

US beekeepers reported lower winter losses but abnormally high summer losses

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Beekeepers across the United States lost 43.7% of their managed honey bee colonies from April 2019 to April 2020, according to preliminary results of the 14th annual nationwide survey conducted by the nonprofit

Bee Informed Partnership (BIP). These losses mark the second highest loss rate the survey has recorded since it began in 2006 (4.7 percentage points higher than the average annual loss rate of 39.0%). The survey results highlight the cyclical nature of honey bee colony turnover.

Although the high loss rate was driven by the highest summer losses ever reported by the survey, winter losses were markedly lower than in most years. As researchers learn more about what drives these cycles of loss, this year emphasizes the importance of the summer for beekeeper losses.

This past year, winter losses were reported at 22.2%, which is 15.5 percentage points lower than last year and 6.4 points lower than the survey average. However, high [summer](#) losses were reported at 32.0%, which is 12.0 percentage points higher than last year and 10.4 points higher than the survey average.

"This year, summer loss was actually the highest we've ever recorded, even higher than winter losses, which is only the second time we've seen that, and it's mostly commercial beekeepers that are driving that loss number, which is unusual," says Nathalie Steinhauer, BIP's science coordinator and a post-doctoral researcher in the University of Maryland Department of Entomology. "So that makes this year different and interesting to us, because we want to know what is driving their losses up in comparison to previous years."

Commercial beekeepers typically have lower losses than backyard and smaller operations. Commercial honey bees pollinate \$15 billion worth of food crops in the United States each year, so their health is critical to food production and supply.

"When BIP started doing this survey, winter loss was the main focus because that period of the year was thought to be the most challenging for beekeepers and their colonies, especially in temperate climates," says Geoffrey Williams, assistant professor of entomology at Auburn

University and co-author of the survey. "Adding summer loss into the survey in 2010/11 was quite revealing. For the first time, we had the numbers to show that loss occurs throughout the year, and that summers are not insignificant for [beekeeper](#) losses."

Since beekeepers began noticing dramatic losses in their colonies in the early 2000s, state and federal agricultural agencies, university researchers, and the beekeeping industry have been working together to understand the cause and develop best management practices to reduce losses. The BIP annual [colony](#) loss survey, which has been conducted since 2006, has been an integral part of that effort.

The survey asks beekeeping operations of all sizes to track the survival or turnover rates of their [honey bee colonies](#). This year, 3,377 beekeepers managing 276,832 colonies all across the country responded to the survey, representing about 10.4% of the nation's estimated 2.67 million managed colonies.

According to Dan Aurell, BIP field specialist based at Texas A&M University, the factors that go into summer and winter losses are quite different, as are the consequences for commercial beekeepers, who seem to have struggled the most this past year based on the survey results. The health of the queens that head production colonies is a major factor in summer losses. In addition, beekeepers split their colonies after winter to strengthen them as a best management practice, and the health of those colonies at that time is critical to their longevity.

"Factors that often contribute to summer loss tend to be if your splits are in poor condition or don't have the right resources, and queen failure," says Aurell. On the other hand, winter loss is closely related to fall management practices, Aurell explains, such as whether your colonies have good conditions during the summer to build up to a robust fall population, and if the fall varroa mite loads were high.

"I've heard beekeepers say that the California queen raising season in 2019 was the worst in 30 years," Aurell adds about one of the major queen-raising markets in the United States. According to Aurell and his colleagues at Michigan State University, UC Davis, and Oregon State University who all work with commercial beekeepers, this could have been a contributing factor.

"Commercial beekeepers pretty consistently have lower losses than backyard beekeepers—you don't get to a level where you are managing more than 500 colonies, and often a lot more than that, without learning good management strategies," says Aurell. "But high losses for commercial beekeepers can be really costly. It may be that 400 colonies cost upwards of \$80K to replace. And even if the rest of your bees are healthy and strong after a big loss, it is a lot of labor to split those and restore balance in your operation. If you've had a big loss, it's often the case that your surviving colonies are also in poor condition."

Many of the summer losses this year could represent carry-over from a particularly poor winter last year, where BIP reported the highest winter losses it had ever recorded at 37.7%. Higher levels of the parasitic varroa mite reported that winter may have weakened colonies going into the spring of 2019. Additionally, weather conditions may have promoted brood diseases, affected the availability of mated queens when they were needed, or contributed to a lack of food for honey bees at key times throughout the year, such as during the almond blooms.

"While these explanations are entirely based on what we have been seeing and not on data, our conversations with beekeepers and colleagues across the country support these issues as potential reasons for the particularly high summer losses this past year," says Aurell.

In addition to the loss survey, BIP conducts a management survey to connect management practices to losses, exploring ways to manage and

reduce losses overall. However, according to the researchers, losses are a natural part of the beekeeping industry, rising and falling with the weather, varroa loads, pesticide loads, and a variety of other factors.

"In the survey, we ask what beekeepers consider to be acceptable loss in the winter, and that number has crept up from 15% to 25% pretty steadily, so it is slowly trickling into the beekeeper's mind that [losses](#) have gotten worse over time, and they have to accept more as a new normal," says Steinhauer. "There is always going to be some turnover, but it is about what is a normal turnover and what is abnormally high, and how BIP can help arm beekeepers with the information they need to manage it."

Williams adds, "BIP is working on an epidemiological approach to really understand the health issues of bees. It's using correlational information generated by the loss and management survey results to drive more hypothesis-driven research to validate and verify findings and causes of mortality."

Provided by University of Maryland

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