



Insecticide Susceptibility Status of *An. gambiae* s.l. in four sentinel sites in Cameroon

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- Introduction
- Methods
- Results
- Discussion and Conclusion

- Pyrethroid resistance of malaria vectors (in particular, *Anopheles gambiae* complex) is still a challenge for the implementation of successful malaria control programs.
- Bed nets impregnated with pyrethroids are a major tool impacting malaria transmission and reduction of mortality and morbidity.
- Vector resistance to insecticides used for malaria control should be assessed annually to inform the country's insecticide resistance management plan.

Slide 3

KA2

Are these points all general or are they specific to Cameroon? I think we should mention the country somewhere on this slide.

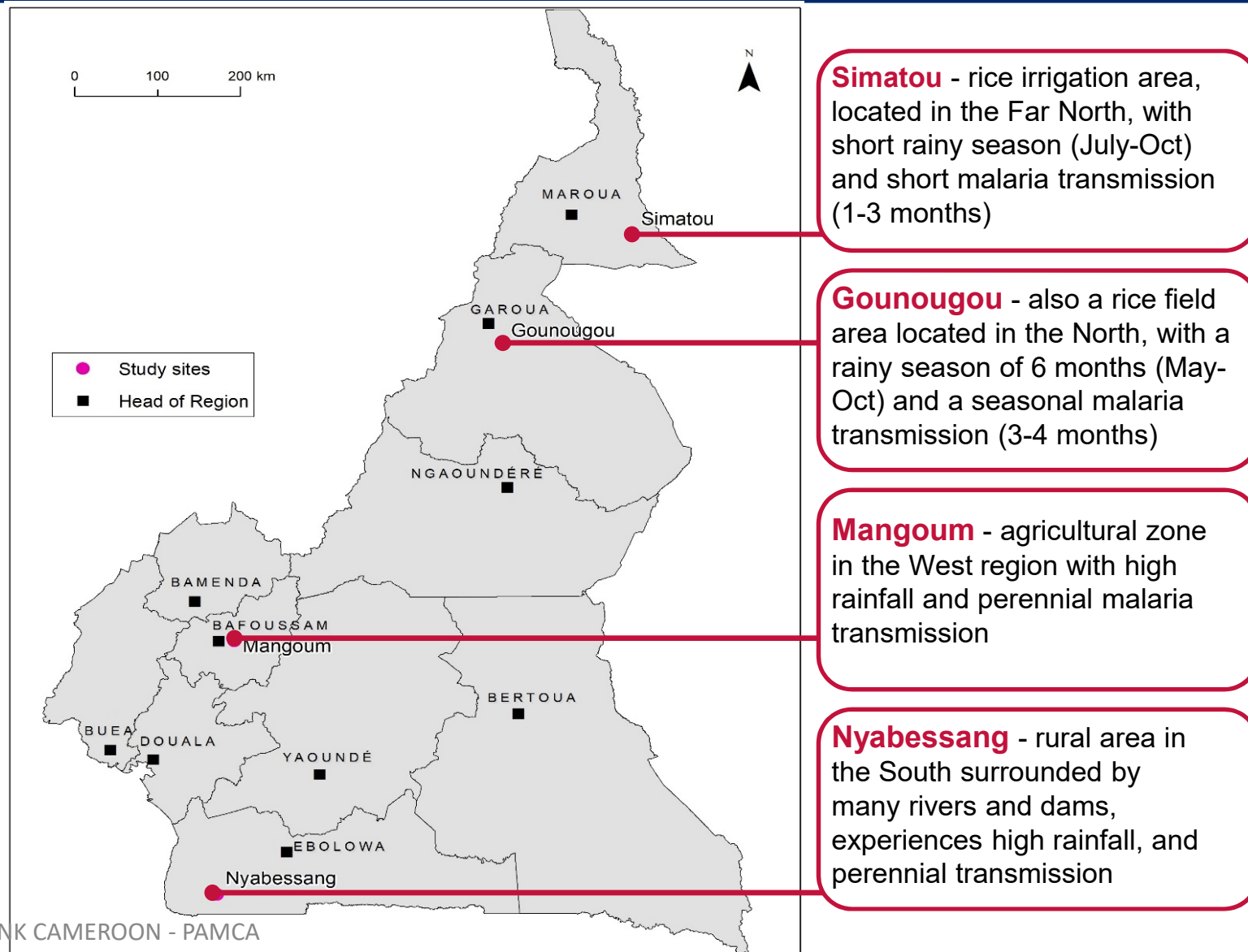
Kelley Ambrose, 8/19/2019

EF1

Yes all these points are general and concerned all malaria countries

Etienne Fondjo, 8/19/2019

Study Sites





Insecticide Resistance Testing Methods (1)

- *An. gambiae* s.l. larvae and pupae collected from different habitats and reared to adulthood in lab
- Insecticide susceptibility tests conducted on adult females (3-5 days old) using WHO tube tests
- Diagnostic concentrations of permethrin (0.75%), deltamethrin (0.05%), alpha-cypermethrin (0.05%), bendiocarb (0.1%) and pirimiphos-methyl (0.25%) were tested
- Synergist assays using piperonyl butoxide (PBO) and resistance intensity (5x & 10x) tested for 3 pyrethroid insecticides
- New insecticide, clothianidin, also tested using the formulated product (SumiShield) at the dose of (13.2 mg/m²).

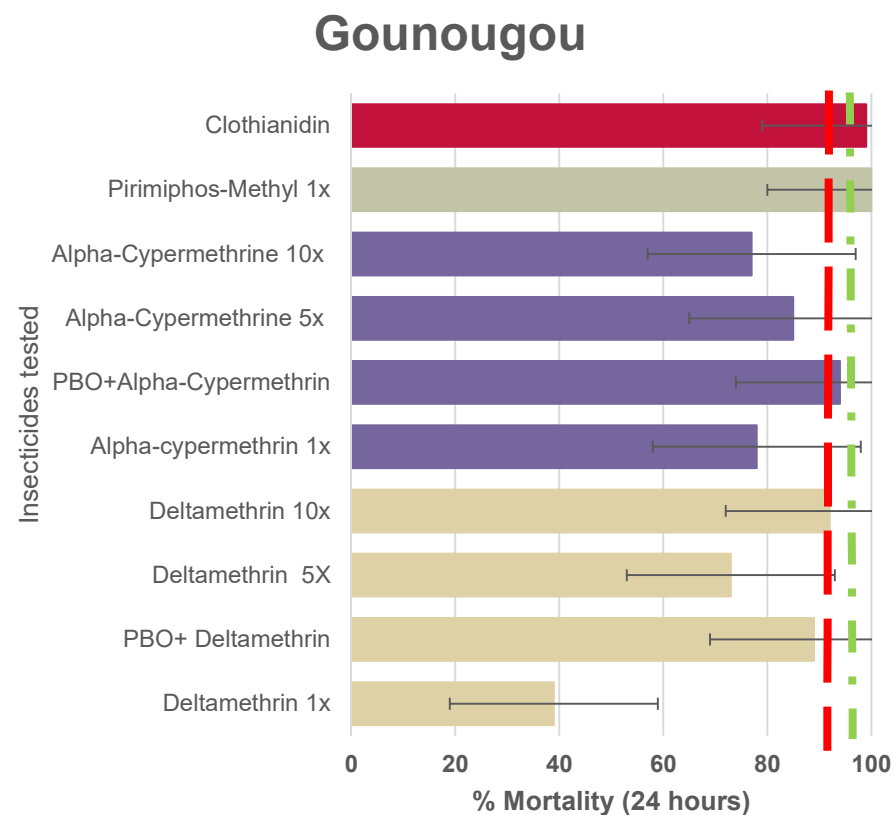
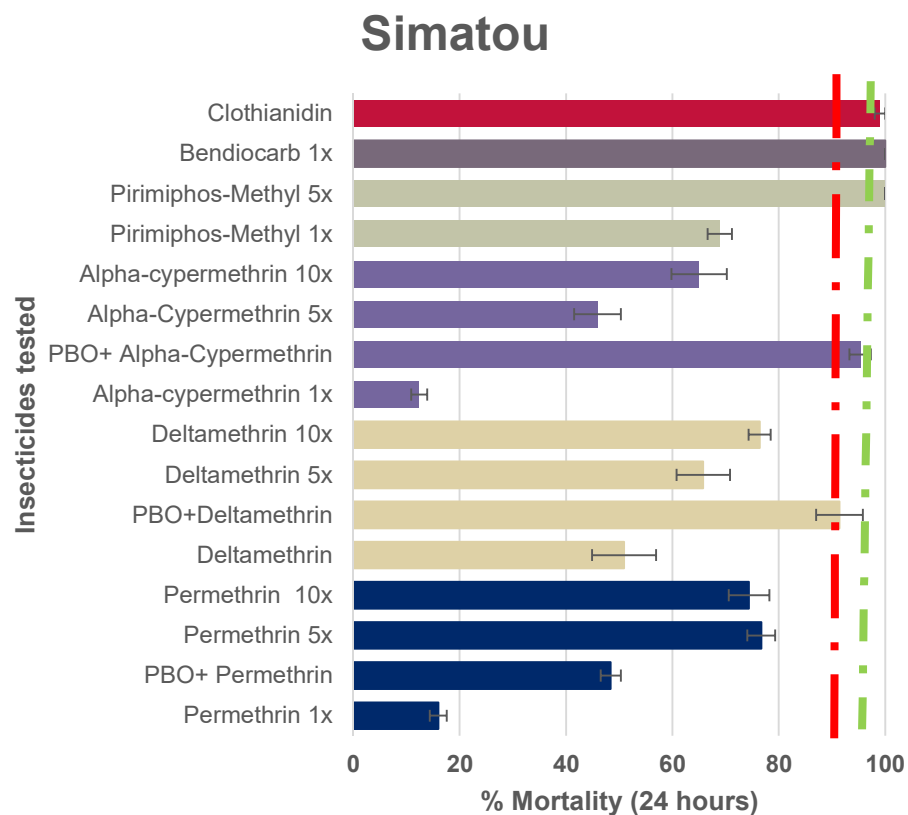




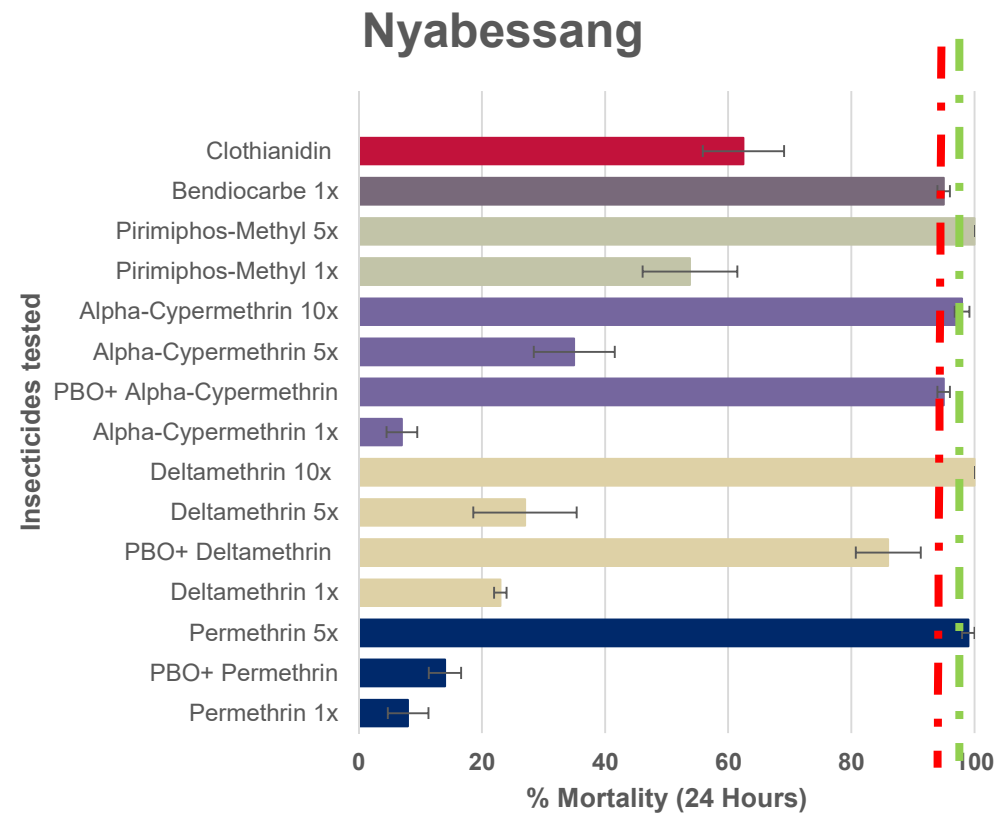
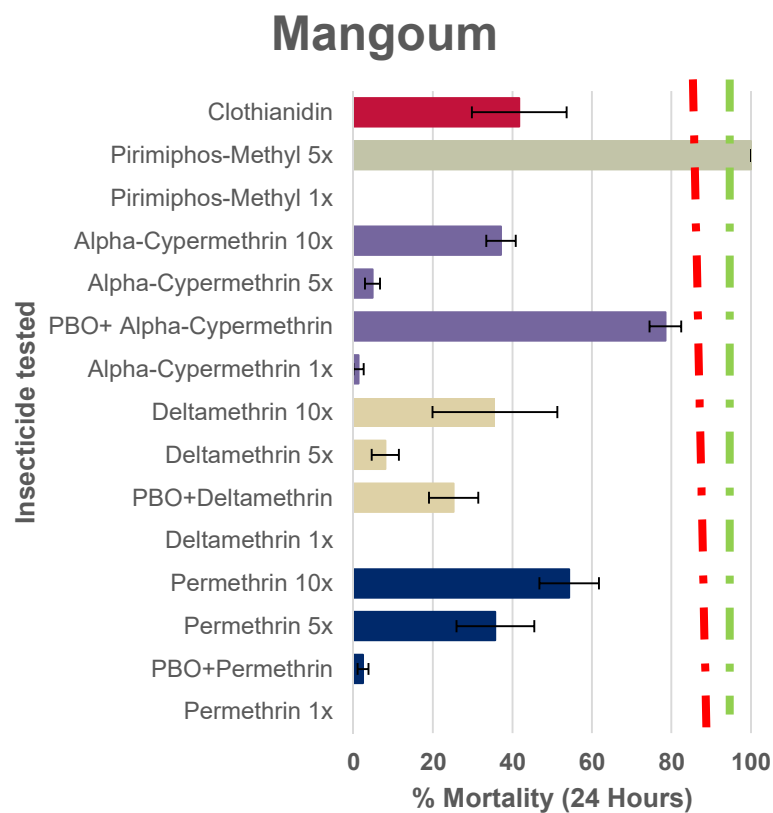
Insecticide Resistance Testing Methods (2)

- Used WHO criteria for resistance:
 - Susceptible: greater than 98% mortality
 - Possible resistance: between 90-97% mortality
 - Confirmed resistance: less than 90% mortality
- Measuring resistance intensity:
 - Low: 5x mortality greater than 98%
 - Moderate: 10x mortality greater than 98%
 - High: 10x mortality less than 98%
- The increment of mortality after pre-exposure to PBO indicates the involvement of P450s in pyrethroid resistance of the vectors

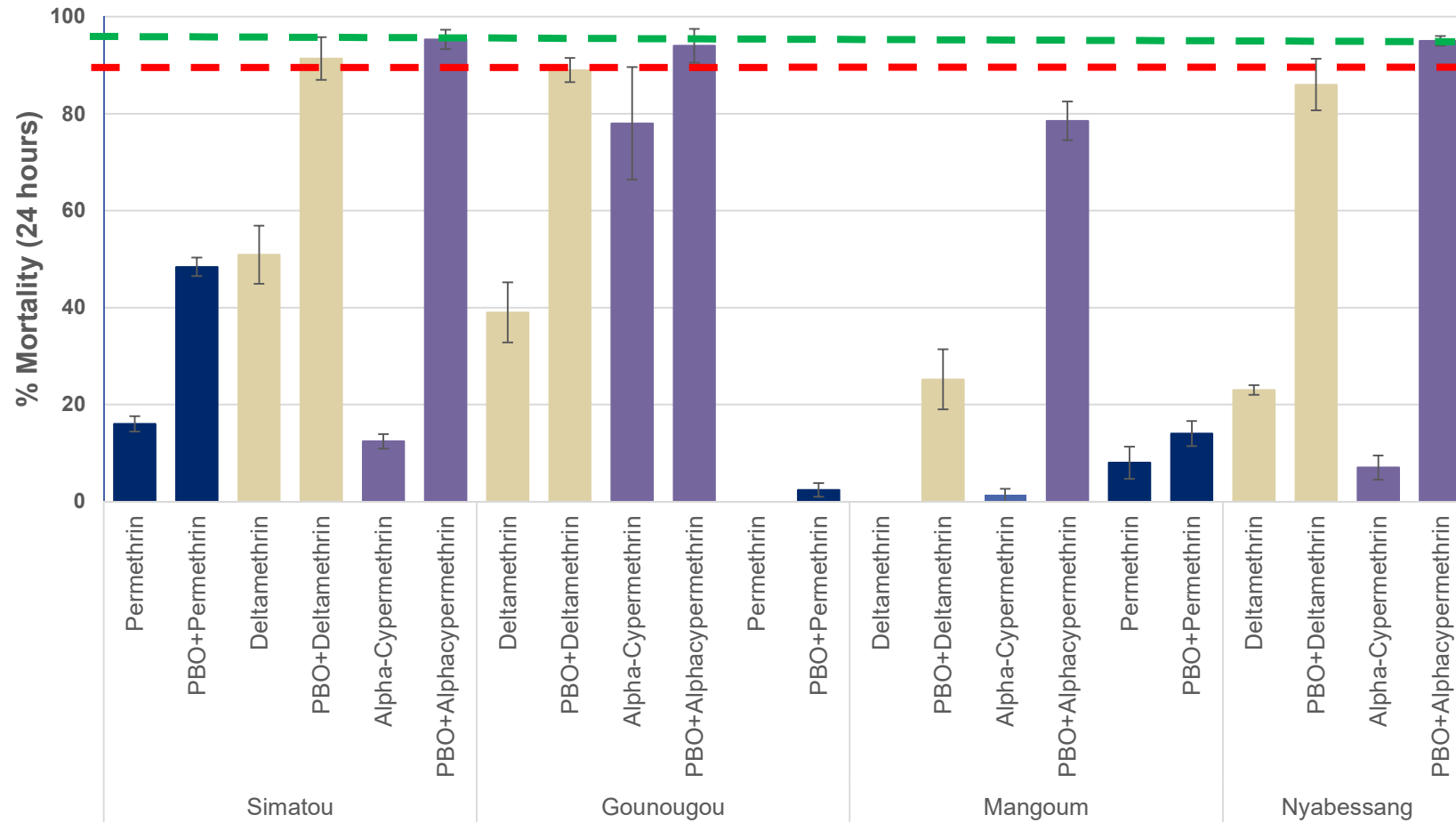
Results (1)



Results (2)



Results (3): Synergistic Effect of PBO on Pyrethroid Resistance



- High pyrethroid resistance was observed in all sites with survival observed at 10x the diagnostic dose JC1
EF3
 - This could have been due to pressure from agriculture pesticide use as all sites are in agricultural areas
- Involvement of monooxygenases in the resistance observed through the impact of PBO
- Pirimiphos-methyl resistance was detected in three of the four sites (Simatou, Mangoum, and Nyabessang)
- *An. gambiae* s.l. was susceptible to clothianidin and bendiocarb in Gounougou and Simatou

Slide 10

JC1

this bullet 1 is results and i'm sure you will talk about that orally

Joseph Chabi, 8/19/2019

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Remove

Etienne Fondjo, 8/20/2019



Conclusions

- Results reinforce the need to develop an insecticide resistance management plan to ensure effective malaria vector control in Cameroon
- Could inform the Cameroon NMCP's decisions on:
 - Type of ITNs to distribute
 - (More broadly) Development of a feasible, integrated vector control strategy



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Thank You for Your Attention!