

Removing malaria-carrying mosquitoes unlikely to affect ecosystems, says report

July 26 2018, by Hayley Dunning

By combining studies on one species of malaria-carrying mosquito, researchers found that no other animals rely solely on them for food.

The study, by Imperial College London researchers, suggests the mosquito can be reduced or even eliminated in local areas without impacting the ecosystem.

Locally eliminating this one species of mosquito could drastically cut cases of malaria, although the team note that more research is needed in the field to test that the ecosystem is not significantly perturbed.

In 2016, there were around 216 million malaria cases and an estimated 445,000 deaths, mostly of children under five years old. There are many strategies currently being proposed to eliminate malaria, and one promising solution is using [genetically modified mosquitoes](#) to suppress local populations of mosquitoes.

In sub-Saharan Africa, where the majority of malaria cases occur, only a handful of mosquito species carry [malaria](#) out of the hundreds present. An international team of researchers led by Imperial, called Target Malaria, are targeting one of these species, *Anopheles gambiae*, for possible suppression in the future using genetic engineering.

However, before this is attempted the team need to predict the impact of locally suppressing *An. gambiae*. Now, in a report published today in *Medical and Veterinary Entomology*, the team have reviewed previous

studies into this species of mosquito to see how it fits into the ecosystem.

They found that some animals do eat *An. gambiae*, but those that do also eat other species of mosquito and other insects, meaning they do not need *A. gambiae* to survive.

Lead author Dr. Tilly Collins, from the Centre for Environmental Policy at Imperial, said: "As adults, *An. gambiae* mosquitoes are small, hard to catch, most mobile at night and not very juicy, so they are not a rewarding prey for both insect and vertebrate predators. Many do eat them—sometimes accidentally—but there is no evidence that they are a big or vital part of the diet of any other animal.

"There is one curious jumping spider known as 'the vampire spider' that lives in homes around the shores of Lake Victoria and does have a fondness for female blood-fed mosquitoes. Resting blood-fed females are easy and more nutritious prey as they digest their blood meal, but this spider will readily eat other available mosquito species as opportunity arises."

The team also looked at mosquito larval habitats. The female mosquitoes tend to lay their eggs in small, temporary ponds and puddles away from predators. When laid in larger ponds, any predators that feed on them also eat many other things preferentially.

As well as what eats *An. gambiae*, the team also reviewed what competes with them. If a species is removed from an ecosystem, it can mean that a competitor species – one that uses a similar food resource, for example – grows much larger in numbers to fill the space.

This can become a problem if the competitor species carries its own dangers, such as if it carries a different human disease like yellow fever.

The team found that other [species](#) of mosquito are most likely to compensate for fewer *An. gambiae*, although lab studies and field studies, as well as evidence from past eliminations of [mosquitoes](#) for example by insecticide spraying, do not always agree.

To validate and improve their findings, the Target Malaria project is launching a four-year study led by the University of Ghana and the University of Oxford that will study *An. gambiae* in the local environment in Ghana.

More information: C. M. Collins et al. Effects of the removal or reduction in density of the malaria mosquito, *Anopheles gambiae* s.l., on interacting predators and competitors in local ecosystems, *Medical and Veterinary Entomology* (2018). [DOI: 10.1111/mve.12327](https://doi.org/10.1111/mve.12327)

Provided by Imperial College London

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