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SEASONAL VARIATION IN SPECIES COMPOSITION AND FREQUENCY OF INSECTICIDE RESISTANCE ALLELES (KDR AND ACE-1R) IN THE *ANOPHELES GAMBIAE* COMPLEX FROM AN IRRIGATED RICE FIELDS AREA IN WESTERN BURKINA FASO

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Monitoring of the spread of insecticide resistance in field vector populations is a prerequisite for the implementation of efficient and sustainable vector control strategies based on the use of insecticides. Screening for resistance alleles in *Anopheles gambiae* populations is facilitated by the availability of molecular diagnostics to detect major target-site mutations, such as knock-down resistance (kdr) and insensitive acetylcholinesterase (ace-1R). *Anopheles gambiae* mosquitoes were collected resting indoors in two villages within a rice cultivation area in western Burkina Faso, from January to December 2007. Specimens were identified to species and molecular form and their genotype at the kdr and ace-1 locus was determined using PCR and RFLP protocols. The M form was largely predominant in our samples and was present all year round in both villages. S-form mosquitoes gradually appeared during the rainy season in the village at the margins of the rice fields (VK7) whereas it was very rare in the center of the rice cultivation area (VK5) throughout the survey. The frequency of both kdr and ace-1R mutations was higher in the S than in the M form at any time. In the M form, frequency of the kdr mutation was higher during the rainy season in both villages ($P<0.005$). We report occurrence of the ace-1R mutation in the M form, albeit at a low frequency (<1%). In conclusion, our results highlight the preoccupying status of insecticide resistance in *An. gambiae* populations from Burkina Faso, and suggest that comprehensive monitoring strategies need to consider population dynamics.

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INFLUENCE OF INSECTICIDES RESISTANCE ON THE SALIVARY PROTEINS OF *CULEX PIPIENS QUINQUEFASCIATUS* MOSQUITO

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Culex quinquefasciatus mosquito has developed several resistant mechanisms to the main families of insecticides used in public health. Among these mechanisms, the insensitive acetyl cholinesterase (*Ace.1^R*) confers cross resistance to organophosphorous and carbamates. Fortunately, in an insecticide-free environment, this mutation is associated with a severe genetic cost that affects different biological systems. In insects, the saliva contains bioactive molecules (vasodilatators, anticlotting and anti-hemostatic proteins) which permit a successful blood meal and also facilitate pathogen transmission. In this context, we studied the differential expression of salivary proteins between susceptible and carbamate-resistant (*Ace.1^R*) strains of *Cx. quinquefasciatus* having a same genetic background. 2D-electrophoresis and SameSpots® software were used to determinate the variation of salivary proteins expression. The preliminary results showed that three majority saliva proteins of the D7 family have lower expression in the resistant strain compared to the susceptible strain. Conversely, proteins involved in metabolic reactions, were up regulated in the resistant strain. The results of an analysis including more replicats (n=17) will be presented. This differential expression according to the resistant status of the mosquito may have a repercussion on the biting behaviour and on the transmission of parasites/virus to vertebrate hosts. The next step will consist to study using a video based analysis system the feeding behaviour of susceptible and resistant mosquitoes in flying chambers. These studies will provide new elements to develop alternative insecticide resistance management strategies in *Culex* mosquito.

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VARIABILITY IN MOSQUITO RESPONSE TO COMMERCIAL REPELLENT FORMULATIONS TESTED IN THE FOREST AREA OF CAMEROON

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Application of repellents to the skin is a common personal protection practice for preventing mosquito-borne diseases. Here, we tested the efficacy and persistence of three commercial repellent formulations against the bites of mosquito vector diseases. Four target doses (0.1mg/cm²; 0.3 mg/cm²; 0.6mg/cm² and 0.8mg/cm²) of each repellent ie 30%DEET (Buzz-Off™) and 25%IR3535 (Cinq-sur-Cinq™ and Prébutix™) or 90% ethanol as control were applied on the legs of volunteers who performed human landing catches to determine repellent efficacy. Effective dosages and persistence of each repellent were estimated by fitting a logistic plane model. During 48-days, 7,569 mosquitoes belonging to four genera were collected: *Mansonia spp* (67.3%), *Anopheles spp* (27.4%), *Aedes spp* (3.8%), and *Culex spp* (1.5%). After 8h exposure to mosquito bites, percentages of repellency provided by each of the three formulations were quite variable, ranging from 20 to 80%. Efficacy and persistence parameters were estimated only for *An. moucheti* and *Mansonia* spp. The effective dosages (ED_{50} and ED_{95}) as well as the effective half-lives obtained with the DEET-based repellent were highly variable among replicates in the case of *An. moucheti*. For *Mansonia* spp, the estimated ED_{50} value for the DEET-based repellent was ≈ 0.06 mg/cm². For the two IR3535-based repellents, the ED_{50} values varied from 0.06 to 0.10 mg/cm², and 0.15 to 0.20 mg/cm² for *An. moucheti* and *Mansonia* spp, respectively. Globally, the ED_{95} values of the three repellents were around 1mg/cm² except that of Cinq-sur-Cinq™ which was ≤ 0.3 mg/cm² in the case of *An. moucheti*. The estimated effective half-lifes of the three repellents were approximately between 3 and 5h. Our results highlight the heterogeneity in the response of different mosquito species when exposed to the tested insect repellents, showing the relevance of choosing and evaluating efficacy and persistence profiles of different formulations in specific environmental contexts.

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A NOVEL DISSEMINATION TOOL FOR THE APPLICATION OF MOSQUITO LARVICIDES

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Uncertainty over the relative productivity of specific aquatic habitats, and the subsequent need to seek out, identify and treat all larval development sites makes the implementation of larviciding across large or spatially complex areas very challenging. A new technique that promises effective coverage of the most productive habitats may contribute greatly to the practicality and impact of such campaigns. Recent proof-of-principal studies show that natural behaviours of adult mosquitoes can be exploited for targeting larvicides to aquatic habitats. The treatment of mosquito resting places with pyriproxyfen; a persistent juvenile hormone analogue (JHA), results in the contamination of breeding sites as exposed resting adults subsequently disperse and oviposit. In the field, placement of JHA dissemination stations in 3 to 5% of the available resting area resulted in almost 100% coverage of aquatic habitats with JHA and overall reductions