

Entomological aspects of the 2016 malaria outbreak in Pawa, Haut-Uélé province, Democratic Republic of Congo

P. Mansiangi^{1,2}, E. Metelo^{1,3}, J. Zanga^{1,4}, C. Batubenga², F. Phanzu², E. Kieto², A. Nsiala², A. Kalonji, F², Minuku², L. Kintaudi², S. Irish⁵, J.L. Likwela⁶

¹Laboratoire de Bioécologie et Lutte Antivectorielle du Département de Santé-Environnement de l'Ecole de Santé Publique/Faculté de Médecine, Université de Kinshasa/RDC; ²Santé en milieu Rural (SANRU asbl), ³Faculté de Médecine, Université de Bandundu/RDC, ⁴Département de Médecine Tropicale, Faculté de Médecine, Université de Kinshasa/RDC; ⁵Entomology Branch, Division of Parasitic Diseases and Malaria, Center for Global Health, Centers for Disease Control and Prevention, 1600 Clifton Road NE, Atlanta, GA 30329, USA; ⁶Programme National de Lutte contre le Paludisme de la RDC
Correspondance: Paul Mansiangi Mankadi, pmansiangi@gmail.com

Background

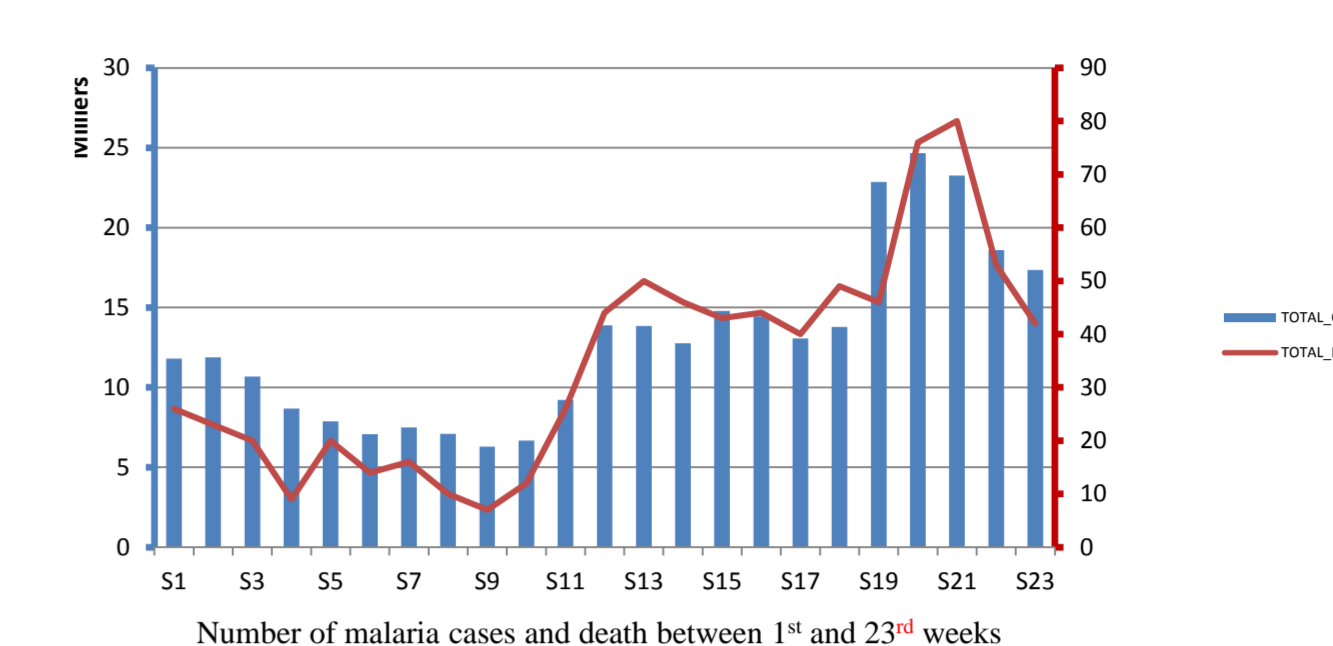
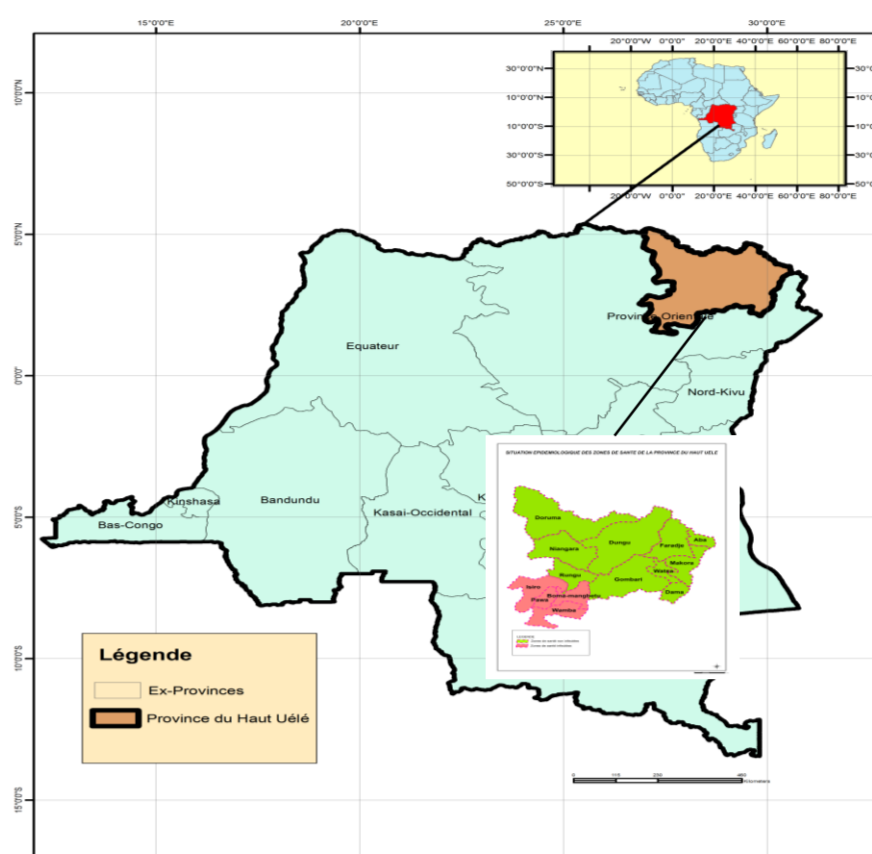
Since 2011, malaria outbreak has been frequent in DRC.

➤ In 2016, the upsurges of malaria cases were recorded in 13 Health zones (HZ)

The Haut-Uélé province is often affected by these upsurges of malaria cases.

➤ Two malaria outbreaks were recorded: in 2012 and 2016 in this province, with Pawa HZ at the upsurge center.

The investigation of the latter allowed the description of important entomological aspects, which might allow prevention and response to future outbreaks.



Methods

The investigation took place in June 2016, following a cross-sectional design.

Pyrethrum spray catches were made in 13 households at the 'Mission neighbourhood' in Pawa HZ.

Morphological and molecular identification techniques were used to identify *Anopheles* mosquitoes collected.

ELISA was used to detect sporozoite infected mosquitoes.

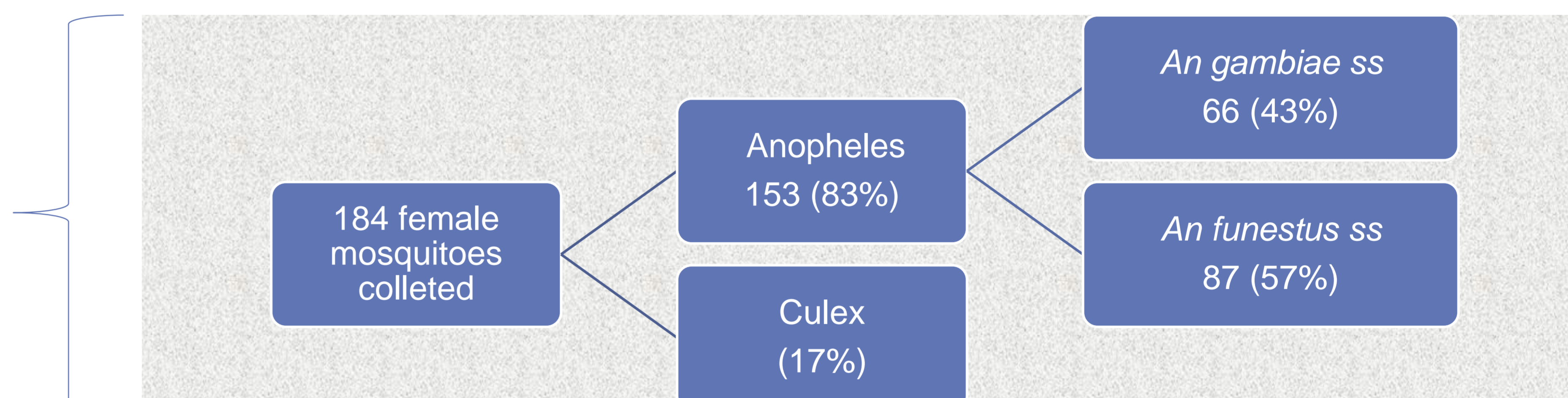
Knock down resistance mutations were detected using PCR.

Some entomological index were calculated (Density of *Anopheles*, Sporozoite index, EIR).



Results

Molecular identification revealed the presence of 2 species of *Anopheles* : *An. funestus* s.s. and *An. gambiae* s.s.



Anopheles species identified ntol	Entomological Indexes			
	Density of An (An/house)	Agressivity (p/h/n)	Sporozoite Index (%)	EIR (Infection bites/person/night)
<i>An. gambiae</i> ss	5,1	0,89	24	0,22
<i>An. funestus</i> ss	6,7	1,07	12	0,13
Total	11,8	1,96	18	0,35

Entomological indexes of plasmodium transmission observed are very high

Both kdr-east and kdr-west were detected in *Anopheles gambiae*, with frequencies of 0.88 and 0.12, respectively.

Espèce	Fréquences alléliques des gènes kdr							
	Fréquence gène Kdr allèle L1014F 'Ouest'				Fréquence gène Kdr allèle L1014S 'Est'			
	RR	Rs	ss	F(kdr)	RR	Rs	ss	F(kdr)
An. Gambiae (n=26)	23	-	-	0,88	3	-	-	0,12

Discussions and Conclusion

The entomological investigation during the 2016 Pawa malaria outbreak showed the presence of two major malaria vectors. Furthermore, the high levels of kdr in *Anopheles gambiae* constitute increased risk for the occurrence of other malaria outbreaks in this area.

The Kdr allele often associated with resistance to pyrethroids and DDT is more and more detected and seems to be very spread in DRC (3).

The MILD treated with pyrethroids scale up use since 2006 can be in the root of this situation (4).

Further entomological surveillance and continued resistance monitoring are necessary in this area and throughout the country.

Mosquito Nets treated with a mixture of insecticides or an insecticide with a synergist (PBO) constitute an important alternative

References

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