Mosquito spraying in South Florida scaled back to protect rare butterflies

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In the annual battle to rid steamy South Florida of swarming summer mosquitoes, new research has found routine spraying may pose a far greater risk to an innocent bystander: butterflies.

In a study commissioned by the U.S. Fish and Wildlife Service to address the growing number of butterflies going extinct, Florida International University researcher Gary Rand found two common chemicals used in spraying were toxic to butterflies at amounts typically used to control mosquitoes. While researchers have long suspected pesticides killed butterflies, Rand's research documents lethal amounts and found that spraying may have lasting effects.

The findings, drawn from five years of research, prompted federal wildlife managers this year to increase boundaries around endangered butterfly habitat, forcing both Miami-Dade and Monroe counties to change how they spray.

"It's up to us to protect them. They don't protect themselves," said Rand, who published his findings in three journals this spring.

Rand, a toxicologist, said his research also shows the need to broaden insect safety testing for pesticides, which currently only tests honeybees. In recent years, pesticides have come under increasing scrutiny with the widespread collapse of honeybees. But other pollinators have also suffered historic declines, including monarch butterflies, wasps and beetles. Since 1990, the number of monarchs has dropped by 970

million, federal officials announced earlier this year.

"You can't make a blanket statement about insect testing when you only test for honeybees," Rand said.

In response, Miami-Dade County plans to increase boundaries for spraying around three areas totaling nearly 2,000 acres where endangered Florida leafwing and Bartram hairstreak butterflies live. The county has also decided to stop spraying on a patchwork of environmentally endangered land inhabited by native butterflies, said Craig Grossenbacher, chief of the county's Water Resources Coordination Division.

Monroe County is also making changes, increasing boundaries around endangered butterfly habitat to 400 meters for aerial spraying and 250 meters for truck fogging, said Fish and Wildlife toxicologist Anthony Sowers.

While drought conditions have made this mosquito season one of the mildest in years, mosquito managers say the new rules mean they'll have to work a little harder at educating the public about the risks from standing water.

"It's not going to be easy," said Chalmers Vasquez, operations manager for Miami-Dade County Mosquito Control. "The population needs to be protected before the butterflies."

Mosquito season typically starts about two weeks after the rainy season, when salt marsh mosquitoes get blown inland from Everglades National Park or Biscayne Bay's tangled mangroves. But so far this year, Chalmers said the district has sprayed just once, at a half dozen parks, before the July 4 holiday and may cancel aerial spraying scheduled for July 20. Standing water in pots and plants has so far posed a bigger

concern.

"Bromeliads are a horrible problem," he said.

Risks linked to spraying date back to at least the 1990s, when researchers began connecting the decline in butterflies to pesticides. Worry only increased in recent years as butterfly numbers continued to drop. In 2013, federal officials declared two Florida species extinct. A report found three more have likely disappeared, due largely to habitat being razed for development and pesticide spraying.

Just last year, the leafwing and hairstreak were added to the endangered species list, bringing the total number of endangered butterflies in the state to four. Another three are considered threatened.

To better manage butterfly habitat, particularly on Big Pine Key where Keys residents who have come to rely on spraying to make summer months tolerable, and ocean winds can easily carry pesticides to nearby butterfly habitat, federal officials decided it was time to take a closer look at toxicity, Sowers said.

"Everyone went into it with the understanding they are insecticides. They are insects. There is going to be come toxicity," he said. "The goal was to see what type of exposure for impacts to occur."

For his study, Rand selected five Florida species he purchased from a Naples breeder: the common buckeye, painted lady, zebra longwing, atala hairstreak and white peacock. He focused on naled, permethrin and dichlorvos, the most common pesticides used in spraying across South Florida.

Using levels recorded by Mote Marine Lab in field sampling in the Keys as well as the University of Florida, he said he coated leaves with the

chemicals, then used a hole-puncher to create servings for the caterpillars, which will morph into butterflies. Rand also tested exposure for butterflies by spraying them, conducting separate tests to look at what happened when the pesticides landed on their thorax or on their wings.

Rand found naled and permethrin, but not dichlorvos, harmed both butterflies and caterpillars. Permethrin also tended to pose a lasting risk, since it stayed on leaves longer.

"If they're spraying according to the label rate and doing a proper job, you wind up with concentrations that produce acute toxicity to a number of species," he said.

Despite the findings, Rand said he is not opposed to pesticide use.

"I'd love for the whole world to be organic farming, but I don't think it' s possible," he said. Instead, he said his findings should be used as warning about how pesticides are applied and used. "Everybody complains about farmers, but you've got massive amounts of spraying outside by people. What other organisms are out there being depleted that we don't know about? And we won't know until it's too late."