

RESEARCH ARTICLE

Multigene Phylogeography of *Bactrocera caudata* (Insecta: Tephritidae): Distinct Genetic Lineages in Northern and Southern Hemispheres

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Data Availability Statement: DNA sequences are available in GenBank database (accession numbers: 28S rRNA—KP694325, KP694326; ITS-2—KP694336, KP694337; COI—KP694327, KP694328; COII—KP694329, KP694330, KP694331, KP694332, KP694333, KP694334, KP694335, AY037406).

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Abstract

Bactrocera caudata is a pest of pumpkin flower. Specimens of *B. caudata* from the northern hemisphere (mainland Asia) and southern hemisphere (Indonesia) were analysed using the partial DNA sequences of the nuclear 28S rRNA and internal transcribed spacer region 2 (ITS-2) genes, and the mitochondrial cytochrome c oxidase subunit I (COI), cytochrome c oxidase subunit II (COII) and 16S rRNA genes. The COI, COII, 16S rDNA and concatenated COI+COII+16S and COI+COII+16S+28S+ITS-2 nucleotide sequences revealed that *B. caudata* from the northern hemisphere (Peninsular Malaysia, East Malaysia, Thailand) was distinctly different from the southern hemisphere (Indonesia: Java, Bali and Lombok), without common haplotype between them. Phylogenetic analysis revealed two distinct clades (northern and southern hemispheres), indicating distinct genetic lineage. The uncorrected 'p' distance for the concatenated COI+COII+16S nucleotide sequences between the taxa from the northern and southern hemispheres ('p' = 4.46-4.94%) was several folds higher than the 'p' distance for the taxa in the northern hemisphere ('p' = 0.00-0.77%) and the southern hemisphere ('p' = 0.00%). This distinct difference was also reflected by concatenated COI+COII+16S+28S+ITS-2 nucleotide sequences with an uncorrected 'p' distance of 2.34-2.69% between the taxa of northern and southern hemispheres. In accordance with the type locality the Indonesian taxa belong to the nominal species. Thus the taxa from the northern hemisphere, if they were to constitute a cryptic species of the *B. caudata* species complex based on molecular data, need to be formally described as a new species. The Thailand and Malaysian *B. caudata* populations in the northern hemisphere showed distinct genetic structure and phylogeographic pattern.