ESTIMATION OF PRODUCTIVITY OF LARVAL HABITATS OF *Aedes Aegypti* IN MSAMBWENI, KWALE COUNTY, KENYA

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DECLARATION

This thesis is my original work and has not been presented for a degree award in any other University.

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DEDICATION

This work is dedicated to my wife, children and parents whom without their support, this thesis would not have materialized.

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ABBREVIATIONS

CDC	Centre of Disease Control
DHF	Dengue hemorrhagic fever
USA	United States of America
DENV	Dengue Virus
SPSS	Statistic package for the social sciences
ANOVA	Analysis of variance
VBDCU	Vector borne disease control unit

ABSTRACT

Accurate identification of epidemiologically important types of larval habitats is considered an essential step in the targeted control of *Aedes aegypti*; an important vector for several arboviruses, including dengue and chikungunya viruses. This study determined larval habitats-specific *Ae. aegypti* productivity in selected habitats in Msambweni, Kwale County, Kenya. The number of *Ae. aegypti* immatures in 83 representative larval habitats were counted daily for 30 days during the wet and dry seasons. All pupae were removed and allowed to emerge in the laboratory. A total of 664 potential larval habitats were identified and classified based on their use and material into seven habitat types, including: buckets, drums, jerrycans, pots, small domestic containers (SDC), tires and others during the habitat census survey. Of 664 larval habitats examined, 144 larval habitats (21.7%) were infested with *Aedes aegypti* larvae. 71% of the pupae were collected from tires and pots, both of which representing 17% of the habitats. On the other hand, buckets and SDC represented 55% of the total habitats with an infestation rate of 11.8%, yet only 13.5% of the pupae were found in them. Multivariate analysis showed that only habitat type and ability of the habitat to be moved were associated with pupal abundance. During the 30-day daily pupal production studies, only a few habitats were persistently found harboring pupae. In the wet season, pupae were collected from 28% (23/83) of the larval habitats. In the dry season, only 12% (10/83) of the habitats were ever found with pupae during the 30-day sampling period, with three habitats accounting for 80% of all the pupae collected. Three drums with 35% (127/365), 33% (121/365) and 12% (45/365) pupae respectively. The results of the multivariate models for the risk factors of pupal productivity showed that habitat type, placing of larval habitats in the backyard (IRR = 0.55; 0.35, 0.86), larval habitats with without purpose (IRR = 2.62; 2.18, 3.14) and rainwater (IRR = 2.33; 1.69, 3.23) were the important predictors of larval habitat productivity during the wet season. Although the multivariate model for habitat type did converge, habitat type and large-size larval habitats (IRR=0.05 0.005, 0.56) were the only important predictors during the dry season. In conclusion, drums, pots and tires covered more than 85% of *Ae. aegypti* pupae; reinforcing the 'key containers concept.' Larval habitat characteristics and human behavior can be used to predict entomological risk. Targeting these three types of habitats makes epidemiological sense, especially during the dry season in the study area.