



## Agro-allied chemicals, Environmental Xenobiotics and Insecticides Resistance in *Anopheles gambiae* in Nigeria

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### Abstract:

Mosquito breeding sites were grouped into two different study zones (A and B) on the basis of human related activities taking place in and around the breeding sites. *An. gambiae* larvae collected from ecologically contrasting breeding sites were reared to adults in the laboratory. Adults from the F1 progeny were assayed for resistance against 4% DDT, 0.75% permethrin and 0.1% bendiocarb using the WHO adult insecticide susceptibility bioassay protocol. During mosquito sampling a survey was carried out in each site with the aim of documenting the most widely used insecticide. The levels of the physicochemical environmental factors were measured from the anopheline breeding sites. Results shows that pyrethroids (cypermethrin, lambda-cyhalothrin and cyfluthrin) and organophosphates (dichlorvos, dimethoate and chloropyrifos) were most commonly used for crop protection in the agricultural sites, organochlorine (endosulfan and fipronil) and carbamates (carbofuran and carbaryl) were also used to a lesser extent. On the other hand, interview in the residential sites revealed indoor residual sprays (IRS), Piya Piya sprays (Piya Piya sprays are formulations produced locally as insecticides sprays and without government approval) and coils containing pyrethroid insecticides with cypermethrin, lambda-cyhalothrin and cyfluthrin as common active ingredients were mainly used for personal protection. The results of measurement of physicochemical parameters showed little variation in the levels of the physical environmental factors (pH and temperature) across the sampling sites in the two zones studied. However, the levels of nitrates, nitrites, phosphates, sulphates and carbon content were higher in sites located in zone A than those in zone B. Overall, zone A is significantly different from zone B ( $p=0.000$ ). There was evidence of high insecticides resistance among the mosquitoes tested from all the sampling sites. However, mosquitoes from agricultural sites (zone A) recorded higher insecticide resistance when compared to those from residential sites (zone B). These high levels of resistance are probably related to extensive pesticide usage in the zone. This is further supported by higher levels of the environmental chemicals recorded in zone A compared to zone B. These observations could have a significant impact on the environmental management and



insecticide based approach to malaria vector control in Nigeria.

### Biography:

Habibu U Abdu received his BSc and MSc in Medical Microbiology from Bayero University Kano in Nigeria and a PhD in Molecular Entomology from University of Abertay Dundee, Scotland, UK. His major areas of research interest are medical microbiology and biotechnology, molecular entomology (insecticides resistance mechanisms in principal malaria vector in northern Nigeria) and general biology.

### Publication of speakers:

1. **HU Abdu** et al; Effect of water stress on the leaf relative water content and yield of some cowpea (*Vigna unguiculata* (L) Walp.) genotype
2. **HU Abdu** et al; Susceptibility status of *Anopheles gambiae* complex to insecticides commonly used for malaria control in Northern Nigeria
3. **HU Abdu** et al; Malaria vectors resistance to commonly used insecticides in the control of Malaria in Bichi, Northern Nigeria
4. **HU Abdu** et al; A role for glutathione and its biosynthetic genes in *Anopheles gambiae* insecticide resistance
5. **HU Abdu** et al; Differential expression of insecticide resistance genes in *Anopheles gambiae* from Northern Nigeria
6. **HU Abdu** et al; Investigating the role of glutathione and glutathione biosynthetic genes in the adaptation of *Anopheles gambiae* to insecticides

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