Female mosquitoes become savvy about other-species suitors, study finds

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This is an Aedes albopictus female mosquito obtaining a blood meal from a human host. Credit: CDC

(Phys.org)—Talk about meeting Mr. Wrong. Female yellow fever mosquitoes sometimes contend with the courtship and mating efforts of males from another, competing species—the Asian tiger mosquito.

She's naïve, he's sneaky. Both species spread dengue, a viral disease

that's a major human health threat.

In an ironic turnabout, Florida dengue cases may rise in the near future due to female yellow fever mosquitoes becoming savvy about the false-flag suitors, leading to increased yellow fever mosquito populations, says an expert with the University of Florida's Institute of Food and Agricultural Sciences.

When male Asian tiger mosquitoes successfully deceive yellow fever females, their matings are fruitless – the two species can't produce offspring together, said Phil Lounibos, a distinguished professor of entomology with UF's Florida Medical Entomology Laboratory in Vero Beach. Instead, chemicals transferred during mating render the yellow fever female sterile for the rest of her short life.

Scientists believe this phenomenon, called satyrization, helps explain how the Asian tiger mosquito quickly became established throughout the Southeastern U.S. in the 1980s.

If satyrization happens hundreds or thousands of times in a place where both species share habitat, the net result is fewer yellow fever mosquito eggs being laid. Ultimately, satyrization reduces yellow fever mosquito populations, leaving more ecological "space" for the Asian tiger to occupy, Lounibos said.

Both mosquitoes are container-nesting species that seek water trapped in old tires, flowerpots, cup-shaped plants and the like. Both eagerly prey on humans, and are long associated with human communities. Both are invasive and annoying to Florida residents.

And, because they can transmit human disease, both species are public-health concerns. But yellow fever mosquitoes are believed to be more efficient than Asian tigers at transmitting pathogens to people.

A paper published in the Feb. 19 issue of the journal *Proceedings of the National Academy of Sciences* describes laboratory experiments suggesting that female yellow fever mosquitoes may develop an ability to spurn advances from Asian tiger males.

"We don't know that they are better able to discriminate between males of their own species and Asian tigers," said Lounibos, one of the paper's authors. "What we can say is, females from colonies that have a history of exposure to Asian tiger males are less likely to mate with Asian tiger males."

The exact reason the females manage to avoid deception is unknown, he said.

"It may be that some subtle nuance in the behavior of the yellow fever females is involved," said Lounibos, at the Florida Medical Entomology Laboratory in Vero Beach.

He also noted that if female yellow fever mosquitoes can rapidly evolve an aversion to Asian tiger males in the wild, then perhaps diminished yellow fever mosquito populations would gradually rebound.

Lounibos said he has received anecdotal reports of greater yellow fever mosquito presence in some South Florida locales.

Currently, the major health concern associated with the yellow fever mosquito is dengue. It causes severe flu-like symptoms, including fever, muscle and joint pain, headache, and possibly gastrointestinal issues. In the past few years, dengue has become a significant public health issue in South Florida, particularly the Keys.

Resurgent populations of yellow fever mosquitoes could lead to more dengue cases, Lounibos said, so one of his objectives for the near future

is to investigate some of the areas where yellow fever mosquitoes are said to be making a comeback.

In the study, Lounibos and colleagues set up laboratory experiments in which various male/female pairings of mosquitoes could mingle and possibly mate.

The results showed that, on average, mating was about three times as likely between female yellow fever mosquitoes and male Asian tigers, compared with female Asian tigers and male yellow fever mosquitoes.

Yellow fever females from colonies that had never encountered Asian tiger mosquitoes were tricked about 25 percent more often, compared with females from colonies that had a history of co-existing with Asian tiger colonies.

Provided by University of Florida