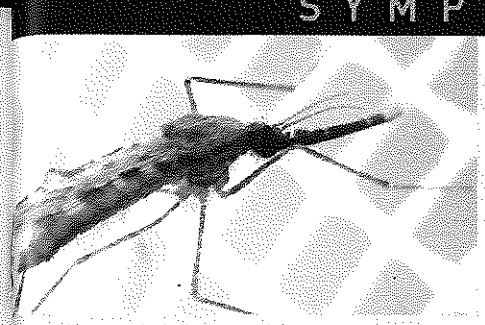
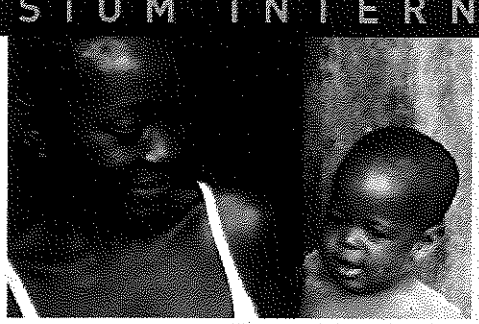
SYMPOSIUM INTERNATIONAL


Paludisme & Trypanosomose Humaine Africaine :
NOUVELLES STRATÉGIES DE PRÉVENTION ET DE CONTRÔLE

ACTES DU SYMPOSIUM
Proceedings

Les 07 et 08 octobre 2010
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Entomologie REFS Paludisme Trypanosomose

C.R.E. COTONOU

TRSP

CIRDES

PNLTHA Guinée

PNLTHA Burkina Faso

medMOE vet

The ABC Network

SUMITOMO CHEMICAL

sanofi aventis

VESTERGAARD FRANDSEN
DISEASE CONTROL TEXTILES

Bayer CropScience

process, washing process, rinsing process and drying process) was not known. This study based on socio-anthropological and entomological approaches analyzed long lasting concept by confronting long lasting insecticide nets with the local washing practices. During 36 months, qualitative and quantitative surveys had been conducted to describe community net washing practices. Bioassays and HPLC were realized to evaluate the efficacy of net after using by community and to measure the quantity of insecticide remaining in the net fibres. The main results of the study show that community soak their net with detergent before washing, used the modern soap, washed with hand, rinsed once, dried under sun and shade, washed on average twice per month. Efficacy of net varied according the washing practices and the formulation of insecticide on the nets. One year after net using the efficacy was stable, 15 months after using the efficacy was reduced following the washing practices being also efficacy until 24 months but after 36 months the efficacy decreased notably.

SIII_P21. The distribution of insensitive acetyl cholinesterase (ace-1R) in *Anopheles gambiae* s.l. populations from Burkina Faso (West Africa).

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Key words: *Anopheles gambiae* s.s; ace.R mutation; organophosphates; carbonates; Burkina Faso
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Carbonates (CX) and organophosphates (OP) are considered as alternative to pyrethroids (PY) since many species of vectors including *Anopheles gambiae* had developed resistance to the latest ones especially for indoor spraying. But it is a prerequisite to test the susceptibility status of main malaria vectors to these insecticides before their use on large scale. This study is designed to evaluate the resistance status of *An. gambiae* s.l. to bendiocarb 0.1% (but also other insecticides including PY and OP) that is selected by the National Malaria Control Programme of Burkina Faso to be used in IRS in the West region of the country as an alternative to pyrethroid resistance reported in *An. gambiae*. We investigated through transversal sampling at 20 localities across the three different agro-climatic zones of Burkina Faso, the distribution of the acetyl cholinesterase insensitive mutation ace-1R, conferring the resistance phenotype to OP and CM in *An. gambiae* s.l. Specimens were identified by PCR assays and characterized for the ace.1R mutation. The overall collection of adults by indoor aerosol spray was a mix of *An. gambiae* s.s. and *An. arabiensis* across the Sudan (98.3% vs. 1.7%), Sudan-sahelian (78.6% vs. 21.4%) and the Sahel (91.5% vs. 8.5%) ecotypes. The S-form predominated in the Sudan sites from the West (69% vs. 31% for the M form) being very rare in the Sahel (100% of M form). The ace.1R mutation was dispersed throughout the Sudan and Sudan-sahelian localities at low frequencies (<50%) and was absent in the Sahel. It was overall most spread in the S form (0.32 vs. 0.036) but the highest frequency value was recorded in the M form (0.66). Few *An. arabiensis* were detected carrying this mutation in Bobo-Dioulasso town. However this mutation occurred in the two major climatic zones, its distribution overlapped mainly the cotton growing areas dispersed throughout the two zones. In conclusion the role of agricultural uses of insecticides facilitating the spread of the ace.1R mutation is discussed. These results are important at epidemiological level as OP and CM had been proposed to be used alone or in combination with pyrethroids as alternative strategy in vector control programs.

SIII_P22. Evidence of metabolic resistance to carbosulfan in addition to kdr-based mechanism resistance to pyrethroids within *Anopheles gambiae* in urban agriculture area in Benin.

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Key words: *Anopheles gambiae*; vector control; metabolic resistance; Benin
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Insecticide resistance of the main malaria vector, *Anopheles gambiae* threatens the efficacy of major insecticidal control tools such as Insecticide-Treated Nets and Indoor Residual Spraying. The objectives of this study were to assess the status of insecticide resistance in field populations of *An. gambiae*; then identified the resistance mechanisms implicated either target modification or metabolic detoxification. Anopheles larvae were sampled in Cotonou urban areas at the end of the dry and the beginning of the rainy season. The insecticide resistance status, the synergists PBO and TCPPE tests, and the selection with carbosulfan were carried out by using the WHO diagnostic bioassays kits. Species and molecular forms of *An. gambiae*, ace-1R and Leu-Phe kdr mutations were determined using PCR. Biochemical assays were conducted to confirm ace-1R mutation in individual mosquitoes and to detect any increase in the activity of enzymes involved in insecticide metabolism. All Anopheles sampled belonged to the M form of *An. gambiae* except one specimen of *An. arabiensis*. A strong resistance to DDT, carbosulfan, permethrin, and at a lower level to deltamethrin was detected in local population of *An. gambiae*. The cross resistance to DDT and pyrethroid was consistent with the high allelic frequency of the kdr mutation (87% in average). A significant increase in the amount of oxidases was diagnosed in local population compared to the susceptible reference strain. The level of resistance to carbamates decreased significantly when adult mosquitoes were preliminary exposed to PBO. The mean quantity of oxidase was significantly higher in the local population selected to carbosulfan. Biochemical tests detected a very low allelic frequency of the ace-1R mutation (6%). The scarcity of the ace-1R mutation was confirmed by the molecular diagnosis. This study underlines the multiple resistances to insecticides in the M form of *An gambiae*. The cross resistance to DDT and pyrethroids is mainly due to the Leu-Phe kdr mutation. The specific resistance to carbosulfan without implication of the ace-1R mutation is linked with overproduction of oxidases. Nevertheless, the detection of multiple resistance mechanisms in *An. gambiae* in Benin may represent a threat for the efficacy of vector control in next future.

SIII_P23. Le Master International d'Entomologie médicale et vétérinaire.

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