Comparative evaluation of a new exposure-free tool, the M-trap, for sampling outdoor-biting mosquitoes

Alex J. Limwagu¹, Stephen Mwangungulu¹, Fredros Okumu²,³ and Robert Sumaye¹,³
1. Environmental Health and Ecological Science Thematic Group, Ifakara Health Institute, Tanzania. 2: School of Public Health, University of Witwatersrand. 3. Institute of Tropical Medicine Antwerp, Belgium.

Background
Outdoor sampling of outdoor host seeking mosquitoes is a major challenge for vector biologists when conducting surveillance of these mosquitoes or evaluating new interventions. Human landing catches (HLC), which is the gold standard is a potentially risky and labour-intensive method, requiring use of human volunteers to collect mosquitoes attracted to their legs. Scientists have come up with different alternative methods such as Ifakara Tent Trap (ITT-B), Ifakara odour baited station (OBS), Mosquito Magnet (MMX), and BG Sentinel, but none of these has been as effective as HLC. This is a report on development and evaluation of a recently developed outdoor sampling technique, the M-trap against other existing outdoor sampling tools.

Methods

**Exp.1:** M-Trap evaluated against MMX, BG Sentinel, ITT-B and Ifakara OBS traps at the field set up.
- First round: All traps baited with CO2 from yeast-molasses fermentation and synthetic lure (Ifakara blend)
- Second round: All traps baited with yeast-molasses fermentation and synthetic mosquito attractant, except M-Trap and ITT-B, which were baited with volunteers

**Exp. 2:** M-Trap evaluated against Human Land Catch (HLC) in semi field system.

Results

**Dry Season without involving volunteer**
Evaluation of the M-trap as an outdoor sampling tool for host-seeking, disease-transmitting mosquitoes

**Wet Season + Volunteer in M-trap**
Mean mosquito catches per trap in dry season which human volunteers were used as an odor to M-trap and ITT-B

**Mean mosquito catches per trap used**
Mean mosquito catches per trap used in BG-Sentinel and M-trap

**Mean no mosquito catch per trap used**
Mean no mosquito catch per trap used in BG-Sentinel and M-trap

Conclusion
M-Trap performs well in both semi-field system and field system, and unlike the HLC catches that drop through the night, the M-Trap catches remain consistent throughout the night. The trap can be adapted and used as an outdoor sampling tool for host-seeking, disease-transmitting mosquitoes. The trap also offers opportunities to safely involve human volunteers in vector sampling, thus ensuring improved accuracy when estimating human-vector contacts and transmission risk.