Survey of urban mosquitoes species (Diptera: Culicidae) with focus on waste water channels as larval habitats in Nairobi industrial area, Kenya.(2017)

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Summary

Background: A cross sectional study to establish the levels of heavy metals and other potentially harmful elements (PHEs)present in samples obtained from selected open waste water channels in Nairobi industrial area (Kenya) was carried out. The waste water channels selected were those near the factories or those directly discharging from factories. The samples collected included mosquitoes (larvae and adults), waste water, green algae, and soil. Unmaintained open waste water channels are among the man-made features that enhance the breeding of urban mosquitoes because they tend to have overgrown vegetation and trapped solid wastes which slow or inhibit the waste water flow. Different mosquito species have previously transmitted arboviruses including those responsible for dangerous fevers such as West Nile, Rift Valley, Zika, Dengue, Yellow, and Chikungunya among others in different parts of the world. The study area (Nairobi industrial area) neighbors several densely populated informal human settlements. This paper specifically reports on composition and distribution of mosquito species obtained from the study area.

Methods: The fourth instars mosquito larvae were collected from waste water channels using the standard dipping method. Adult mosquitoes were trapped using the center for disease control and prevention (CDC) light traps. Purposive random sampling for mosquito adults and larvae was carried out in industrial premises and waste water channels respectively at seven locations. This involved selecting sampling sites from which mosquito samples were likely to be obtained. The mosquitoes were then microscopically identified using taxonomic keys for the Ethiopian and East African region.

Results: Out of 2,926 adult mosquitoes trapped, 12 species were identified including Cx. pipiens (95%); Cx. Vansomereni (2.6%); Cx. zombaensis (1.4%); Cx. univittatus (0.34%); Cx. theileri (0.21%); Ae. aegpti (0.14%); An. maculipalpis (0.03%); An. squamosus (0.03%) and other culicid species (0.20%). Of these adult mosquitoes, 94% (2753/2926) were females and 6% (173/2926) were males giving a male: female ratio of 1: 16 when using CDC traps. Of the 4,679 mosquito larvae scooped from the waste water channels, 4 species were identified including Cx. pipiens (99.34%); Cx. vansomereni (0.51%); Toxorhynchites brevipalpis (0.13%) and Aedes mosquito (0.02%).

Conclusion: The majority of mosquito species obtained were culicid, Culex pipiens for both adults and larvae. A few Anopheles and Aedes populations were obtained. Unmaintained open waste water channels seen\med to enhance the breeding of urban mosquitoes in the study area. The ecology of these mosquitoes should be studied further to enhance surveillance and control in order to minimize the risk of mosquito borne viral infections or any other re-emerging mosquito-borne infections to the residents of Nairobi, in particular those living in the informal settlements near Nairobi industrial area, Kenya.