

East African honeybees are safe from invasive pests... for now

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This is the African honey bee, *Apis mellifera scutellata*, on an ornamental succulent, Kitui, Kenya. Credit: Maryanne Frazier, Penn State

Several parasites and pathogens that devastate honeybees in Europe, Asia and the United States are spreading across East Africa, but do not appear to be impacting native honeybee populations at this time, according to an

international team of researchers.

The [invasive pests](#) include including *Nosema microsporidia* and *Varroa* mites.

"Our East African honeybees appear to be resilient to these invasive pests, which suggests to us that the chemicals used to control pests in Europe, Asia and the United States currently are not necessary in East Africa," said Elliud Muli, senior lecturer in the Department of Biological Sciences, South Eastern Kenya University, and researcher at the International Centre of Insect Physiology and Ecology, Kenya.

The team first discovered *Varroa* mites in Kenya in 2009. This new study also provides baseline data for future analyses of possible threats to African honeybee populations.

"Kenyan beekeepers believe that bee populations have been experiencing declines in recent years, but our results suggest that the common causes for colony losses in the United States and Europe—parasites, pathogens and pesticides—do not seem to be affecting Kenyan bees, at least not yet," said Christina Grozinger, professor of entomology and director of the Center for Pollinator Research, Penn State. "Some of our preliminary data suggest that the loss of habitat and drought impacting flowering plants, from which the bees get all their food, may be the more important factor driving these declines."

According to Harland Patch, research scientist in entomology, Penn State, not only are flowering plants important for honeybees, but the insects are important for plants as well.



This is an African honey bee, *Apis mellifera scutellata*, Kitui, Kenya. Credit: Maryanne Frazier, Penn State

"Honeybees are pollinators of untold numbers of plants in every ecosystem on the African continent," Patch said. "They pollinate many food crops as well as those important for economic development, and their products, like honey and wax, are vital to the livelihood of many families. People say the greatest animal in Africa is the lion or the elephant, but honeybees are more essential, and their decline would have profound impacts across the continent."

In 2010, the researchers conducted a nationwide survey of 24 locations across Kenya to evaluate the numbers and sizes of honeybee colonies,

assess the presence or absence of *Varroa* and *Nosema* parasites and viruses, identify and measure pesticide contaminants in hives and determine the genetic composition of the colonies.

"This is the first comprehensive survey of bee health in East Africa, where we have examined diseases, genetics and the environment to better understand what factors are most important in bee health in this region," said Grozinger. The results appeared today in *PLOS ONE*.

The researchers found that *Varroa* mites were present throughout Kenya, except in the remote north. In addition, *Varroa* numbers increased with elevation, suggesting that environmental factors may play a role in honeybee host-parasite interactions. Most importantly, the team found that while *Varroa* infestation dramatically reduces honeybee colony survival in the United States and Europe, in Kenya, its presence alone does not appear to impact colony size.

The scientists found *Nosema* at three sites along the coast and one interior site. At all of the sites, they found only a small number of pesticides at low concentrations. Of the seven common honeybee viruses in the United States and Europe, the team only identified three species, but, like *Varroa*, these species were absent from northern Kenya. The number of viruses present was positively correlated with *Varroa* levels, but was not related to colony size.



This shows Elliud Muli and Maryann Frazier interviewing Kenyan beekeepers, south of Mombasa, Kenya. Credit: Diana Sammataro, USDA Agricultural Research Service

"The Africanized bees—the so-called 'killer bees'—in the Americas seem to be having no problem with *Varroa* or diseases, so I would not be surprised to find they have some innate genetic tolerance to these pests," Patch said. "We suspect the seemingly greater tolerance of African bees to these pests over the western bees is a combination of genes and environment."

Given their findings that African honeybees currently appear to be resilient to the effects of parasites and viruses, the researchers recommend that beekeepers in East Africa maintain healthy bee populations by protecting vital nesting habitat and the native flowering

plant diversity that the bees depend on for food. In addition, the researchers suggest that beekeepers use pesticides sparingly.

"This research is important because it confirms the resilience of African bees despite the heavy presence of recently introduced *Varroa* mites, and it suggests that the approach to manage these pests should not follow the application of pesticides as has been done in the western world," said Muli. These newly introduced pests to Africa might have long-term implications for the [honeybee populations](#).

"As these new parasites and pathogens become more widespread, as pesticide use increases and as landscape degradation increases due to increased urbanization, farming and climate change, we expect to see the combination of all these factors negatively impact the bees in the future," Grozinger said.

Provided by Pennsylvania State University

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