Cambodia – Medical Entomology

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ECOMORE II

AFD

WP CAMBODIA

Institut Pasteur

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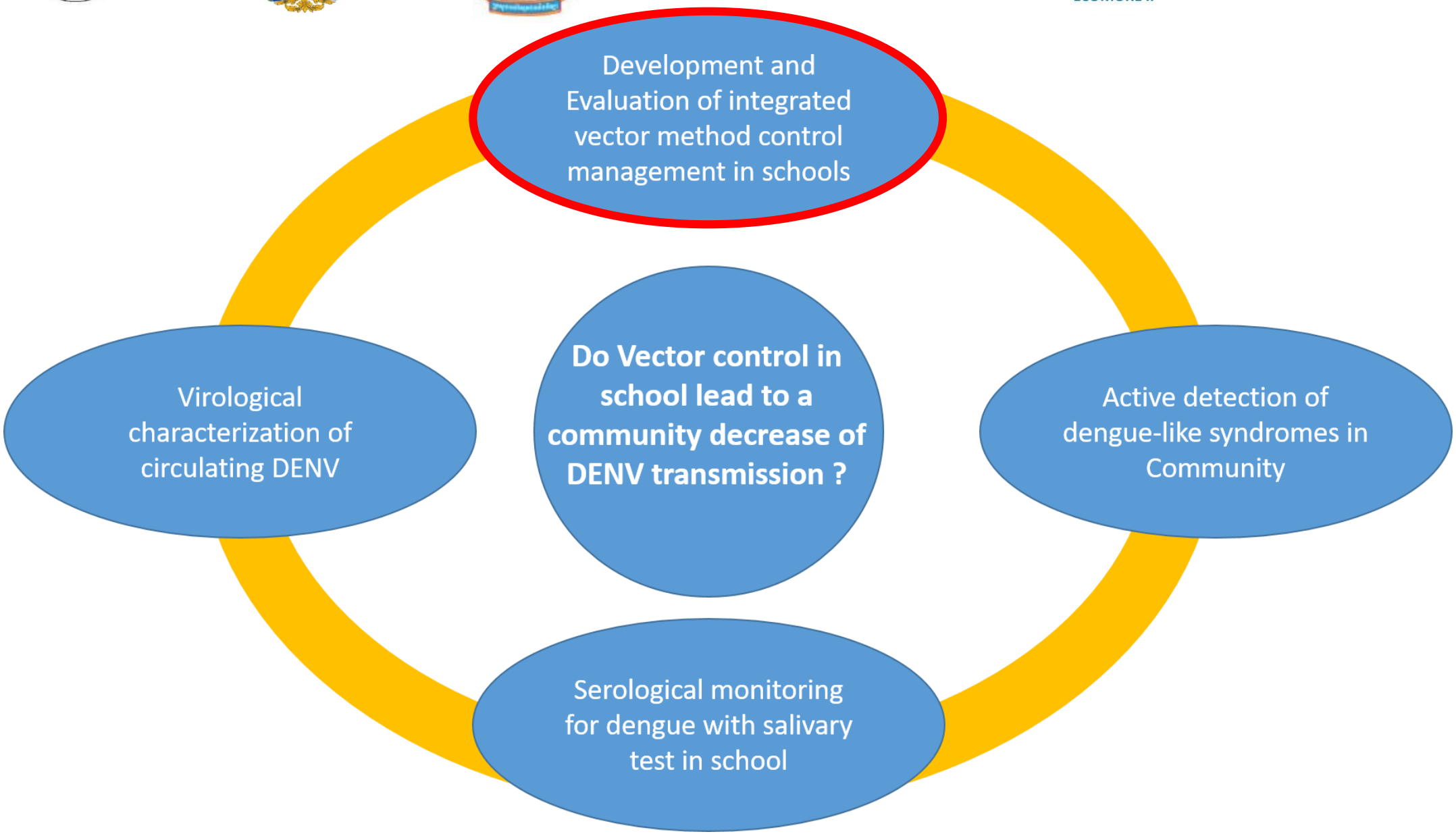
Institut Pasteur du Cambodge


Development and Evaluation of integrated vector method control management in schools
Active detection of dengue-like syndromes in Community
Serological monitoring for dengue with salivary test in school
Virological characterization of circulating DENV
Do Vector control in school lead to a community decrease of DENV transmission ?

Development and Evaluation of integrated vector method control management (IVM) in schools

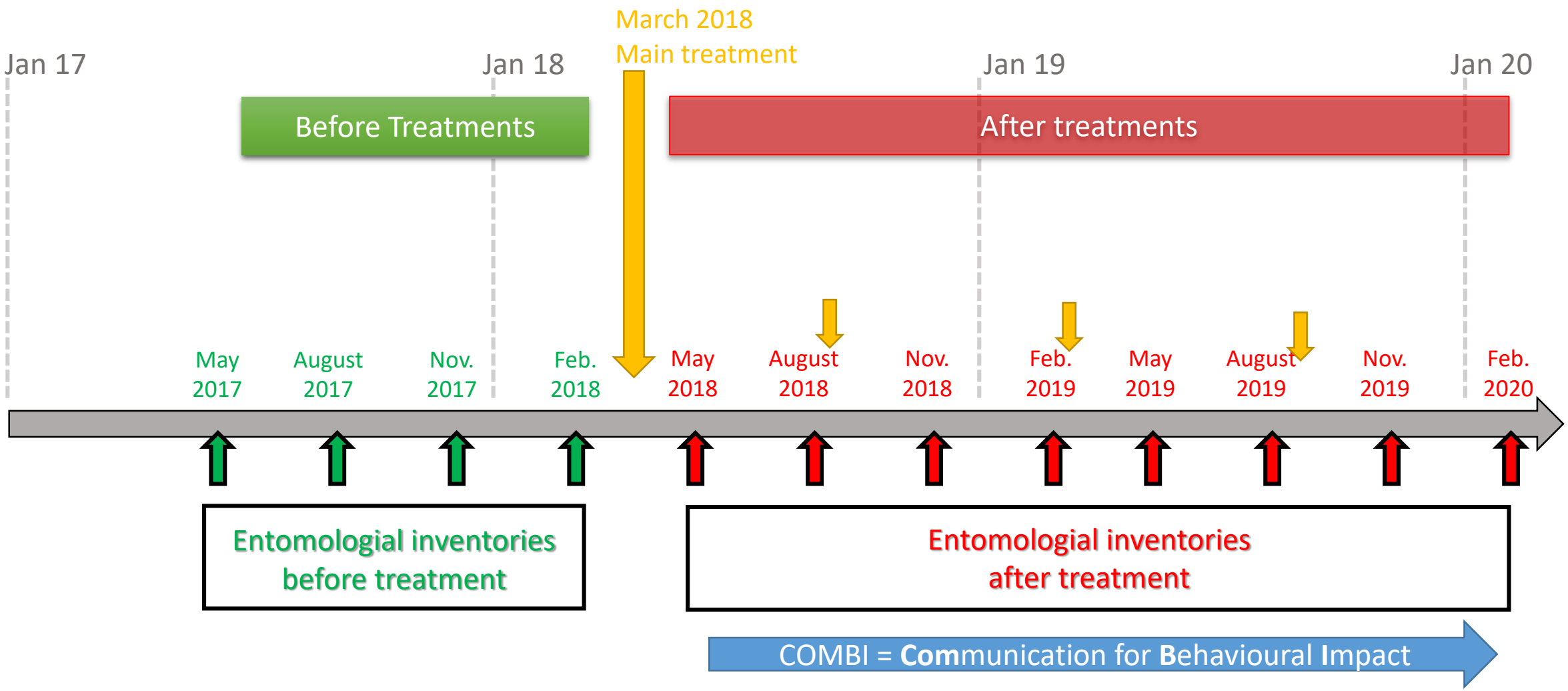
MAIN QUESTION

- Do the IVM decrease the population of *Aedes aegypti*?

RELATED QUESTIONS

- Is the density of *Aedes aegypti* the same in the 2 clusters before treatment ?
- What is the mosquito composition species ?
- What are the breeding sites in/around schools ?
- Are *Aedes aegypti* resistant to insecticides ?

To set up an integrated vector control strategy in schools



HIGH BIODIVERSITY !

10 genus
> 61 species

Aedeomyia catasticta

Aedes aegypti
Aedes albopictus
Aedes lineatopennis
Aedes malayensis

Armigeres subalbatus
Armigeres theobaldi

Coquillettidia crassipes
Coquillettidia ochracea
Coquillettidia sp1

Anopheles annularis
Anopheles argyporus
Anopheles barbirostris.g

Anopheles barbumbrosus

Anopheles sinensis
Anopheles tessellatus
Anopheles subpictus
Anopheles vagus
Anopheles sp1

Culex bitaeniorhynchus

Culex vishnui.g
Culex whitmorei
Culex sp1
Culex sp2
Culex sp3

Lutzia fuscana

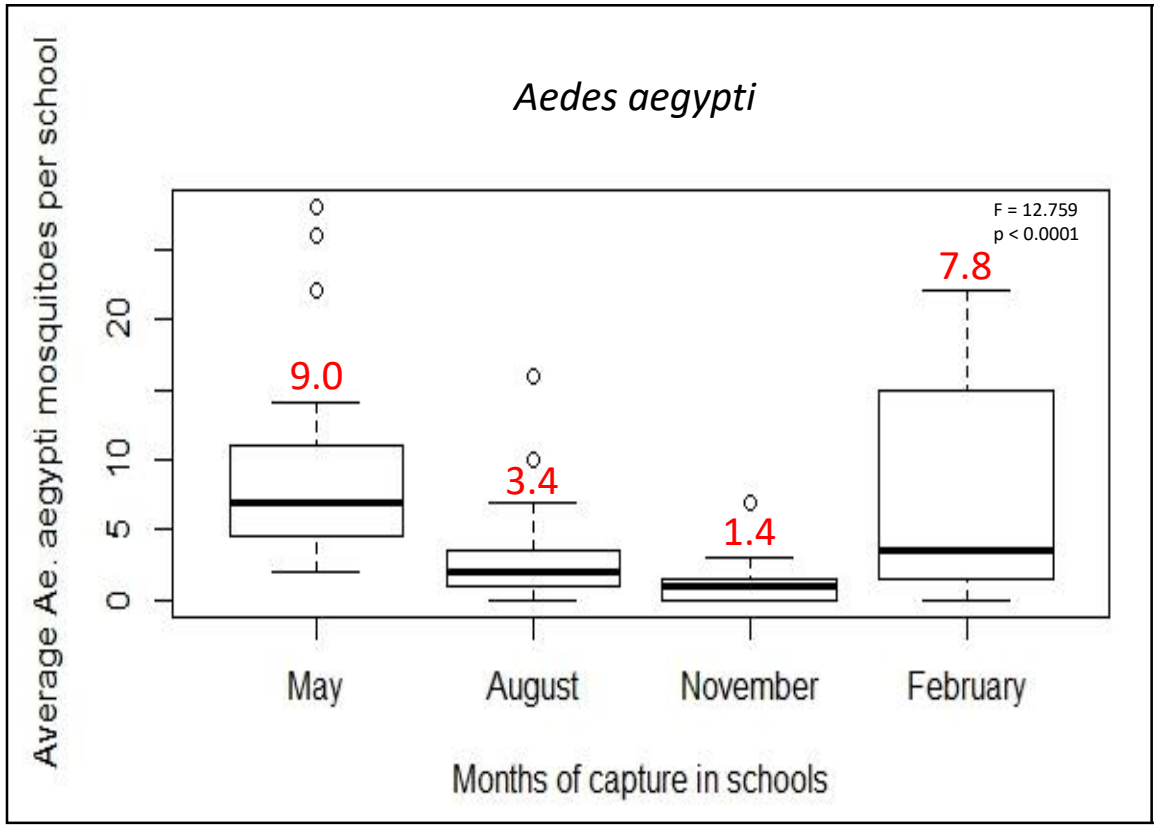
ulifera
ormis

ea
gans
rida
Zonensis

Uranotaenia lateralis / subnormalis
Uranotaenia micans
Uranotaenia nivipleura
Uranotaenia rampae

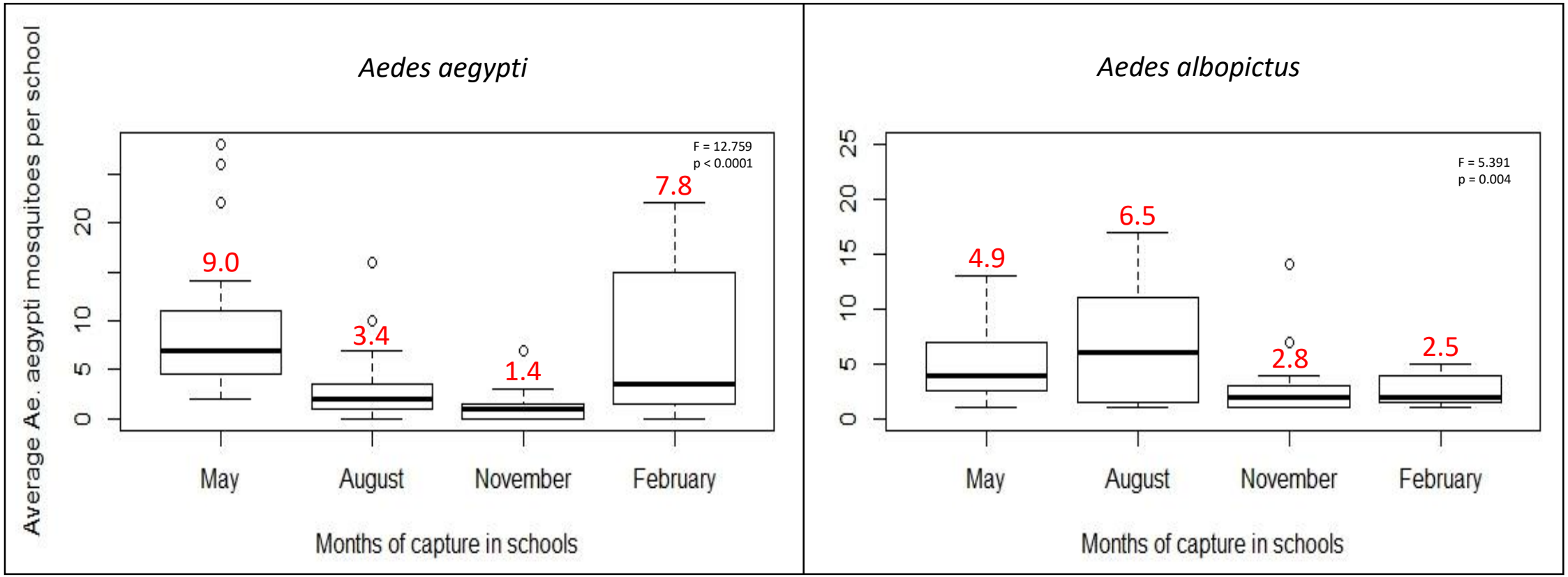
6 potential **JEV** vector species	20,139 mosquitoes (69%)
6 potential **RVF** vector species	4,630 mosquitoes (16%)
5 potential **WNF** vector species	4,251 mosquitoes (15%)
4 potential **RRV** vector species	3,750 mosquitoes (13%)
3 potential **malaria** vector species	3,449 mosquitoes (12%)
3 potential **ZIKV** vector species	3,094 mosquitoes (11%)
3 potential **DENV** vector species	1,112 mosquitoes (4%)

BEFORE vector control intervention



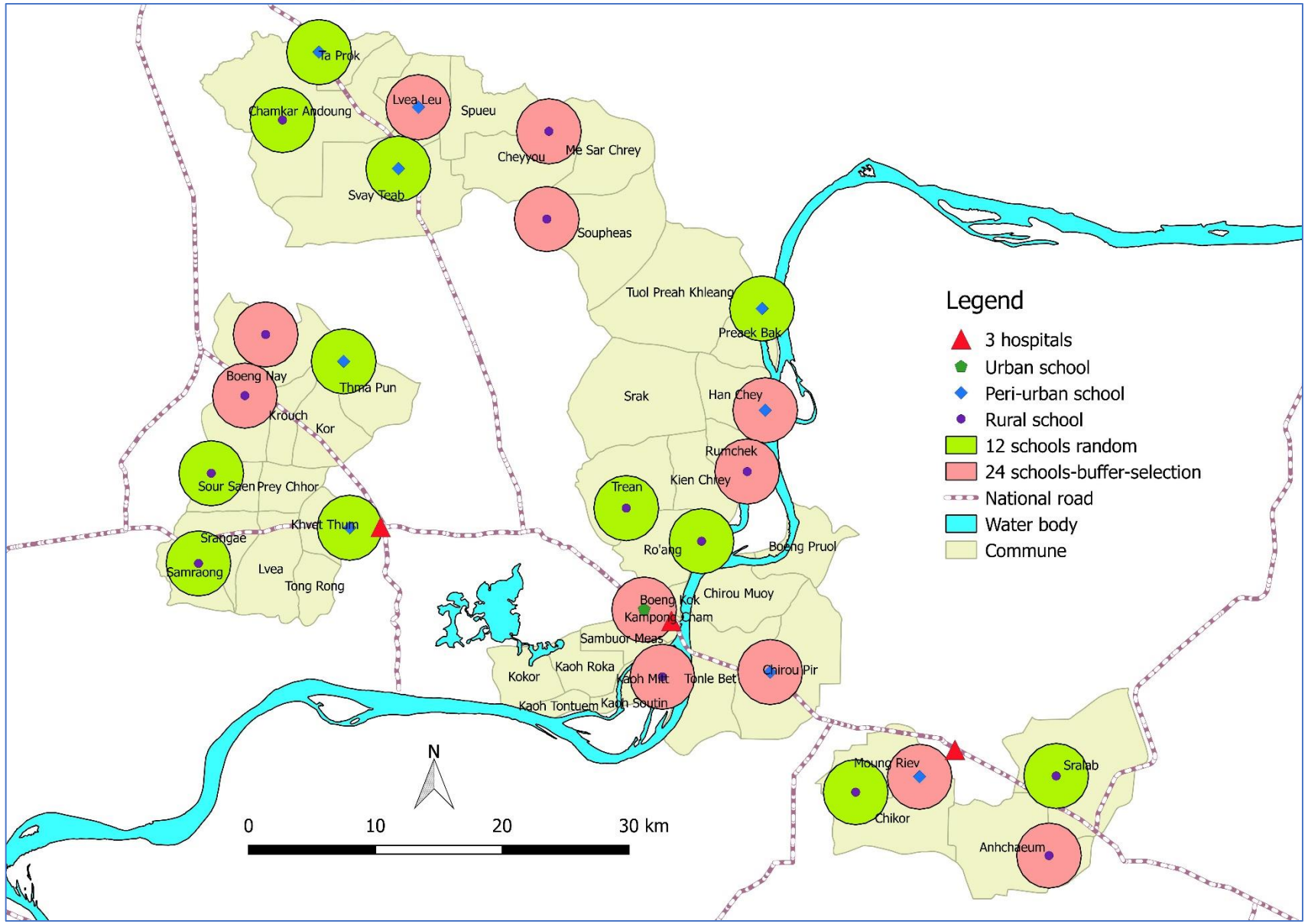
- Seasonality of *Aedes aegypti*
- Limited presence

BEFORE vector control intervention



- Seasonality of *Aedes aegypti*
- Limited presence

- Different seasonality of *Aedes albopictus*
- Limited presence


Ta Prok
Chamkar Andoung
Lvea Leu
Spueu
Cheyyou
Me Sar Chrey
Svay Teab
Soupheas
Tuol Preah Khleang
Preaek Bak
Boeng Nay
Thma Pun
Krouch
Kor
Srak
Han Chey
Rumchek
Kien Chrey
Sour Saen
Prey Chhor
Trean
Khvet Thum
Srangae
Samraong
Lvea
Tong Rong
Ro'ang
Boeng Pruol
Boeng Kok
Chirou Muoy
Kampong Cham
Sambuor Meas
Kokor
Kaoh Roka
Kaoh Mitt
Tonle Bet
Chirou Pir
Kaoh Tontuem
Kaoh Soutin
Moung Riev
Sralab
Chikor
Anhchaeum
Legend
3 hospitals
Urban school
Peri-urban school
Rural school
12 schools random
24 schools-buffer-selection
National road
Water body
Commune
N
0
10
20
30 km

integrated vector method control management

1. Communication & Knowledge
2. Destruction of breeding sites
3. Use of larvicide *Bti*
4. in2care traps in schools (auto-dissemination)

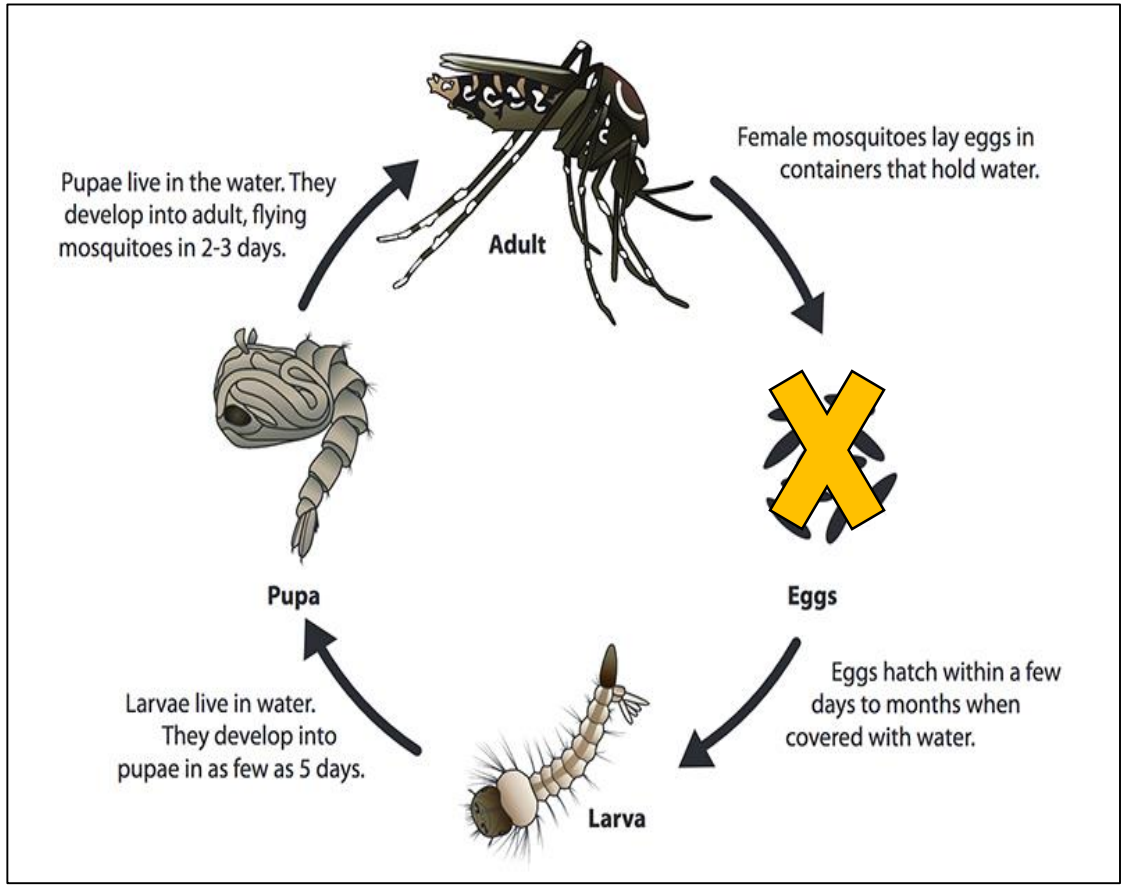
integrated vector method control management

integrated vector method control management

Distribution & explanation of the 2nd poster in all schools (2 or 3 posters per schools)

integrated vector method control management

1. Communication & Knowledge
2. Destruction of breeding sites
3. Use of larvicide *Bti*
4. in2care traps in schools (auto-dissemination)



Physical destruction

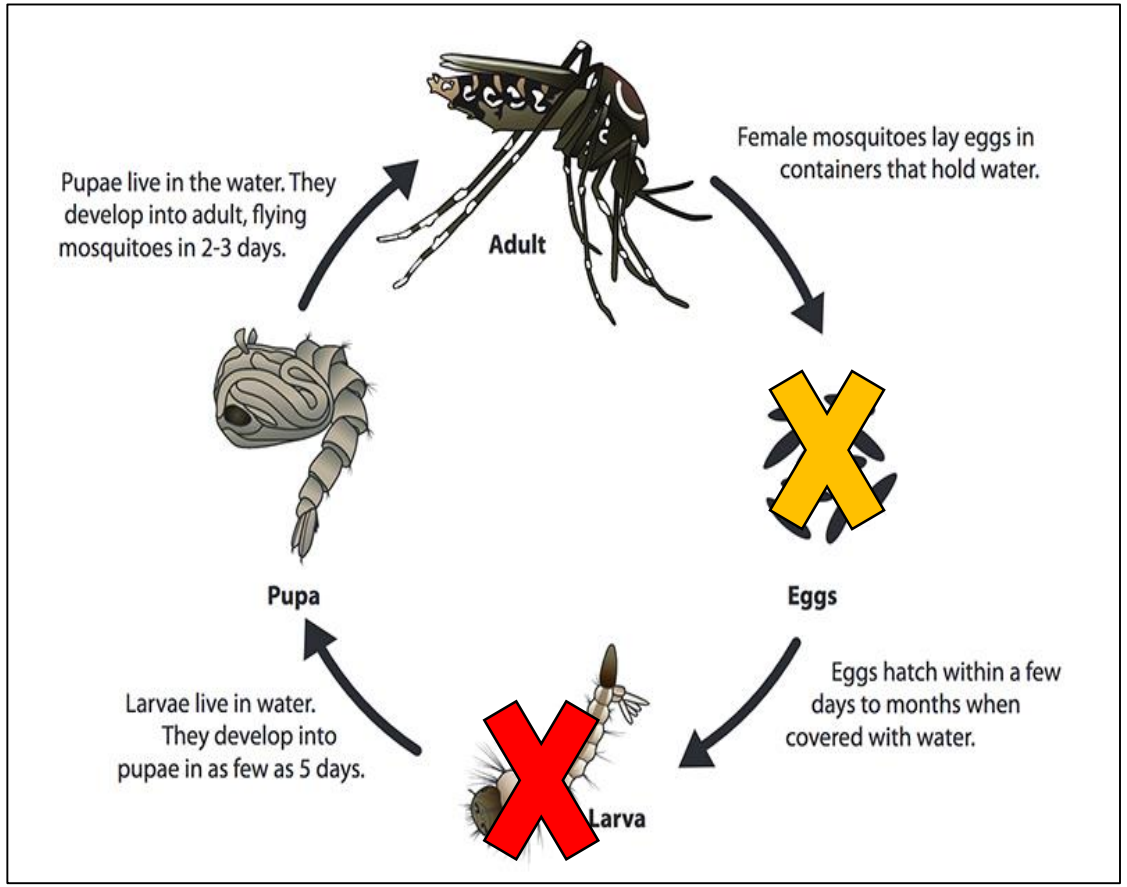
Destruction of the small breeding sites

Before

Destruction of the small breeding sites

After

Involvement of Children



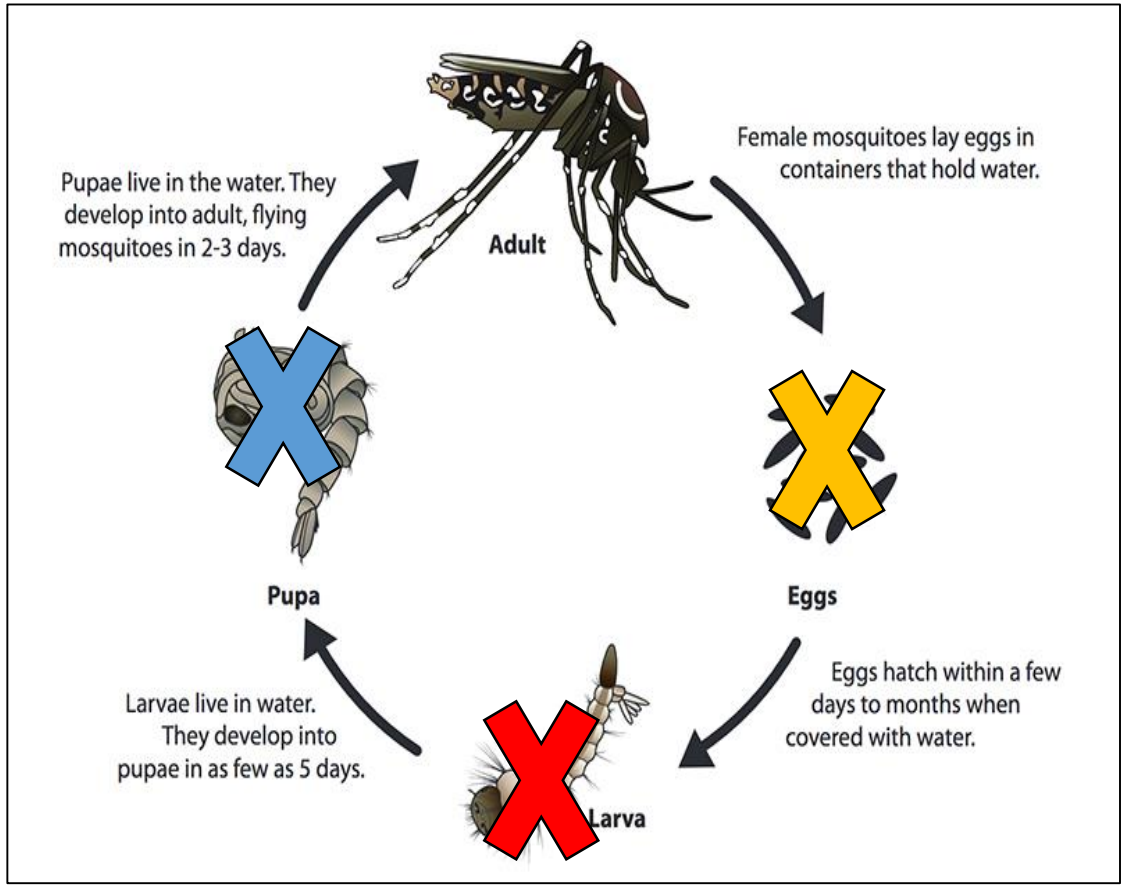
Use of *Bti*

Physical destruction

Inventory of main breeding sites IN and AROUND the schools





Use of *Bti*

Physical destruction

Pyriproxyfen autodissemination (in2care traps)

Presentation and explanation of in2care traps in each classroom

Trap Set Up

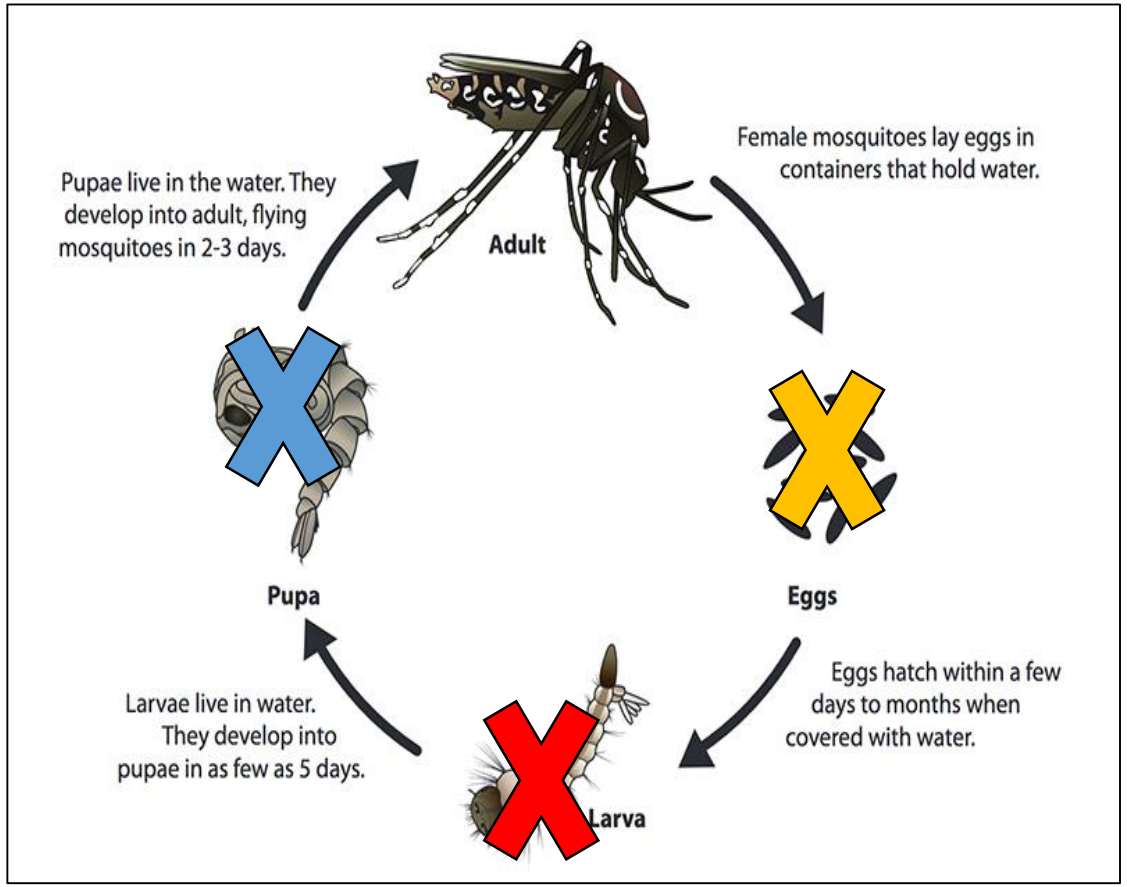





A lot of larvae!

It works very well!

No emergence in lab

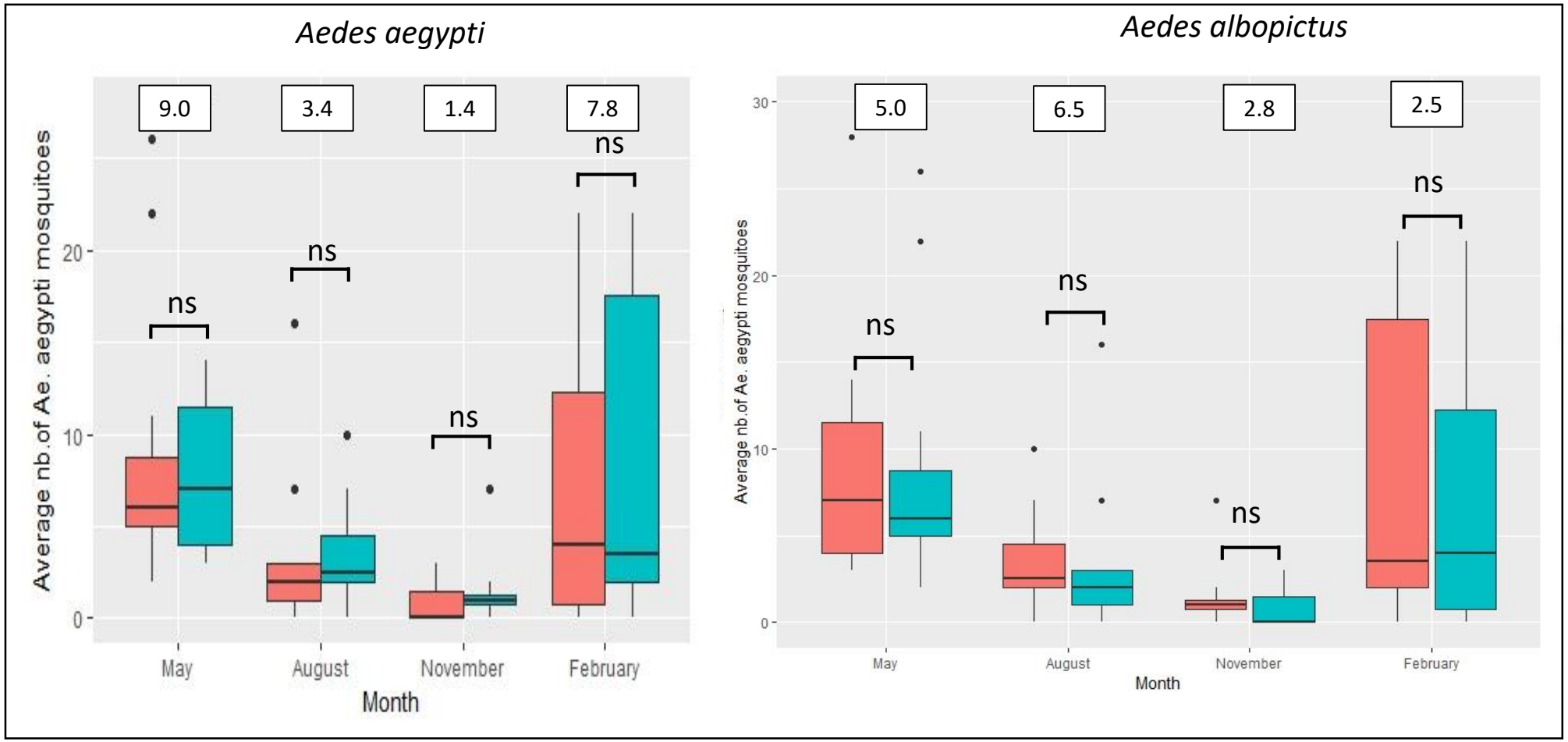


Use of *Bti*

Physical destruction

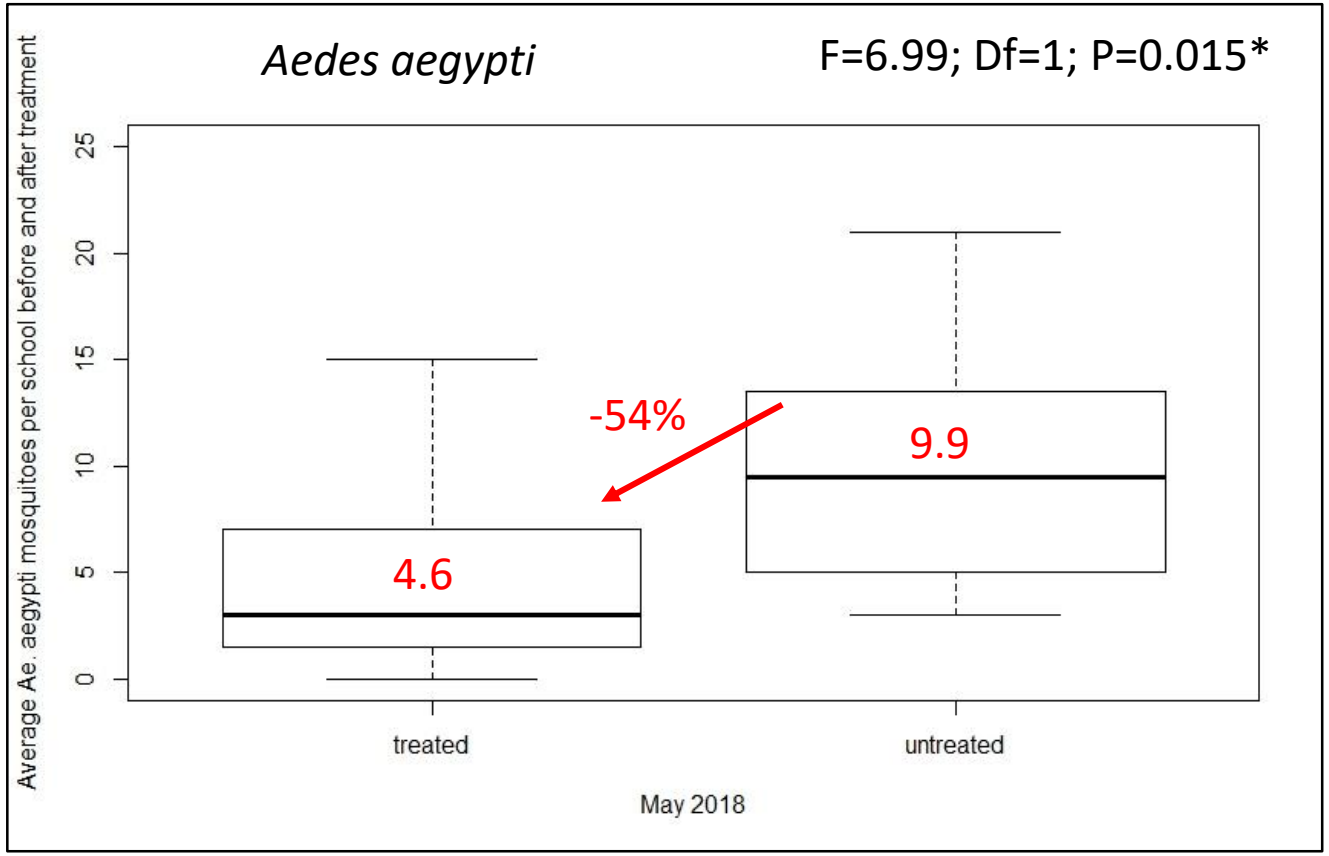
Pyriproxyfen autodissemination (in2care traps)

BEFORE vector control intervention



No difference between the 2 clusters before intervention

Aedes aegypti - **AFTER** vector control intervention

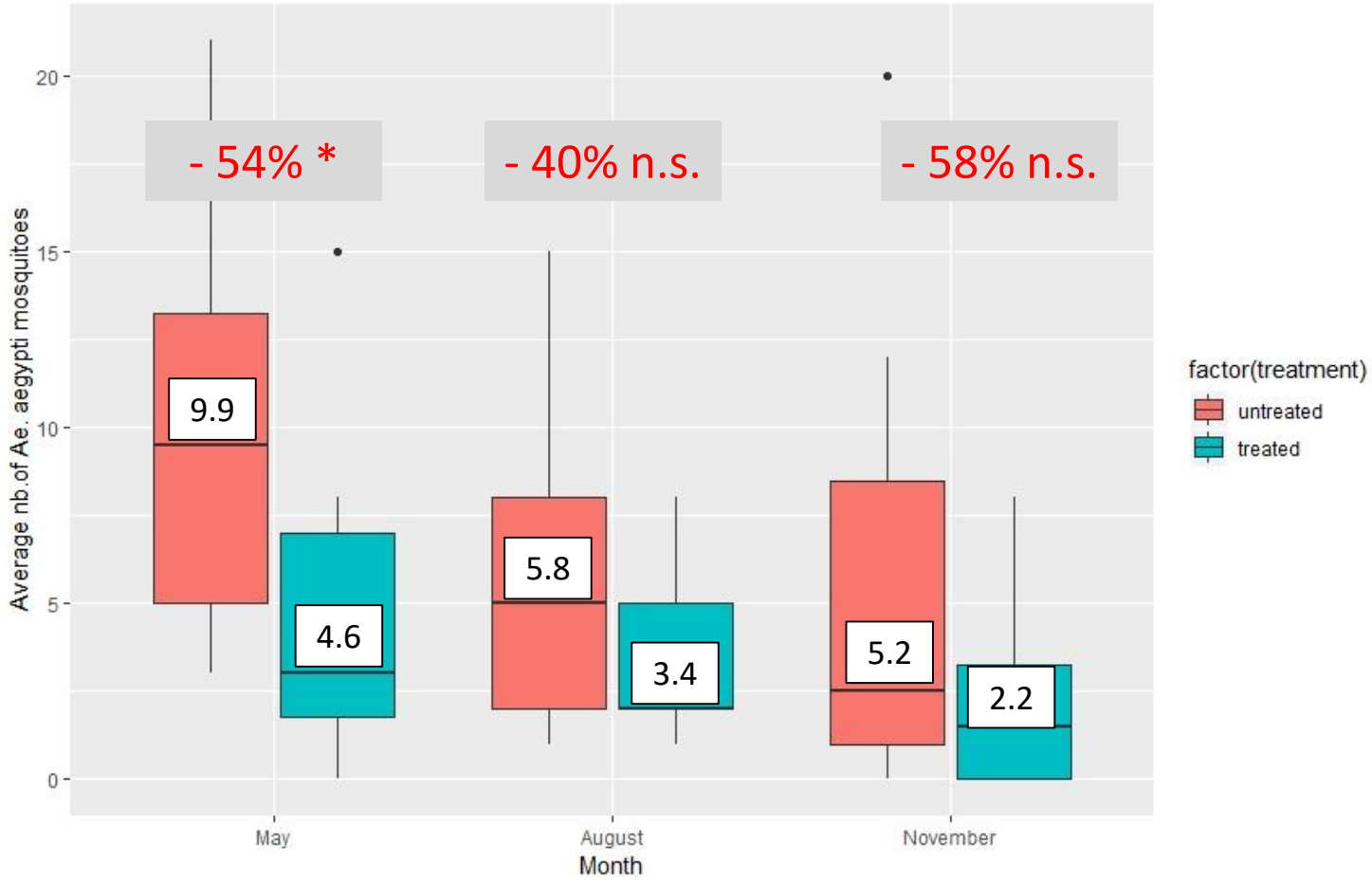


In May 2018

- In untreated area, same average than in May 2017
- Decrease between treated and untreated area (2 months after treatment)

Aedes aegypti - **AFTER** vector control intervention

On All Year 2 : **Significant** difference between treated and untreated schools. p-value = 0.002458



In August and November 2018

- No statistical difference between treated and untreated areas (5 & 8 months after treatement)

Determination of small breeding sites after vector control intervention

Positive breeding sites	
Plastic cup	**42%**
Jar	20%
Plastic bottle	**11%**
Rice box	**7%**
Tree holes	6%
Ground water	6%
Can	**4%**
Flower pot	2%
Small pool	2%

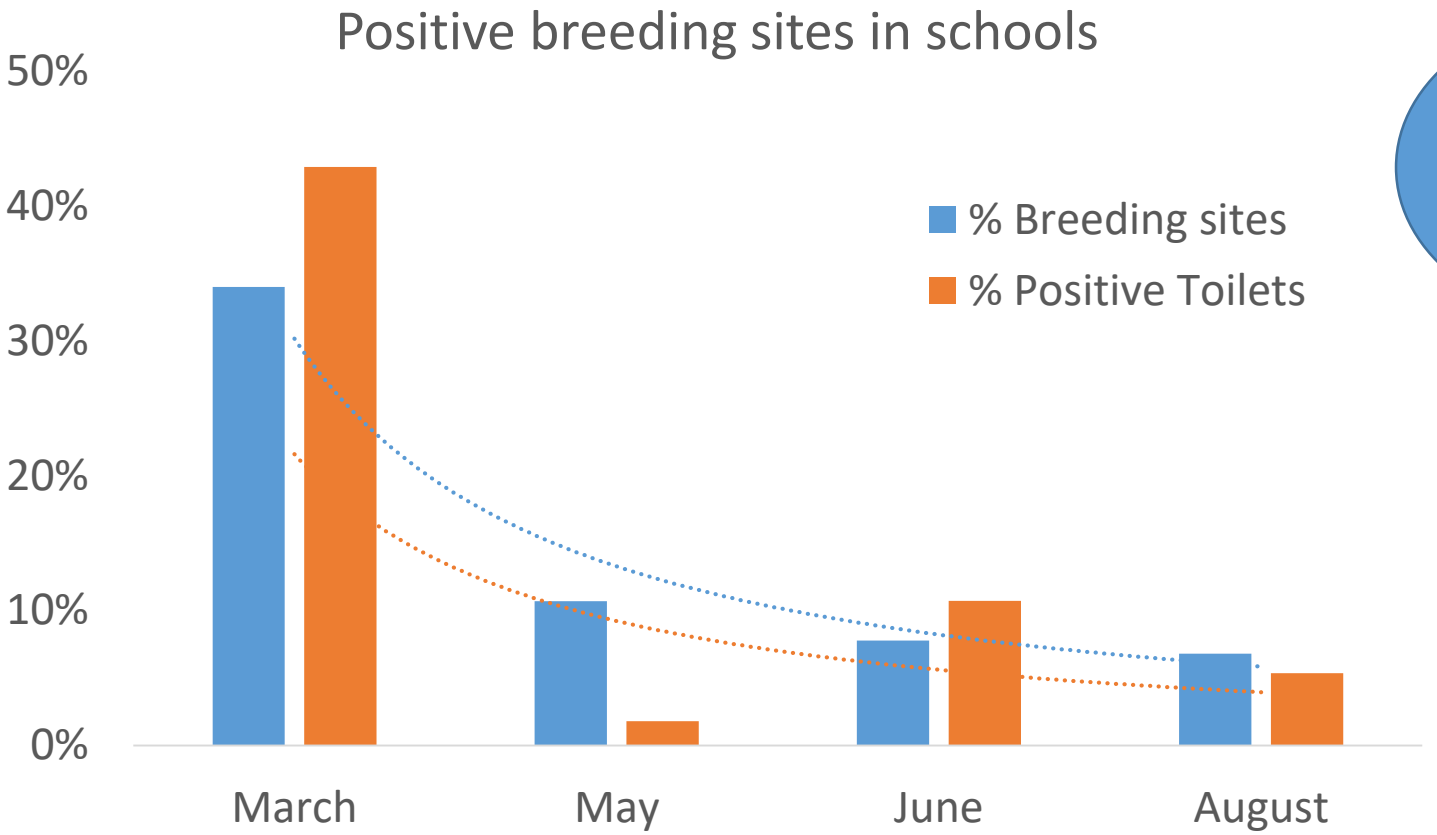
In orange and red, human-made breeding sites (88%).
In **bold red**, trash directly done by children and teachers (**64%**).

Small breeding sites with water

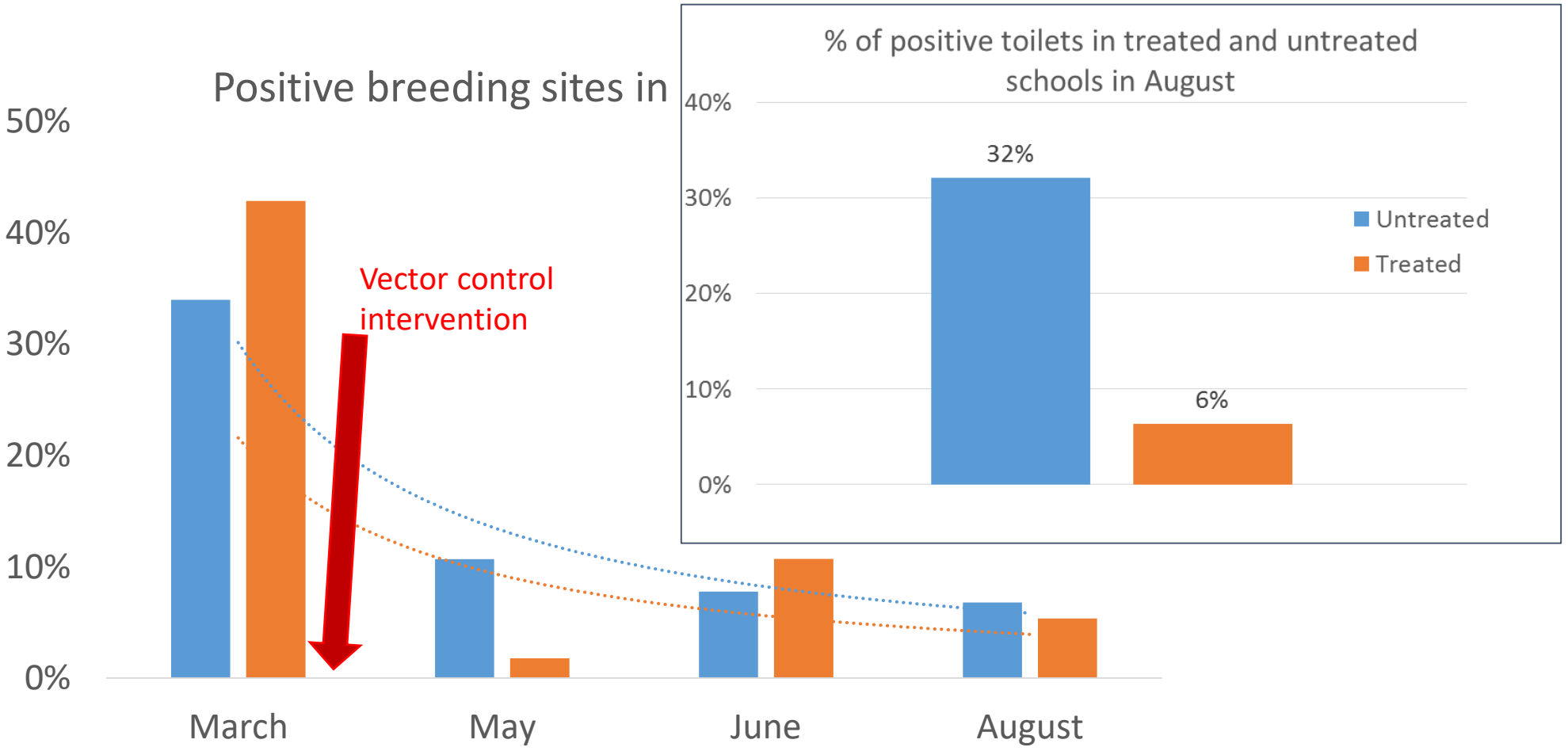
- 422 in untreated schools
- 38.4 / untreated schools
- 3.5 % positive

- 404 in treated sites
- 33.7 / treated sites
- **7.6 % positive**

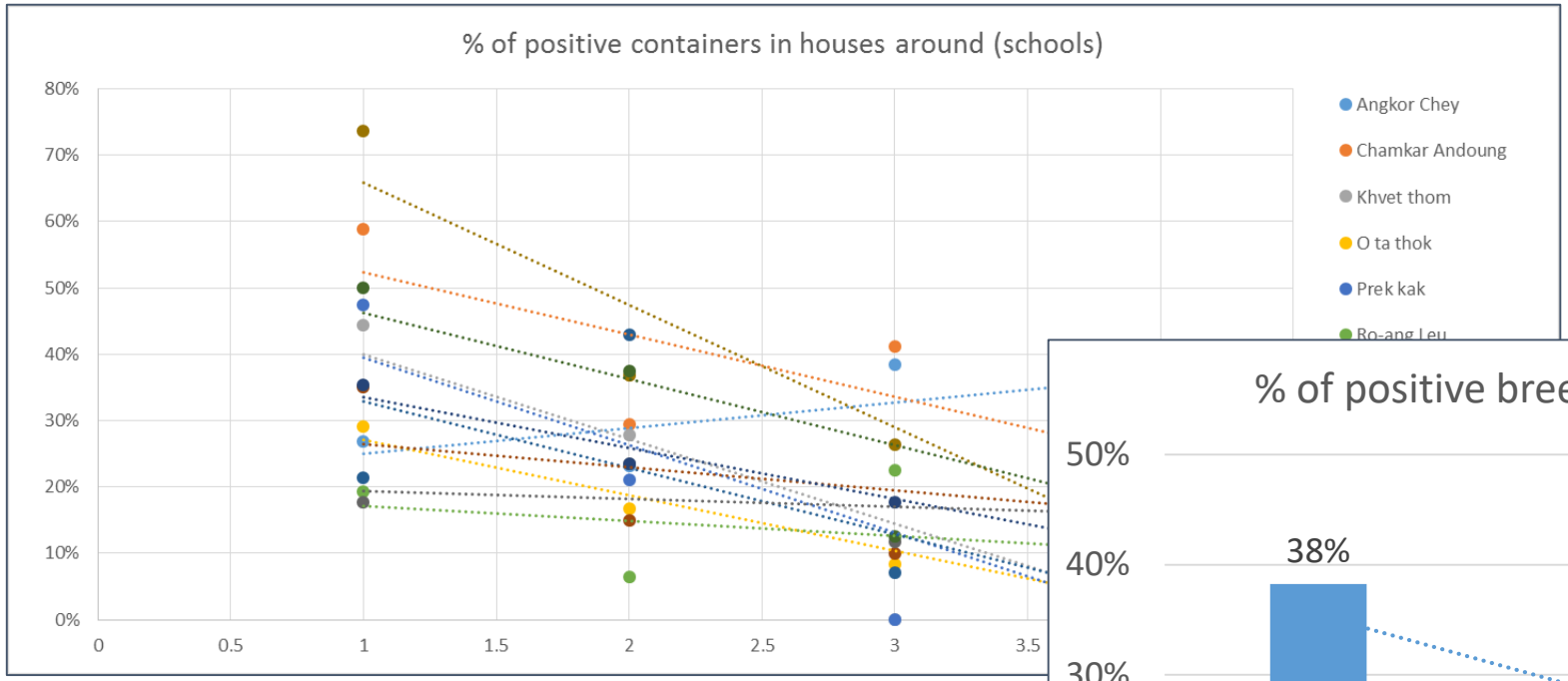
Seems that plastic prevention didn't work…

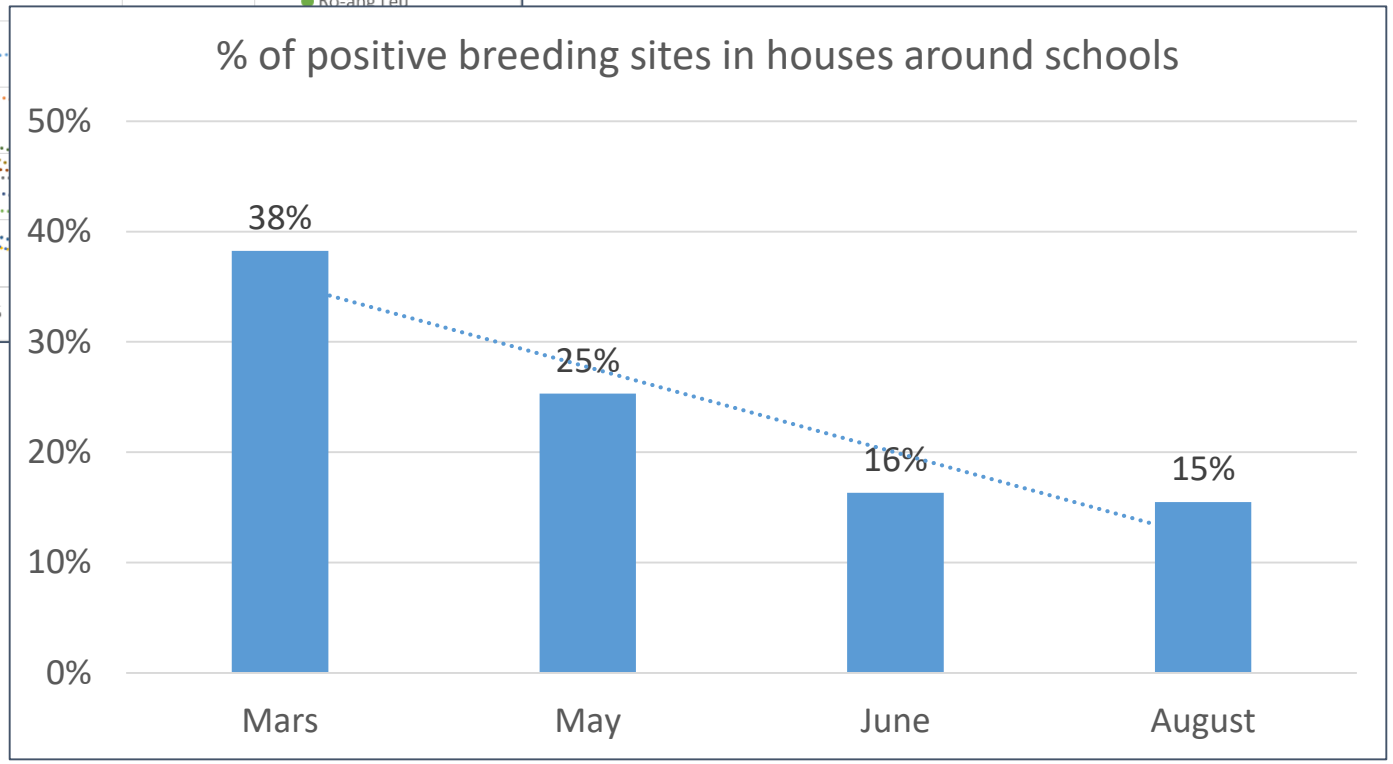


PRESENCE DE LARVES



- In treated area, decrease of positive breeding sites
- Difference between treated and untreated area (5 months after treatment)





In all houses around schools (except one), the tendency is to the decrease of positive containers in terated schools

POSITIVE POINTS

- Children like the BEAUTIFUL poster
- Children participated
- Decrease of big positive breeding sites
- Decrease of *Aedes aegypti* population

Development and Evaluation of integrated vector method control management (IVM) in schools

MAIN QUESTION

- Do the IVM decrease the population of *Aedes aegypti*?

RELATED QUESTIONS

- Is the density of *Aedes aegypti* the same in the 2 clusters before treatment ? **YES**
- What is the mosquito composition species ? ☑ **> 61 species, presence of vector species…**
- What are the breeding sites in/around schools ? ☑ **mainly toilets in the schools**
- Are *Aedes aegypti* resistant to insecticides ? **YES** **Deltamethrin, permethrin, temephos (Abate)**

No resistance to *Bti*

COMING SOON **other larvicides and adulticides**

Milestonename / Short description	1st S.C.	2nd S.C
Senior entomologist PhD deployment		
Initial inventory of breeding sites in schools and destruction with participation of scholar		
Result of insecticide sensitivity and selection of products for the control of vectors		
Implementation of adult mosquitoes control		
Installation of auto-dissemination system around schools		
Kits for COMBI ready to be distributed		

Acknowledgements

- School directors and teachers
- Medical Entomology team : Sony, Kalyan, Moeun, Kimhuor

Questions and Discussion