

# Large carpenter bees exhibit considerable dispersal capabilities in a tropical semi-arid region susceptible to desertification

Sandara N R Brasil-Peixoto<sup>1</sup>, Francisca Araujo<sup>1</sup>, Alan Brelsford<sup>2</sup>, Christiana Faria<sup>1</sup>, Lorenzo R. S. Zanette<sup>1</sup>, and Hollis Woodard<sup>2</sup>

<sup>1</sup>Federal University of Ceara

<sup>2</sup>University of California Riverside

March 29, 2022

## Abstract

Desertification is a major threat to biodiversity in arid areas of the world, in part because many organisms in these regions are already existing at or near the limits of their movement and physiology. Here, we used molecular data to investigate patterns of persistence and dispersal in an ecologically and economically important carpenter bee (*Xylocopa grisescens* Lepeletier) found throughout the semiarid Caatinga region of Brazil. We used a genome-wide approach (Restriction-site associated DNA sequencing, RAD-seq) to gather genetic data (>83,000 SNPs) from bees sampled from eight sites within an arid region subject to desertification in Northeastern Brazil. We observed low levels of population genetic diversity and differentiation across the study region, despite data collection from sites up to 300 km distant. Additionally, we detected evidence of a relatively severe genetic bottleneck occurring an estimated 60 years ago. Our data suggest that population genetic patterns of *X. grisescens* have been shaped by human-mediated changes in the Caatinga, but these patterns have also been heavily influenced by biological characteristics of this species, such as their relatively high capacity for movement.

## Hosted file

Main\_document.doc available at <https://authorea.com/users/467724/articles/561698-large-carpenter-bees-exhibit-considerable-dispersal-capabilities-in-a-tropical-semi-arid-region-susceptible-to-desertification>