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ANALYSIS OF EXTERNAL MORPHOLOGICAL CHARACTERS IN DETERMINING SEXUAL DIFFERENCES IN THE BULBULS (FAMILY: PYCNONOTIDAE)

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ABSTRACT

Most bulbul species (Family: Pycnonotidae) are monomorphic. Morphometric study of selected bulbul species was conducted using Sarawak Museum specimens (dry skin). The selected external morphological characters of the specimens were measured to determine differences between male and female birds (sexual dimorphism). Dimorphism index was used to calculate the dimorphism among selected species. Significant differences were observed in bill depth of straw-headed bulbul *(Pycnonotus zeylanicus)*, wing length and tail length of yellow-vented bulbul *(Pycnonotus goiavier)* and also bill depth and tail length of ashy bulbul *(Hemixos flavala)*. Dimorphism index shows that straw-headed bulbul has the highest index in bill length while the lowest is yellow-vented bulbul. Based on dimorphism index assessment, 78.1% of overall indexes show that males are larger than females based on external morphology.

Keywords: Morphometric, sexual dimorphism, monomorphic, dimorphism indexes, Pycnonotidae, museum specimens.

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INTRODUCTION

Bulbuls belong to the Family Pycnonotidae (Order: Passeriformes). Genus pycnonotidae has 119 species in the world and 29 species are found in Sunda region (Smythies, 1981). Bulbuls are pale-coloured passerines with a short neck. Members of this family are found throughout Borneo (Smythies, 1981) and Southeast Asia MacKinnon, and Phillipps 1993). Many bulbuls are songsters including the crested finchbill (*Spizixos caniforms*), straw-headed bulbul (*Pycnonotus zeylanicus*),

and black-headed bulbul (*P. atriceps*) that make them very popular as cage birds. The body length of bulbul ranges between 150 and 300 mm. The majority of the members in this family are found in secondary forests, bushes, grass field, and urban areas from sea level to about 3,000 m at Himalaya (Anon., 2000).

Sexual dimorphism refers to differences in phenotype between male and female of the same species, usually size or feather coloration. Most members of this family are monomorphic. Monomorphism in birds is shown with having the same feather coloration and similar external morphological characters to human eyes (Merry, 1999; Møller, 1994). Sexual dimorphism can be qualitatively and quantitatively assessed using external morphological characters (Christensen, 2000).

According to Charles Darwin, in many animal species, male and female can be differentiated by size. For example, the female of most vertebrates, such as fishes, amphibians and reptiles tend to be larger than the male. On the other hand, most male birds and mammals are larger than female (Møller, 1994).

Sex identification of monomorphic birds in the field is almost impossible; they have to be dissected to check the gonads. There are 67% monomorphic birds out of 483 birds species in Borneo recorded by King *et al.* (1993). However, Francis (1984) and Smythies (1999) documented 79% of species of birds in Borneo are monomorphic. Meanwhile, MacKinnon and Phillipps (1993) identify only 63% out of 704 species of birds recorded in Borneo, Sumatra, Java and Bali as monomorphic. The differences in the documented number of monomorphic birds in the Southeast Asian region among writers is inevitable because the field guides are not complete documents in recording the bird data.

We selected bulbuls as our focus of study because they fit the criteria of a monomorphic bird group and there are adequate numbers of specimens available in the Sarawak Museum for this study. The aim of this study was to determine whether selected external morphological characters could be used to differentiate between male and female of monomorphic birds such as bulbuls.