

Standard Operating Procedure for interception trapping with barrier screens

Effective Date: 19 November 2021

SOP #: BSC-2021



PACMOSSI

Pacific Mosquito Surveillance
Strengthening for Impact

Scope

The purpose of this SOP is to outline the materials and processes required to deploy barrier screens to intercept adult mosquitoes.

Overview

Description: Barrier screens are an interception trap that was initially designed and trialled by Burkot et al. (2013). Barrier screens intercept flying mosquitoes that are moving throughout the village and enable their collection when they rest on the material. The absence of any attractants means that the barrier screen provides a more accurate assessment of where mosquitoes are under natural conditions.

Target species and physiological states: Captures adult mosquitoes of both sexes in all physiological states and from many species.

Entomological surveillance indicators: Adult vector occurrence and density as well as adult vector behaviour (host seeking and resting location).

Advantage: This method can use locally sourced materials, is easily constructed and the screen will last through many seasons of use.

Disadvantage: This method is field-intensive as staff need to assess the screen at regular intervals and aspirate mosquitoes in order to collect them.

Sampling period: Catches are performed hourly across a 12 h or 24 h period, usually overnight.

Data: Total number of mosquitoes per sampling effort (by species and sex). When necessary, field data is merged with the results of subsequent laboratory analyses.

Materials

- | | |
|--|---|
| <input type="checkbox"/> Shade cloth netting | <input type="checkbox"/> Cotton wool |
| <input type="checkbox"/> Zip-ties or polyester cord | <input type="checkbox"/> Pencils/pens/markers/scissors |
| <input type="checkbox"/> Poles (potentially bamboo) | <input type="checkbox"/> Labels |
| <input type="checkbox"/> Shovel | <input type="checkbox"/> Chloroform |
| <input type="checkbox"/> Oral aspirator (1 per collector + spares) | <input type="checkbox"/> Torches |
| <input type="checkbox"/> Rubber bands | <input type="checkbox"/> Batteries for torches |
| <input type="checkbox"/> Mesh for cups | <input type="checkbox"/> Data collection forms/digital device |
| <input type="checkbox"/> Consent forms | <input type="checkbox"/> Microcentrifuge tubes |
| <input type="checkbox"/> Collection cups | <input type="checkbox"/> Cardboard storage boxes |

Product description

The barrier screen is constructed from high-density polyethylene UV stabilised shade cloth netting that is attached to wooden or bamboo poles with zip-ties or polyester cord. The barrier screens should be between 1.8 m to 2 m high and usually 10 to 20 m in length (Burkot et al. 2013), but can vary depending on topography. The optimal design is simple dark coloured screens of 50% to 70% shading weight (Pollard et al. 2019).

Trap location selection

1. The location of the barrier screen needs to be carefully considered to intercept the flying mosquitoes. You will need to consider the general layout of the village, especially the locations of blood-meal sources, resting sites and oviposition sites. Female mosquitoes will readily move between these resources.
2. Before beginning the sampling program, spend a couple of nights fine tuning the location of the barrier screens. Sometimes, turning the barrier screen 90 degrees will increase or decrease catches.

Sampling procedure

1. **Insert bamboo poles or other poles into the ground so they are 1.8-2 m high.**
 - a. Screen will be tightly attached to the poles to make it easier for collectors to see the resting mosquitoes so poles should be spaced about 2 m apart.

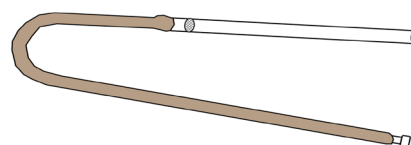


2. **Secure the screen to the bamboo poles using either zip-ties or cord (“bush cord” can also be used).**



3. **Ensure collections have equipment required to service the artificial resting shelters.**

- a. At the start of the night, set up sufficient paper cups for the work. Generally, each collector will have 12 paper cups per night in total if collections occur hourly from 18.00 to 06.00. Ensure that the cups are used in the correct order for time.
- b. For further details about collection cups and using an oral aspirator see [SOP# MOS-2021](#).



4. **To collect mosquitoes walk along both sides of the barrier screen with a torch (it will take about 10-20 min to search each side every of a barrier screen 20 m long during each hour) between 18:00 and 06:00. Mosquitoes resting on the screen can be easily seen and captured by aspiration. Ensure you look at high and low positions.**

- a. Resting mosquitoes are generally passive and can be collected with careful visual inspections and an oral aspirator. Place mosquitoes directly into the labelled collection cups.



5. **Temporarily store the mosquitoes in labelled collection cups until processing and long-term storage. For further details see [SOP# MOS-2021](#).**

Additional notes:

- Mosquito collections for anopheline will be recorded for each hour between sunset and dawn but the hours of collection may be changed based on knowledge of the biting behaviours. Generally it is good that collections start before the time of earliest biting and end after host seeking has stopped. Sometimes, partial night collections may be sufficient to monitor mosquito densities, particularly if most host biting occurs during only part of the night for anophelines.
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- Individuals collecting mosquitoes from barrier screens need to avoid acting as a lure that attracts mosquitoes to the barrier screen. This risk can be minimized by the collectors wearing repellent, and the collectors moving at least 10 m away from the barrier screen in between collection periods.
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- Do not collect more than five mosquitoes in one sucking tube before transferring them to the paper cup.
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- The catches for each hourly interval should be stored in separate collection cups labeled with date, location and hour of collection.
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- Head torches are very useful as they provide a hands-free solution. People have used red lens (~680 nm) which is considered invisible to mosquitoes and therefore does not impact behavior.
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Safety/Risk assessment

Your workplace may require you to complete a risk assessment prior to conducting field work. There are a range of risks to which field workers could be exposed, and when sampling with barrier screens may include:

- Mosquito transmitted infections
- Chloroform
- Dog bites

For further details on safety and risk assessments see [SOP# MOS-2021](#).

References

Burkot, T.R., Russell, T.L., Reimer, L.J. et al. (2013) 'Barrier screens: a method to sample blood-fed and host-seeking exophilic mosquitoes.' *Malaria Journal*.

<https://doi.org/10.1186/1475-2875-12-49>

Pollard, E.J.M., Russell, T.L. & Burkot, T.R. (2019) 'Maximising mosquito collections from barrier screens: the impacts of physical design and operation parameters.' *Parasites and Vectors*.

<https://doi.org/10.1186/s13071-019-3291-4>

Acknowledgements

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