Mosquito control at Hickeys Lake, Katherine, NT
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Background

The Hickey’s Farm is located approximately 2.5 kilometres north west of the Katherine town centre adjacent to a populated rural area (Fig. 1). An approximate 220-hectare area of this private property is subject to seasonal inundation for up to six months of the year and is known locally as Hickey’s Lake. A large part of the margin of the inundated area produces a significant mosquito-breeding habitat, especially for the common banded mosquito Culex annulirostris. This species is a major vector for Ross River virus (RR) and Murray Valley encephalitis virus (MVE), with the latter causing a potentially fatal human disease.

Fig. 1: Katherine flooded areas 3rd February 1998 (8 days after flood) (Whelan 1998).

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Extensive mosquito breeding at Hickey’s Lake was first identified by the Medical Entomology Branch (MEB) in liaison with Katherine Environmental Health Officers’ during the Katherine flood in January 1998. Two aerial mosquito larval control operations were conducted around the margins of the lake and other areas on 5th and 12th February in order to prevent potential outbreaks of RR and MVE.

As a result of the control operations, mosquito numbers and disease cases remained low and similar to previous years. The control operations and results were reported previously (Whelan 1998). One of the conclusions of the report was that “Storm drain maintenance of the town drain system had not been carried out in an adequate manner or on a routine basis. This maintenance should have been carried out before each wet season. If this had been done it would have allowed much more efficient drainage of the remnant flood areas after the initial floodwaters had gone down.” A further major conclusion from the mosquito control operations was the “Need for urgent and additional flood mitigation measures in Katherine. Those areas within 2 km of the residential areas of Katherine, which remained flooded for more than one week after the floods should be either drained or filled so that they are unavailable as mosquito breeding areas. This work is a vital public health measure and is unrelated to flood mitigation measures that may be required to protect property.”

Mosquito surveillance and control

There is a fortnightly adult mosquito-monitoring program in the Katherine area, which is followed up by larval surveys and either larval control or recommendations for other control measures. Since 1998 the Katherine Environmental Health Office (EHO) has undertaken routine mosquito larval surveys around the Hickey’s Lake area. Surveys by the EHO and the MEB in the wet season months revealed extensive breeding, with larval densities greater than 100 larvae per dip and adult mosquito numbers of up to 1601 per light trap adjacent to the lake area (pest level 600 per trap). Mosquito breeding was initially controlled using backpack spraying and quad bike mounted spraying units but the magnitude of the breeding site eventually necessitated aerial mosquito larval control 3 times in February and March 2002. There was a potentially high public health risk of mosquito borne disease due to the close proximity of breeding sites to populated areas. Between 1998/99 and 2000/01 confirmed cases of Ross River virus disease in the Katherine district increased from 16 to 48. MEB personnel went to Katherine to assist with pre – and post helicopter control larval surveys. Initially a helicopter was sent from Darwin for the aerial application but associated helicopter transfer costs lead to the utilisation of a local helicopter company for the second and third aerial control operation. All 3 operations were successful and adult mosquito numbers at Hickey’s Lake decreases to less than 100 mosquitoes per trap night by March 2002.

Continued treatment of the Hickey’s Lake area utilising insecticide is considered impractical in terms of personnel resources and best practice mosquito control. Physical draining of the Lake area was considered to be consistent with the principles of integrated pest management. This would reduce the need for extensive surveys and use of aerial insecticide spraying over the area. This is a feasible option where land has been extensively modified, such as on intensive farming areas, and which are not considered environmentally sensitive habitats.

Drainage of Hickey’s Lake

The Department of Infrastructure Planning and Environment (DIPE) developed a drainage scheme for Hickey’s Lake as part of a flood mitigation plan order to prevent access blockage of Florina Road during the wet season. The Katherine EHO discussed the drainage project with DIPE to ensure that the drainage scheme was in accordance with MEB guidelines for mosquito breeding prevention. The proposed path of the drain across Hickey’s Farm is in a preliminary stage of construction and is

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anticipated to substantially drain the western basin of the lake, completely drain the eastern basin and drain the majority of the northern basin into the Katherine River (Fig. 2). During the recent wet season of 2001/02 the eastern basin was the centre for control efforts, both because of its proximity to the Katherine town and mosquito breeding productivity. Although it might not be possible to completely drain the western basin, the area is more accessible for control than any other parts of the lake. Construction of the drainage system commenced in October 2001 with earth removal of a two-kilometre section forming the preliminary stage. The drain is currently in an advanced stage of construction with the finished drain expected to be up to five metres deep in some sections. The finished drain is not expected to completely drain Hickey’s Lake. Small ponds will remain in the area. However these should be relatively short lived and more amenable to ground insecticide application. It would be impractical to completely drain Hickey’s Lake with a deeper drainage system because of Katherine River floodwaters would go back up a deeper drain. A flap valve on the culvert in Florina Road has been incorporated into the present design to prevent water going back up the drain.

**Anticipated outcome**

The reduction of mosquito breeding sites around Hickey’s Lake is anticipated to significantly reduce pest mosquito numbers affecting residents in the Katherine rural and urban area. The Katherine sentinel chicken program shows annual high MVE virus activity, with 3 chickens seroconverting to MVE on average per year. Lowering mosquito vector numbers will reduce the associated public health risk from both MVE and RR virus.

**Reference**