

# How urban heat affects bee populations

February 22 2018, by Steve Frank

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Credit: Elsa Youngsteadt

North Carolina is home to 500 species of wild bees, yet only a subset of these are common in cities and suburbs. People encourage wild bees by planting flowers and creating pollinator gardens to provide the pollen and nectar bees need. However, even gardens rich with flowers do not have the same bee abundance or diversity as natural areas. So, there must be things besides flowers that limit urban bee communities. But what are they?

In a recent paper, we show that one of these factors is the urban [heat island effect](#). The [urban heat island](#) effect is caused by impervious surfaces – like cement and pavement – that absorb [heat](#) from the sun, making cities hotter than surrounding rural areas. We sampled bees for two years in 18 yards and parks around Raleigh, NC. These yards differed in flower abundance and diversity, but also differed in temperature. The hottest yards had about a third as many bees as yards just 2°C (about 3.6°F) cooler.

In addition, hot yards had fewer bees from species that [we previously found](#) to be sensitive to heat and more bees from species we found to be heat tolerant. We know [from previous research](#) that high temperatures can reduce bee survival by making them more susceptible to pathogens or less able to forage.

Yards with lots of flowers still had more bees and more kinds of bees than yards with few flowers but this was mitigated by yard temperature.

In other words, simply adding flowers to otherwise hot sites with lots of impervious surface cover is unlikely to restore pollinator communities. To amplify the benefits provided by [flowers](#), you could plant trees to shade driveways and sidewalks, reducing the temperature of a yard. We wouldn't expect other animals to thrive in poor habitats just by providing them with food. Bee conservation requires habitat restoration.

*(This is a guest post by Steve Frank, an associate professor of entomology at NC State University.)*

**More information:** April L. Hamblin et al. Wild bee abundance declines with urban warming, regardless of floral density, *Urban Ecosystems* (2018). [DOI: 10.1007/s11252-018-0731-4](https://doi.org/10.1007/s11252-018-0731-4)

Elsa Youngsteadt et al. Urbanization Increases Pathogen Pressure on

Feral and Managed Honey Bees, *PLOS ONE* (2015). [DOI: 10.1371/journal.pone.0142031](https://doi.org/10.1371/journal.pone.0142031)

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