

Molecular sex identification of Malaysian white-nest swiftlet (*Aerodramus fuciphagus* Thunberg, 1812)

ABSTRACT

The difficulty in differentiating the sex of monomorphic bird species has made molecular sexing an important tool in addressing this problem. This method uses noninvasively collected materials such as feathers and may be advantageous for sexing endangered as well as commercialized bird species. In this study, seven primer sets for sexing birds were screened in *Aerodramus fuciphagus* using a total of 13 feather samples that were randomly selected from the state of Perak, Malaysia. From the screening analysis, only one primer set (P8/WZ/W) successfully differentiated the sex of *A. fuciphagus*. PCR amplification produced a single 255-bp DNA fragment for males which was derived from CHD-Z (CHD gene region in the sex chromosome Z), while for the females it produced two fragments (144 and 255 bp). The 144-bp fragment was from CHD-W (CHD gene region in the sex chromosome W). Results from sequencing showed no variations in the base sequences of the CHD-W and CHD-Z amplified fragments within the same sexes, except for one male sample (A23) where at position 166, a base substitution occurred (G → A). Phylogenetic analysis of CHD-W showed that four (Apodiformes; Gruiformes; Passeriformes; and Pelecaniformes) out of the five orders investigated had formed four clear clusters within their orders, including the studied order: Apodiformes. Whereas in CHD-Z, four (Accipitriformes; Columbiformes; Galliformes; and Passeriformes) out of five orders investigated formed four clear clusters within their orders, excluding the studied order. In addition, *A. fuciphagus* and *Apus apus* (both Apodiformes) showed less divergence in CHD-W than CHD-Z (0% c.f. 9%). The result suggests that in *A. fuciphagus*, CHD gene evolution occurred at a higher rate in males (CHD-Z) compared to females (CHD-W). This finding may be useful for further studies on sex ratio and breeding management of *A. fuciphagus*.

Keyword: *Aerodramus fuciphagus*; CHD gene; Molecular sexing