

Dengue Mosquito Eradication

Techniques employed during the *Aedes aegypti*
eradication program in Tennant Creek

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Department of Health (DoH) and Barkly Regional Council

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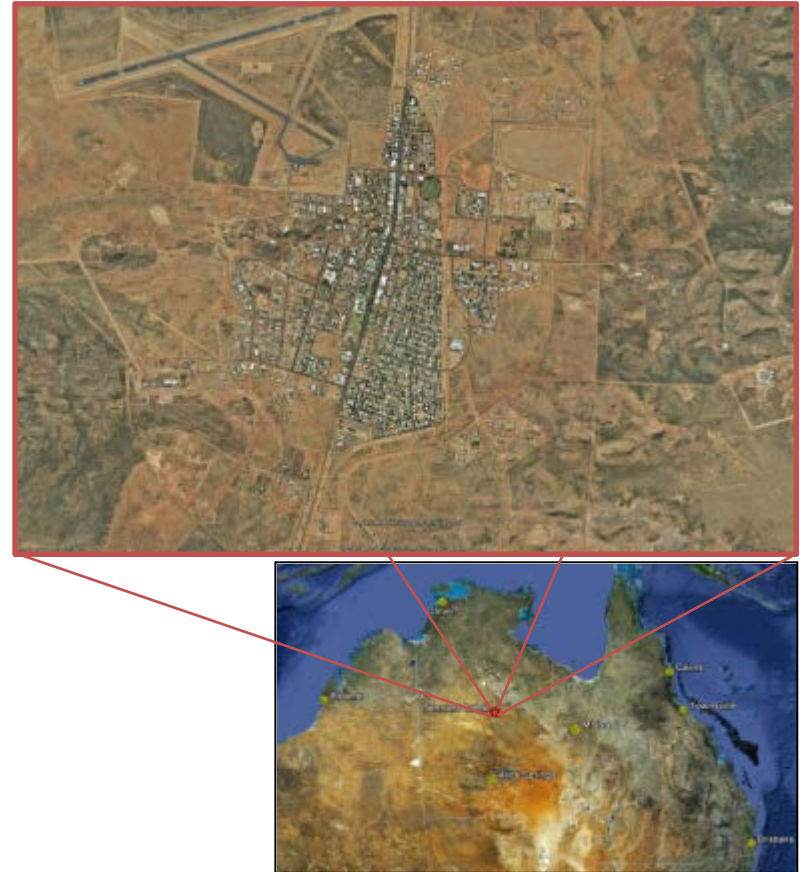
Overview

- Introduction to Tennant Creek
- History of Dengue mosquito incursions
- Eradication program
- Survey methods
- Trapping
- Identification
- Treatment options
- Ongoing surveillance and monitoring



Introduction to Tennant Creek

- Population of 3,600.
- Barkly region is approx. 322,000 km².
- Town has seven town camps.
- Has a high transient population with many travellers and transport passing through.



Tennant Creek



History of incursions

- Since the 1950s there hasn't been an endemic population of *Ae. aegypti*.
- From 1975, NT DoH (Medical Entomology) has conducted active surveillance for exotic mosquitoes.
- *Ae. aegypti* found to be established in Tennant Creek in 2004 and subsequently eradicated.
- In November 2011 *Ae. aegypti* was detected in an ovitrap sample from Tennant Creek.

Eradication program

- **Where?** Tennant Creek.
- **When?** 2011-2014.
- **What?** Inspect and treat each town lot.
- **Who?** DOH, Entomology, local technical officers.
- **Why?** Eliminate *Ae. aegypti* to prevent potential dengue outbreaks.


Survey methods

- Community engagement
- Door-to-door surveys
- Property details
- Water tanks
- Receptacles
- Survey duration
- Types of receptacles
- Larvae record



Inspection Form

- Records kept on each property inspected.
- Water sources recorded.
- Types of treatment undertaken.
- Safety issues recorded.

	Inspection Record Form TENNANT CREEK 2011/12 Map: 8 Town: Round: 2		For Follow Up Rainwater tank repaired: Yes <input type="checkbox"/> No <input type="checkbox"/>
	Location: <u>Grey</u> Aedes aegypti Control Project - MEDICAL ENTOMOLOGY, DoH, NT		Ae. aegypti Present <input type="checkbox"/> Y/N
			Plotted on wall map <input type="checkbox"/>

Inspecting Officers: _____ Date: <u>15/2/2012</u> Lot # _____ Street # _____ Street Name _____ Location Type: Residential, Transport, Commercial, Nursery, Caravan Park, Vacant Land Owner/Resident Name: _____ Ph: _____ Permission granted to re-enter property in their absence: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	No. dry receptacles: 0, 5, 10, 20+ No. receptacles with water: 0, 5, 10, 20+ Survey Duration (mins): 10, 30, 60+ Dangerous Dog: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
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Address present for: Dog Barking - distracted by fellow dog fighters!

1 Rain water tank
 2 Swimming pool (disused)
 3 Fish pond (disused)
 4 Bird bath, dog bowl
 5 Roof gutter pooling
 6 Evaporative aircon (disused)
 7 Water containers (eg: bucket, disused tyre, car body, drum, kitchen ware, pot plant, sump, tarp, vase, wheel barrow)
 8

Vial	Container Description	Location	Water Present (L)	Treatment	Larvae/dip
1	<u>tyre</u>	Inside / Outside/ shaded	<1, 5, 10, 30+	a-cyber. <u>S-meth. C</u>	<5, 10, 20, 30+
2	<u>dog bucket</u>	Inside / Outside/ shaded	<1, 5, 10, 30+	a-cyber. <u>S-meth. C</u>	<5, 10, 20, 30+
3	<u>compost bin</u>	Inside / Outside/ shaded	<1, 5, 10, 30+	a-cyber. <u>S-meth. C</u>	<5, 10, 20, 30+
4		Inside / Outside/ shaded	<1, 5, 10, 30+	a-cyber. S-meth. C	<5, 10, 20, 30+
5		Inside / Outside/ shaded	<1, 5, 10, 30+	a-cyber. S-meth. C	<5, 10, 20, 30+
6		Inside / Outside/ shaded	<1, 5, 10, 30+	a-cyber. S-meth. C	<5, 10, 20, 30+
7		Inside / Outside/ shaded	<1, 5, 10, 30+	a-cyber. S-meth. C	<5, 10, 20, 30+
8		Inside / Outside/ shaded	<1, 5, 10, 30+	a-cyber. S-meth. C	<5, 10, 20, 30+
9		Inside / Outside/ shaded	<1, 5, 10, 30+	a-cyber. S-meth. C	<5, 10, 20, 30+

Comments: Check on permission granted. Has barking dog? dangerous perimeter spray.

Where larvae were found during surveys?

Category	Round 1	Round 2	Round 3	Round 4	Round 5	Round 6
Garden ornaments	61	2	-	-	1	-
Water storage containers	5	-	-	-	-	-
Discarded household items	62	5	-	-	-	-
Rubbish	14	1	-	-	-	-
Commercial usage containers	41	8	-	-	-	1
Recreational items	6	1	1	1	-	-
Building fixtures and materials	4	-	-	-	-	-
Natural habitats	-	-	-	-	-	-
Unspecified	2	-	-	-	-	-
Total number of receptacles	195	17	1	1	1	1

Larval Dip



Trapping

Many different ways to trap and collect mosquito samples throughout the town.

- BG Sentinel traps
- CO₂ EVS traps
- Lethal traps
- Ovitrap



Carbon Dioxide (CO₂) EVS Trap

Tin containing
dry ice (CO₂)

Light for
attraction



Battery
powered fan

Catch container

BG Sentinel Trap



Lethal Trap



Ovitrap (egg trap)



Identification

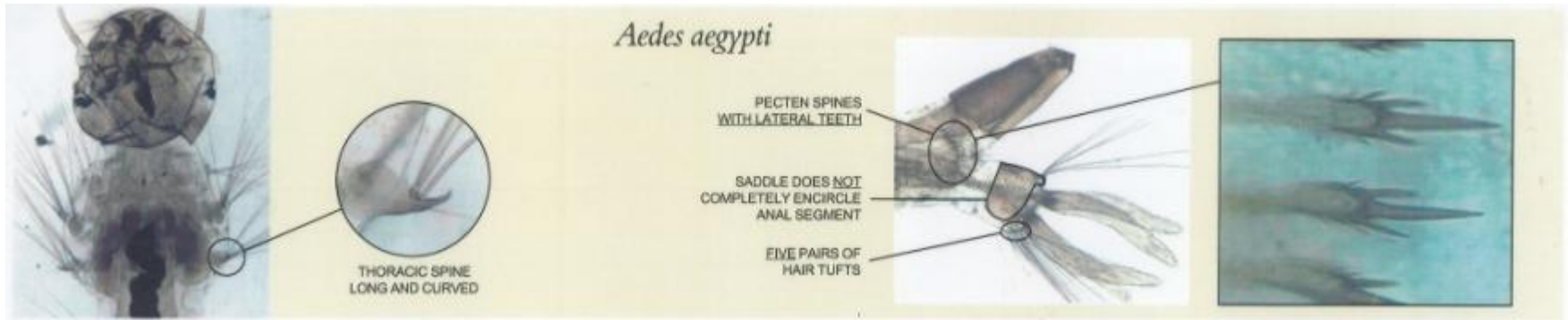


- All samples identified formally through use of a dissection microscope.
- Identification of *Aedes aegypti* was used to track the locations where breeding or harbourage may occur.
- Other species identified included:
 - *Cx. annulirostris*
 - *Cx. quinquefasciatus*
 - *Ae. tremulus*
 - *Ae. vigilax*
 - *Ae. notoscriptus*

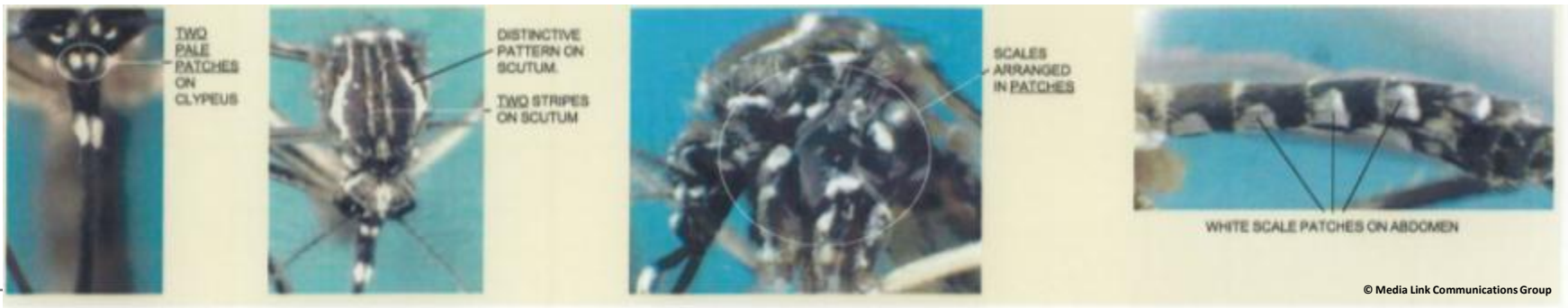
ANOPHELES	CULEX	AEDES
<p>Larvae</p> <p>Rest parallel to water surface</p> <p>Rudimentary breathing tube</p>	<p>Rest at an angle to the water surface</p> <p>Air tube</p> <p>Short, stout breathing tube with one pair of hair tufts</p>	<p>Rest at an angle to the water surface</p> <p>Air tube</p> <p>Long, slender breathing tube with several pairs of hair tufts</p>
<p>Pupae (differ only slightly)</p>		
<p>Adult</p> <p>Proboscis and body in same straight line</p>	<p>Proboscis and body at an angle to one another</p>	<p>Proboscis and body at an angle to one another</p>

Identifying *Aedes aegypti*

Larvae



Adult



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Treatment options

- Physical or chemical treatment.
- Tipping out water or treating standing water and containers.
- Media coverage throughout the town.
- Educating residents and community members.



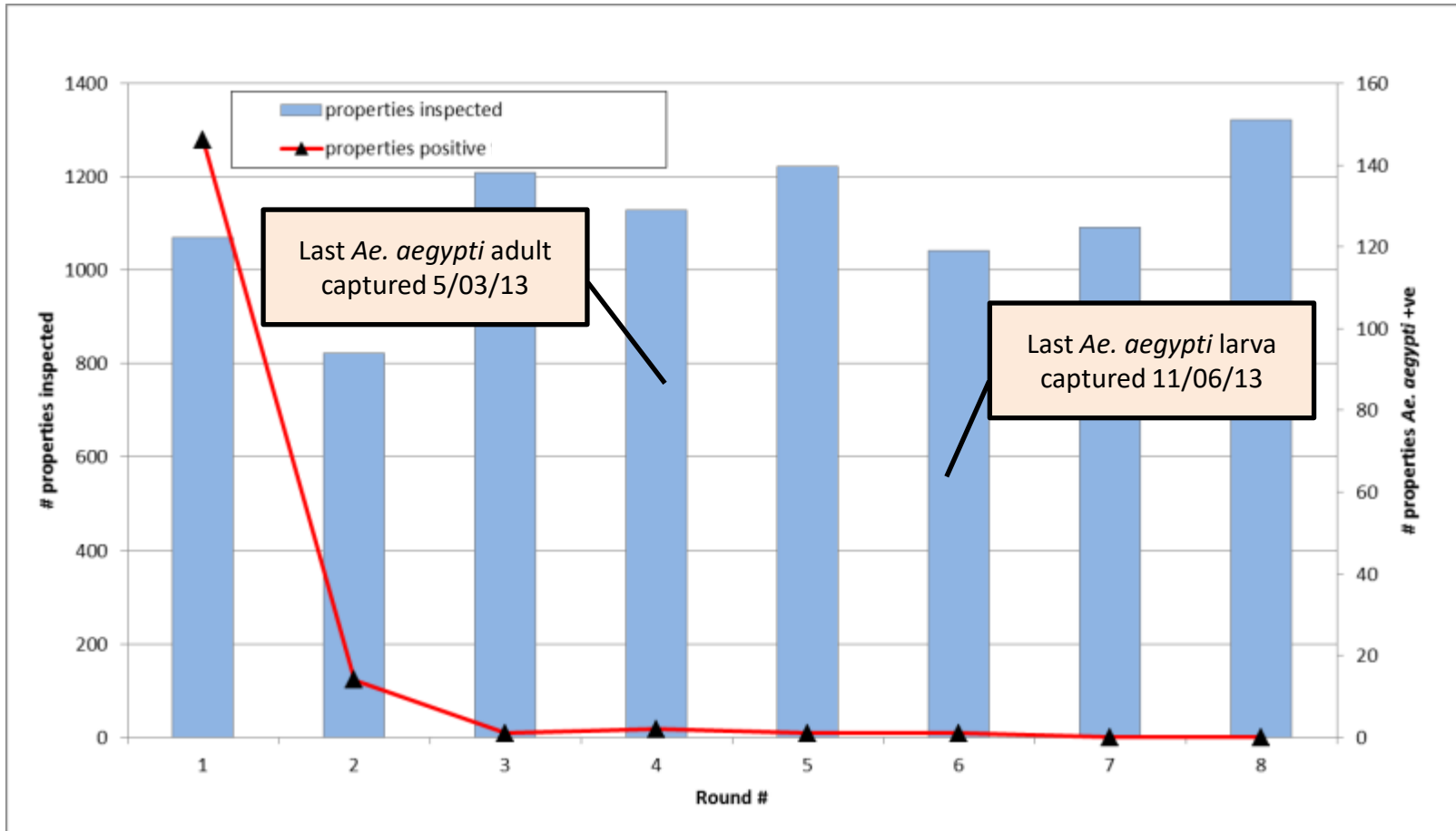
Treatment Chemicals

- **Insect growth regulator:** s-methoprene
Pellets
- **Residual pyrethroid:** alpha-cypermethrin
(Bestox pc50; ai 50g/L)
- **Egg killing treatment:** Bleach (10%) with
household detergent
- **Water surface treatment:** Aquatain AMF





Eradication



Ongoing surveillance and monitoring

- Weekly monitoring through ovitraps, BG and EVS traps.
- Annual property survey for mosquito larvae.
- DoH working with Barkly Regional Council and other stakeholders to promote appropriate infrastructure.
- Engagement with Power and Water Corporation regarding limiting mosquito breeding at sewage ponds.



Conclusions of the eradication program

- ***Eradication successful!***
- Control through targeted insecticide treatment and habitat modifications.
- Current NT surveillance program for exotic *Aedes sp.* is effective in detecting introductions.
- During an elimination program every property needs to be treated in every round of inspection.



Any Questions?



Acknowledgements

- Medical Entomology staff
 - particularly Bill Pettit (exotic vector surveillance officer)
 - Environmental Health, CDC and other DoH and NTG staff
 - Barkly Regional Council
 - Julalikari Council
 - Anyinginyi Congress
 - Residents of Tennant Creek
 - Local businesses in Tennant Creek
 - NAMAC
 - DoHA
-
- Commonwealth Department of Health for financial assistance in the elimination program.



STOP MOSQUITO SICKNESS



Some mosquitoes carry sickness. The main types of mosquito sickness that can affect people in this region are:

- * Australian Encephalitis
- * Ross River Virus
- * Barmah Forest Virus

Mosquitoes breed in still water. During the wet season when there is a lot of rain, the risk of getting bitten by an infected mosquito is bigger.

A person bitten by an infected mosquito can become very sick. Babies and old people are more likely to get this type of sickness.

It is important to avoid being bitten by mosquitoes.



Protect your community, home and family from mosquitoes

For more information contact your local health service

Help stop mosquitoes from breeding.

Cover open tanks and drains. Clean up rubbish or containers that hold water.

Don't camp next to breeding places like billabongs or swamps.

When camping use a mosquito net or make smoke from the Kungkara or Good Good bush.

Keep mosquitoes out of the house.

Put fly-wire screen on all windows and doors.

Protect sleeping babies with a mosquito net.

Wear long, loose clothing.

Use mosquito repellent with 5-20% DEET (Repellents should not be used on babies).

Thank you for listening

