

# MOSQUITO-BORNE DISEASE DYNAMICS IN THE TORRES STRAIT

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## Study sites



Emerging infectious diseases are a growing global threat to human and wildlife health. Outbreaks of infectious diseases are predicted to occur in frontier regions of tropical countries where land-use can increase disease risk. Disease surveillance in these regions is critical but challenging because standard sampling relies on vector-attractants that are unavailable or expensive in remote localities.

We sampled four islands from February-April 2013. Mosquitoes were collected using our novel Passive Box Traps (PBT) baited with CO<sub>2</sub> produced from yeast/sugar fermentation (Fig. 1) and BG-Sentinel™ Traps (BGT) (Fig. 2). Traps were set within villages and further away from the villages in native vegetation.

We have two main objectives: 1) evaluate how land-use in the Torres Strait influences mosquito communities (& its implications for disease risk); & 2) improve mosquito sampling methods for remote areas so disease surveillance can be undertaken on a regular basis.

### Vector-borne pathogens that increase due to human-induced land use changes

| Urbanisation                  | Deforestation                      | Agricultural Practices                |
|-------------------------------|------------------------------------|---------------------------------------|
| <b>Dengue Fever</b>           | Loiasis (African eye worm)         | <b>Malaria</b>                        |
| <b>Malaria</b>                | Onchocerciasis (River Blindness)   | <b>Japanese encephalitis</b>          |
| <b>Chickungunya</b>           | <b>Malaria</b>                     | <b>St. Louis encephalitis</b>         |
| <b>Epidemic polyarthritis</b> | Leishmaniasis                      | <b>West Nile fever</b>                |
| <b>West Nile fever</b>        | <b>Eastern equine encephalitis</b> | Oropuche fever                        |
| <b>St. Louis encephalitis</b> | <b>Yellow Fever</b>                | <b>Western equine encephalitis</b>    |
| Lyme disease                  | Kyasanur Forest Disease            | <b>Venezuelan equine encephalitis</b> |
| Plague                        | <b>La Crosse encephalitis</b>      |                                       |
|                               | Lyme Disease                       |                                       |

Mosquito-borne diseases are highlighted in red

adapted from Gubler 1998



Figure 1: PBT with CO<sub>2</sub> derived from sugar, yeast and water.



Figure 2: BGT using a power supply to operate a fan that sucks mosquitoes in

### Vectors in the Torres Strait and their disease transmission potential

*Aedes aegypti*: dengue, yellow fever, chikungunya



*Anopheles spp.*: malaria, Ross River,



*Aedes notoscriptus*: Ross River, dog heartworm



*Aedes albopictus*: dengue, chikungunya, dog heartworm

