

Agave distribution and floral display influence foraging rates of an endangered pollinating bat and implications for conservation

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October 6, 2023

Abstract

Wildlife conservation involves making management decisions with incomplete knowledge of biological and ecological relationships. Efforts to augment foraging resources for the endangered Mexican long-nosed bat (*Leptonycteris nivalis*) are progressing despite limited knowledge about the species' foraging behavior and requirements. This study sought to fill knowledge gaps about *L. nivalis* responses to floral resource availability by addressing individual plant and local-scale (30 m) characteristics that influence visitation rates to flowering agaves. We observed bat visitation at 62 flowering agaves around two roosting caves in northeast Mexico on 46 nights in summers 2017 and 2018. We found visitation rate had positive relationships with two agave-scale characteristics: the number of umbels (flower clusters) with open flowers and earlier phenological stages of plants. A negative interaction between the significant predictors indicated that direction of the relationship between visitation and either characteristic depended on the level of the other characteristic. We also found relationships between visitation rate and two local-scale characteristics: negative for the density of flowering conspecifics within 30 m of the focal plant and positive for the density of dead standing stalks within 30 m. Our findings suggest opportunities to augment foraging resources for *L. nivalis* in ways that are consistent with the bats' foraging behavior, including: planting larger agave species with more flowers, planting multiple species of agaves with different flowering times to ensure nectar availability when *L. nivalis* is present in northeast Mexico, planting agaves in clusters, and keeping dead standing stalks on the landscape. Our study highlights important considerations for management actions, which will ultimately aid the development of ongoing conservation efforts.

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