

Human and cattle decoys trap malaria mosquitoes outdoors

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Host Decoy Trap (BG-HDT) set-up. Credit: Abong'o et al *Parasites & Vectors* (2018)

Host decoy traps which mimic humans or cattle by combining odour, heat and a conspicuous visual stimulus could be effective at measuring and controlling outdoor-biting mosquitoes in malaria endemic regions, according to a study published in the open access journal *Parasites & Vectors*.

While indoor-biting mosquitoes, which are important vectors for malaria, are being controlled through the use of long lasting insecticidal nets and indoor spraying, additional strategies are needed to effectively

control outdoor-biting mosquitoes. To achieve this, effective monitoring of outdoor-biting mosquitoes is key.

Mr. Bernard Abong'o, Ph.D. student at Liverpool School of Tropical Medicine, based at Kenya Medical Research Institute and the corresponding author of the study said: "In regions with high bed net coverage like western Kenya, mosquitoes are likely to rest and bite outdoors since bed nets prevent them from feeding indoors. With increased outdoor biting and resting of mosquitoes, it becomes extremely difficult to collect and study the vectors due to their wide dispersal in the outdoor environment. However, monitoring of outdoor-biting mosquito populations is important in understanding mosquito species composition, densities and more importantly malaria transmission in regions with high bed net coverage."

The researchers compared three different mosquito collection methods: Human landing catch—the current gold standard which relies on collection of mosquitoes which land on human volunteers—and host decoy [traps](#) baited either with human or cattle odour.

The traps combine a container filled with hot water (the heat stimulus, equivalent to human body temperature) which is placed in a bucket with a black fabric jacket tied around it (the visual stimulus, which provides a conspicuous dark contrast against the surrounding environment). Natural host odours are added by placing either a human volunteer or a cow inside a ventilated tent and venting the odour from the tent around the trap using a ventilator and a tube. Mosquitoes are expected to follow first the odour cues emanating from the tube and subsequently react to the visual and heat stimuli of the trap, landing on its adhesive surface where they can be collected.

In two experiments carried out in May and June 2017 in two villages in Western Kenya, the authors tested whether human and cattle-baited

decoy traps were as effective as or more effective than a human landing catch (performed by field assistants exposing their lower limbs) at collecting outdoor-feeding *Anopheles* mosquitoes.

The authors collected a total 1,807 *Anopheles* mosquitoes, confirming that, in the study areas, outdoor biting occurs for all main malaria vector species; *An. arabiensis*, *An. gambiae*, *An. funestus* and *An. coustani*. They found that traps baited with cattle odour consistently caught more anopheline mosquitoes than human odour-baited traps and human landing catches. Proportions of the different species varied in accordance with trapping method and field location, with *An. arabiensis*—a main outdoor vector previously found to predominantly feed on cattle—caught in the greatest numbers in both cattle and human odour-baited traps.

Mr. Abong'o said: "The high numbers of *An. arabiensis* we collected in cow odour-baited traps suggest the existence of a large population of these malaria vectors outdoors, and that they are sustained by cow blood. The fact that we caught *An. arabiensis* both in human and cattle-baited traps illustrates the diversity of feeding behaviour in this species which may make it difficult to sample and control by established methods."

Mr. Abong'o added: "Host decoy traps may provide us with a new system to monitor and potentially control outdoor-biting mosquitoes and to obtain insights into their host choice, while minimising the risk to human volunteers otherwise exposed to [mosquitoes](#) during landing catches."

More information: Bernard Abong'o et al, Host Decoy Trap (HDT) with cattle odour is highly effective for collection of exophagic malaria vectors, *Parasites & Vectors* (2018). [DOI: 10.1186/s13071-018-3099-7](https://doi.org/10.1186/s13071-018-3099-7)

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