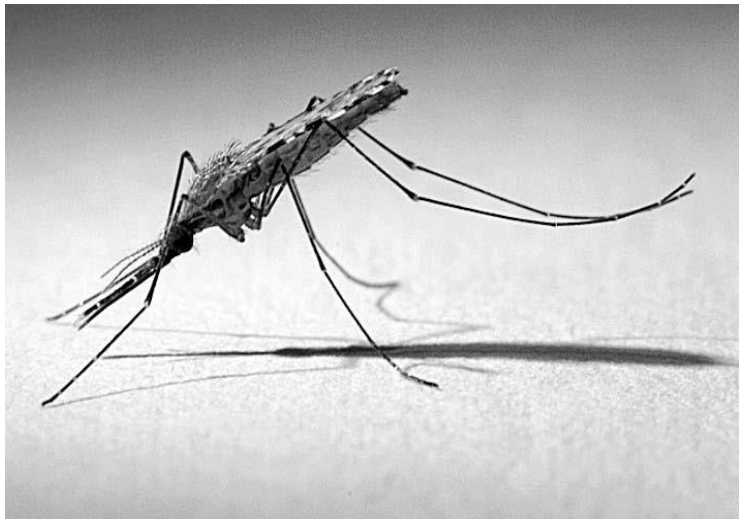
JB Duchemin

Tout ce que vous avez toujours voulu savoir sur les *Aedes* et *Anopheles** (**sans avoir jamais osé demander*)

Everything you always wanted to know about *Aedes* and *Anopheles** (**But were afraid to ask*)



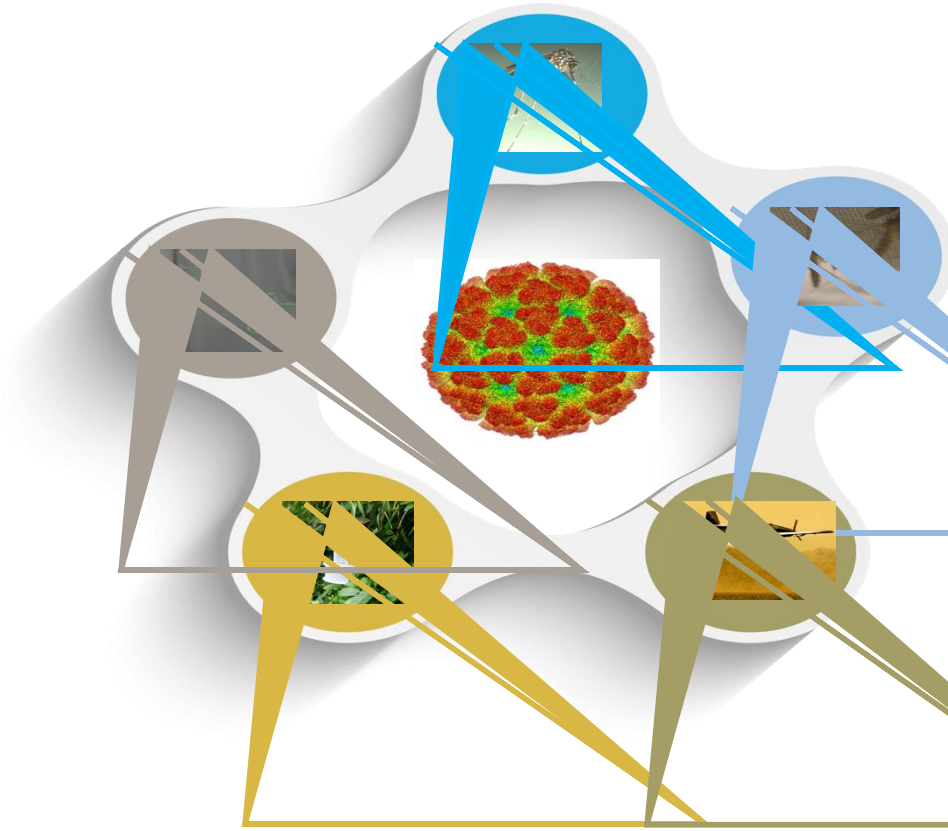
Medical view: Pathogen Transmission

Species ? (inventory, distribution, molecular barcoding)

Vector Competence ? (endemic / exotic)

Behaviors ? (hours, flights, hosts, breeding sites,…)

Control ? (Adapted / available, resistance)



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Species ? (inventory, distribution, molecular barcoding)

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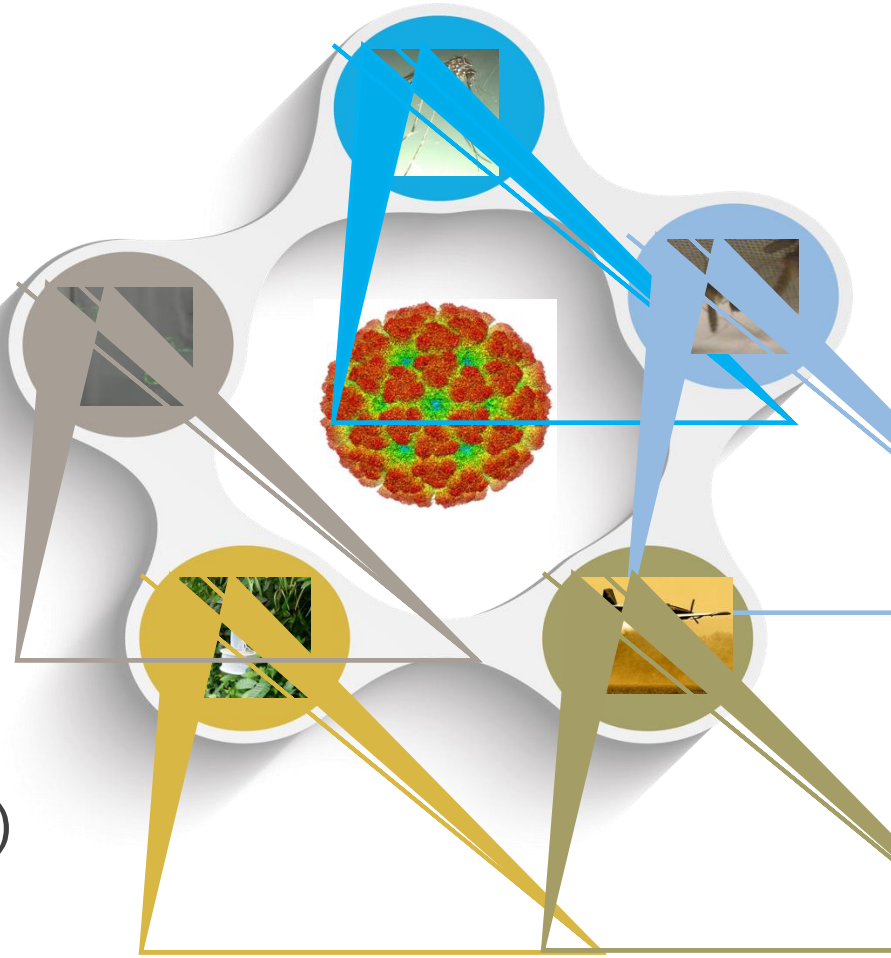

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Morphology / Biology / Genetics

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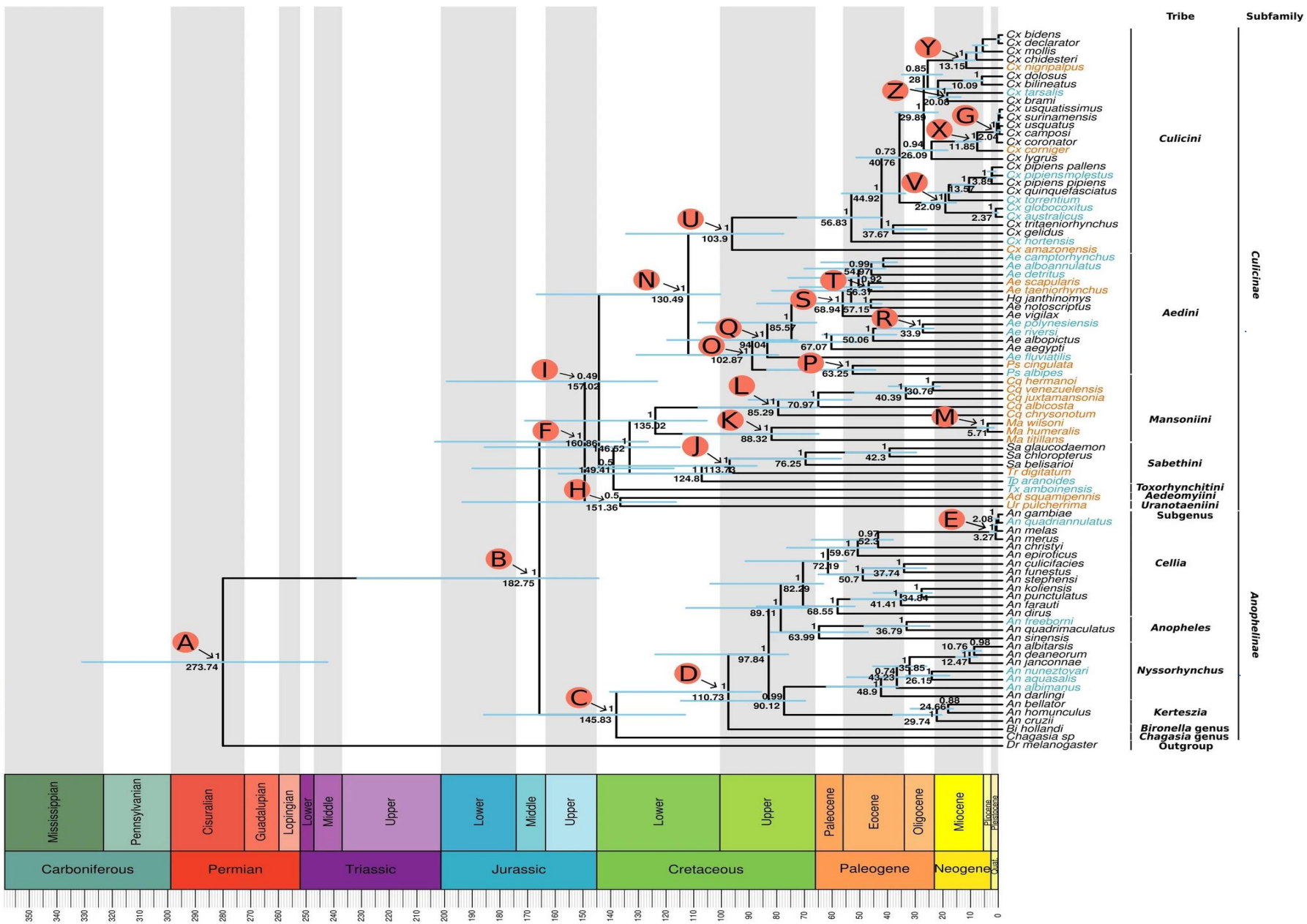

da Silva, A.F., Machado, L.C., de Paula, M.B. et al. Culicidae evolutionary history focusing on the Culicinae subfamily based on mitochondrial phylogenomics. Sci Rep 10, 18823 (2020). https://doi.org/10.1038/s41598-020-74883-3

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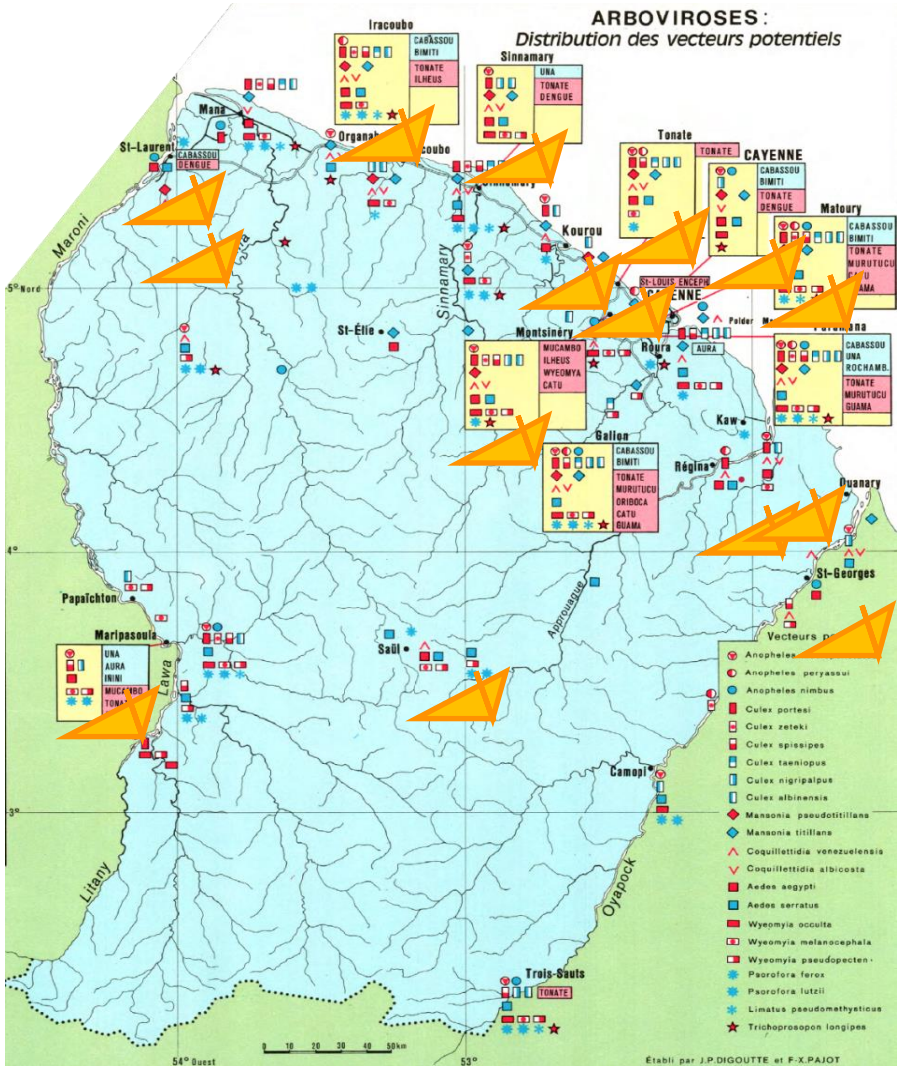
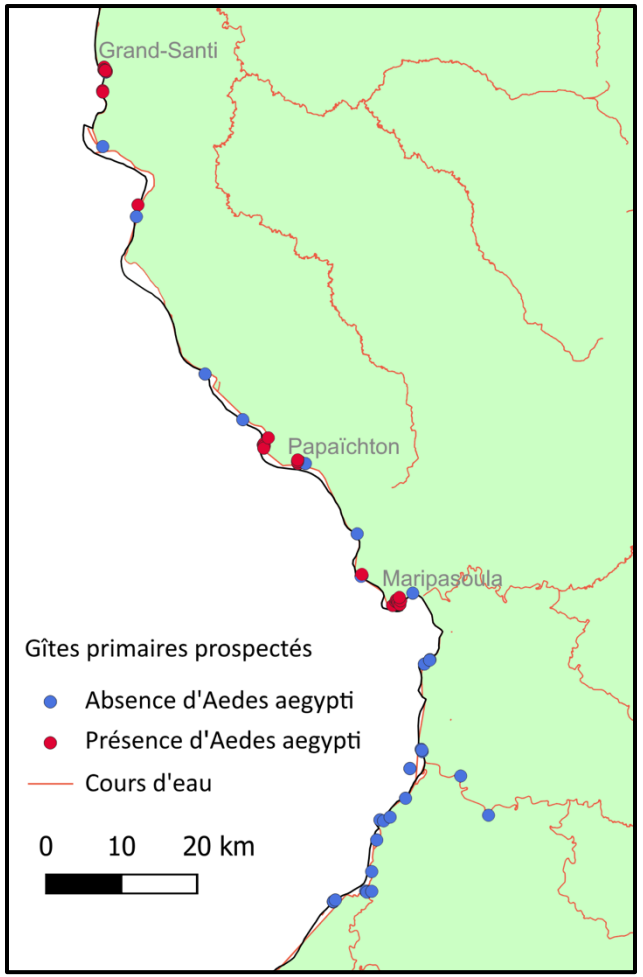
Distribution 1979 vs 2018



Atlas Guyane ORSTOM / CNRS



March 2018:

29 sampled localities

9 positive with *Aedes aegypti*

Limit of *Ae. aegypti* distribution = uppper Maroni **Maripasoula** (~ 12000 inhabitants)

After Talaga, Lacour et al - IPG, in progress.

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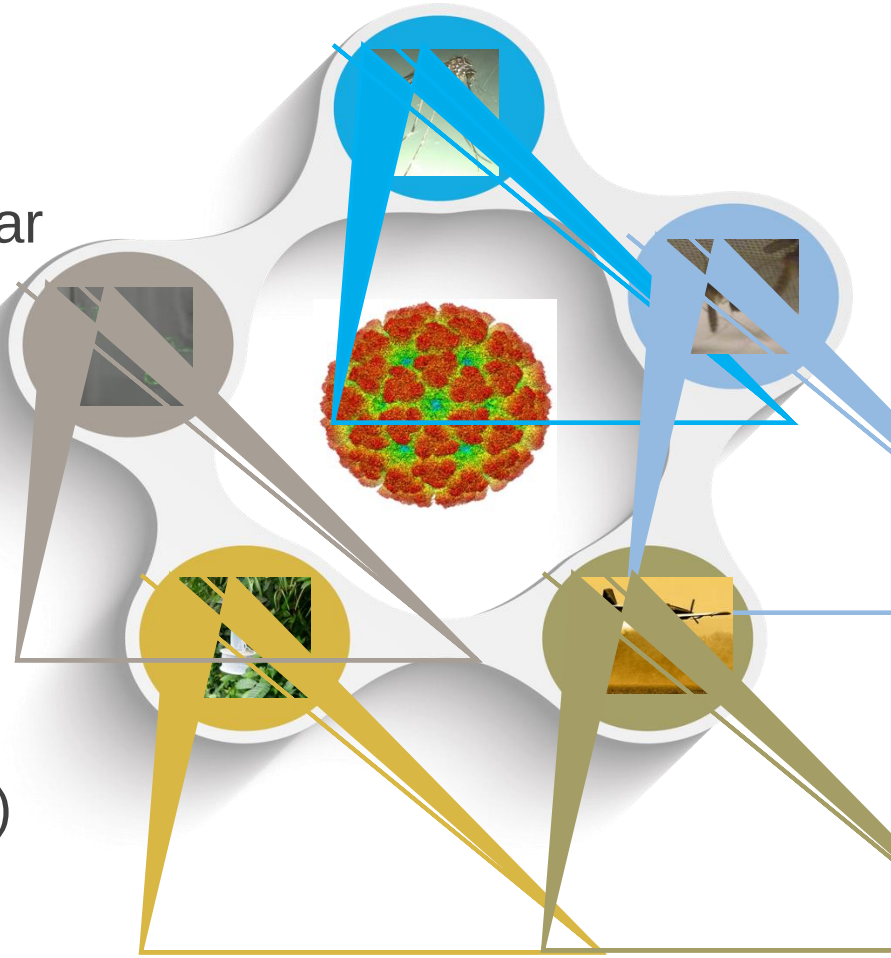
Vector Competence

Species ? (inventory, distribution, molecular barcoding)

Behaviors ? (hours, flights, hosts, breeding sites,…)

Control ? (Adapted / available, resistance)



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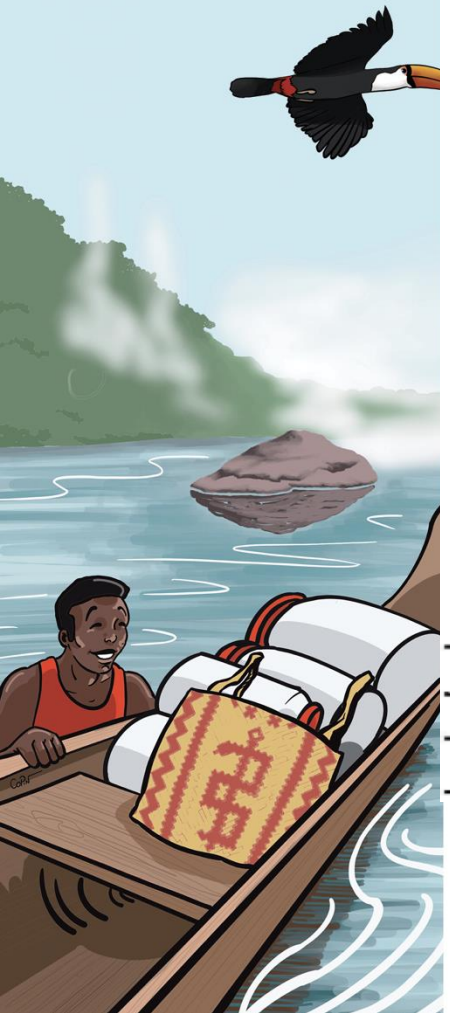
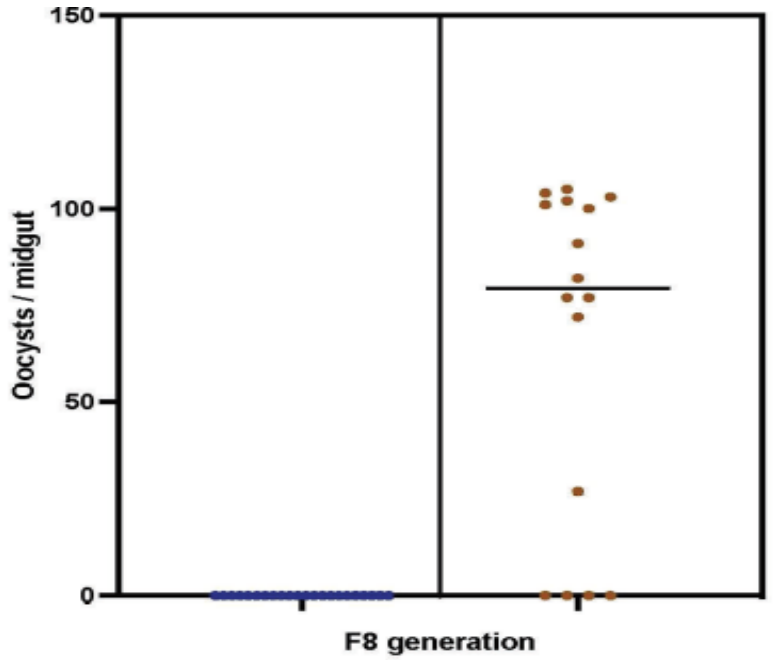
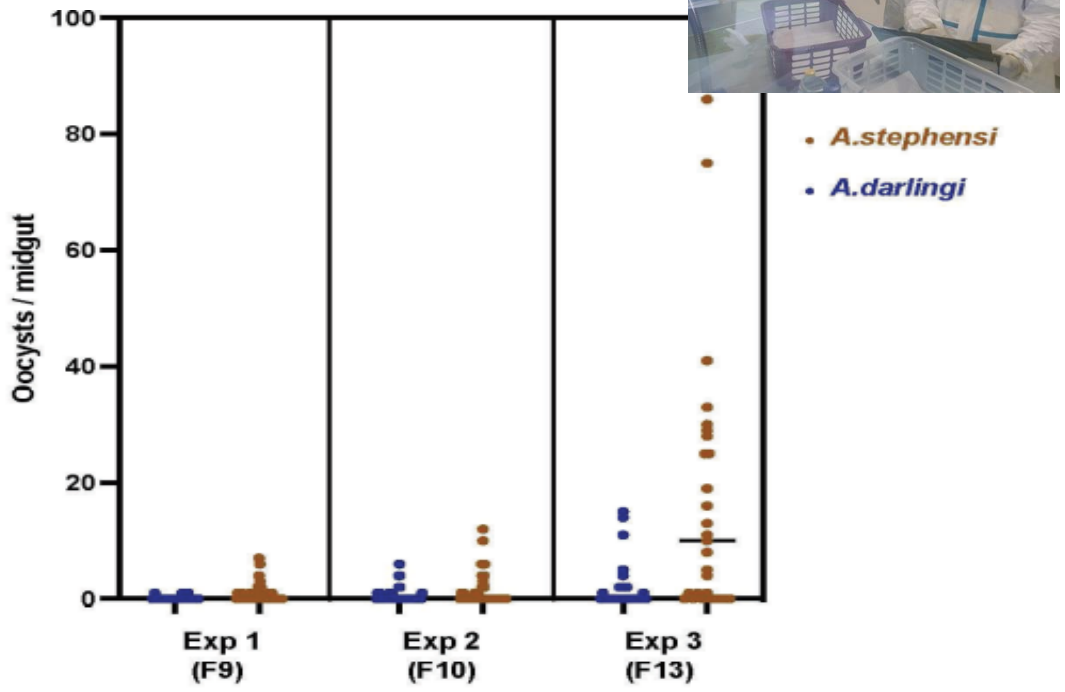
Vector competence - Anopheles





N	22	16
Prevalence %	0	75
Mean oocyst	0	85.5
Range	[0]	[27->100]

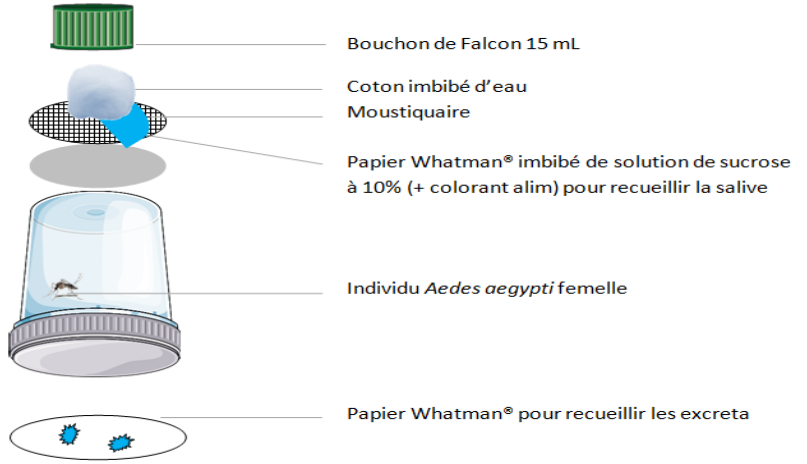


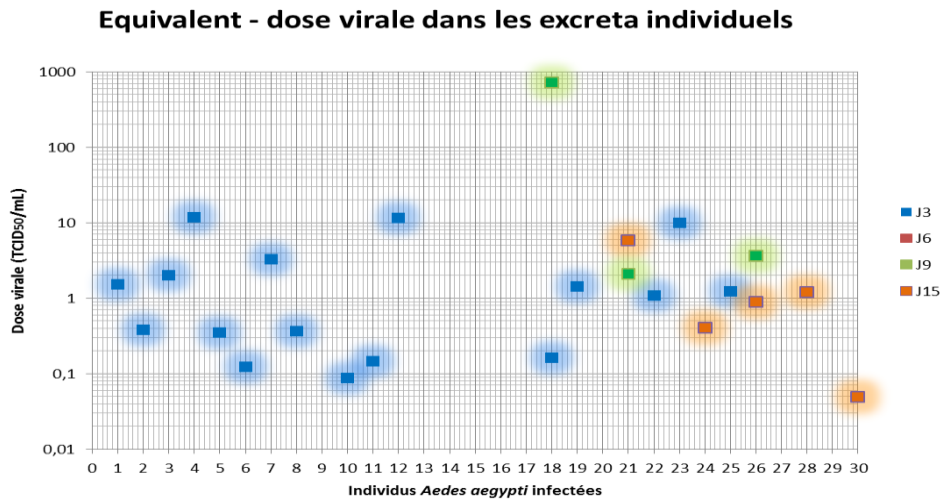
N	24	58	60	60	29	19
Prevalence %	12.5	36.8	16.7	26.7	37.9	72.4
Mean oocyst	1	2.1	2.3	4.2	5.2	26.3
Range	[1]	[1-7]	[1-6]	[1-12]	[1-15]	[1-92]

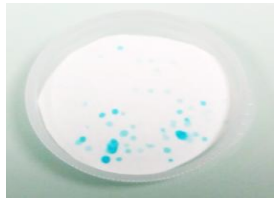
Infection of An. darlingi with P. berghei and P. falciparum. The horizontal bar on the graph represents the median of developing oocysts per mosquito midgut. After Puchot N, Lecoq M-T, Carinci R, Duchemin JB, Gendrin M and Bourgouin C (2022) Establishment of a colony of Anopheles darlingi from French Guiana for vector competence studies on malaria transmission. F
ront. Trop. Dis 3:949300. doi: 10.3389/fitd.2022.949300

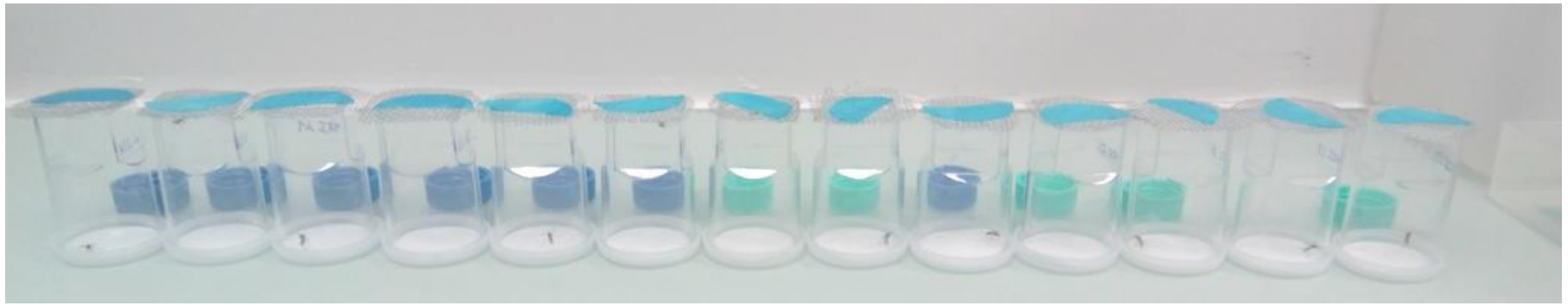
Vector competence - Aedes

YFV individual follow up with viral strain out of a patient, 10>6 /ml titer, Aedes aegypti Cayenne strain
Master Fanny Kopp 2022.









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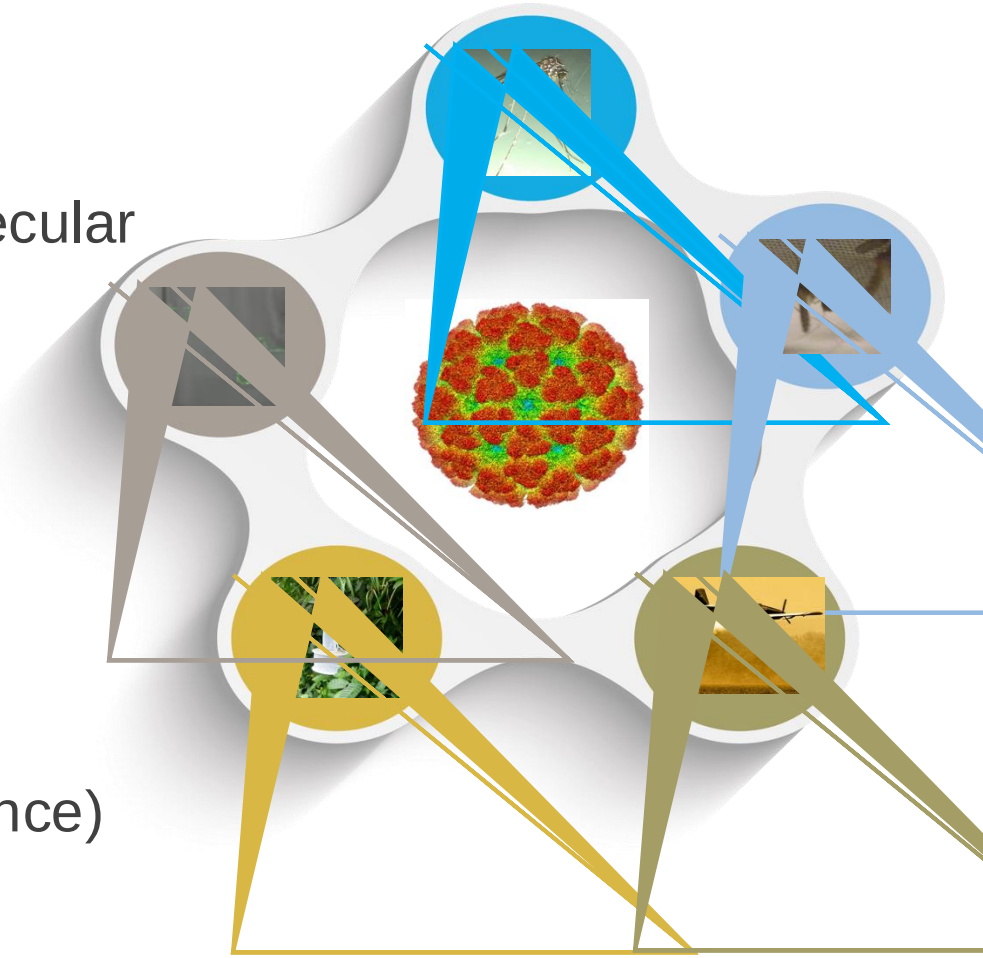
Behaviors (hours, flights)

Species ? (inventory, distribution, molecular barcoding)

Vector Competence ?

Control ? (Adapted / available, resistance)



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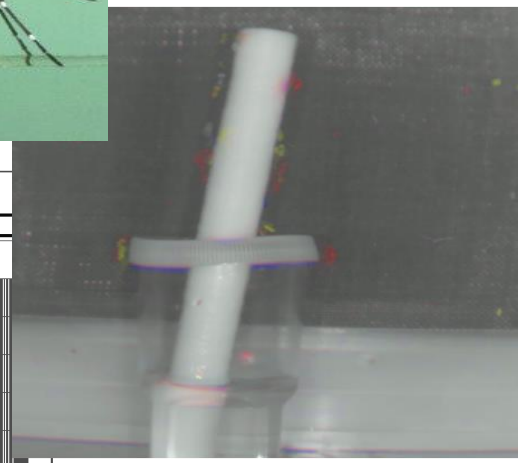
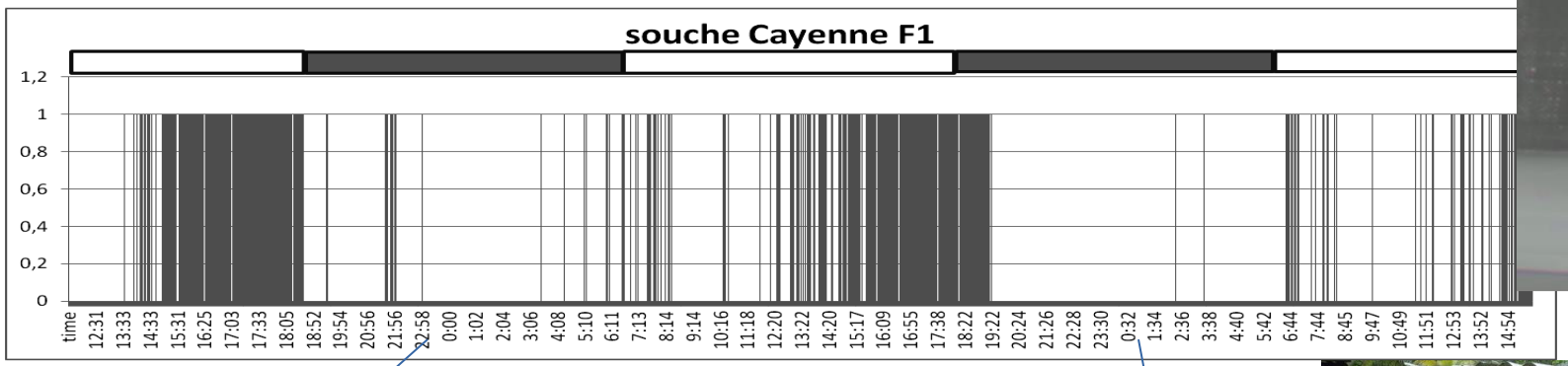
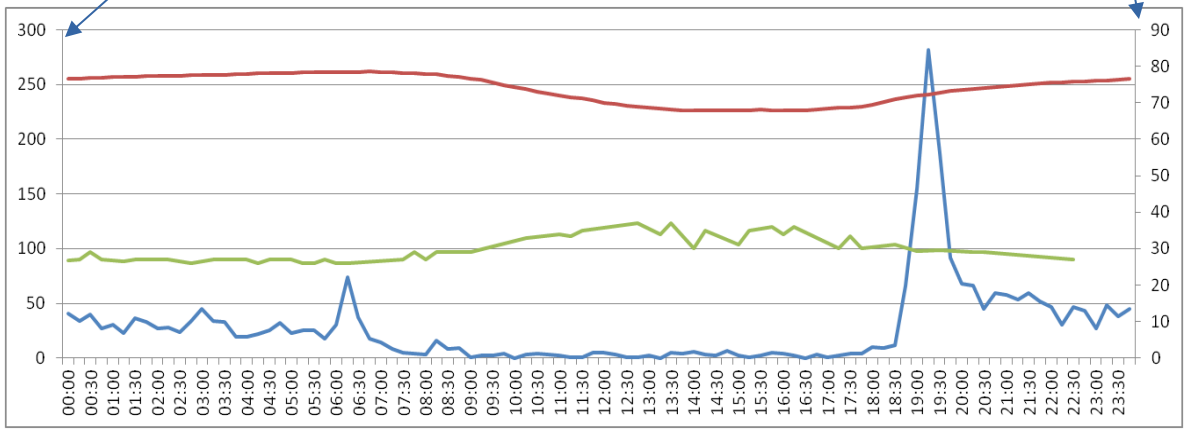
Biting time







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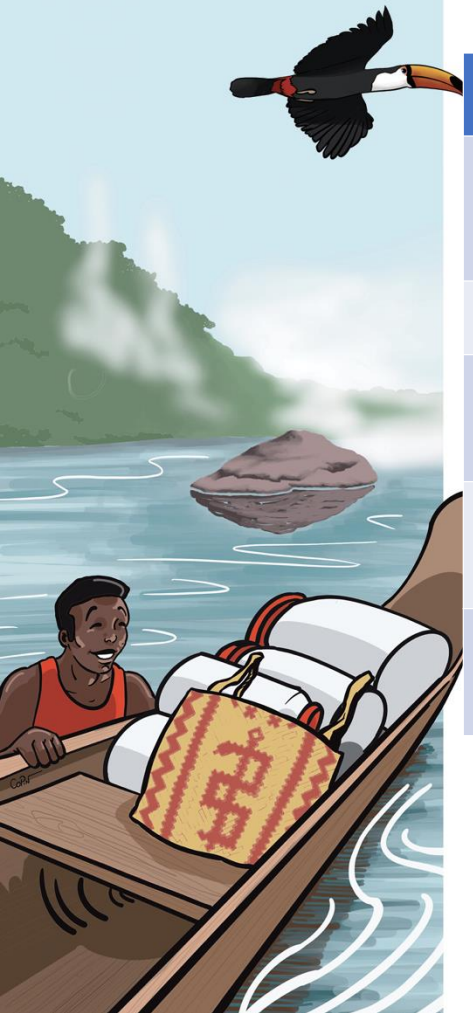
Flight distances

- Required distance between larval site and human housing to diminish the mosquito population, expressed in decreasing percentage of mosquito population at housing.



Species	n	R2	70%	80%	90%	95%	99%
Aedes aegypti	26	0.6725	4	16	67	137	**244**
Aedes albopictus	3	0.3708	97	183	347	478	617
Culex quinquefasciatus	6	0.2896					5219
Anopheles darlingi	1	0.9919	30	238	1915	5433	**12,515**
Aedes taeniorhynchus	1	0.9527	1545	3572	7038	10,503	18,551

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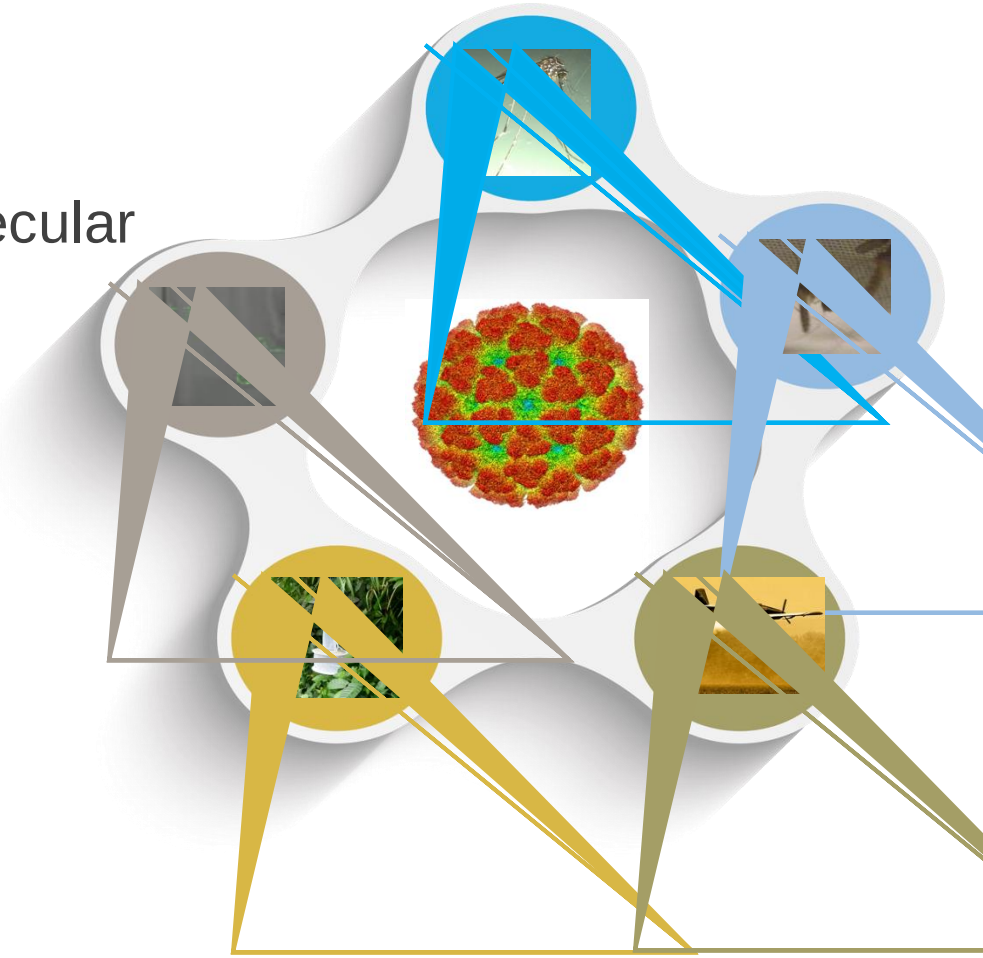
Control Now and Tomorrow ?

Species ? (inventory, distribution, molecular barcoding)

Vector Competence ?

Behaviors ? (hours, flights, hosts, breeding sites,…)



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Vector control : Now

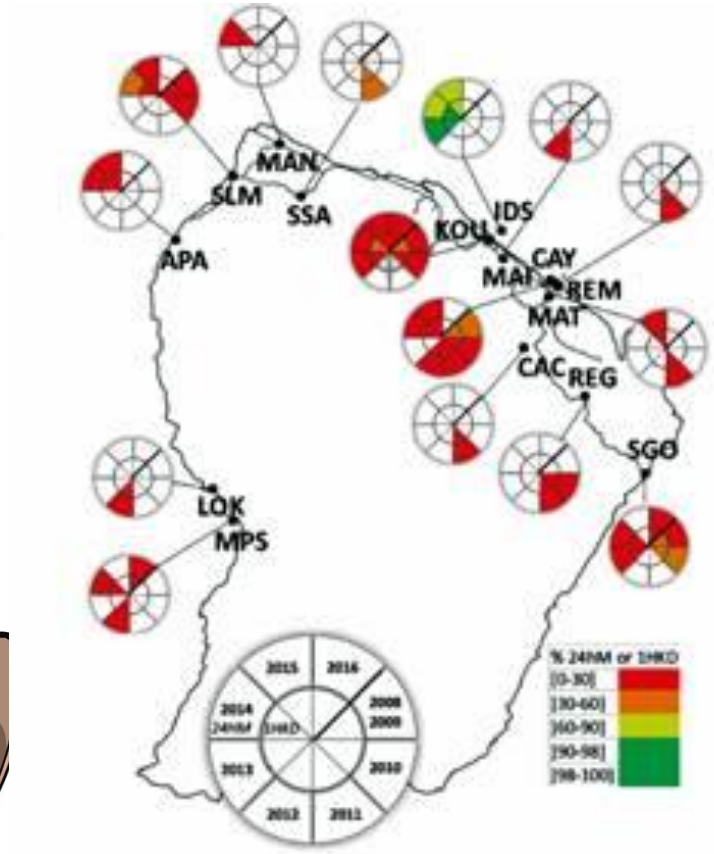
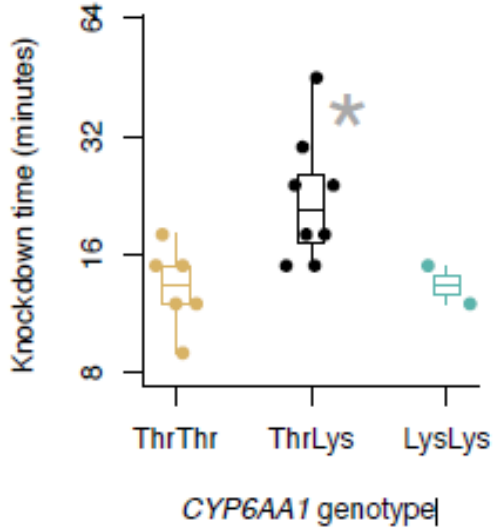


Fig. 1: spatiotemporal distribution of mortalities (% 24 h M) in *Aedes aegypti* population against deltamethrin

Fig. 1: No recorded resistance in *Anopheles darlingi* but…

Questioning CYP allele in longer survival in knockdown assays with deltamethrin ? To be continued… (Thanks Dan Neafsey et al.)



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Vector control : Tomorrow

Current trends (Africa) :

<u>GM mosquitoes</u> but :

- *An darlingi* difficult to breed… (mass releases)

- Regulations EU

- Public concerns +++

Current trends (South America, New Cal, Asia, Australia) :

<u>Wolbachia methods</u> :

- *Ae aegypti* easy to breed… (mass releases)

- Regulations EU (regional interest / DROM)

- Public concerns +++

<u>GM mosquitoes</u> but : …

Thanks for :

- Attention, dear Audience
- Fundings, dear Funders
- Inviting me, dear Organizers
- Collaborating, dear Partners
- Supporting me, dear Colleagues