

Conserved, yet disruption-prone gut microbiota in Neotropical bumblebees

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Abstract

Bumblebees are important pollinators in natural ecosystems and agriculture, but many species are in decline. Research on temperate-zone bumblebees has shown that gut microbiota influence bumblebee health and may have a role in mediating the effects of environmental stressors. However, there are almost no data on gut microbiota of neotropical bumblebees. Here, we characterized the gut microbiota of four neotropical *Bombus* species and of co-occurring solitary bees in the genus *Thygater*. We collected wild foraging bees from multiple sites in central Colombia, and used 16S rRNA gene sequencing to analyze gut microbiota. We found that neotropical bumblebees generally harbor microbiota with similar diversity and composition as compared with temperate-zone bumblebees. This result indicates that microbiota were conserved during dispersal from North America, despite shifts in ecology and life history traits. As has been observed in temperate-zone species, some bumblebees had disrupted microbiota; in these individuals, conserved bacterial taxa were replaced by environmental microbes, resulting in a microbial profile more similar to *Thygater* than conspecifics. The parasites *Nosema* and *Crithidia* were also prevalent and tentatively associated with microbiota disruption. Our findings provide insights into the microbial biogeography of bumblebees and a foundation for studying bee-microbe-stressor interactions in the neotropics.