by mist-nets between February and April 2016. There were variations in morphometric measurement in weight, head bill length, wing length and tail length in Cisarua Forest habitat, but no significant difference was found ($F_{2.19}$ = 0.822, P> 0.05) in body weight among the three different habitats. This habitat has sufficient resource for Crescent-crested Babbler for molt activity during the study.

Key words : Morphometric, molt, *Stachyris melanothorax*, West Java

INTRODUCTION

Crescent-chested Babbler (*Stachyris melanothorax* (Temminck, 1823)) is endemic to the islands of Java and Bali, Indonesia and is protected by the Indonesian Government regulation No. 7/ 1999. This is a small bird with a total length of approximately 126 mm, bill length of 14 mm, and legs of 21 mm (Prawiradilaga *et al.* 2003). It has short bright chestnut wings and crown, pale grey cheeks, white throat with black patch on sides, and small crescent on breast (Fig. 1). It is a secretive bird that remains hidden in dense undergrowth, dense thickets and thick shrub (MacKinnon *et al.* 2010, Collar & Robson 2016). Its population is allegedly to be decreasing due to habitat destruction and fragmentation, although no quantification of the population has been made (Birdlife International 2016), and information on its bio-ecology is still lacking.

Morphological characters reflect bird adaptation to its habitat. Bird morphology affects foraging behaviour of the bird in certain environment (Martin & Karr 1990), which in turns will influence its survival. Molt is an event in the life of birds when food is abundant, because molt is energetically expensive (Chai 1997). This paper is aimed at describing morphometric and molt of Crescent-chested Babler inhabiting a block of forested land in Cisarua, West Java.

Figure 1. Crescent-chested Babbler *Stachyris melanothorax*

MATERIALS AND METHODS

Data on morphometric and molt stages were obtained from six mist-netting activities conducted from February to April 2016 in secondary forest, mixed forest and agroforestry coffee. The secondary forest composed of four strata with *Castanopsis acuminatissima* as the most dominant tree, other dominant plants are *Elatostema acuminatum*, *Diplazium pallidum*, and *Lasianthus stercorarius*. The mixed forest composed of three strata with *Calliandra calothyrsus* as the most dominant tree, other dominant plants are *Acyranthes aspera, Oplismenus compositus,* and *Nephrolepis biserrata*. The agroforestry coffee composed of four strata with *Pinus merkusii* as the most dominant tree*;* other dominant plants are *Eupatorium riparium, Ichanantus pallens, Diplazium pallidum,* and *Coffea arabica.*

The height of nets was 2.5-3.0 m, five shelves, 30 mm mesh size and were set up 0-1.0 m above the ground, depending on the site conditions. The total net hours were 28,850 net hours in three habitats (secondary forest: 10,595 net hours; mixed forest: 8,769 net hours; agroforestry coffee: 9,486 net hours).

The study was conducted in a block of lowland forest in West Java that has been exposed to high anthropogenic activities, such as logging in the past, agricultural land and conversion for settlement. This area consisted of a production forest and protected forest, both managed by Perum Perhutani (State owned enterprise managing State Forests) regional division of West Java and Banten. It is located at 1,200-1,700 m a.s.l. with an annual rainfall of about 3,555 mm/year. The average highest temperature recorded in June was 26.28°C, whilst the lowest average temperature recorded in January was 25.08°C (BMKG 2016).

The morfometric data consisted of weight, head-bill length, wing length and tail length. The age was determined by colour of body parts, type of feathers and gape color. Adult birds were characterised by white patch throat with black edges, whitish supercilium, bright chestnut wings and crown, olive-brown back and tail, grey cheeks, the occurrence of brood patch or eggs in oviduct, and having rounded tail tips. Juvenile bird was identified from the yellow gape, whitish supercilium, whitish ear coverts and cheek, and having pointed tail tips (Lowe 1989). Crescent-chested Babbler does not show sexual dimorphism nor sexual dichromatism; therefore effort to identify sex was done by palpating the abdomen to check the occurrence of eggs. Molt was checked by examining primary wing feathers and was scored from 0 (old feather) until 5 (new feather) following Ginn and Melville (1983). Primary molt was scored on one wing only, so the sum of molt score ranges from 0 to 50.

RESULTS

Twenty-three individuals of Crescent-chested Babbler were marked and examined out of 153 individual birds (15%) of 32 species captured during mist-netting sessions. The Crescent-chested Babbler consisted of 22 adult birds and single juvenile bird. The number of individuals captured was highest in secondary forest (12 adult individuals), followed by mixed forest (7 adults and 1 juvenile), and coffee agroforestry (3 adults). There were 11 individuals (47.8%) of Crescent-chested Babbler showing brood patch, and 9 of them (39.1%) were having eggs.

There were variations in body weight of Crescent-chested Babbler among the three different habitats although no significant difference was found ($F_{2.19} = 0.822$, $P > 0.05$), and from the range variation of head-bill length, wing length and tail length, there was no difference in size between three different habitats (Table 1).

Table 1. Morphometric measurement of *Stachyris melanothorax* in Cisarua Forest (n=23) in three habitat types from February-April 2016

Morphometric	Range variation (means ± *SD*)		
	Secondary Forest (*n*=11)	**Mixed Forest (*n*=8)**	**Agroforestry coffee (*n*=3)**
Weight (g)	12-16 (13.7 ± 1.2)	11-17 (14.1 ± 2.0)	14-16 (15.0 ± 1.0)
Head-Bill length (mm)	30.2-32.9 (31.8 ± 0.9)	31.0-34.1 (32.13 ± 1.1)	31.7-32.6 (32.1 ± 0.5)
Wing Length (mm)	55-61 (57.8 ± 2.2)	57-62 (58.5 ± 1.5)	57-59 (58.0 ± 1.0)
Tail Length (mm)	50-57 (54.2 ± 2.3)	50-57 (54.3 ± 2.4)	52-54 (53.0 ± 1.0)

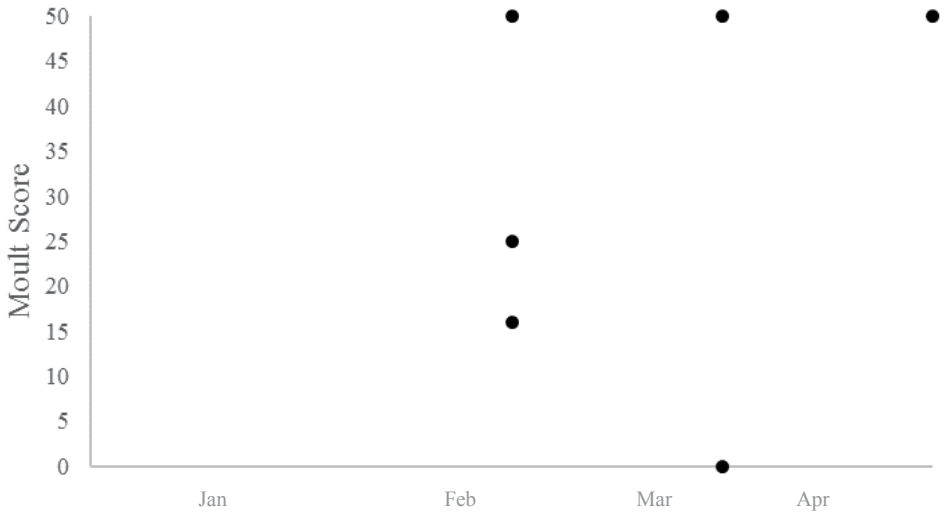

Figure 2. Scattered plot of molt score of Crescent- chested Babler *Stachyris melanothorax*. The y-axis showed the total numbers of molt score

Molt data were obtained from 22 adult birds and a single juvenile bird. Primary wing feathers were examined for molt and scored. Crescent-chested Babbler had new feathers in February until April (n=17), two individuals had growing feathers in February and three individuals had old feathers in March (Fig. 2).

DISCUSSION

The study found that over 90% of caught individuals were adults. This is contrasting to other studies that found mist net method is more likely to catch young individuals. Adult birds that are more experienced than the young ones may avoid mistnets when they heard the alarm call from other bird already caught in the mist net (DoméNech & Strings 1997; Gutiérrez and Pritchard 1990; Noske et al. 2011). The high numbers of adult birds in this study might relate to the territorial behavior during breeding season. There is very limited information on breeding biology of this species, but if only females incubate then the suggested sex ratio would be approximately 1:1 (Zacharias 1978). Crescent-chested Babbler may breed the whole year round except July (Prawiradilaga 2004; Collar and Robson 2016), and we found 47.8% birds with brood patch in February until April.

Research by Zduniak & Yodep (2004) of birds in sub tropic found that adults of Graceful Warbler (Prinia gracilis) were often captured in the spring because they defend their territory during breeding season from young individuals who enter their territory. Foster (2001) also found that the breeding female of Crescent Honeyeater (Phylidonyris pyrrhoptera) more frequently spent time in the lower strata than the non- breeding female in spring.

The body weight of Crescent-chested Babbler did not differ among habitats. Changes in body weight can indicate environmental conditions of the species in these habitats. Small body weight during cold weather or very thin body weight may indicate a lack of food or indicate a poor environment. High body weight in high predation risk places will probably indicate a good environment (Brown & Brown 1998, MacLeod *et al*. 2007, Creswell 2009). Therefore, monitoring changes in body weight through mist nets method is important to assess environmental quality (Cresswell 2009).

The molt data showed the progress of molting season and the duration of molt in an individual bird (Ginn & Melville 1983). Table 1 showed that Crescent-chested Babbler has new feathers from February until April. Besides the birds molt in February and March, one individual had the brood patch in February during active molting.

Birds in good weight have ability for more rapid molt and frequency (Senar *et al.* 1998, Senar *et al.* 2002, Lind & Jakobsson 2001). Molt is an important process in avian life histories, and it needs careful regulation in timing because it consumes high energy. The process of molting and the

growth of new feathers require high energy, so that the birds will usually set the time of molt when the environmental condition ensures sufficient resources. Fogden (1972) and Poulin *et al*. (1992) showed that tropical birds avoid molt and breeding at the same time during food depletion. Based on molting time of the Crescent-chested Babbler, which occurred between February and April at Cisarua Forest, it can be assumed that there are sufficient resource for birds. The availability of sufficient resources allows birds to molt and breed (Howell 1999). Some tropical birds have records of molt and breeding overlaps (Miller 1961).

Habitat should provide adequate food for the birds during breeding season: pre nesting, nest construction, incubation until nestlings. If the habitat lacks of food, bird would delay the breeding period due to poor body condition (Bortolotti et al. 2002). However the Crescent-chested Babbler may breed the whole year and the study found some of this species was breeding. It means that Cisarua Forest provided sufficient food availability, such as spider (Araneae) and insect (Collar and Robson 2016) to support the breeding season.The research on female Willow Flycatchers (Empidonax traillii) showed that bird needs to consume energy more during incubation than during nest construction (pre nesting) and care for nestlings (Ettinger and King 1980).

It is important for the local government of this site to monitor and save the habitat of the Crescent-chested Babbler by keeping understory plant growth as feeding grounds. However small sample size in this study should be interpreted carefully. A long term mist-netting study will be beneficial to reveal molt and breeding pattern of this species.

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