

Connecticut's Wild Bees May Be In Trouble

By **Gregory B. Hladky**

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NEW HAVEN – There are an astounding 337 species of bees buzzing around to pollinate Connecticut's flowers, crops and trees, according to a new research effort, and the vast majority of those are wild insects.

To your average non-entomologist (which is nearly everybody), that might sound like a heck of a lot of wild bees. But Connecticut experts warn that at least four native bee species have vanished from our state since 1997, and the likelihood is that their disappearance was caused by human activity.

Experts theorize that disease brought in with introduced bee species may have something to do with the loss of these native insects. Or it could be related to destruction of their natural environment. Or that it involves controversial pesticides called "neonicotinoids" that many environmentalists fear are linked to drastic drops in honeybee populations. Or it could be all of the above.

No one knows for certain why these four different types of bumblebees are no longer around, but it's clear their troubles aren't limited to Connecticut.

"There's good evidence those species have declined across the Northeast," said Kimberly Stoner, an associate scientist and bee researcher with the Connecticut Agricultural Experiment Station's entomology department here in New Haven. "The decline of these species was really not noticed until they were gone. ... Once something is gone, it's very hard to prove why."

Stoner is part of the team of scientists who have been working for the past six years to document all the different types of bees in this state. Their study, which is due to be submitted this month to an entomological journal for publication, includes 11 wild species that hadn't been recorded in Connecticut before. They may have been here all along and not have been recorded.

Concerns about the health of wild bee populations have been increasing in recent years in direct proportion to stunning losses of domesticated honeybees.

A recent survey found that close to 60 percent of Connecticut's honeybees died over the summer of 2014 and the winter of 2015. Bees and other insects are critical to the pollination of American crops worth an estimated \$24 billion a year. Fewer honeybees mean we become more and more dependent on wild bees.

Only nine of Connecticut's 337 bee species are non-native types, Stoner said. The trouble with that is scientists haven't conducted very much research into wild bees, Stoner said. Studying domesticated honeybees is a lot easier and lots more money has been devoted to honeybee research because of their commercial and agricultural importance, she said.

"There's not really a lot of data for other types of [wild] bees," Stoner said during a recent interview in her office in the basement of the experiment station's Jenkins-Waggoner Laboratory. "The general public pretty much doesn't know of the existence of wild bees."

The Obama administration recently released a plan to spend more than \$82 million on research into the problems of bees and other pollinators like monarch butterflies. Some environmental groups claim new program doesn't go far enough because it fails to ban neonicotinoid pesticides, which have been prohibited in the European Union for the past

two years because of the bee issue.

The new study to document the number of different types of bees in Connecticut wasn't focused on the loss of any particular species. Researchers led by John S. Ascher, a scientist with the American Museum of Natural History, were attempting to find out how many of North America's approximately 4,000 bee species call Connecticut home. The study in this state is part of a project to create an international "bee database."

Ascher and David Wagner of the University of Connecticut's department of ecology and evolutionary biology made visits to both public and private bee collections at places like the Peabody Museum as well as universities and colleges around the state looking for documentation on native bees. Another scientist participating in the study is Jason Gibbs of Michigan State University.

Tracy Zarrillo is a research technician at the Connecticut Agricultural Experiment Station (CAES) in New Haven who has also been part of the bee study. Her job includes checking bee traps at seven different spots around the state, including Bridgeport's Beardsley Zoo, the White Memorial Foundation in Litchfield, and CAES facilities in Windsor and Griswold.

The traps or "bee bowls" are containers of fluids that both attract bees and drown them once they're inside. While this may sound a bit harsh, it's the best way researchers have found to document what types of bees are in a particular area.

Zarrillo and other researchers then collect the traps once every two weeks and sort out the captured bees for examination and classification. The dead bees must be washed and then dried (using a hand-held blow dryer) so their hair patterns and colors can be seen under a microscope for identification purposes.

"Right now my research assistants are pinning bees from 2013," Zarrillo said.

The new bee data base for Connecticut will, in the future, give scientists the chance to gauge the health of wild bees here. The lack of this type of historical information means there's no way now to determine if a particular bee species is healthy or hurting, Stoner said.

The Connecticut study will be submitted to the Journal of the Kansas Entomological Society, which has a long history of publishing ground-breaking bee research, according to Stoner.

Bee scientists have been struggling for years to figure out the causes of the massive declines in honeybee populations, and researchers are now beginning to discover that wild bees may be suffering the same sorts of problems.

Loss of habitat means the diet of bees has changed and become less healthy and less able to care for hives and offspring. Pesticides and fungicides appear to be leaving bees weak and more vulnerable to disease and parasites.

A study by Cornell University researchers released in June found that wild bees pollinating orchards in upstate New York appeared to suffer population declines relating to pesticide and fungicide use. A separate experiment in Sweden indicated that neonicotinoid pesticides "can have serious consequences for wild bees."

Scientists at Newcastle University in Britain and Trinity College in Dublin found evidence that bees may in fact be attracted to plants treated with neonicotinoids – pesticides that are based on nicotine, the same substance human smokers find so addictive.

The fact that four different species of native bumblebees have vanished from Connecticut in less than 20 years has researchers like Stoner worried about the future of other wild bees.

One theory is that their disappearance from this state could have something to do with a disease brought into

Connecticut when commercial greenhouse operators introduced a non-native type of bumblebee. While the commercial bumblebee was resistant to the disease, according to this theory, our native bumblebees weren't.

Another possibility is that we've done something to the natural landscape through development and pollution that makes it too difficult for these species to survive here.

Stoner said some scientists believe that the neonicotinoids may be to blame. She said the disappearance of those four native bee species appears to have coincided with "the era when neonicotinoids ... came into widespread use."

"I would say it's probably a combination of things," Stoner said. "We know very little about how pesticides ... and changes in habitats may be affecting these wild bees."

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