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# Discovery of a new group of highly susceptible malaria mosquitoes in Africa

**In the course of a large genetic study of malaria vector mosquitoes in Burkina Faso, West Africa, researchers at the Institut Pasteur, the French National Center for Scientific Research (CNRS) and their collaborators have discovered a new subspecies of the mosquito *Anopheles gambiae*, the world's most important malaria vector. This new mosquito group, which may be an especially efficient malaria vector, was identified using a novel sampling method that for the first time accounted for mosquito behavior. The results of this study, published in the journal Science, highlight the importance of including mosquito behavior as a factor in malaria vector control strategies. A better accounting of mosquito behavior could expand the reach of control measures to target all malaria vector populations, and not just those found indoors.**

Anopheles gambiae, *main malaria vector in the world. © Institut Pasteur*

To date, most field studies of malaria transmission by the mosquito *Anopheles gambiae* have been based on the assumption that people are mainly bitten inside their houses during the night. As a consequence, researchers investigating and measuring malaria transmission have collected mosquitoes primarily inside of houses.

Researchers of the Unit of Genetics and Genomics of Insect Vectors (Institut Pasteur / CNRS URA 3012), along with collaborators from the Centre National de Recherche et de Formation sur le Paludisme, Ouagadougou, Burkina Faso, the University of Minnesota (USA), and Harvard University (USA), took a different approach: the researchers suspected that mosquitoes collected indoors may represent only a subset of the entire *A. gambiae* population. If true, this would mean that the standard collection method, morning collection of

mosquitoes inside houses, would sample mosquitoes that bite and rest indoors, but could entirely miss mosquitoes that leave houses immediately after biting, as well as those that bite outdoors and do not even enter the house.

In large study in Burkina Faso to identify the mosquito genes that control transmission of malaria, the scientists collected mosquitoes across a 400 km region of the country over four years. They collected mosquitoes inside houses, as well as outside in pools of water close to villages. Female mosquitoes must lay their eggs in water to develop into larvae, and then adult mosquitoes. The scientists hypothesized that in West Africa's arid savanna zone, where there are relatively few pools of water available for female mosquitoes to lay eggs, larvae collected from pools should include all mosquito groups, regardless of the adult mosquitoes' behavioral preferences for indoor or outdoor environments.

By this means, the researchers discovered a new, previously undescribed mosquito subpopulation of *A. gambiae* representing more of the half of the mosquitoes sampled. The new subpopulation was named Goundry after one of the villages where they were collected. The Goundry subpopulation does not rest indoors after biting people, which explains why these mosquitoes have gone undetected through traditional sampling methods.

A genomic analysis showed that while Goundry mosquitoes belong to the A. gambiae species, they are a genetically different sub-group. In contrast to other known A. gambiae populations in the study area, Goundry mosquitoes are more susceptible to malaria parasite infection, and thus could be an especially effective vector of malaria transmission.

This surprising discovery could explain why current mosquito vector control measures directed against indoor-resting mosquitoes have not been fully effective at reducing malaria transmission. This work highlights the need to rethink malaria control strategies in light of different mosquito biting and resting behaviors, in order to target the broadest range of mosquito vectors that transmit malaria.

## Source

**A cryptic subgroup of *Anopheles gambiae* is highly susceptible to human malaria parasites, *Science*,** 4 février 2011.

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