

## Another exotic mosquito interception at Frances Bay port facility, Darwin, January 2011

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### Abstract

*The introduction of target-specific adult mosquito traps (Biogents® (BG) sentinel mosquito traps) in 2009/10 to detect exotic dengue vectors at Darwin port facilities has apparently increased the ability and frequency of their detection. The latest detection of Aedes aegypti at Frances Bay in Darwin in January 2011 was followed by subsequent successful elimination measures and heightened surveillance responses, which indicated no further presence of adults or larvae of this species.*

*Key words: Aedes aegypti; Darwin port facility; interception response*

### Introduction

In early January 2011, the dengue mosquito *Aedes aegypti* was detected at the Darwin port facility of Perkins Shipping at Frances Bay in Darwin, Northern Territory (NT) of Australia. The NT is regarded as one of the very few areas of the tropics free of any of the potential vectors of dengue.<sup>1</sup> The adult collection was made in a Biogents (BG) sentinel trap<sup>2</sup>, which is usually baited with cylinder dispensed carbon dioxide (CO<sub>2</sub>), but was unbaited on this occasion due to unavailability. The trap was run continuously from 29/12/10 and collected on 04/01/11. The Medical Entomology (ME) section of the Centre for Disease Control, NT Department of Health (DoH), in cooperation with the Australian Quarantine Inspection Service (AQIS), engages in programs for the inspection, surveillance and treatment of risk cargo and port environs to prevent the establishment of exotic mosquitoes in the NT.<sup>3</sup>

### Detection

The mosquito collection from a routine AQIS BG trap was received by ME on the day of collection (04/01/11). ME entomologists confirmed the identification of 1 male and 2 female *Ae. aegypti*.

The marine vessel implicated in the introduction (CEC Accord Voyage CA009) berthed in Darwin on 26/12/2010 and was cleared by AQIS on 29/12/10. The manifest of the vessel indicated there were 18 transport containers, with 16 of these being tank container types, which have previously been shown capable of collecting water in a section of their access hatch<sup>4</sup>. However none of the tank containers from the vessel voyage of 26 December were found to be capable of pooling water in their access hatches. The remaining 2 transport containers were open topped, with 1 housing oversized tyres. These tyres had already been unloaded onsite at Perkins and cleared by AQIS.

### Control response

#### *Adult Mosquito Control*

On the evening of 06/01/11, ME conducted a vehicle mounted Ultra Low Volume (ULV) fogging application of bioresmethrin insecticide to eliminate any further exotic adult mosquitoes that may have been present. The application of the fog was conducted along a similar route to previous interception responses<sup>3,4</sup> and included the Perkins Shipping international berthing area, the general Perkins Shipping yards, and the adjacent area to the south at the Frances Bay Marine premises (Figure).

#### *Larval Survey and Control*

On the following day (07/01/11), 2 AQIS officers and 5 ME personnel conducted a larval survey and receptacle treatment of the entire Perkins Shipping yards. Alpha-cypermethrin insecticide (a pyrethroid) was applied by hand held pressure sprayers to all actual and possible water holding receptacles. AQIS personnel conducted larval surveys of the adjoining premises of Frances Bay Marine on 10/01/11, while ME personnel conducted an insecticide treatment of this site on the following day.

**Figure. *Aedes aegypti* detection location and area of ULV application Perkins shipping and Frances Bay Marine – January 2011**



### Enhanced adult mosquito surveillance

AQIS responded to this exotic detection by increasing the level of passive surveillance in the port area. The details are as follows. Three cylinder dispensed CO<sub>2</sub> baited BG adult mosquito traps were deployed on the day of detection. The BG traps were run continuously for 1 week. Catch bags were collected and reset after every 24 hrs. After the initial week, CO<sub>2</sub> baited BG traps were still run continuously, but catch bags were collected every 5 days. This trapping schedule was maintained for 3 weeks. A CO<sub>2</sub> baited encephalitis virus surveillance (EVS) trap was set weekly in the Perkins area as per routine, with trapping conducted overnight from mid-afternoon to approximately 10:00 am the next morning. Four extra ovitraps (special traps used to collect eggs laid by *Aedes* mosquitoes) were set on the 28/01/10 and serviced weekly for 4 weeks by AQIS.

### Results

No *Ae. aegypti* adults or larvae were recovered

from any of the heightened surveillance activities in response to the initial detection. There were a number of breeding sites recorded from the larval survey, including vehicle tyres, skip bins holding water, and a septic tank that required mosquito proofing. Perkins undertook to rectify the breeding sites as a source reduction measure.

### Discussion

A number of detections of exotic mosquito breeding in cargo arriving at Darwin port have been made over the past 18 months. Tank containers used to transport fuel have been identified as high risk cargo and are now routinely inspected to ensure they are not capable of holding water in the area near their access hatches.<sup>4</sup> Other risk cargo include tyres and machinery capable of holding water.<sup>5</sup>

A recent detection of 3 x 3rd instar *Aedes albopictus* larvae was made on the 29/12/10. These larvae were detected in a cable drum, a break bulk consignment from the same

international vessel detailed above (CEC Accord CA009). No ME adult fogging or receptacle inspection and treatment response was deemed necessary at the time, as there was no evidence of pupae or pupal skins in the receptacle or amongst debris collected, indicating that there was little potential for adults to be present. All cavities in the cable drum that could pond water were flooded by Perkins personnel with chlorine solution after a quarantine direction. It is not likely that the present detection of *Ae. aegypti* had emerged from the cable drum breeding site after treatment.

The current *Ae. aegypti* detection was assessed as a medium risk importation, because relatively low numbers of both male and female *Ae. aegypti* were involved and no breeding sites could be located. Male mosquitoes are generally collected when a nearby breeding site is present. This indicated that a breeding site was present either on the vessel, in recent cargo, or in receptacles onshore nearby. Since the adult numbers were low and no onshore breeding sites were uncovered, the risk for establishment of the species was believed to be medium to low, although this did not preclude the presence of an undetected cryptic breeding site.

Surveillance carried out over 4 weeks following the elimination responses yielded negative results suggesting that the importation was very limited. It was likely to be only a few adults mosquitoes that originated either from the vessel or on the cargo soon after arrival. The results of the subsequent investigations indicate that the probability of an establishment of *Ae. aegypti* in the vicinity of Perkins wharf from the interception is negligible.

This is the 4<sup>th</sup> detection of imported exotic *Aedes* mosquitoes by a BG trap at the Darwin port area since 05/02/10, when it was first put into operation during an enhanced surveillance measure for an *Ae. aegypti* detection on 25/01/10<sup>4</sup>. In the course of writing this article, a 5<sup>th</sup> detection involving *Ae. albopictus* occurred on 10/03/11 from a similar CO<sub>2</sub> baited BG trap. A similar response to this detection detailed here was mounted, with no further specimens detected and no onshore breeding source located.

In comparison, no adult exotic mosquitoes have been detected in routine CO<sub>2</sub> baited EVS traps at Darwin port areas since the current routine monitoring program recommenced in 29/09/99. It is therefore recommended that routine CO<sub>2</sub> baited BG traps be incorporated into quarantine surveillance around risk ports in Australia to detect exotic *Aedes* mosquitoes. These should be run continuously for at least 5 days each week to ensure increased trapping efficiency.

The current enhanced surveillance and elimination procedures following these importation events significantly reduce the likelihood of a viable population of the dengue vectors entering through the port areas and establishing in Darwin, or spreading to other NT towns.

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