Volatile Compounds in Shoulder Gland Secretions of Male Flying Foxes, Genus *Pteropus* (Pteropodidae, Chiroptera)

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The shoulder gland secretions of captive males of the Indian flying fox (*Pteropus giganteus*), the little golden-mantled flying fox (*P. pumilus*), the island flying fox (*P. hypomelanus*), and the large flying fox (*P. vampyrus*) were examined by gas chromatography-mass spectrometry. Sixty-five compounds, including hydrocarbons, carboxylic acids, alcohols, aldehydes, ketones, esters, and amides, were identified among the four species. Many of these compounds, such as squalene, cholesterol, and C_5–C_{16} straight- and branched-chain carboxylic acids, are typical of tetrapod epidermal products. Aldehydes, which were detected in all four *Pteropus* species, and some straight- and branched-chain ketones, which were detected in *P. hypomelanus* and *P. pumilus*, are known from other mammalian skin glands. Acetophenone, 4-acetoxyacetophenone, and 4-hydroxyacetophenone were observed in *P. pumilus*; the last compound comprised 37.1% of the total ion current. 2,3-Butanediol, a prominent component (5.2–19.3%) in the secretions of *P. giganteus*, *P. hypomelanus*, and *P. pumilus*, and C_{10} and C_{12} isopropyl esters and C_{10}–C_{14} 1-methylbutyl esters, observed in *P. hypomelanus* and *P. vampyrus*, have not previously been reported from vertebrates. α-Methyl-4-methoxybenzyl alcohol and dihydro-5-phenyl-2(3*H*)-furanone, from *P. giganteus* and *P. pumilus*, are new natural products. 1-Chloro-3-methyl-2-butene, another new natural product, and five C_5 compounds exhibiting a similar isoprenoid structure were observed in *P. giganteus*. Striking contrasts were observed in the chemical profiles of the species we examined, with even general chemical classes differentially represented among them.

Key words: Chiroptera, Flying Foxes, Gas Chromatography-Mass Spectrometry