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BEE FUNCTIONAL TRAITS AND CLIMATE VARIABILITY DRIVE BEE PHENOLOGICAL PATTERNS IN TROPICAL AND SUBTROPICAL REGIONS

Paula María Montoya-Pfeiffer¹, Patricia Morellato²

São Paulo State University (UNESP) and Research Center for Biodiversity Dynamics and Climate Change^{1,2}, Rio Claro, São Paulo, Brazil. (CNPq#401577/2022-8; PROPE- 13/2022)

ABSTRACT

Bee temporal activity in temperate regions is mainly imposed by the marked temperature seasonality throughout the year. In contrast, the bee phenological pattern in tropical and subtropical regions is expected to be more continuous, given the mild monthly temperatures and reduced variability over the year. In spite of such assumption, several tropical and subtropical bee species have shown different levels of seasonality, but the extrinsic and intrinsic factors explaining their phenological patterns are still poorly known. In this work, we review the phenological patterns of bee species across the Brazilian biomes and evaluate the relations with bee functional traits and the climate variability. Our results demonstrated that solitary, specialist and ground nesting bee species are more seasonal than eusocial and cavity nesting species. The bee seasonality increased both, interspecifically and intraspecifically, in sites with colder climates, but did not change in response to local precipitation regimes (humid sites vs. arid sites). Bee monthly activity was positively affected by monthly temperature whereas slightly negatively affected by monthly precipitation. The implications of these variable seasonal patterns and drivers on the possible bee responses to global warming are discussed.