

## Honeybee Stresses While Transporting

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As approximately 1.68 million beehives are transported across the country, from the almond groves in California to the blueberry farms in Maine, they encounter a variety of stressors including heat, travel, and the stress of the new environment.<sup>2</sup> Even after they get to their temporary destination, they continue to be exposed to stressors including pesticides, diseases, and pests that can damage or destroy the hives. Hobbyist beekeepers also have some of the same problems as the commercial beekeepers, but they have more control over the environment in which they are putting the bees. However, these stationary bees, vital to the local ecosystem, face fierce competition for forage supplies from bees that have been transported. They can also be exposed to disease from the more transient bees who are over-summering in Nebraska and other locations in the midwest.<sup>2</sup>

There are many stresses that bees have to deal with while being transported over both long and short distances. Heat stress is a common problem that many commercial beekeepers face.<sup>6</sup> The current solution is to transport the bees by night. Because they are confined to the hive, bees also create their own heat, which provides an additional source of heat stress. Beekeepers improve ventilation by using a tight but breathable material to contain the bees, allowing for air to pass through and the bees to better thermoregulate.<sup>5</sup>

The shaking of the hives as the vehicle travels can be another stressor to the bees. When the beehives are shaken, the bees can think a predator is attacking. This will make the bees more aggressive and they will try to defend their hive. The hives are usually strapped down, and this prevents the hives from falling apart and severely damaging the beehives.<sup>4</sup>

There are some stresses that are unique to bees that are being transported for long distances. Cold stress can play a big role, especially when traveling over high elevation areas in the early spring for the almond pollination in California. As the trucks are driving down the highway, the wind can chill the bees, so beekeepers will try to pick a night that is not too cold. The bees are often awakened from their winter rest early when it is still cold to prepare them for the California pollination season by feeding the bees sugar water so they will draw out the comb. These stresses combine to amplify the strain on commercial bees.<sup>3</sup>

There are even some stresses that occur at pollinator destinations across the United States. One of these stresses is the proximity of all of the bees that are trucked to the same locations in very tight quarters. The almond groves are a new place, and so naturally they will have to adjust. It doesn't get easier every year, however, because the bees that were there one year die by the next year and even if they lived that long, they do not have a long-term memory. Most of the time, when bees are transported long distances, they are being transported to a new ecosystem entirely and so need to adjust. Currently, there is no way to fix this problem.

Another stress that occurs at the pollination site is pesticides. Today's farming methods use many types of pesticides, which can linger for months or even years. As more chemicals are added, more residue builds up on the plants.<sup>3</sup> As honeybees pollinate the plants, they can bring it back to the hive. This can eventually cause Colony Collapse Disorder, or CCD. Diseases can also contribute to CCD. These diseases, such as Deformed Wing Virus or American Foulbrood, can be spread either by hive drifting or by the interaction of bees on the flowers. Pests, such as mites, can further weaken the hive and can eventually cause CCD as well.<sup>5</sup> These pests, such as the varroa mite or the small hive beetle, if left untreated, can destroy hives, especially if they have been already weakened by pesticides, disease, or other travel stressors.

Currently, most states do not have strict laws on permits and imports of bees, with the exceptions of Hawai'i, Georgia, Delaware, New Jersey, and New York.<sup>1</sup> These states have laws that either ban the import of bees and, consequently, their diseases and pests, or they allow it only with permits or inspections. California requires all commercial beekeepers to have a permit to transport their bees across the state lines.<sup>1</sup> This can help with pesticide exposure so regulators can prohibit the exposed colonies and warn local beekeepers of potential exposure. Some states, such as Arizona and Kansas, have no beekeeping laws.<sup>1</sup>

Locally, an estimated 36,000 beehives travel into and out of Nebraska every year. With the lack of policy and regulations, Nebraska has no way to track the exact number of beehives in the states. Bees over-summering in the northern midwest, including Nebraska, can outcompete local bees for forage resources.<sup>2</sup> The commercial bees can also spread pesticide exposure to the hobby beekeeper's bees. Nebraska's bee population may thus be

threatened. In 2017, the Nebraska legislature commissioned a study that investigated the need for future regulations regarding bees, in order to protect local bees and their forage resources.

Today, both commercial and local beekeepers are facing significant stresses from the transport of bees.<sup>5</sup> Some cannot currently be avoided, but some, such as new environments, pesticides, and competition for local resources can be at least partially mitigated. Some states have laws that try to prevent some of these stresses, but others allow free movement of bees into and out of the state.<sup>1</sup> Most of the reason bees are transported the way they are, is to try to minimize stress, but not all of the solutions eliminate stress to bees. In the future, beekeepers need to find different ways of transporting bees, and farmers should reduce their use of pesticides to protect these pollinators that are so vital to our way of life.

<sup>1</sup>Mailander, Deborah and Grant, Zoe. ""When Honey Bees Hit the Road: The Role of Federal, State, and Local Laws in Regulating Honey Bee Transportation." University of Oregon. Last modified 2019. Accessed March 30, 2022. [https://law.uoregon.edu/sites/law1.uoregon.edu/files/when\\_honey\\_bees\\_hit\\_the\\_road.pdf](https://law.uoregon.edu/sites/law1.uoregon.edu/files/when_honey_bees_hit_the_road.pdf).

<sup>2</sup>"Interim Study to Examine Buffer Zone Policies as a Means to Minimize Conflict in the Availability and Utilization of Bee Forage Resources." Nebraska Legislature. Last modified December 31, 2017. Accessed March 31, 2022. [https://nebraskalegislature.gov/pdf/reports/committee/agriculture/lr171\\_2017.pdf](https://nebraskalegislature.gov/pdf/reports/committee/agriculture/lr171_2017.pdf).

<sup>3</sup>*The Pollinators*. Directed by Peter Nelson. Collective Eye Films. DVD.

<sup>4</sup>"5 Steps to Move a Beehive(Without Killing the Bees!)." Backyard Beekeeping. Accessed March 21, 2022. <https://backyardbeekeeping101.com/move-transport-beehive/>.

<sup>5</sup>Melicher, Dacotah. "Road Trip: How Hive Transportation Puts Stress on Honey Bees." Entomology Today. Last modified April 1, 2019. Accessed March 22, 2022. <https://entomologytoday.org/2019/04/01/road-trip-hive-transportation-stress-honey-bees/>.

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My name is Ethan Gabel and I am in 9<sup>th</sup> grade. This is my first year beekeeping. I became interested in bees in second grade when my class studied honeybees.