Modern Vector Control: Genetically Modifying Anopheles gambiae

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Modern Vector Control: Genetically Modified Mosquitoes

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Abstract
The RIDL technique was used to decrease the population of *A. gambiae* s.s. and thereby reduce malaria incidence. Experiments were conducted in laboratory cages and in a two-year field study in Kou Village 4 (KV4) of Kou Valley, Burkina Faso. Our initial tests were successful, leading to the field study in which there was a decrease in the population of *A. gambiae* over the testing period.

Background
Mosquitoes spread *Plasmodium* parasites from one host to another, serving as the vectors of malaria (8). In Kou Valley, Burkina Faso, the entomological inoculation rate is around 60 infected bites per person per year (2).

Global Distribution of *Plasmodium falciparum* (10)

Goals
Genetic Modification
- RIDL on *A. gambiae* s.s.
- Control *A. gambiae* s.s. in lab
- Control *A. gambiae* s.s. in KV4

Population Control

Methods

<table>
<thead>
<tr>
<th>Laboratory Phase</th>
<th>Field Study</th>
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<td>Establish wild-type mosquitoes</td>
<td>Modify <em>A. gambiae</em> s.s.</td>
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<tr>
<td>Suppression Phase</td>
<td>Preliminary Sampling</td>
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<td>Release of modified <em>A. gambiae</em> s.s.</td>
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Predicted Results

Number of Eggs Collected Per Week Per Cage

- Cage 1 and Cage 2 contained only wild-type mosquitoes. Cage 3 and Cage 4 had modified mosquitoes introduced at the end of week 10 (4).

Number of *A. gambiae* Observed on Humans Per Month

- In the field study where OX513A male mosquitoes were released in May. The Robert et al study was done independently by another research group (8, 9).

Acknowledgments
We would like to thank Rebecca Zlino and Jim Monaco for their contributions to this project.

Conclusions

- Accomplished: Successful field study
- Future Applications: Expand field study area
- Use of RIDL on other vectors