Diversity and host associations of Myrsidea chewing lice (Phthiraptera: Menoponidae) in the tropical rainforest of Malaysian Borneo

ABSTRACT

The tropical rainforests of Sundaland are a global biodiversity hotspot increasingly threatened by human activities. While parasitic insects are an important component of the ecosystem, their diversity and parasite-host relations are poorly understood in the tropics. We investigated parasites of passerine birds, the chewing lice of the speciose genus Myrsidea Waterston, 1915 (Phthiraptera: Menoponidae) in a natural rainforest community of Malaysian Borneo. Based on morphology, we registered 10 species of lice from 14 bird species of six different host families. This indicated a high degree of host specificity and that the complexity of the system could be underestimated with the potential for cryptic lineages/species to be present. We tested the species boundaries by combining morphological, genetic and host speciation diversity. The phylogenetic relationships of lice were investigated by analyzing the partial mitochondrial cytochrome oxidase I (COI) and the nuclear elongation factor alpha (EF-1α) genes sequences of the species. This revealed a monophyletic group of Myrsidea lineages from seven hosts of the avian family Pycnonotidae, one host of Timaliidae and one host of Pellorneidae. However, species delimitation methods supported the species boundaries hypothesized by morphological studies and confirmed that four species of Myrsidea are not single host specific. Cophylogenetic analysis by both distance-based test ParaFit and event-based method Jane confirmed overall congruence between the phylogenies of Myrsidea and their hosts. In total we recorded three cospeciation events for 14 host-parasite associations. However only one host-parasite link (M. carmenae and their hosts Terpsiphone affinis and Hypothymis azurea) was significant after the multiple testing correction in ParaFit. Four new species are described: Myrsidea carmenae sp.n. ex Hypothymis azurea and Terpsiphone affinis, Myrsidea franciscae sp.n. ex Rhipidura javanica, Myrsidea ramoni sp.n. ex Copsychus malabaricus stricklandii, and Myrsidea victoriae sp.n. ex. Turdinus sepiarius.