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DRIVERS OF DIVERSITY AND COMMUNITY STRUCTURE OF BEES IN AN AGROECOLOGICAL REGION OF ZIMBABWE

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ABSTRACT

Worldwide bees provide an important ecosystem service of plant pollination. Climate change and land-use changes are among drivers threatening bee survival. In developing countries, rural areas constitute a significant proportion of the country's land, but information is lacking on the status of bee populations. This study investigated how weather variables and habitat-related factors influence the abundance, diversity, and distribution of bees across seasons in a farming rural area of Zimbabwe. Bees were systematically sampled in five habitat types across diverse landscapes and weather variables. Zero-inflated models, censored regression models, and PCAs were used to understand the influence of explanatory variables on bee community composition, abundance, and diversity.

Bee abundance was positively influenced by the number of plant species in flower ($p < .0001$). Bee abundance increased with increasing temperatures up to 28.5°C, but beyond this, temperature was negatively associated with bee abundance. Increasing wind speeds marginally decreased probability of finding bees. Bee diversity was highest in fields, homesteads, and natural woodlots compared with other habitats, and the contributions of the genus *Apis* were disproportionately high across all habitats. The genus *Megachile* was mostly associated with homesteads, while *Nomia* was associated with grasslands.

Our study suggests that some bee species could become more proliferous in certain habitats, thus compromising diversity and consequently ecosystem services. These results highlight the importance of setting aside bee-friendly habitats that can be refuge sites for species susceptible to land use changes.

KEYWORDS bees, diversity, forage, land use, pollinator conservation, weather, Zimbabwe