



Target Malaria: Uganda

Who we are?

Target Malaria is a not-for-profit research consortium working in Africa, Europe and North America that aims to co-develop and share genetic technologies to modify mosquitoes and reduce malaria transmission. The Uganda Virus Research Institute (UVRI) is the collaborating partner in Uganda.

Our work

Target Malaria's vision is to contribute to a world free of malaria.

Our approach is malaria control by mosquito control. Our aim is to reduce the population of malaria mosquitoes to stop the transmission of the disease, using gene drive technology.

We are proceeding step-by-step and our technology will not be ready for several years to come. We have so far been working on strains of non gene drive genetically modified mosquitoes. In 2021, we concluded our work on the "sterile male" mosquito in Burkina Faso and Mali and are now working with the "male bias" in Burkina Faso. In Uganda, we have been preparing the biosafety groundwork and facility readiness. In Ghana, we are conducting ecological studies. In parallel, we are working in the lab to develop self-sustaining gene drive mosquitoes, that have the potential to become, in the future, a new vector control tool to fight malaria in Africa.

The male bias mosquito strain is fertile and it is genetically modified to produce mainly male offspring (up to 95% in the laboratory). This mosquito does not carry the gene drive technology.

Context

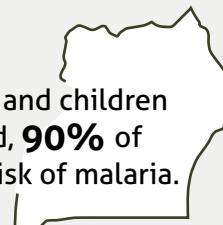
Malaria is the leading cause of morbidity and mortality in Uganda.



20.6 million malaria cases
and **26,400** deaths in 2021.

World Malaria Report 2022

Although pregnant women and children under 5 are mostly affected, **90%** of Uganda's population is at risk of malaria.



Where we operate

Target Malaria includes institutions in Africa, Europe and North America. The project is currently working in three African countries:

- Uganda: Uganda Virus Research Institute, Entebbe
- Burkina Faso: Institut de Recherche en Sciences de la Santé, Bobo-Dioulasso
- Ghana: University of Ghana, Accra

Researchers in the UK, US and Italy are also involved.

Our future work on the non gene drive genetically modified male bias mosquito

We hope to receive regulatory approval for the importation and contained use studies of the non gene drive genetically modified male bias mosquito. It would be the first importation and research on a genetically modified mosquito in Uganda.

Regulatory permits and approvals:

- In October 2022, the Uganda Virus Research Institute received approval from the National Biosafety Committee (NBC) to conduct contained use experiments on the male bias mosquito.

If the authorization is granted by Ugandan regulatory authorities, we will:

- Engage the community around the insectary to receive their support for the importation and ensure that they are informed about the upcoming importation and contained used studies.
- Conduct contained use studies in our Arthropod Containment Level 2 (ACL-2) insectary to:
 - Examine what happens if these modified male bias mosquitoes mate with local wild-type females and how efficiently.
 - Confirm that the genetic modification is working as intended, namely that it produces more male than female offspring.
 - Collect information on the development and behaviour (life parameters, feeding) of this mosquito.
- Engage stakeholders at local, regional and national level in Uganda to inform, consult and also provide feedback on the different aspects of the project and the state of our research.

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Our activities in Uganda



Insectary & laboratory

A specialized Arthropod Containment Level2 (ACL2) insectary was inaugurated in July 2019 at UVRI in Entebbe. This biosafety level is necessary to study genetically modified mosquitoes in containment.

- **Facility readiness:** Studies to maintain a wild type mosquito strain with a naturally occurring color variant (that can be distinguished under a microscope) in the ACL2 insectary, as a capacity building step in preparation for work on genetically modified mosquitoes, were successfully conducted. The Uganda facility is deemed suitable to operate at the ACL-2 level.
- **Resources:** Maintenance of a wildtype colony of local mosquitoes will continue in the insectary in preparation for future work with genetically modified strains. In addition, experiments will be conducted to study mosquito stages suitable for transport to field test sites.



Entomology

Regular mosquito collections and studies are carried out in villages in selected districts in order to obtain information about mosquito populations, species composition, seasonal dynamics and behaviour.



Stakeholder Engagement

- Ensure that all steps of the project receive appropriate individual consent & community agreement (in addition to regulatory approval) before they are implemented.
- Collect stakeholder knowledge and expectations to inform and improve project activity implementation.
- Position genetic approaches as a potential credible complementary tool to fight malaria and create an enabling environment for its evaluation.