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A preliminary study on morphometric variations in three butterfly families of Sri Lanka

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Lepidoptera are one of the most distinctly different orders of class Insecta. Sri Lanka has a rich butterfly diversity; 247 butterfly species (31 endemic species; 84 endemic subspecies). However, identification using morphological characters are sometimes difficult due to intra-specific variation of form and colour, leading to misidentification. Effects of seasonal changes on the colour of wings and effects of landscape structure on morphology has been widely encountered. Thus, morphometric analysis based on the size and shape has been used in identification. This study reports the comparison of the morphometrics of three selected families of Lepidoptera (Lycaenidae, Nymphalidae, Papilionidae) pertaining to some important morphological measurements. The following morphometric measurements were taken for 77 specimens: Body Length (BL), Head Length (HL), Head Width (HW), Thorax Length (TL), Thorax Width (TW), Abdomen Length (AL), Abdomen Width (AW), Wing Span (WS), Fore Wing Length (FWL), Fore Wing Width (FWW), Hind Wing Length (HWL), and Hind Wing Width (HWW). Measurements for 25 specimens of family Lycaenidae, 25 specimens of family Nymphalidae and 27 specimens of family Papilionidae were recorded. Measurements were taken by drawing clear outline diagrams, keeping the specimen on a graph paper which had a 1 cm scale. Further, image processing was done using Image j software. Results were analyzed using One-Way Analysis of Variance and Tukey's multiple comparison method using Minitab 17 software. The study revealed that significant differences were evident between BL, HL, HW, TL, TW, AL, FWW and HWL between the 3 families. AW, WS, FWL were not significantly different between Papilionidae and Nymphalidae. However, these measurements were significantly low in Lycaenidae. When considering morphometric variations between species of the same family, *Troides darsius* of Papilionidae was significantly larger in most measurements than those of the other species. When considering the morphometric variations between the two species of Nymphalids, *Idea iasonia* and *Euploea core*, significant differences were mostly evident in BL and wing parameters. Low sample size is a limitation of the study and increasing sample size is required for more accurate inferences. However, the overall results reveal that morphometric variations are evident amongst the families of butterflies and between the species of the same family. This preliminary study is thus important for future studies in establishing morphometric variations amongst taxa and to establish ranges that will construct isometric systems for species/ taxa identification.

Keywords: Butterfly families, morphometric variations, identification

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