

Correcting Misconceptions: Sustainability and the European Honeybee (*Apis Mellifera*)

Conversations in the public sphere about the role of honeybees are incomplete at best and inaccurate at worst. Current social media discourse displays a prevailing enthusiasm among users to confidently assert that honeybees are causing significant harm to indigenous pollinator populations. This is a frequent sentiment in the comments section of video content posted by beekeepers. Unsurprisingly, these brief and emotion-filled remarks only consider part of the picture. While people may understand that honeybees are invasive pollinators, they may not know how efficiently they are able to pollinate, how their pollination habits differ from those of native pollinators, or how crucial they are to the food we rely on every day. *Apis mellifera* are indigenous to Europe and therefore have not coevolved with the plant species that are important to North American ecosystems as our critical pollinators did. While their role in our ecosystems may not be ideal, they are here to stay. This is not only something we should come to accept but something we should work to understand so that we can better control the negative effects that honey bees *do* have on our ecosystems and native pollinators.

As pollinators, honey bees are very focused. Whereas the western bumble bee and her native neighbors may seem to choose the next flower they pollinate at random, honey bees are faithful to a single species on each flight they take; this phenomenon is known as patch fidelity (Fragoso and Brunet). This gives those plants a significant advantage, as there is no known plant that can cross-pollinate across species. When honeybees are in charge, plants are only receiving pollen from those with which they can reproduce. Other pollinators are crucial to the health of the ecosystems that they evolved with and are often adapted to specific flower shapes and pollination methods, such as the long, thin bill of a hummingbird for a trumpet-shaped flower, or

the nocturnal nature of a moth for night-blooming plants (Pleasants and Wendel). Yet, they do not always travel from sunflower to sunflower or hollyhock to hollyhock as the honey bee does. *Apis mellifera* is reliable in this way.

Honey bees also give other pollinators space. A 2020 study done in central New York suggested that certain introduced plant species were preferred by honey bees, allowing the wild pollinators to access their preferred native plants with less competition (Urbanowicz et al.). The study also determined that removing the honey bees' preferred invasives would impact them, but not the native pollinators (Urbanowicz et al.). This suggests that bees are more likely to visit plants matching their own endemic status: natives to natives and invasives to invasives. This is especially true in colder climates, where native pollinators have adapted to early morning temperatures, and *Apis mellifera* takes her time, waking up and flying to food sources only when it's warmed up enough for her. By the time she arrives, the native pollinators have already chosen their preferred flowers, making her pollination options other, introduced plants (Urbanowicz et al.). Nevertheless, the presence of honey bees does cause competition with native pollinators. There is only so much pollen in a given bee's range, and the more honey bees there are, the less pollen is going to ground bees, solitary bees, and other insects that rely on the protein-rich powder. However, the extent to which honey bees affect their neighbors is grossly overestimated. It is difficult to know how honey bees affect network structures in a given ecosystem, but they have not been shown to affect wild pollinator-plant interactions (Worthy et al.). The honey bee has become a scapegoat for pollinator decline, a serious problem whose sources have been difficult to pinpoint, but signs point to habitat loss, pesticides used in agricultural production, and climate change in general (*Three Causes of Pollinator Declines and Potential Threats*).

For those who enjoy almonds, squash, apples, and many other foods, we have the European honey bee to thank (*Helping Agriculture's Helpful Honey Bees*). The agricultural system in the United States is not perfect by any means, but we have overcome one hurdle: pollination in a monoculture field. Several times per season, overnight, bees are packed, transported, and then strategically placed in blooming fields where they will wake up with plenty of work to do. Every year, over 250 million dollars worth of pollination services are contracted throughout the country (Bond et al.). This is particularly important in almond orchards, which occupy such large swaths of land that native pollinators can neither find suitable habitat nearby nor fly as far as the farmers would need them to in order to pollinate (Goodrich and Goodhue). This dependency on the honey bee is both a beautiful relationship between humans and the natural world and a weakness, easily threatened by diseases such as American foulbrood and phenomena like colony collapse disorder. Until we address the underlying problems in our food systems, our reliance on the honey bee will persist, and so we will ensure that the honey bee does as well.

The discourse surrounding the role of honey bees in our ecosystems is far from comprehensive and often simplified to the point of inaccuracy. It is essential to recognize the nuanced nature of these issues. Native pollinators continue to be vital components of our ecosystems. However, they cannot accomplish the tasks that our agricultural system demands of them. Honey bees provide these services without displacing native pollinators entirely and should not bear the sole blame for the decline in pollinator populations. To navigate these challenges and sustain the vital role of honey bees in our food systems, addressing underlying problems within our agricultural practices and embracing a holistic approach to pollinator conservation is imperative. One such path to this goal is to trust small-scale beekeepers, who

have the most intimate relationships with honey bees, making their knowledge just as valuable to the conversation as that of researchers and conservationists (Maderson). The honey bee's resilience and reliability highlight the importance of coexisting while working towards a more harmonious relationship between ourselves as humans and the natural world at large. Only through intentional efforts can we ensure the continued well-being of both the honey bee and the native pollinators of our homes.

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