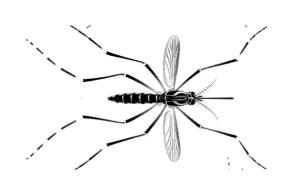
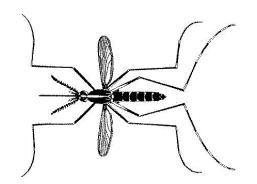
Urban mosquito control with mosquito-disseminated pyriproxyfen





Sérgio LB Luz Fernando Abad-Franch Centro de Pesquisa René Rachou Instituto Leônidas e Maria Deane

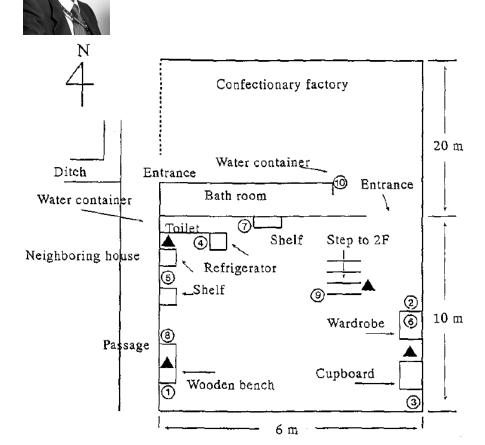


Trop. Med., 36 (4), 243-248, December, 1994

Utilization of Bloodfed Females of *Aedes aegypti* as a Vehicle for the Transfer of the Insect Growth Regulator,

Pyriproxyfen, to Larval Habitats

Takaaki ITOH



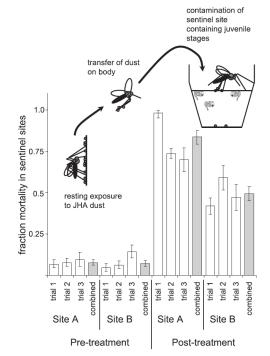
July 14, 2009 | vol. 106 | no. 28

PNAS

Using adult mosquitoes to transfer insecticides to Aedes aegypti larval habitats

Gregor J. Devine^{a.1}, Elvira Zamora Perea^b, Gerry F. Killeen^{c.d}, Jeffrey D. Stancil^{e.2}, Suzanne J. Clark^a, and Amy C. Morrison^f



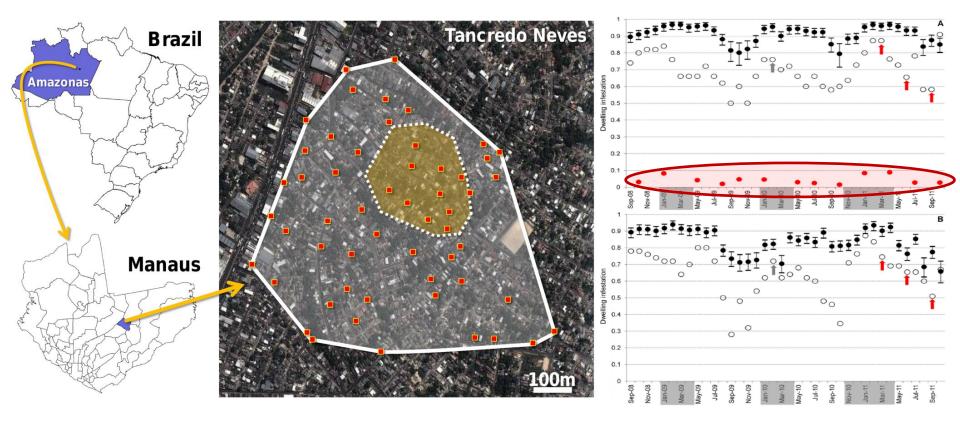




Modeling Dengue Vector Dynamics under Imperfect Detection: Three Years of Site-Occupancy by *Aedes aegypti* and *Aedes albopictus* in Urban Amazonia

Samael D. Padilla-Torres¹, Gonçalo Ferraz^{1,2}, Sergio L. B. Luz³, Elvira Zamora-Perea³, Fernando Abad-Franch³*

2013 | Volume 8 | Issue 3 | e58420



Question 1

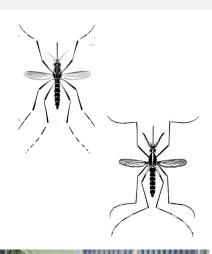
Would it actually work at spatial scales relevant to vector control?

In particular, we first asked,

- How far do mosquitoes carry PPF?
- What breeding-site coverage can we achieve?
- What effect will this have on juvenile mortality?
- What effect will this have on adult emergence?

Trial 1

- The problem (or at least a key issue)
 - Cryptic and inaccessible breeding sites
 - Surveillance and control











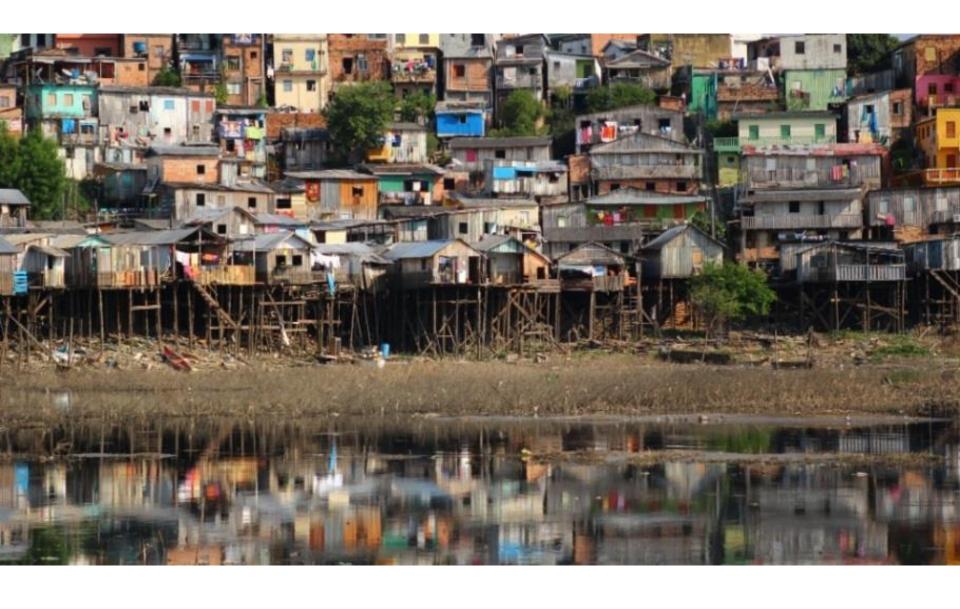
Mosquito-disseminated PPF











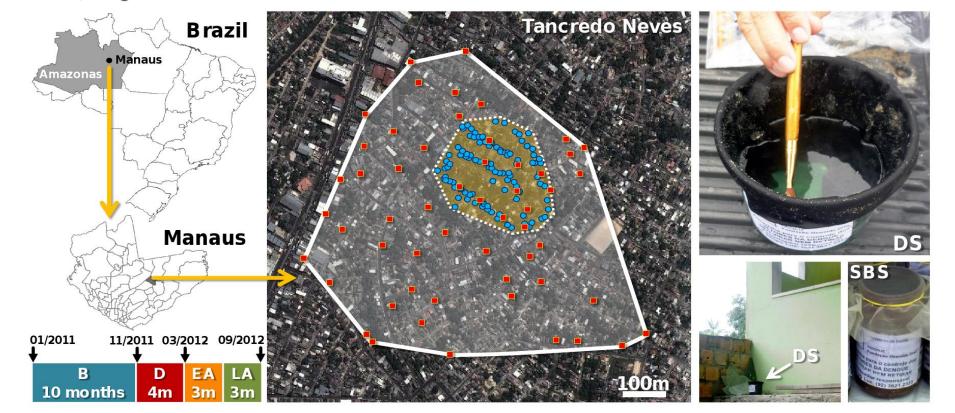




Mosquito-Disseminated Pyriproxyfen Yields High Breeding-Site Coverage and Boosts Juvenile Mosquito Mortality at the Neighborhood Scale

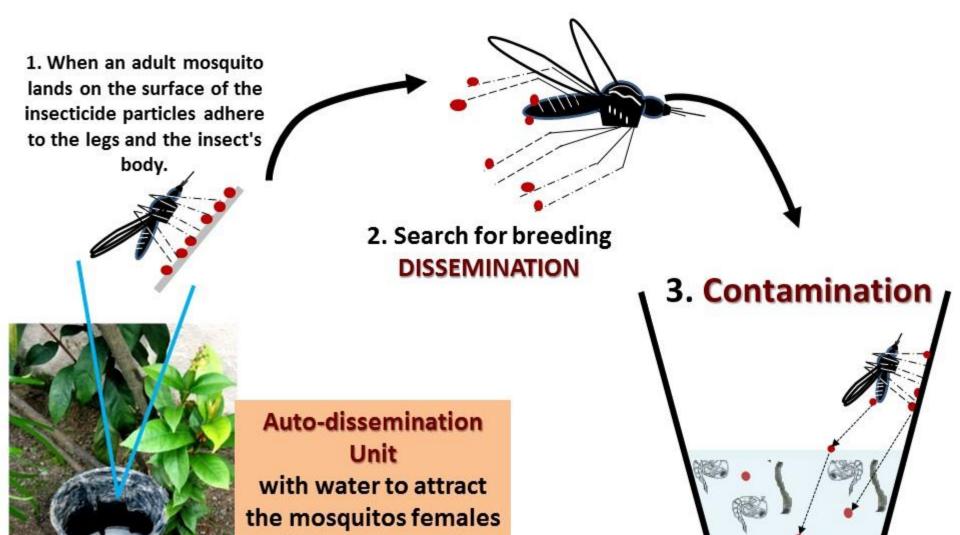
PLOS | NEGLECTED TROPICAL DISEASES April 7, 2015 9(4): e0003702.

Fernando Abad-Franch¹*, Elvira Zamora-Perea¹, Gonçalo Ferraz^{2,3}, Samael D. Padilla-Torres¹, Sérgio L. B. Luz¹



Using adult mosquitoes to transfer insecticides





(Aedes, Culex...)







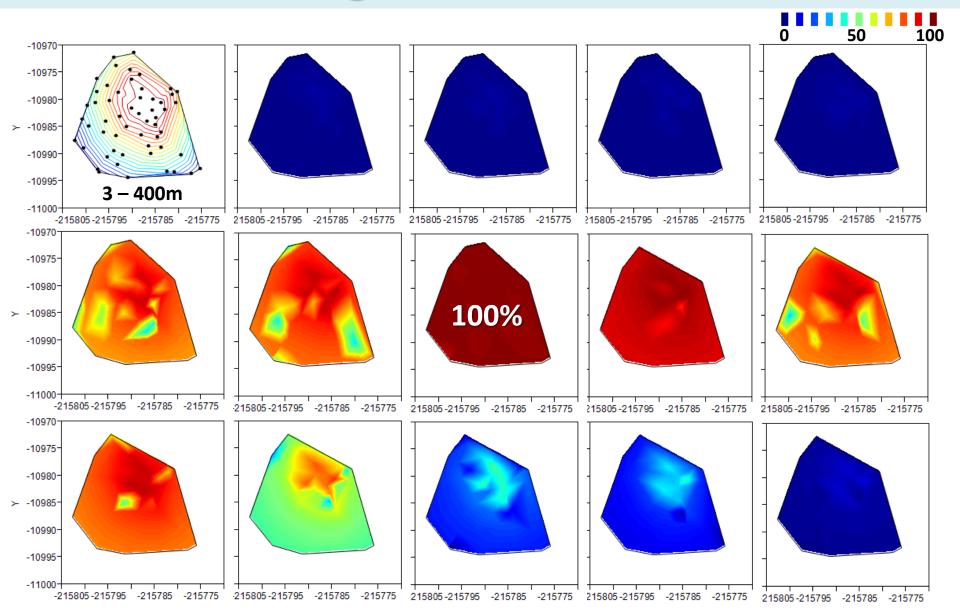




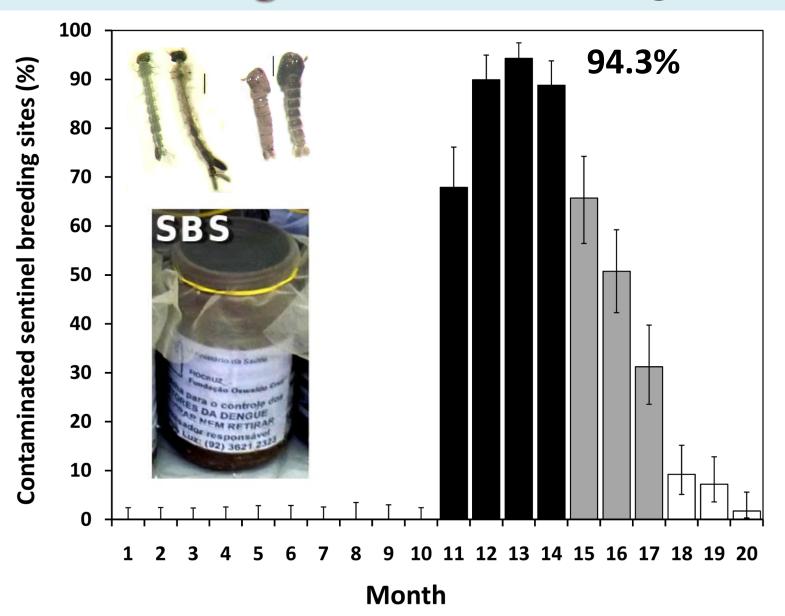




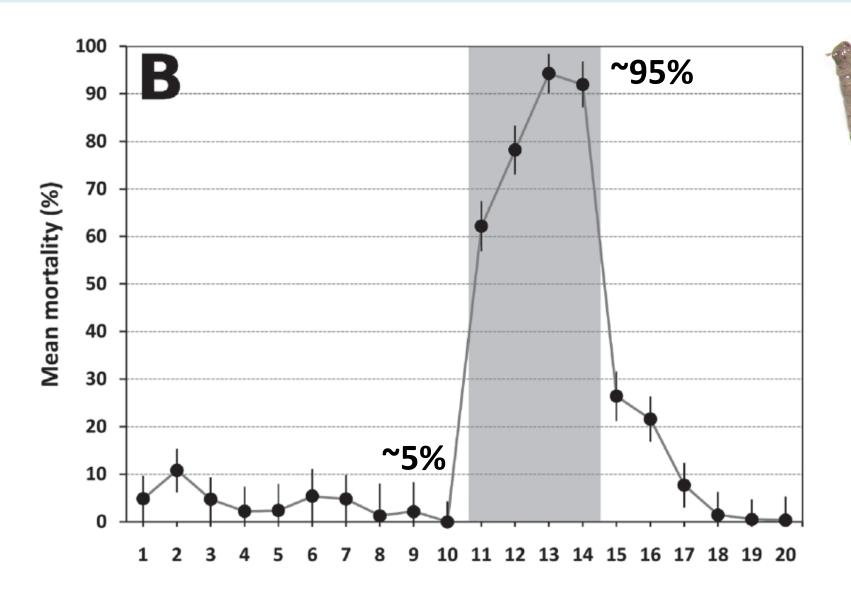
Dwelling-level coverage (%)



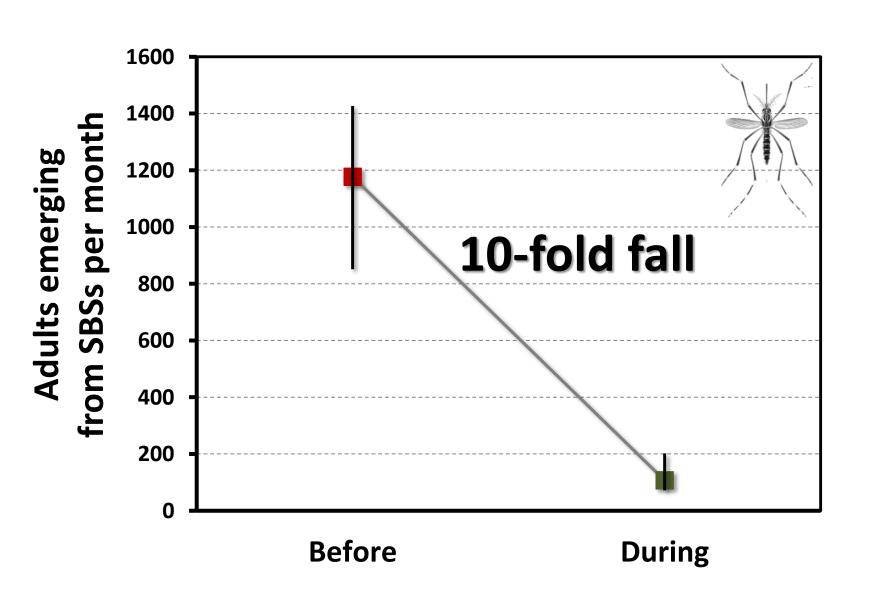
Breeding site-level coverage



Juvenile Aedes aegypti mortality

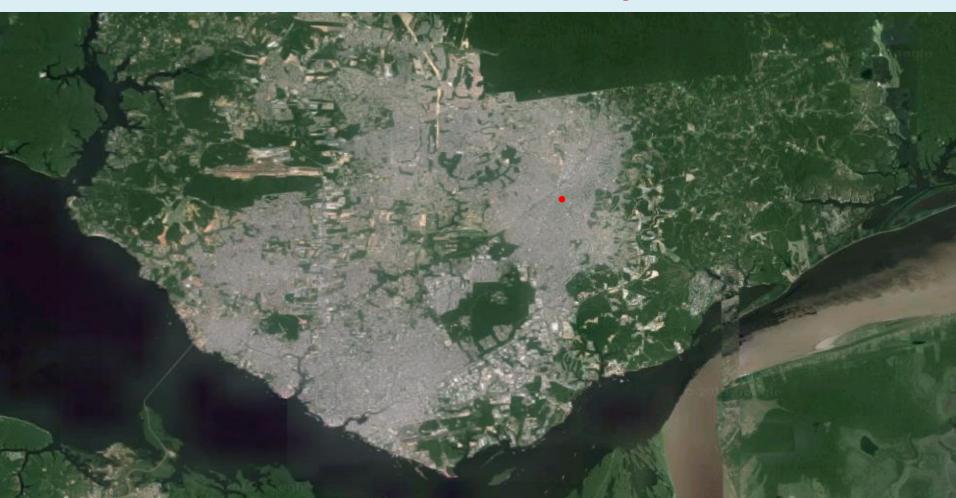


Adult mosquito emergence



Nice, but...

Our study site was a small island... in an ocean of mosquitoes



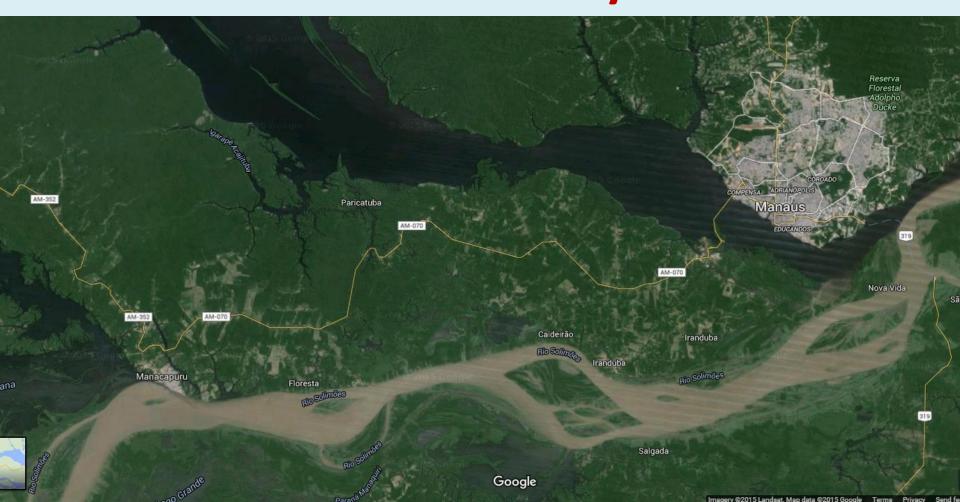
Question 2 Would it actually work in a whole city?

In particular, we wanted to ask,

- What are the effects on house infestation?
- What are the effects on mosquito catches?
- What are the effects on juvenile mortality?
- What are the effects on adult emergence?

Trial 2

Question 2 Would it actually work in a whole city?



What is the strategy?















Training









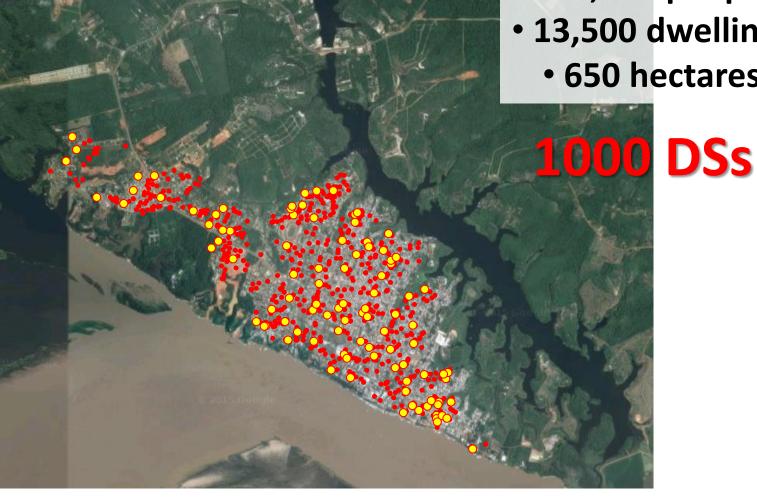




MANACAPURU



650 hectares



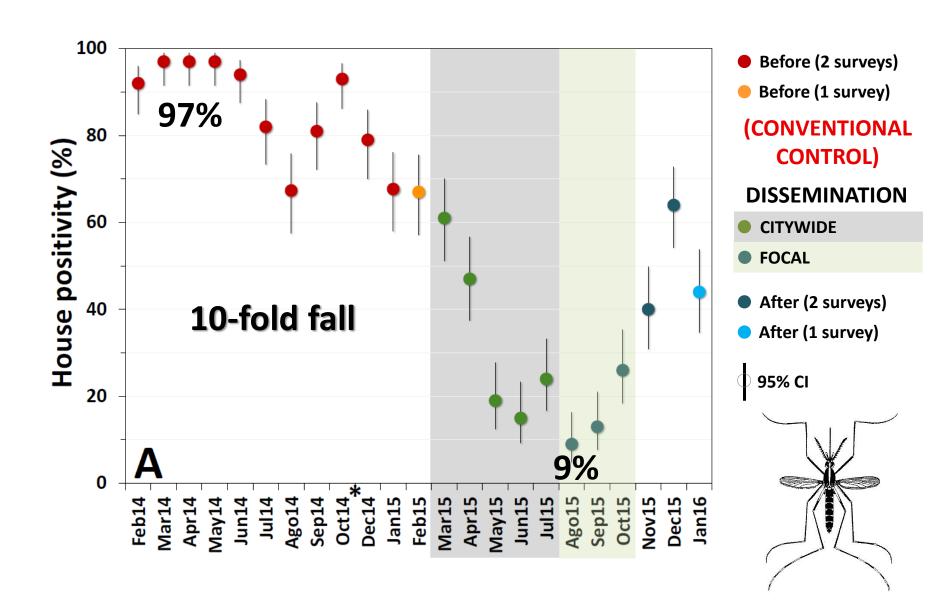
CONVENTIONAL CONTROL 12m

CITYWIDE FOCAL AFTER 5m

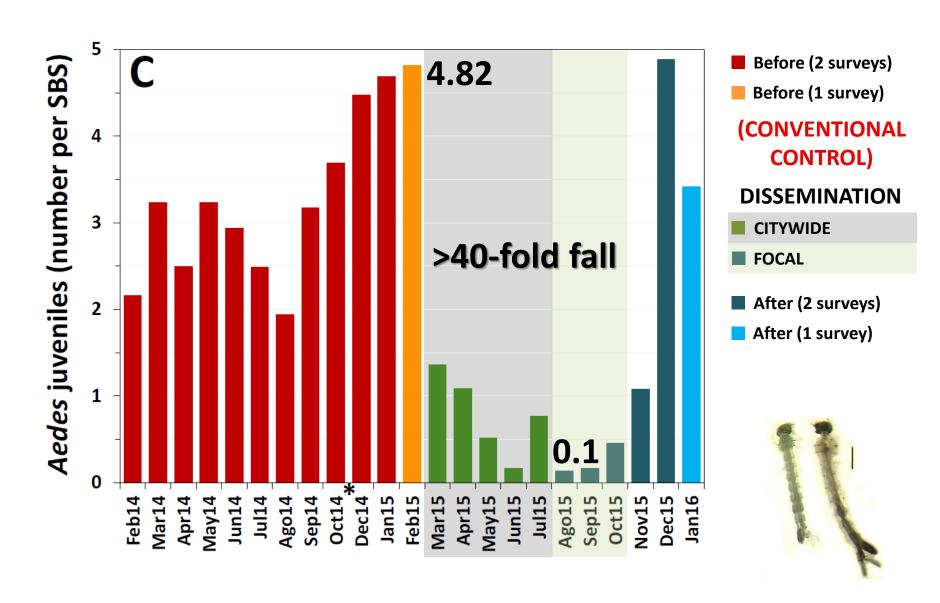
3m

3m

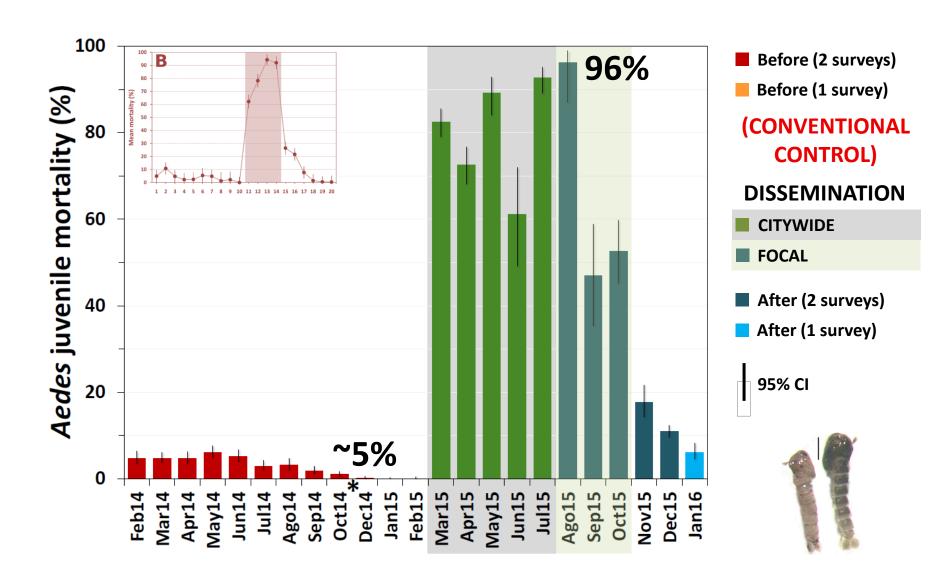
House infestation (Aedes spp.)



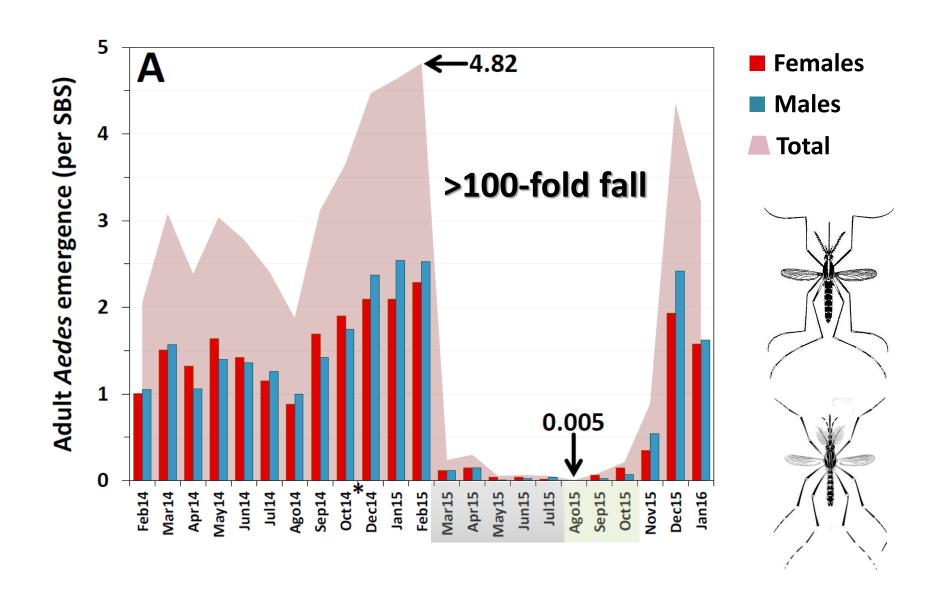
Aedes juvenile catch (# per SBS)

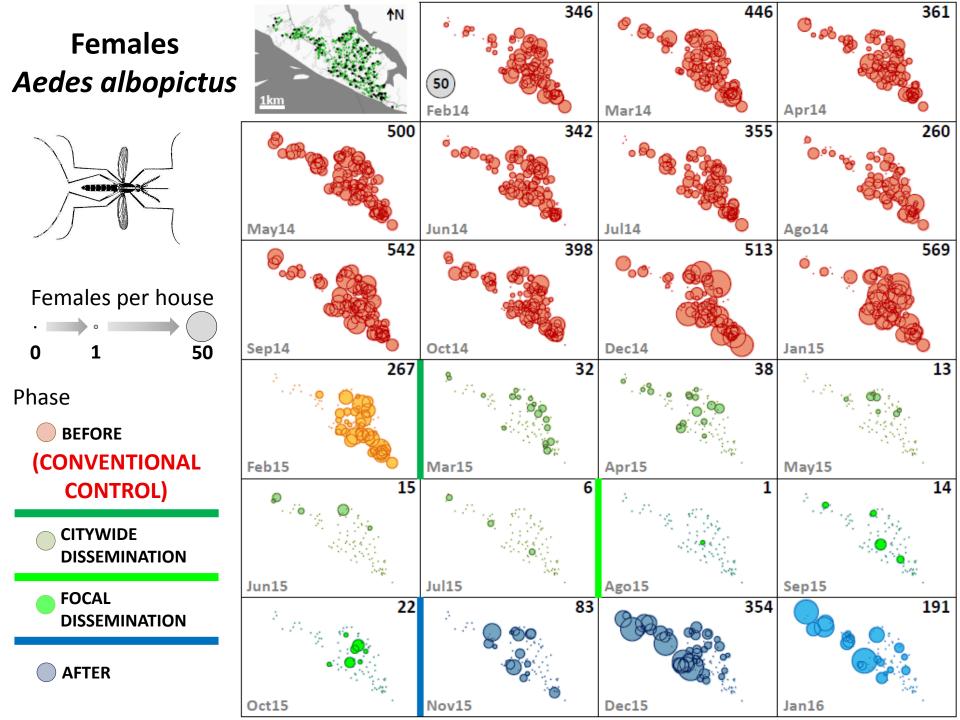


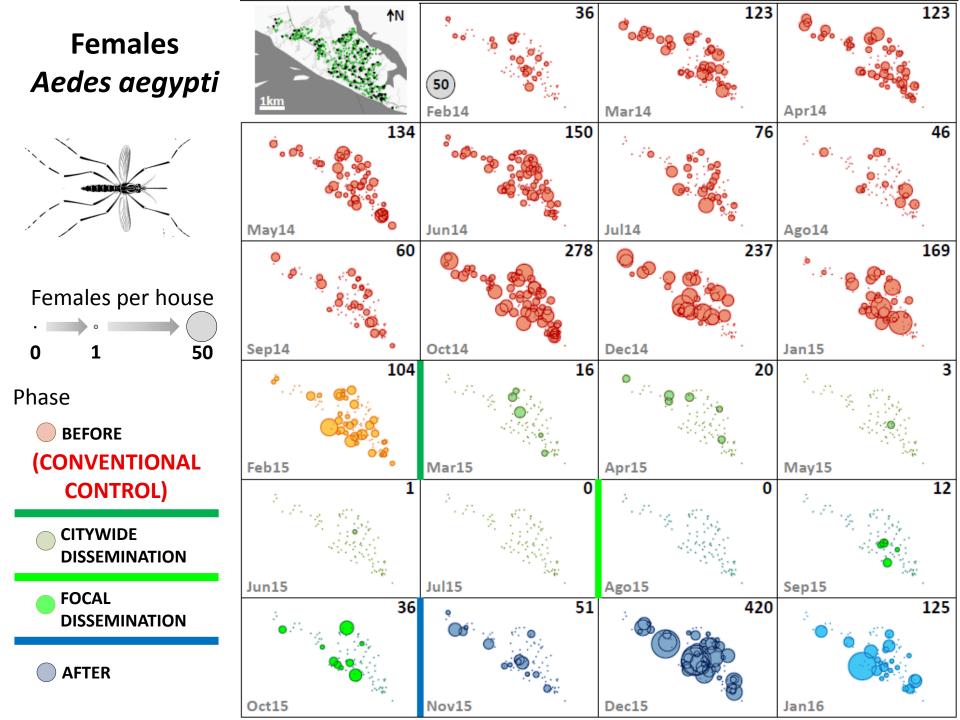
Aedes juvenile mortality in SBSs



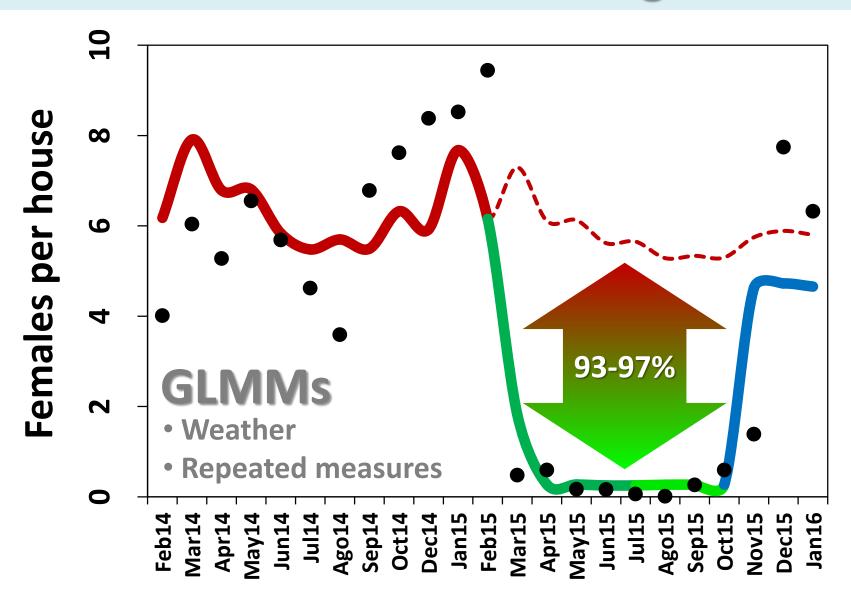
Adult Aedes emergence (# per SBS)



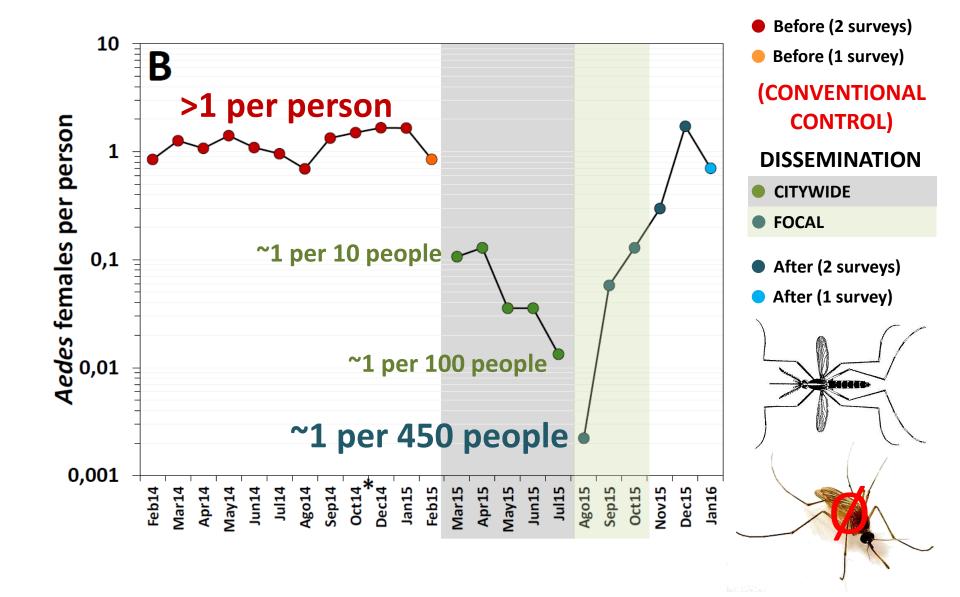




Aedes females – emergence



Aedes females – emergence (# per person)



Would PPF block transmission?

Ross-Macdonald

Basic Reprodutive Number

Naïve population

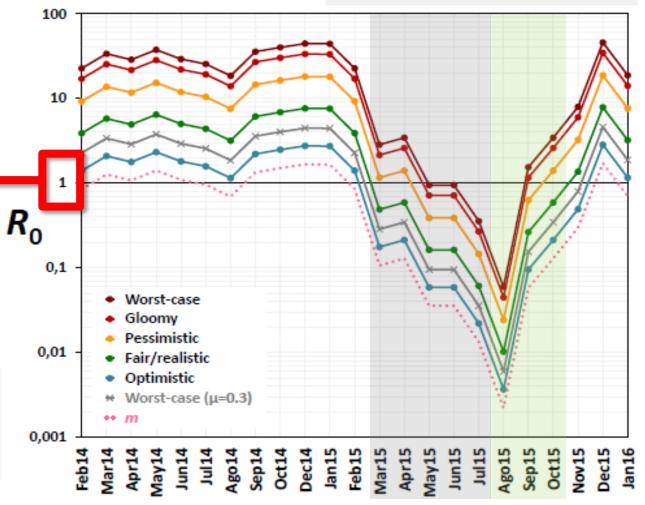
(100% susceptible)



Each case generates > 1 case

Each case generates < 1 case TRANSMISSION BLOCK CONTROL

$$R_0 = Da^2 m \frac{e^{-\mu\tau}}{\mu} bc$$



Mosquito-disseminated PPF



PLoS Med 14(1): e1002213



RESEARCH ARTICLE

Mosquito-Disseminated Insecticide for Citywide Vector Control and Its Potential to Block Arbovirus Epidemics: Entomological Observations and Modeling Results from Amazonian Brazil

Published: January 17, 2017

Fernando Abad-Franch^{1,2}*, Elvira Zamora-Perea², Sérgio L. B. Luz²



PLoS Med 14(1): e1002219

PERSPECTIVE

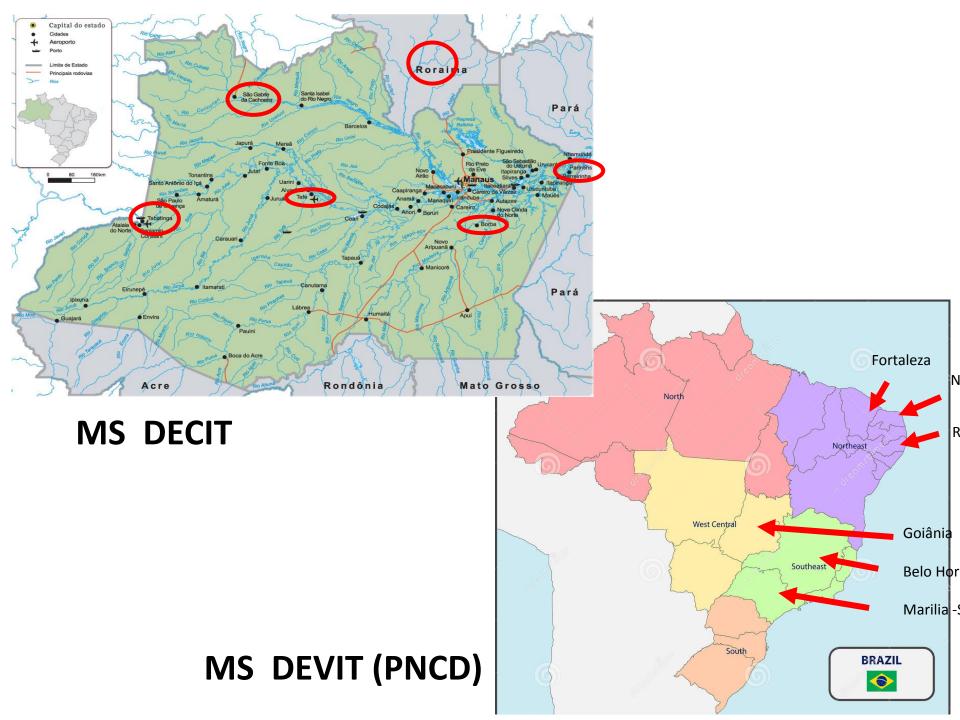
Novel Vector Control Approaches: The Future for Prevention of Zika Virus Transmission?

Lorenz von Seidlein¹*, Alexander S. Kekulé², Daniel Strickman³

Aedes spp. control with mosquito-disseminated pyriproxyfen

- Mosquitoes carry PPF at least to 400m
- Breeding-site coverage is over 94%
- Mosquito catch falls over 40-fold
- Juvenile mortality reaches 90 95%
- Adult emergence falls over 100-fold
- Female emergence falls to <0.005/person-month

In theory, this will block epidemic transmission



Urban mosquito control with mosquito-disseminated pyriproxyfen

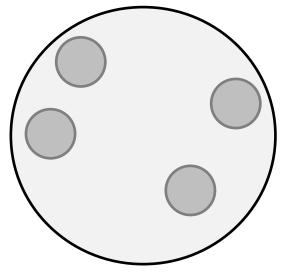
...more questions...

Will it *really* block transmission?

How can we scale it up?

How can we improve it?

Minas Gerais



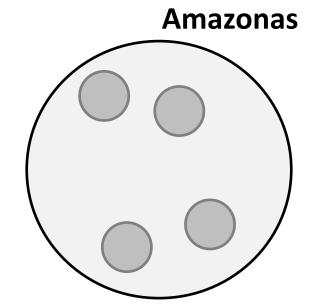
Matched-pair

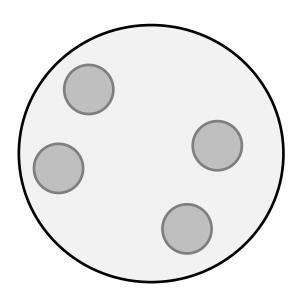
Cluster

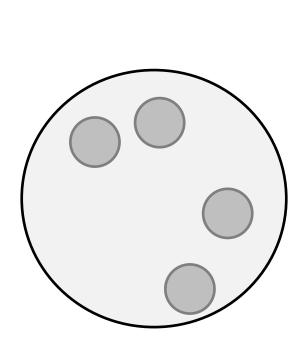
Randomized

Controlled

Trial

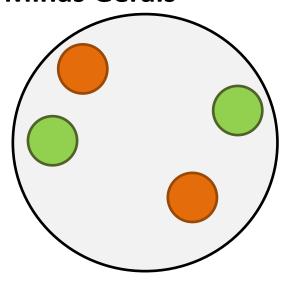


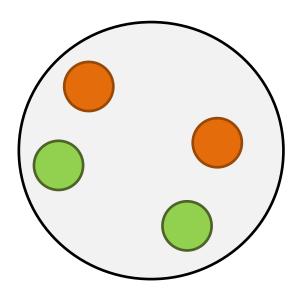




Mosquito-disseminated PPF

Minas Gerais



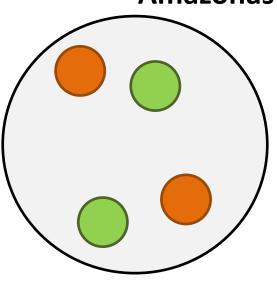


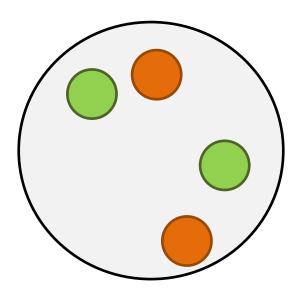


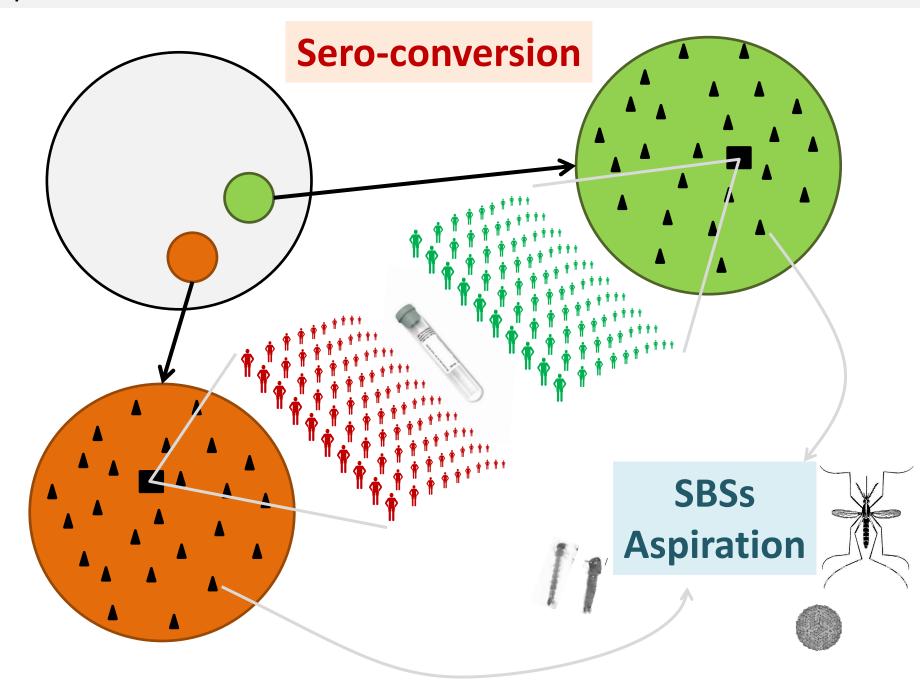














Bringing innovation to the frontline:

new tools to advance the global response to vector-borne diseases
ISGlobal / UNITAID / WHO 11-12 May 2017, Madrid, Spain

Urban mosquito control with mosquito-disseminated pyriproxyfen

mosquito-disseminated pyriproxyfen

Sérgio Luz

Elvira Zamora

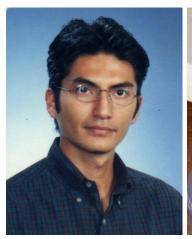
Samael Padilla

Gonçalo Ferraz

Fernando Abad





















Thanks

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