



Bat wing mites associated with phyllostomid bats: A coevolutionary journey*

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Spinturnicid mites of the genus *Periglischrus* Kolenati are permanent hematophagous ectoparasites, associated with phyllostomid bats in the Americas. The entire life cycle of these mites occurs on their hosts. The mites can be transmitted across host individuals via mother to offspring vertical transmission, during copulation or inter-individual contact at bat roosting sites where they form gregarious colonies. The mites' host specificity ranges from monoxeny (host species-specific), stenoxeny (host genus-specific) to oligoxeny (host family-specific). Currently, this mite genus has 26 nominal species. However, we've found additional new species over several years of fieldwork and examining specimens in 20 different museums. These new species provide additional evidence for co-evolutionary associations of *Periglischrus* and their hosts. Here we extended our previously published morpho-evolutionary analysis (Morales-Malacara 2001), which detected two clades and eight species groups, showing a remarkable congruence with the host phylogeny. For example, the *acutisternus* clade is mainly associated with the bat subfamily Phyllostominae and those of the *caligus* clade are associated mainly with Glossophaginae, Desmodontinae, and Sternodermatinae. Based on thorough specimen examination using phase contrast (PhC) and differential interference contrast microscopy (DIC), I assembled and analyzed a large-scale dataset with 242 morphological characters of the idiosoma and legs. To elucidate the mites' intraspecific variability, we used geographic and host-related variation, ancestral areas, migration and isolation, principal component analysis (PCA), and analyses of morphometric variables (Morales-Malacara *et al.* 2018; 2020; Morales-Malacara & López-Ortega *in press*). We also used geometric morphometrics and molecular evidence to analyze cryptic speciation (Zamora-Mejías *et al.* 2022a; 2022b). Therefore, the deep scrutiny of the phenotypic characteristics has revealed errors in the determinations and the discovery of false host-parasite associations previously established; thus, it has been possible to correct and reinforce the evidence of co-speciation or co-evolution, as well as the discovery of five new undescribed species. With these, the species richness of *Periglischrus* is increased to 31 species to date, with prospects for the number of species to increase as studies of these mites and their phyllostomid hosts progress.

Keywords: Spinturnicidae, *Periglischrus*, bat-ectoparasites

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