

Bionomics and vectorial role of anophelines in wetlands along the volcanic chain of Cameroon

Nathalie Amvongo-Adjia^{1,2,3*}, Emmanuela L. Wirsiy^{2,4}, Jacob M. Riveron⁵, Winston P. Chounna Ndongmo^{2,4}, Peter A. Enyong^{2,4}, Flobert Njiokou^{1,6}, Charles S. Wondji^{5,6} and Samuel Wanji^{2,4*}

¹Parasitology and Ecology Laboratory, Department of Animal Biology and Physiology, Faculty of Science, University of Yaoundé 1, Cameroon; ²Research Foundation for Tropical Diseases and the Environment (REFOTDE), Cameroon; ³Centre for Medical Research, Institute of Medical Research and Medicinal Plants Studies (IMPM), Cameroon; ⁴Parasite and Vector Biology Research Unit (PAVBRU), Department of Microbiology and Parasitology, University of Buea, Cameroon; ⁵Vector Biology Department, Liverpool School of Tropical Medicine, United Kingdom; ⁶Centre for Research in Infectious Diseases (CRID), LSTM Research Unit, Cameroon.

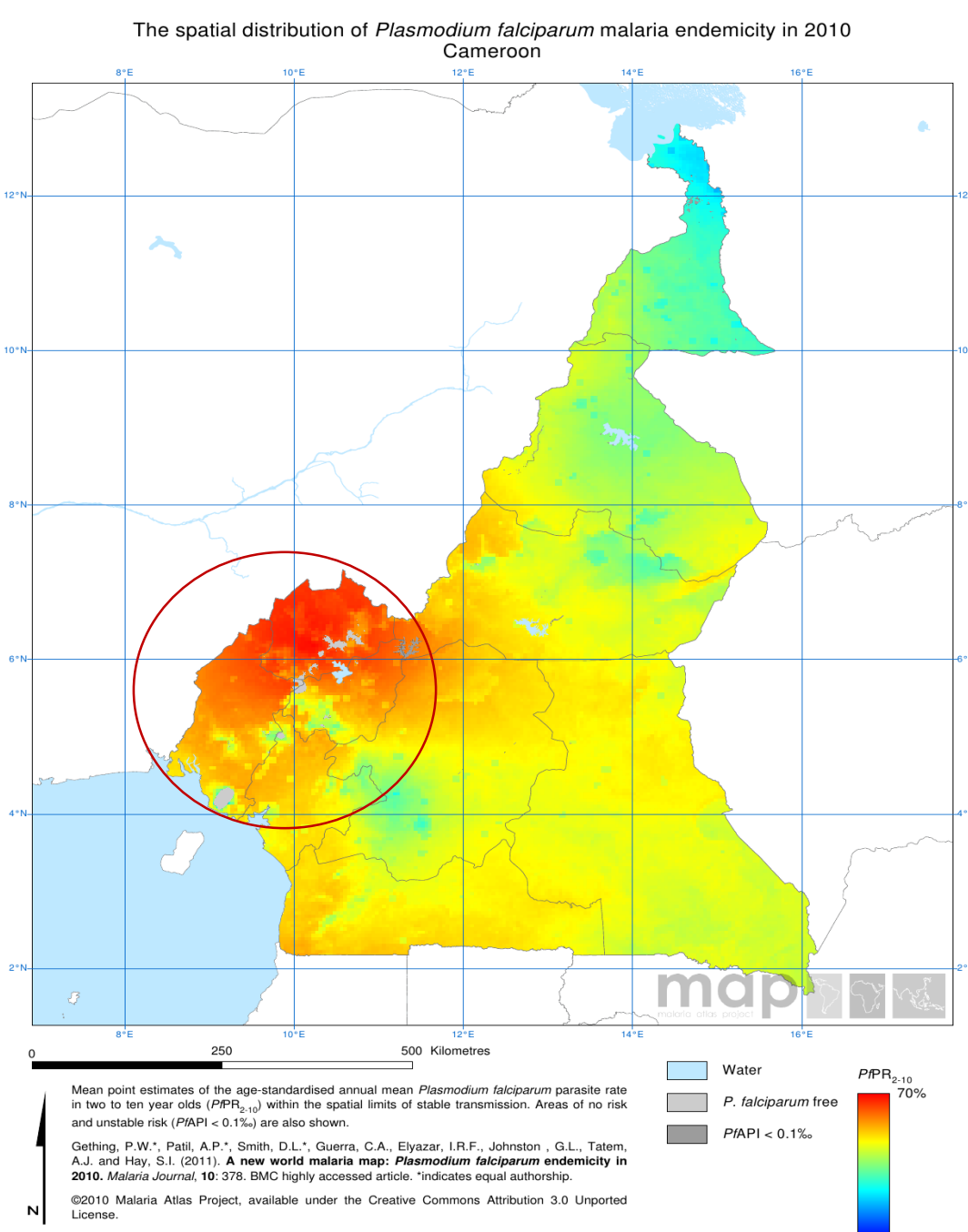
Background

➤ Malaria a major public health burden.

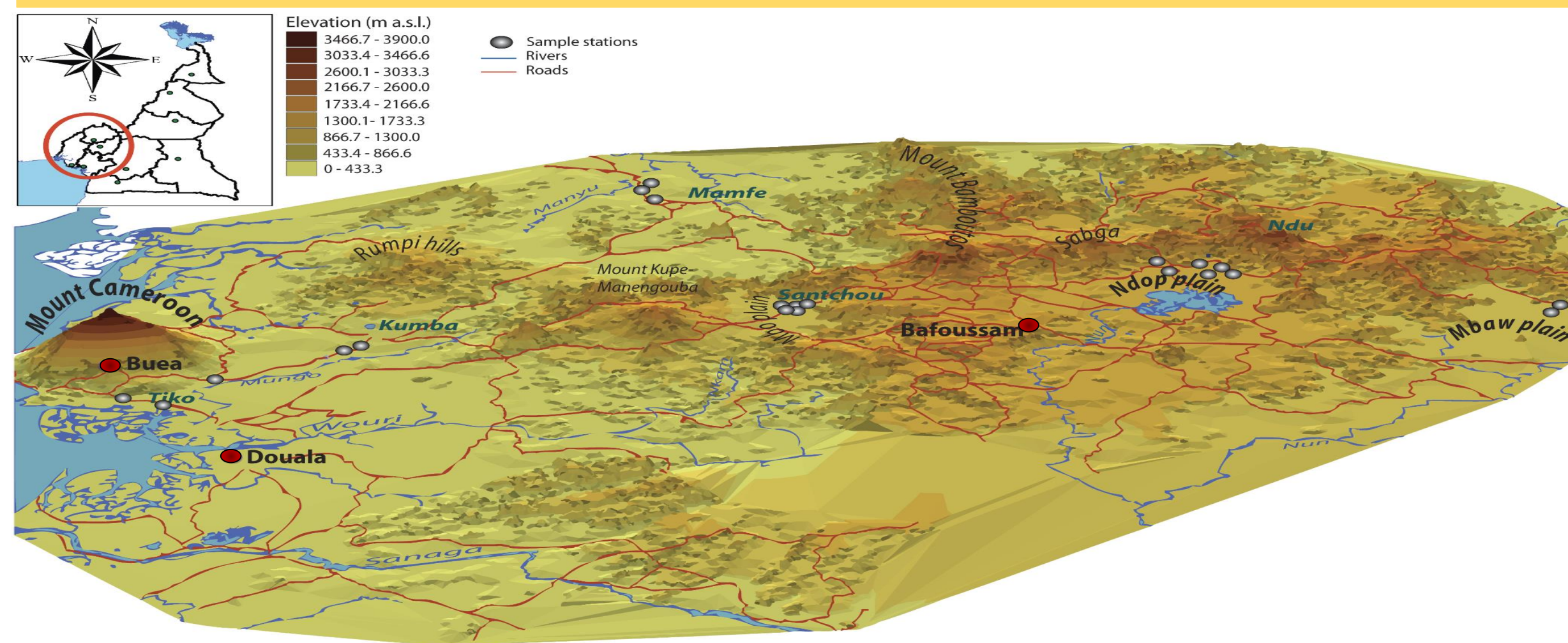
In Cameroon

➤ Disparities of knowledges concerning **Anopheles vector bionomics, malaria transmission dynamics**, vector control measures and their possible consequences such as the level and spread of insecticide resistant genes in *Anopheles* vectors:

- Northern/South/Centre parts of the country well studied.
- Limited information available in the Cameroon hill tract.



Methods



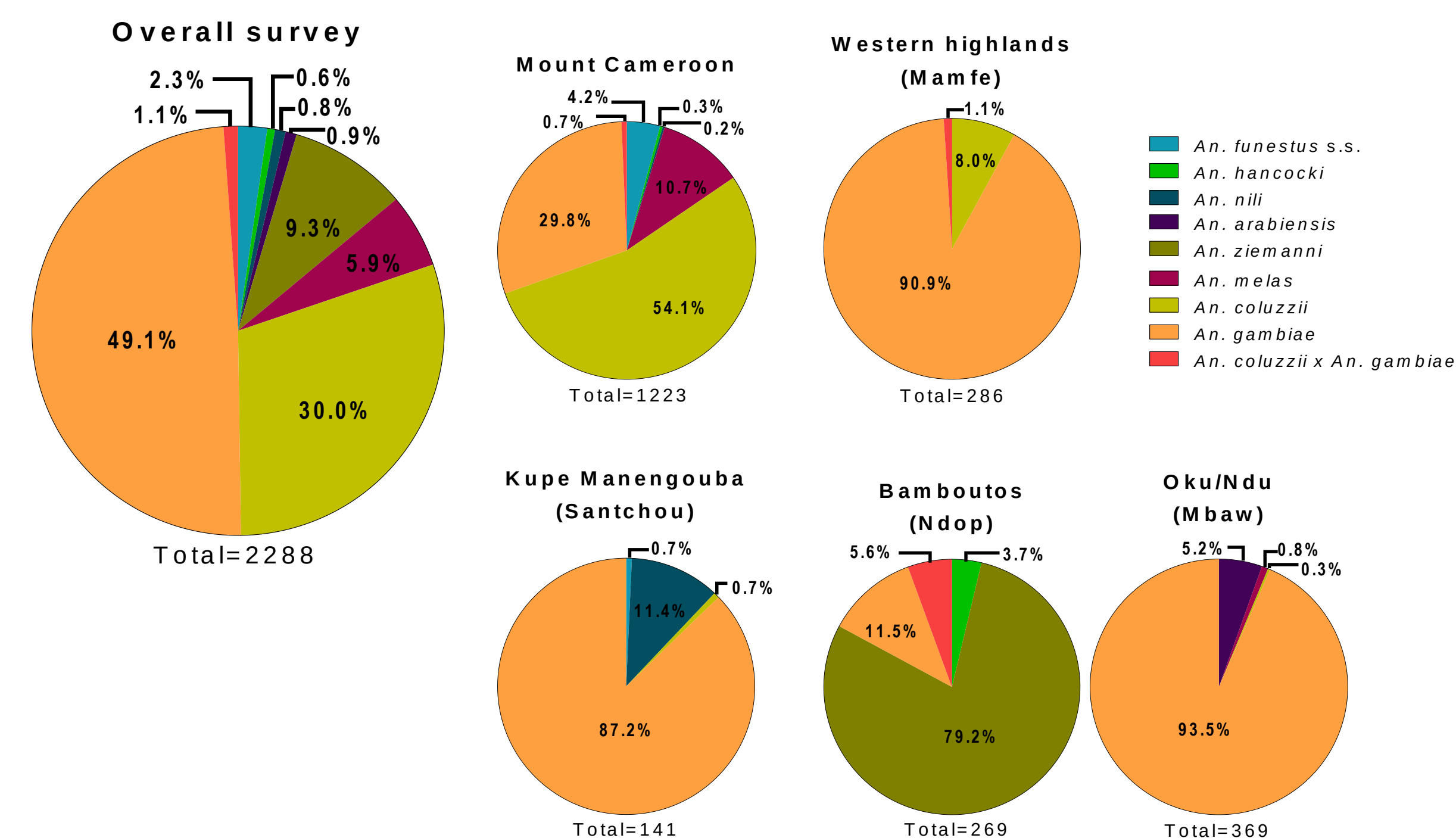
Study design

- Cross-sectional surveys during the dry and rainy season months (May 2012 and October 2015) using HLC (18:00 – 06:00), spray catch and CDC light traps;
- Morphological identification + female *Anopheles* age grading;
- Species molecular identification within *Anopheles gambiae* complex and *An. funestus* group + Plasmodium infection detection using PCR-based assays (c-PCR & TaqMan).

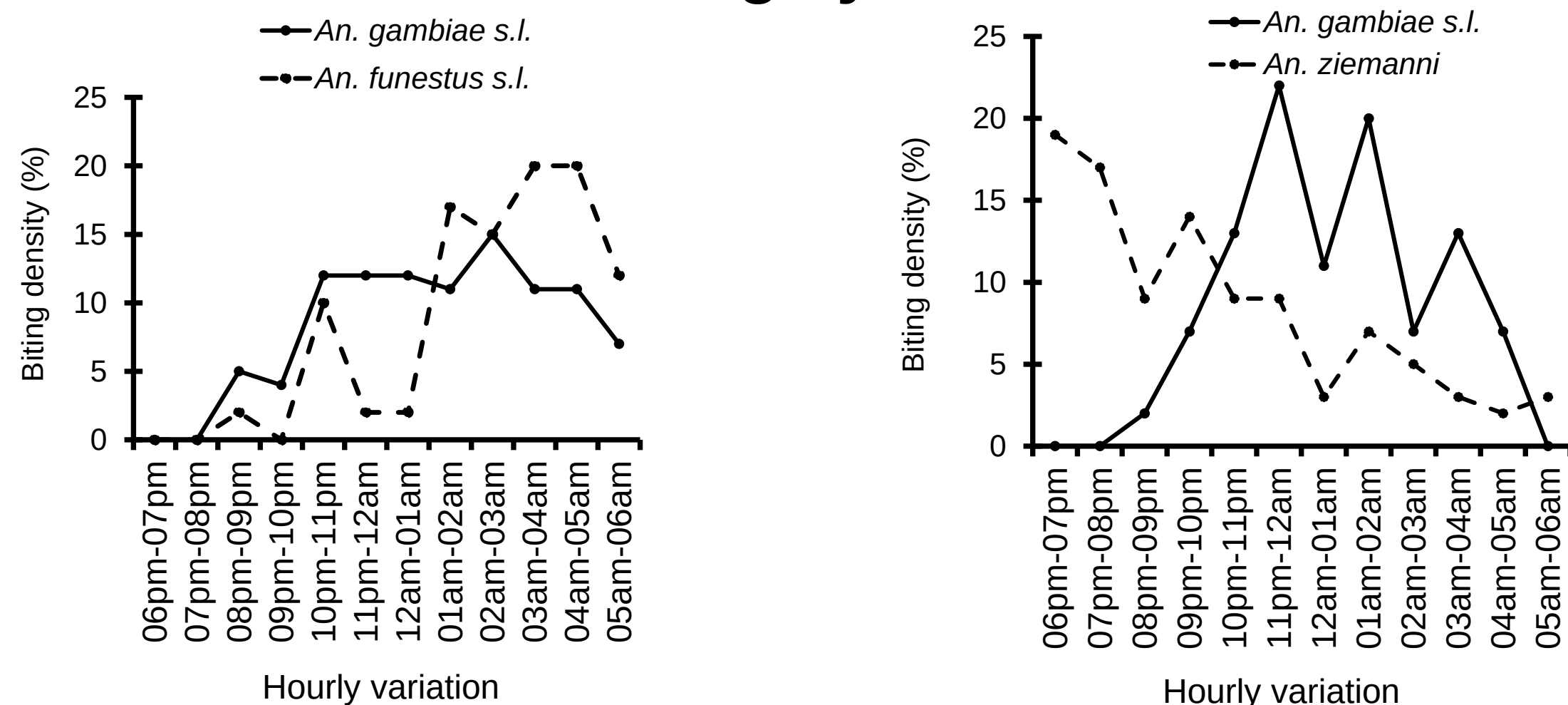
Aim of the study: holistic study in order to characterize *Anopheles* species in relation to human malaria in seven wetlands along the lower section of the volcanic chain of Cameroon.

Major findings

Anopheles species diversity and abundance



Biting cycle



Age grading and life expectancy

Volcanic massifs	Wetlands ^a	Anophelines	Dissected	Parous	PR	P	Longevity (days)
Mount Cameroon	Tiko	<i>An. melas</i>	99	78	0.79	0.92	12.73
		<i>An. coluzzii</i>	337	261	0.77	0.92	11.48
	Meanja	<i>An. funestus</i>	38	21	0.55	0.82	5.02
		<i>An. coluzzii</i>	157	72	0.46	0.77	3.86
Kupe Manengouba	Santchou	<i>An. gambiae</i>	116	80	0.69	0.88	8.08
		<i>An. ziemanni</i>	181	154	0.85	0.92	12.31
Bamboutos	Ndop	<i>An. gambiae</i>	31	28	0.90	0.97	28.47

PR: Parous ratio, P: probability of daily survival.

Entomological indices of transmission

Volcanic massifs	wetlands	Anophelines	Tested	IR (%)	MBR (b/p/mth)	EIR (ib/p/mth)
Mount Cameroon	Tiko	<i>An. coluzzii</i>	469	0.21	328.3	0.7
		<i>An. melas</i>	131	0	91.7	0
		<i>An. funestus</i>	10	0	7.0	0
	Meanja	<i>An. coluzzii</i>	167	0	116.9	0
		<i>An. funestus</i>	41	0	28.7	0
	Kumba	<i>An. coluzzii</i>	26	0	18.2	0
		<i>An. gambiae</i>	357	0	249.9	0
Western highlands	Mamfe	<i>An. coluzzii</i>	23	0	16.1	0
		<i>An. gambiae</i>	260	1.15	121.3	1.4
Kupe Manengouba	Santchou	<i>An. gambiae</i>	116	6.9	32.5	2.24
		<i>An. gambiae</i>	31	3.22	7.2	0.23
Bamboutos	Ndop	<i>An. gambiae</i>	213	1.41	49.7	0.7
		<i>An. ziemanni</i>	20	0	4.7	0
Oku/Ndu	Mbaw	<i>An. arabiensis</i>	20	0	4.7	0
		<i>An. gambiae</i>	345	0	80.5	0

IR: infection rate; Man biting rate (MBR) estimated by number of bites per person per month (b/p/mth); Entomological inoculation rate (EIR) as number of infected bites per person per month (ib/p/mth).



*Correspondence: amvongo,n@gmail.com; samwanji@gmail.com.

Conclusions

The present study represents detailed *Anopheles* vector characterization from an understudied area along the volcanic chain of Cameroon with endemic malaria transmission. The significant differences in bionomics and *Anopheles* species distribution within the studied wetlands, highlights the importance of providing baseline data and an opportunity to assess the outcome of ongoing malaria control interventions in the country.