A NEW METHOD FOR MONITORING MOSQUITO OVIPOSITION IN ARTIFICIAL AND NATURAL CONTAINERS

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ABSTRACT. A new method is described for the direct measurement of *Aedes albopictus*, *Ae. atropalpus*, *Ae. triseriatus* and *Orthopodomyia signifera* oviposition in artificial and natural containers. Seed germination papers were mounted on the insides of can-traps, tree holes and discarded tires to obtain a direct measure of mosquito oviposition. This durable paper substrate was removed weekly while minimizing the disruption of the oviposition habitat. After the germination papers were dried, the aforementioned mosquito eggs were hatched successfully and reared in the laboratory through the adult stage.

During the last 2 decades, several investigations have used oviposition traps to measure the distribution and abundance of *Aedes triseriatus* (Say) in urban and sylvan ecosystems (Loor and DeFoliart 1969, Leiser 1981, Hanson et al. 1988, Kitron et al. 1989, Beehler and DeFoliart 1990). Weekly can-trap records have provided an indirect measure of *Ae. triseriatus* oviposition, but these egg densities have not been directly correlated with larval and adult population frequencies in either artificial or natural containers. Heretofore, no technique has been developed to directly measure oviposition of *Ae. triseriatus*, *Ae. albopictus* (Skuse) and other container breeding mosquitoes within discarded tires, containers or tree holes. Mosquito eggs deposited on tree hole walls or the interior sides of artificial containers are difficult to locate and remove without destroying and/or seriously altering the oviposition habitat. Sampling difficulties and the destruction of oviposition habitat have made continuous and regular quantitative collections of mosquito eggs from tree holes, discarded tires and other types of artificial containers unfeasible.

This paper describes a new technique for sampling eggs of *Aedes albopictus*, *Ae. atropalpus* (Coq.), *Ae. triseriatus* and *Orthopodomyia signifera* (Coq.) while minimizing the disruption of natural and artificial container oviposition habitats.

Black can-traps (Novak and Peloquin 1981), discarded tires and natural tree holes near Urbana, IL, were lined with strips of seed germination paper (76#, Anchor Paper, St. Paul, MN). Seed germination papers were cut into standard 45.5 × 15.5 cm pieces, marked with an identification code on the back side, and mounted with push-pins or thumbtacks to the sides of tree holes and tires. In large tree holes, overlapping papers were mounted to cover the entire oviposition surface. Single and double standard lengths of paper covered the interior side(s) of selected discarded tires that were shaded and exposed to direct sunlight. These tires contained variable quantities of organic debris and water. Shorter can-trap papers (11 × 22 cm) were held in place with small (#BC-02, Charles Leonard, Inc.) binder clips. Approximately, 35–40 mm of the paper was exposed above the infusion surface in can-traps. In tree holes and discarded tires, germination papers were mounted to expose 70–80 mm of the paper above the water's surface.

Papers were removed weekly, placed in clear plastic bags and brought to the laboratory. Before the front and reverse sides were examined for eggs, oviposition papers were air-dried for 24 h and conditioned for a minimum of 48 h (14:10, L:D cycle). After tabulation, egg samples were hatched and reared to the adult stage using standard techniques. Anomalous egg, larval and adult development of *Ae. albopictus*, *Ae. atropalpus*, *Ae. triseriatus* and *Or. signifera* was not observed. During conditioning and long-term storage, oviposition papers were stored in clear plastic bags with moist tissue paper to maintain humidity.

Germination (=oviposition) papers mounted in containers provided regular and direct monitoring of mosquito oviposition frequencies in natural and artificial container habitats that heretofore have been difficult or impossible to sample. Tabulation of *Ae. triseriatus* and *Ae. albopictus* eggs was easy because the light brown color of the seed germination paper contrasted with the dark color of the eggs. In the field, the physical integrity of seed germination paper was not reduced by bacterial or fungal growth. Wet germination papers were resistant to tearing and conformed to the uneven surface features that are commonly found in tree holes and artificial containers. Additionally, collecting and mounting oviposition papers can be accomplished expeditiously with minimal disruption of the ovi-

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position habitat in tree holes, artificial containers and discarded tires.

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