



Semi-Field Systems for Mosquito Research at ITOC-Mbita

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INTRODUCTION

Evaluation of new vector control tools requires not only laboratory discoveries and testing, but also the conduct of in-depth ecological experiments in semi-field environments under ambient natural conditions. Research that has been conducted in semi-field enclosures at the *icipe*-Thomas Odhiambo Campus includes the discovery of mosquito oviposition cues, novel plant-based attractants, differential attractiveness of mosquitoes to humans, new odour blends for trapping mosquitoes, and new larvicides, adulticides and repellents for control of malaria vectors.



Fig. 1. A mud-hut inside a screen house used for testing the eave-tube technology, for exposing mosquitoes to insecticides



Fig. 2. Semi-field enclosures that are used for testing of novel technologies, for mosquito control



Fig. 3. MalariaSphere enclosing a rural hut, and typical vegetation, for providing natural rural malaria transmission.



a



b

Fig. 4a and b. The Kenya National Biosafety Authority will commission the newly built Arthropod Containment Level-2 Facility (equivalent to BSL-2 lab) as a mosquito containment insectary in early 2016. Some containment features include a restricted access pad on the front door (4b) that opens to an ante-room fitted with an interlocking door system. The front concrete section features an office space on the left and a microscopy/molecular biology lab space on the right. The rear portion of the concrete block houses two independent insectaries with larval and adult rearing rooms, which allow for rearing of multiple mosquito strains without risk of contamination. All windows in the lab and insectary are sealed, screened, and fitted with burglar alarms. The screen house (4a) is attached to the concrete block, is double-screened, and fitted with specialised polycarbonate roof that allows free airflow (to attain ambient temperature and humidity). A concrete moat surrounds the entire facility to ensure no crawling insects get into the building. The facility is designed for conventional malaria mosquito research, as well as for novel genetic approaches involving transgenic mosquitoes, or other transmission-blocking technologies that require mosquito containment.



Fig. 5. Semi-field enclosures, for conducting research on the oviposition behaviour of malaria mosquitoes.



Fig. 6. A larval insectary showing mosquito larvae cultured in plastic trays under natural conditions

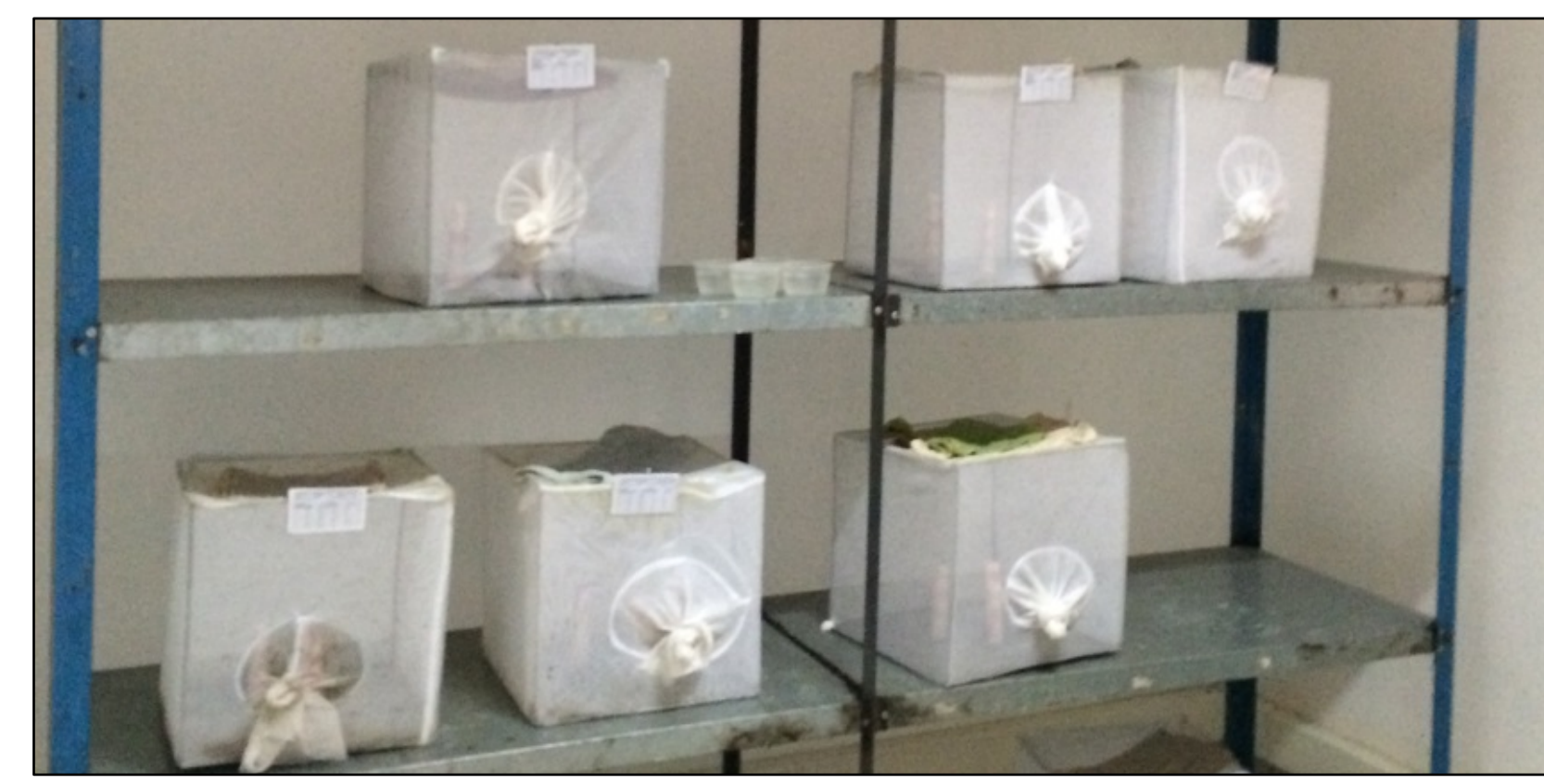


Fig. 7. Insectary cages of an adult colony of *Anopheles gambiae*

There are 15 screen houses, 4 semi-field enclosures, and a medical clinic at *icipe*-TRO campus, Mbita, to augment the laboratory discovery work, and link the research activities to field evaluations and subsequent application.