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Molecular investigation of *Polychromophilus* parasites – data from infections in bat flies of *Miniopterus* bats in Serbia and in *Scotophilus* bats in Thailand

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Polychromophilus parasites infect bats in temperate as well as in tropical regions and are phylogenetically close related to *Plasmodium* species of ungulates. The haemosporidian parasites are vectored by ectoparasitic bat flies (Nycteribiidae) and five to seven *Polychromophilus* morphospecies have been described to date.

Here we present data of *Polychromophilus* parasites of both temperate and tropical bat species. *Polychromophilus* parasites in Palearctic (Serbian) bat flies and in blood samples from bats in Thailand were investigated. Mitochondrial, apicoplast and nuclear genes were analyzed for molecular characterization of the parasites.

The study provides the first information of *Polychromophilus* parasites in the lesser Asiatic yellow bat (*Scotophilus kuhlii*) in Thailand, a common vespertilionid bat species distributed in South and Southeast Asia. The gametocyte blood stages of the parasites could not be assigned to a described morphospecies and the molecular analysis revealed that these parasites might represent a distinct *Polychromophilus* species.

Further, *Polychromophilus melanipherus* infections were detected in different nycteribiid bat fly genera collected from 216 bat individuals of the bat species *Miniopterus schreibersii* and *Rhinolophus ferrumequinum* in Serbia. A high prevalence of *P. melanipherus* infections was recorded in the bat fly association *Penicillidia/Miniopterus* (60%) and lower prevalences in *Nycteribia/Miniopterus* (15%) and *Phthiridium/Rhinolophus* (1.5%). The nucleotide sequence comparisons of these parasites revealed evidence of mixed infections with different *P. melanipherus* haplotypes. Infections were detected in 7/9 sampling locations which points to a high transmission of infections across *Miniopterus* bats and the bat flies in this region of Serbia.

The results of this study provide new insights into the distribution and phylogenetic relationships of *Polychromophilus* parasites in bats and their nycteribiid vectors. The use of bat flies to non-invasively investigate *Polychromophilus* infections in bat populations has proven to be very efficient.