

Mosquito genetic complexity may take a bite out of efforts to control malaria

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A surprising research discovery in mosquitoes could affect future prospects for malaria control. A team of scientists from West Africa, the United States and the United Kingdom found that the mosquito, *Anopheles gambiae*, which was thought to be splitting into two completely new species, may actually have a more complex range of forms due to frequent inter-mating. The resulting hybrids may have implications for insecticide resistance and malaria parasite infectivity. The study published in the April 2013 issue of the journal *GENETICS*, documents substantial amounts of hybridization among two separate mosquito types in a large area spanning four countries in sub-Saharan western Africa.

"Our research shows that *Anopheles gambiae* mosquitoes, which are responsible for most cases of malaria in Africa, are more genetically complex than we thought due to interbreeding," said David J. Conway, Ph.D., one of the researchers from the London School of Hygiene & Tropical Medicine in the United Kingdom, and the Medical Research Council Unit in The Gambia. "Mosquitoes are very good at evolving quickly and this information will help us use existing control methods appropriately and consider possible new tools that will further [malaria control](#) efforts in Africa."

The scientists collected mosquitoes from houses located within 100 kilometers of the Atlantic coast in Senegal, Gambia, Guinea Bissau, and Republic of Guinea. They characterized the mosquitoes' DNA to identify the proportions of each major type, "M", "S", and [hybrid](#) "M/S" forms. Pools of each of the forms of mosquitoes from representative sites were analyzed for genome-wide genetic profiles revealing that the genomes, which are known to be different between the forms, are not different in these areas. That is, the genetic variation that exists is shared between the forms, as if they were a single species.

"Mosquito-borne illnesses can be a death sentence

in developing nations," said Mark Johnston, Editor-in-Chief of the journal *GENETICS*. "It is crucial that we understand the genetic architecture of mosquito populations so we can develop ways to safeguard people from malaria. This research reveals some of the difficulty of eradicating this disease."

More information: Nwakanma, Davis C., Daniel E. Neafsey, Musa Jawara, Majidah Adiamoh, Emily Lund, Amabelia Rodrigues, Kovana M. Loua, Lassana Konate, Ngayo Sy, Ibrahima Dia, T. Samson Awolola, Marc A. T. Muskavitch, and David J. Conway, Breakdown in the Process of Incipient Speciation in *Anopheles gambiae*, *Genetics*, April 2013, 193:1221-1231

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