PAT – Projeto Aedes Transgênico
Aedes Transgenic Project

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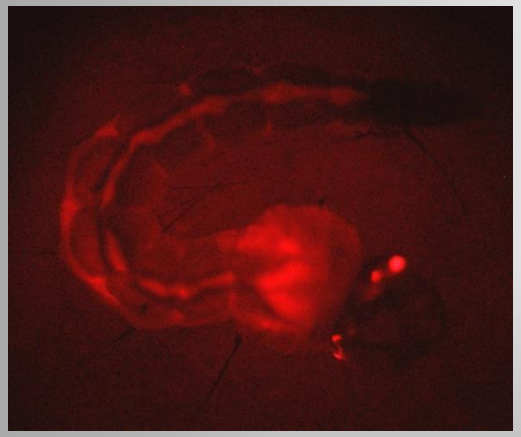
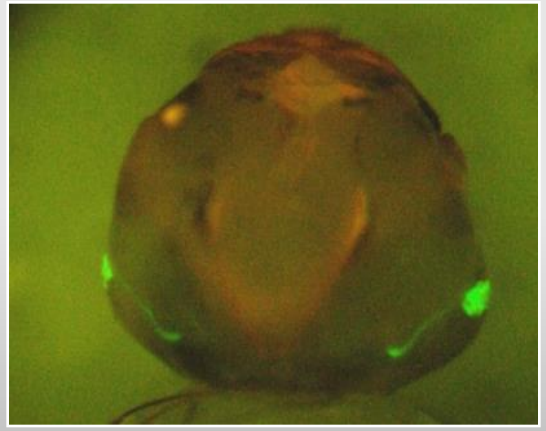




Dengue Prevention and 35 Years of Vector Control in Singapore

Eng-Eong Ooi,* Kee-Tai Goh,† and Duane J. Gubler‡

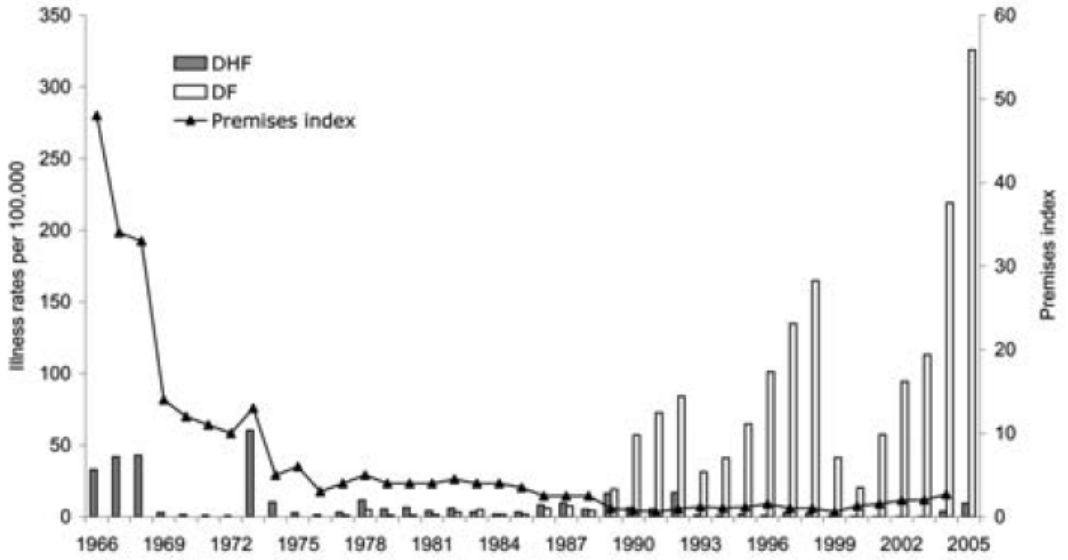
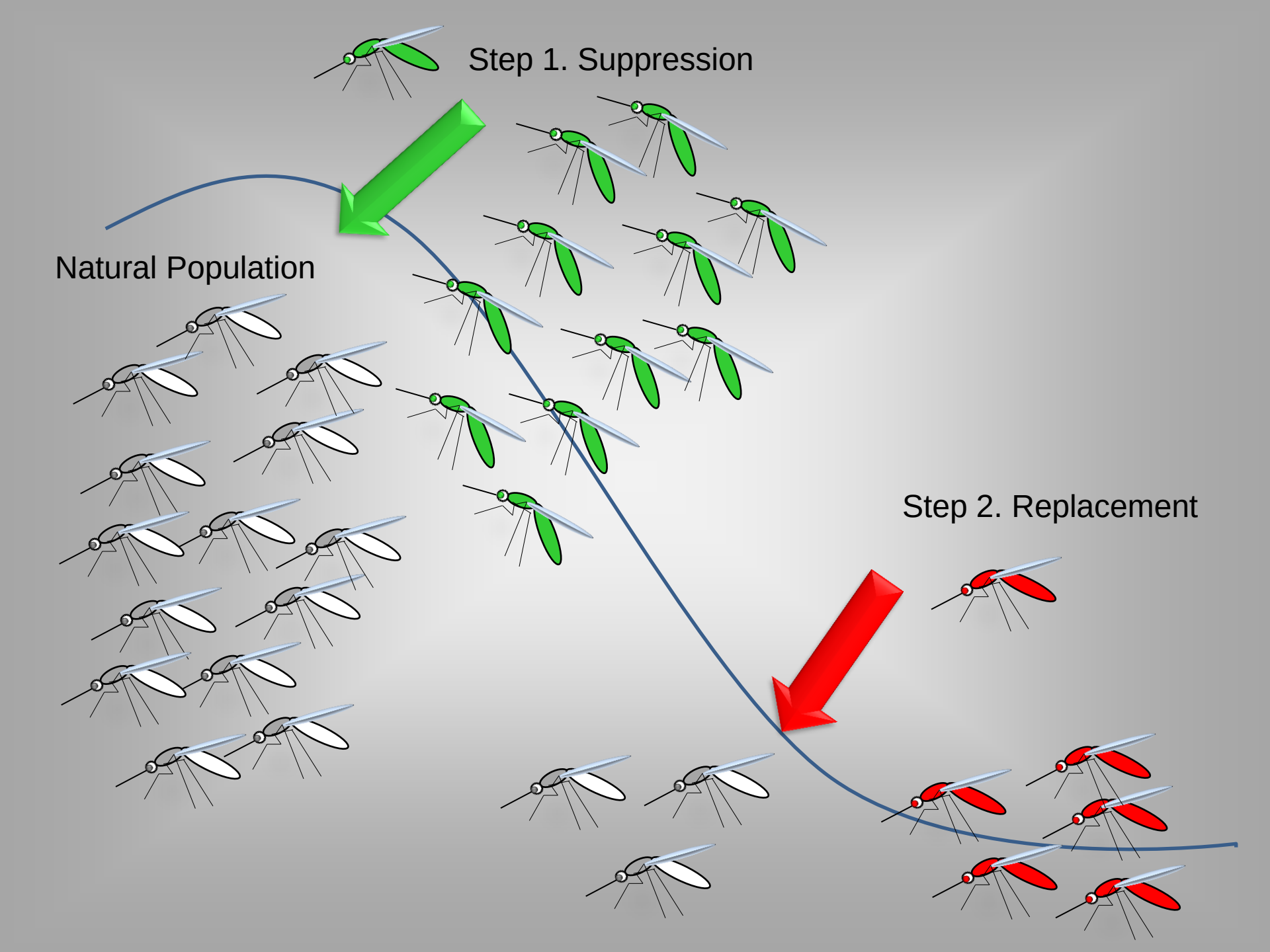


Figure 1. Annual incidence dengue fever (DF) and dengue hemorrhagic fever (DHF) and the premises index, Singapore, 1966–2005. DHF was made a notifiable disease in 1966, while DF became a notifiable disease in 1977. The annual incidences of DF and DHF reported in this figure were calculated from the number of reported cases each year from 1966 to 2004. The annual premises index is expressed as a percentage of the premises in which *Aedes aegypti* or *A. albopictus* larvae were found divided by the number of premises visited by environmental health officers.

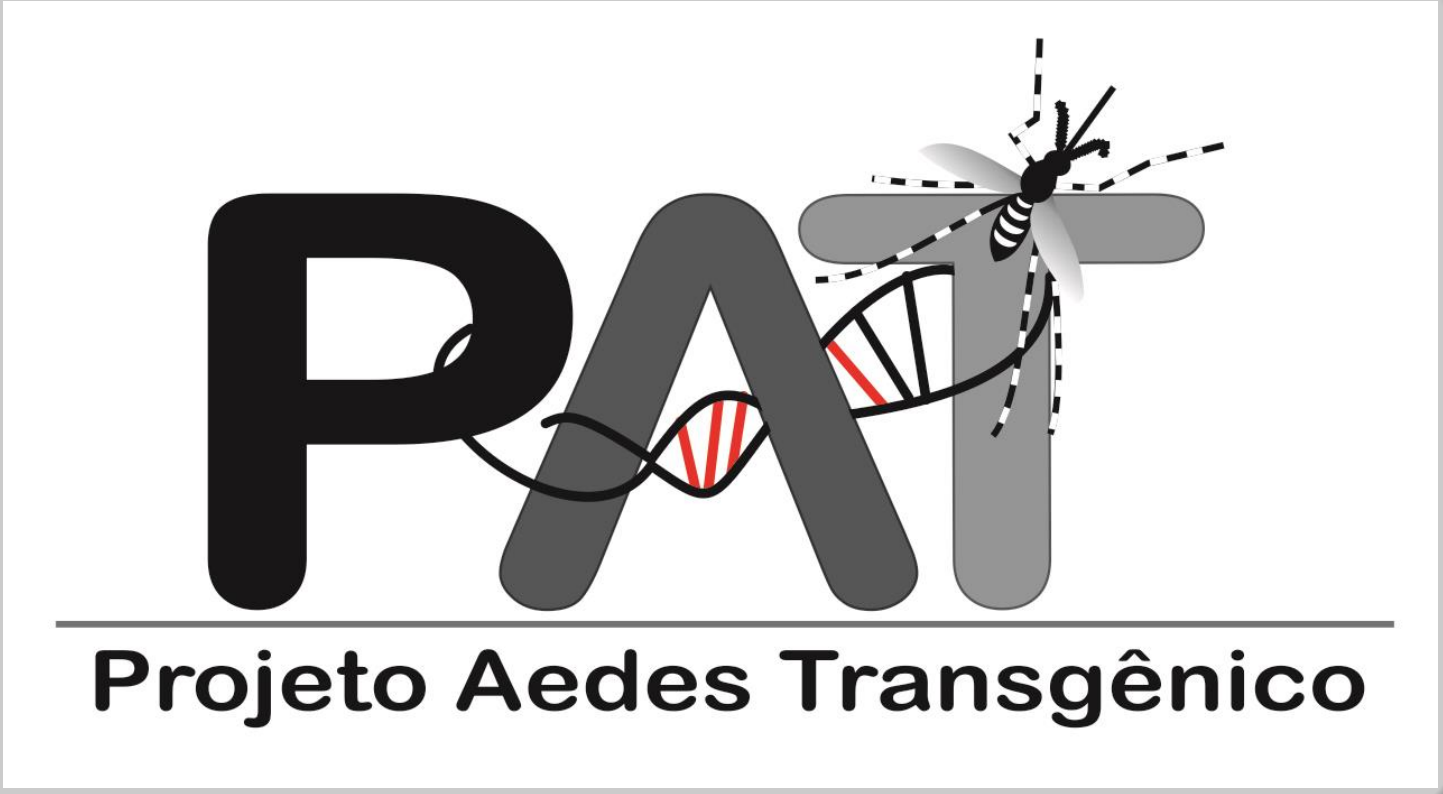
Emerging Infectious Diseases • www.cdc.gov/eid • Vol. 12, No. 6, June 2006

After a 15-year period of low incidence, dengue has reemerged in Singapore in the past decade. We identify potential causes of this resurgence. A combination of lowered herd immunity, virus transmission outside the home, an increase in the age of infection, and the adoption of a case-reactive approach to vector control contribute to the increased dengue incidence. Singapore's experience with dengue indicates that prevention efforts may not be sustainable. For renewed success, Singapore needs to return to a vector control program that is based on carefully collected entomologic and epidemiologic data. Singapore's taking on a leadership role in strengthening disease surveillance and control in Southeast Asia may also be useful in reducing virus importation.

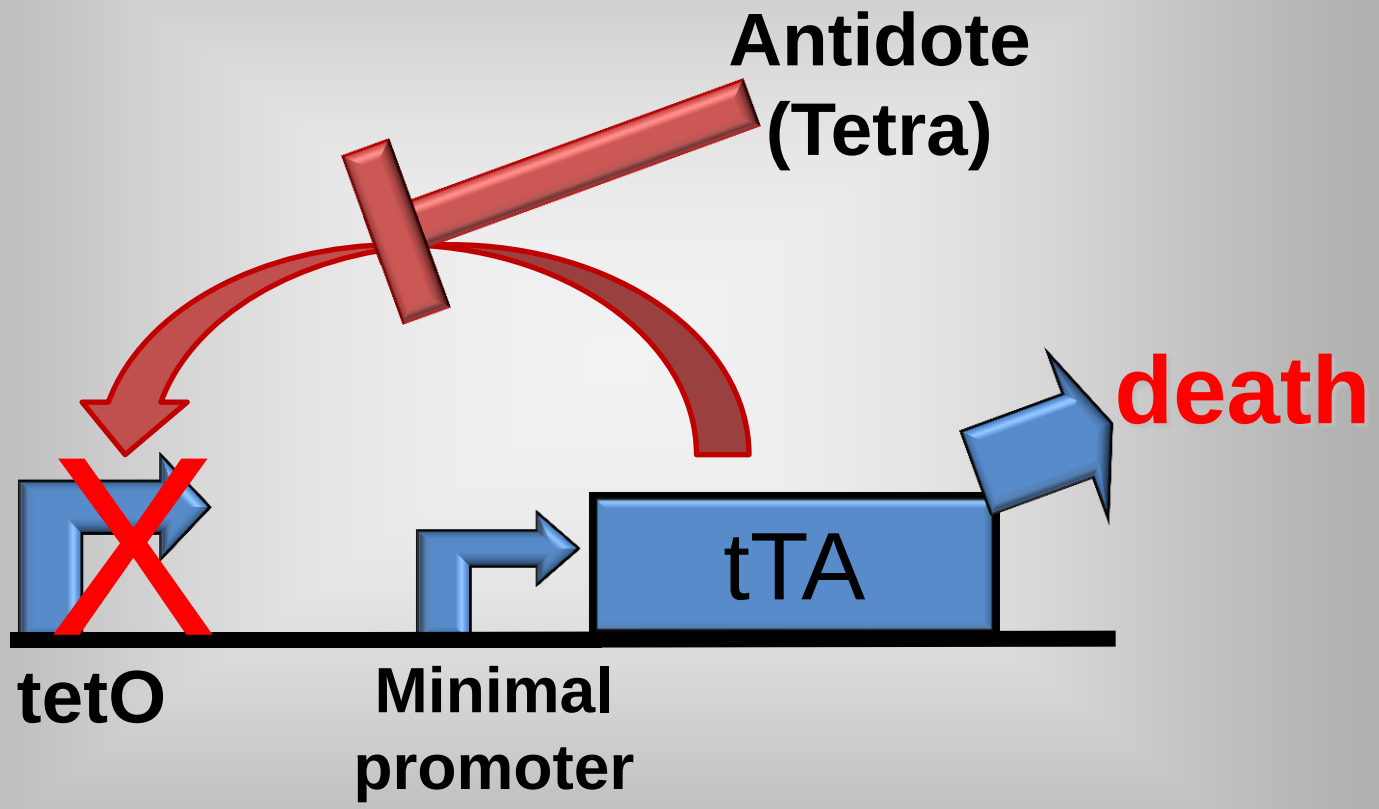

Step 1. Suppression
Natural Population
Step 2. Replacement

Step 1. Suppression

Open Field Release of OX513A *Aedes aegypti* Transgenic line evaluation



Repressive of **I**nsects carrying a **D**ominant **L**ethal gene (RIDL) – From OXITEC Biotech (UK)



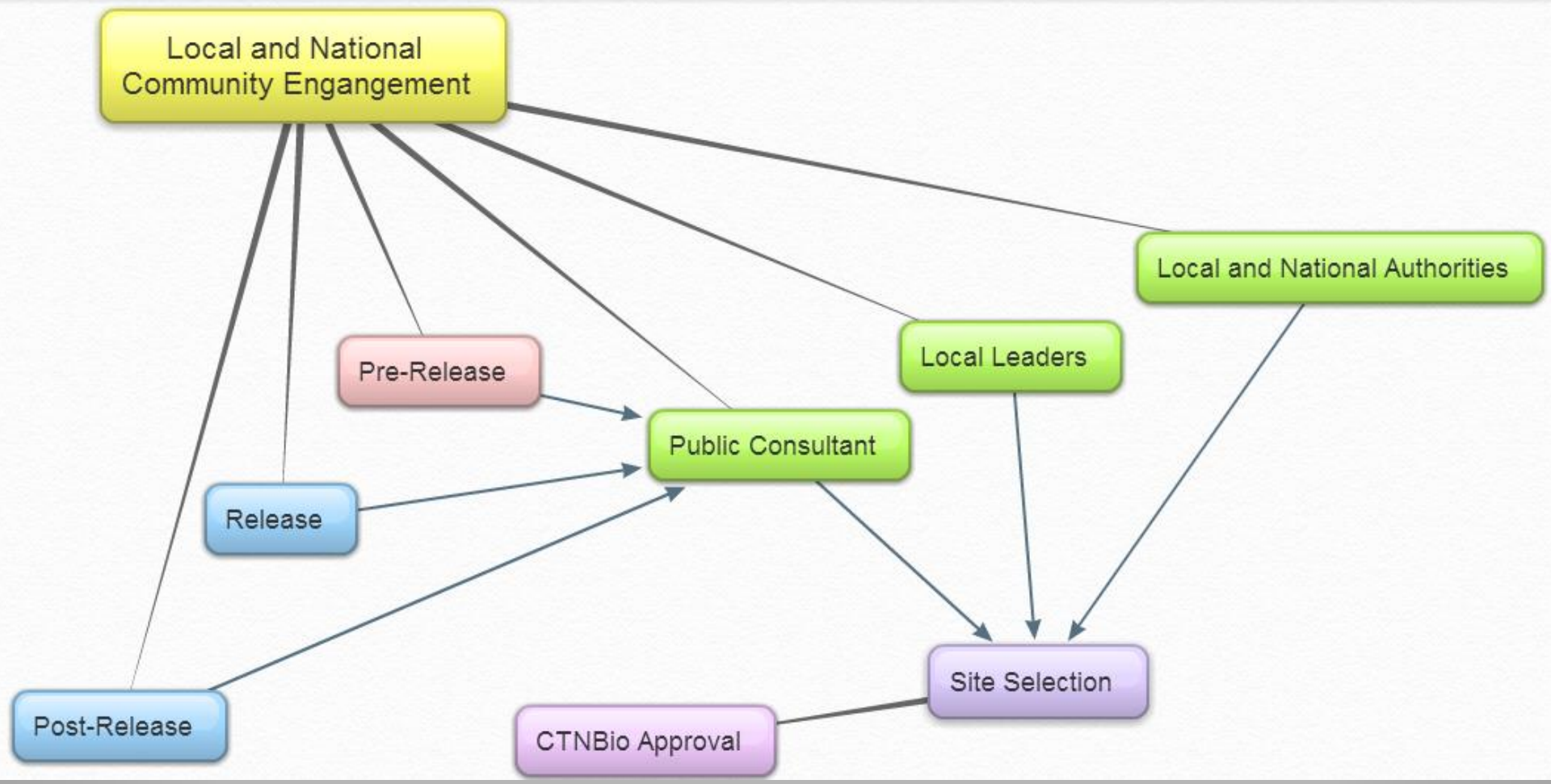
Thomas *et al.* 2000 Science 287: 2474-6

Projeto Aedes Transgênico

A field release validation for transgenic *Aedes aegypti* population suppression

- Goal – evaluate RIDL technology (OX513A) in open field release
- Collaboration between Universidade de São Paulo and Moscamed Brasil
- Oxitec agreement – No bias in the evaluation

Projeto Aedes Transgênico



Program Overview
Production -> Release -> Monitoring

Eggs produced (4-6 million/week)

Mating

Rear release generation

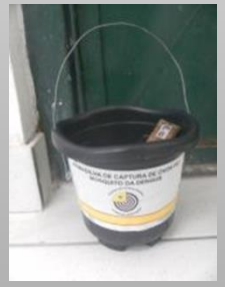
Eggs -> Pupae 1 million/week

Separate Male Pupae

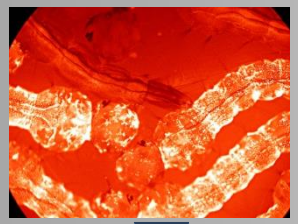
Placed in release device

Release males Adults x 3 week (1.2 million/week)

Eggs traps



Hatch eggs



Larvae screened for presence of Fluorescent genetic marker

Monitoring

Adult traps

Aedes aegypti Production (UPAT)

COLONY
4 to 6 million eggs/week

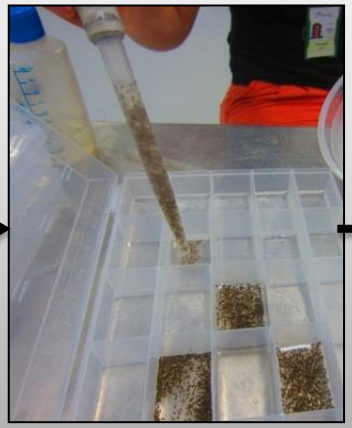
Males for releases
1 million/week

Pupa transportation (LEMI)

C25

BOD 16ºC ON

360,000 in two container

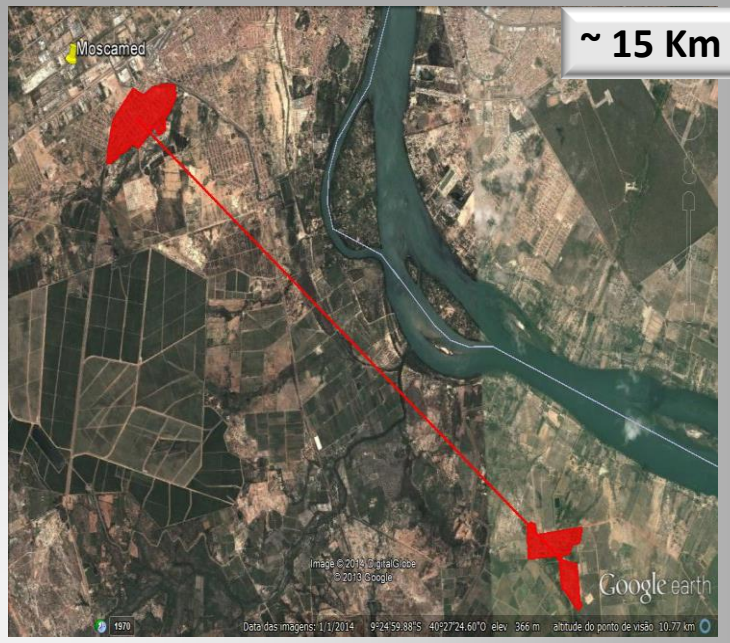


Arriving at LEMI
Emergency , Monitoring and Information Lab

Preparation for release

Projeto Aedes Transgênico

Site Selection

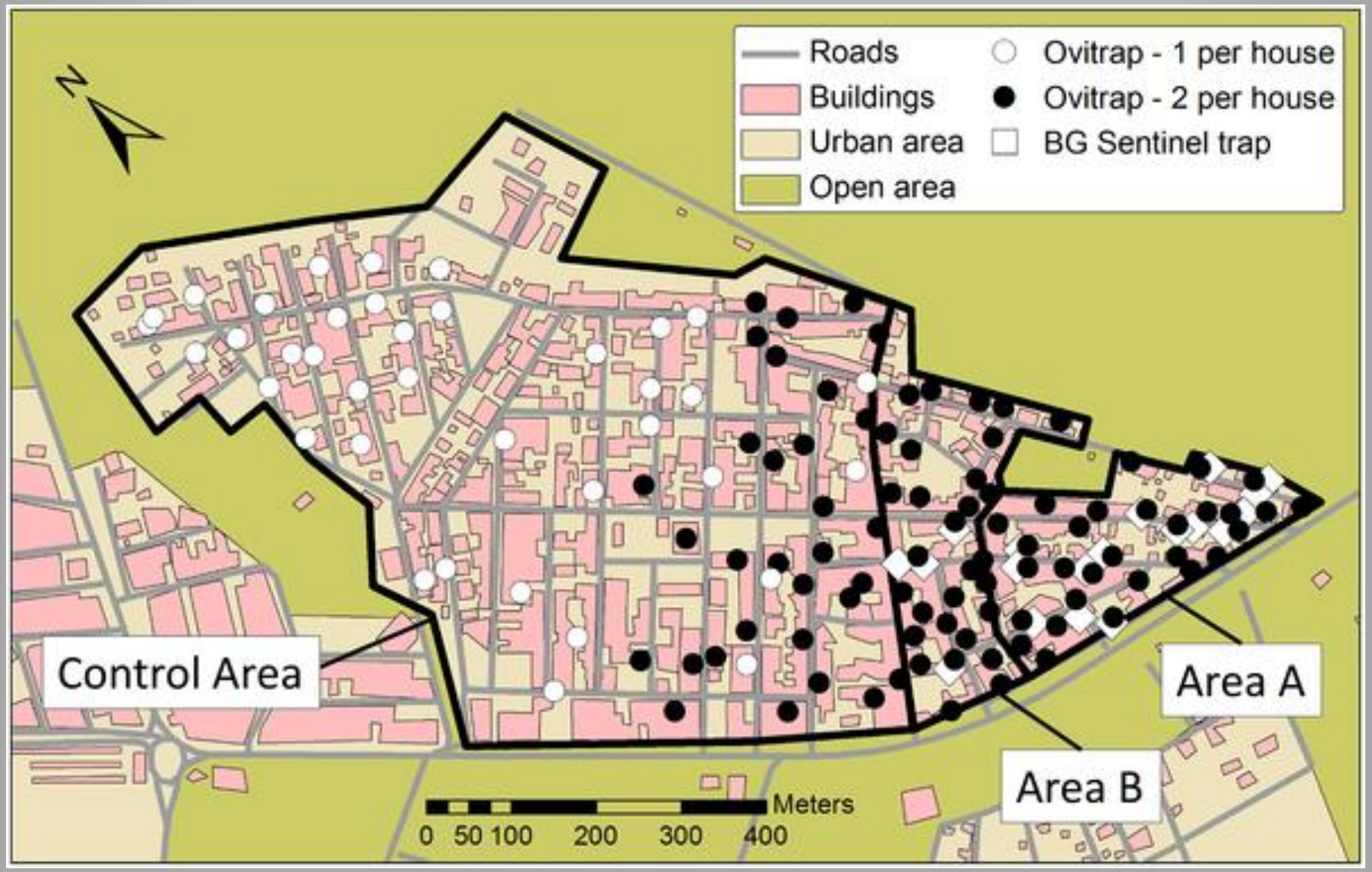


~ 15 Km distance

Itaberaba
1400 houses
550 km²

Mandacaru
600 houses
360 km²

Itaberaba – Field site



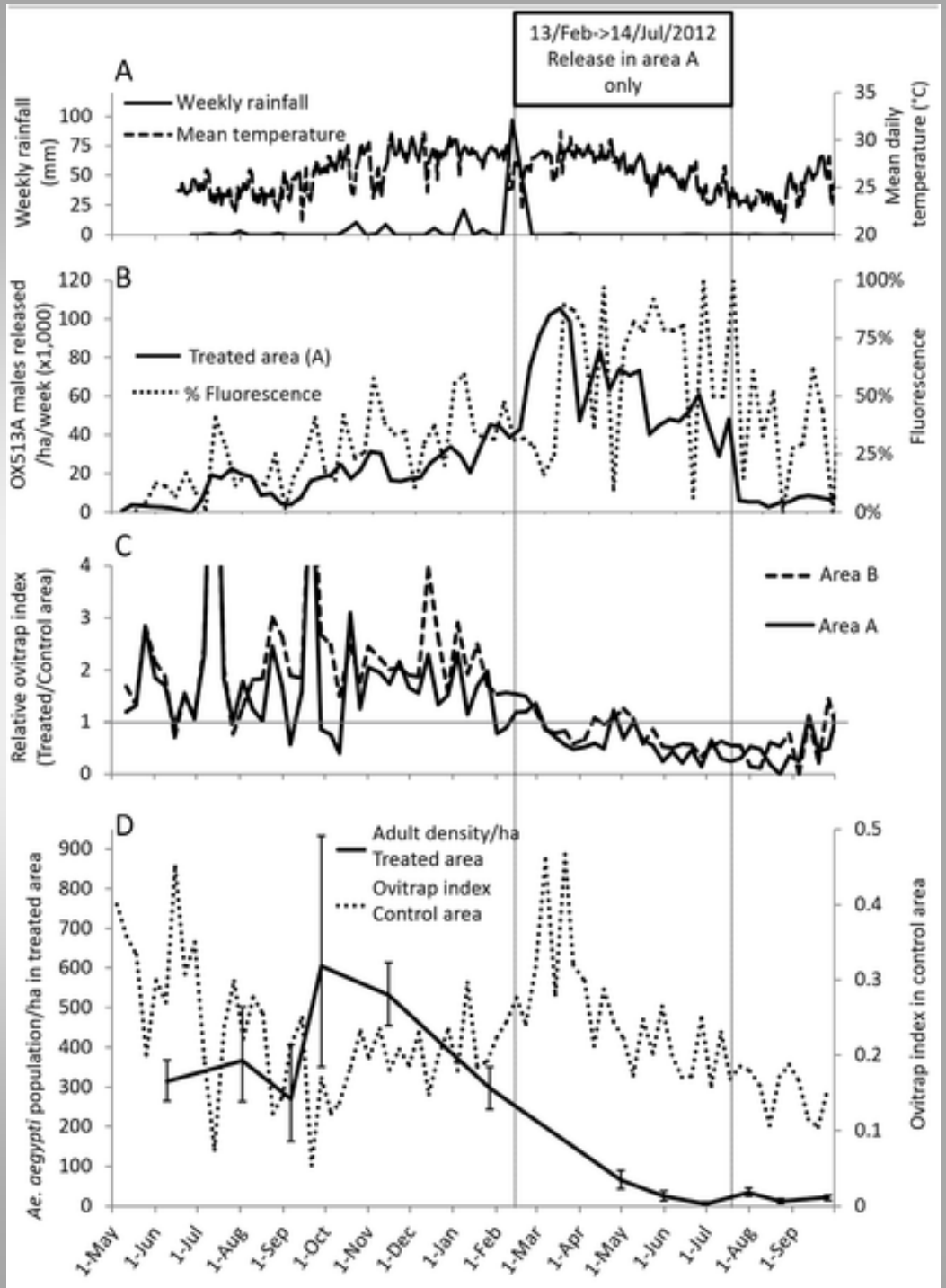
PLOS | NEGLECTED TROPICAL DISEASES

RESEARCH ARTICLE

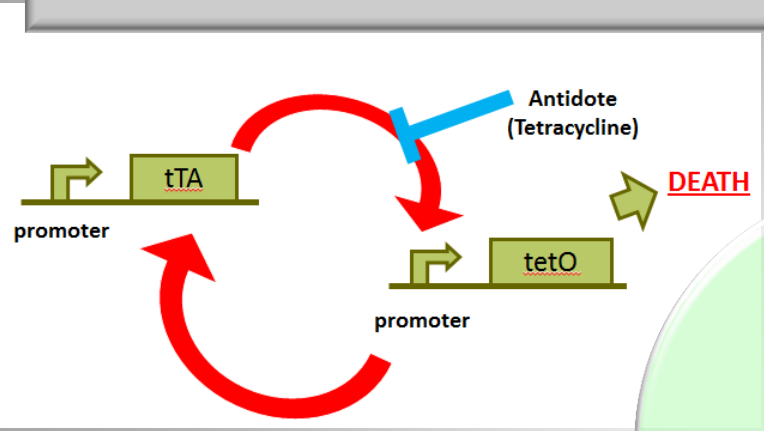
Suppression of a Field Population of *Aedes aegypti* in Brazil by Sustained Release of Transgenic Male Mosquitoes

Danilo O. Carvalho[1,2☯], Andrew R. McKemey[1☯*], Luiza Garziera[3], Renaud Lacroix[1], Christl A. Donnelly[4], Luke Alphey[1,5,6], Aldo Malavasi[3], Margareth L. Capurro[2,7]

PLOS Neglected Tropical Diseases | DOI:10.1371/journal.pntd.0003864 July 2, 2015



Bringing new technology to the field



Technical

Community

Regulatory

RIDL

Nature

Before releasing mosquitoes

- Site selection
  - Public Engagement:
    - Evolving Public Authorities (Government and agencies);
    - Local ones (community engagement);
    - Local people - explain what we are going to do in that area.




Community Engagement

Action		Period			
		Pre-release	Release		Post-release
		2010*	2011	2012	2013*
Domiciliary visit					
Internet	Social Network				
	Web site				
Interviews / appearances	TV				
	Radio				
	Newspaper				
	Magazines				
Jingle broadcast					
Leaflets distribution					
Meeting local leaders					
Questionnaires					
School presentations / lectures					
Monitoring system					
Truck loudspeakers					

* - In both years, the columns are representing the last two semesters and the first two respectively.

Projeto Aedes Transgênico

City Hall Public Hearing

Community Engagement






Total people 17,101,269 in Brazil – Based on the Brazilian Institute of Public Opinion and Statistics (IBOPE) data

Talks and Lectures

Leaflet distribution

PAT
Projeto Aedes Transgênico

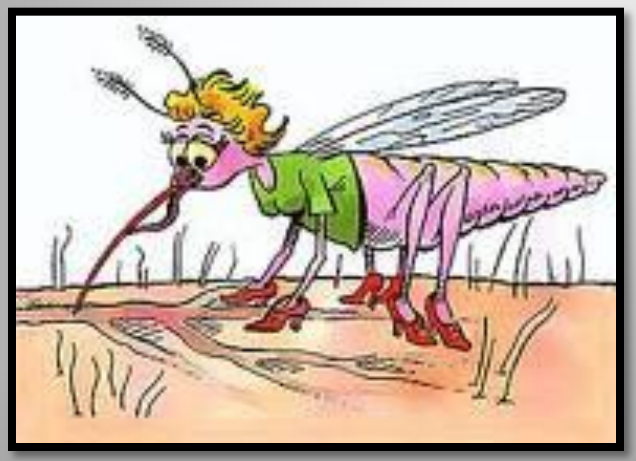
Mosquito Aedes \Dengue

Pica durante o dia (bite during the day)

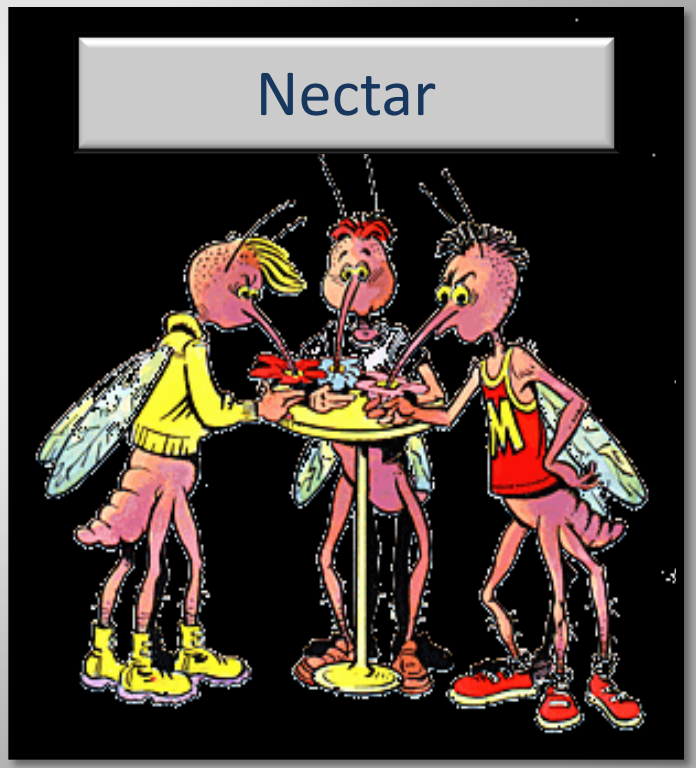
Muriçoca (*Culex)*

Pica durante a noite (bite during the night)

Bar – Blood for Sale!



Only females (girls) bite



Fonte: Google

ACTION	TARGET POPULATION LEVEL	# EVENTS	# PEOPLE
Presentations/Lectures	Local/Regional	10	962
Leaflets [1]	Local	-	10,000
Jingle ([1])	Local	-	-
Meetings	National/ International	39	6,020
Interviews (radio)	Regional	15	1,500
Interviews (TV)	Regional/National	09	17,094,000 [2]
Interviews (newspaper/magazine)	Local/Regional/ National	13	-
Internet (website / social network)	Regional/National	24	-[3]
Houses visited/interviewed with residents	Local	581	2,341
Meetings with local leaders, health agents	Local	16	820
Presentations at elementary and middle school	Local	08	452
Presentation at community center/city hall/others	Local	06	456
Driving truck with loudspeakers in the releasing area	Local	-	500
Spots, jingles and short messages broadcasted in local radio station	Local	52	1,200 [4]
TOTAL			17,101,269

STRATEGIES		
Mandatory	Recommended	Suggested
- Visit/interview sample/every house in the target area	- Lectures at community centers/churches – targeting adults	- Action within a local event (parade, carnival, street fairs)
- Meetings with local leaders, school principals, district managers	- Radio spots, jingles and messages broadcasted	- Driving truck with loudspeakers in the targeting area – jingle and messages
- Lectures at schools – targeting kids/teens	- Press releases by Moscamed journalists	- Use of social media: Facebook and twitter
- Press coverage at local/regional level of PAT activities: production, releases	- PAT technical personnel interviewed by local/regional/(inter)national radio stations	- Press coverage at international level of PAT activities: releases
	- Press coverage at national level of PAT activities: production, releases	

Post-release evaluation	Itaberaba (%)	Mandacaru (%)	Combined (%)
Are you aware of the PAT?	84.0	93.5	88.0
Do you know if releases occurred in this area?	94.1	97.3	95.5
The releases have impact your routine?	12.7	4.3	9.0
Do you believe the project can help the mosquito control?	83.1	95.2	88.4
The visit of our agents to service traps in your home bothered you?	0.8	1.1	0.9
Did you understand the results of PAT?	46.8	77.0	60.1
Do you want the PAT continues with the releases in this community?	89.5	95.7	92.2
Are you aware that other measures for control mosquitoes should be carried out?	98.7	98.4	98.6

Moscamed Brasil

UPAT

LEMI

Universidade de São Paulo

MOSCAMED BRASIL

USP Universidade de São Paulo

GOVERNO DA Bahia TERRA DE TODOS NÓS Secretaria de Ciência, Tecnologia e Inovação

FAPESP

CNPq Conselho Nacional de Desenvolvimento Científico e Tecnológico

IAEA International Atomic Energy Agency

INCT - EM
PRONEX/DECIT

SPOT

To control dengue Moscamed is releasing in this community

A large amount of TRANSGENIC MOSQUITOES .

We would like to recall that this mosquitoes are not the well known

CULEX

They are transgenic MALES and they DON'T BITE.

They are good fellows that will give you protection against dengue.

For more information call a health agent or get in touch with

MOSCAMED

By the phone

(74) 3612-5399

PAT –AEDES TRANSGENIC PROJECT

This one makes the difference.

Jingle Transgenic *Aedes*