Insecticide Resistance in *Culex tarsalis*

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INTRODUCTION

Insecticide resistance in mosquitoes is a public health threat that limits the products that can be used to kill virus infected mosquitoes. *Culex tarsalis* transmits several arboviruses, including West Nile virus, and can breed intensively in natural habitats with pooled rainwater, such as marshes. Large anthropogenic containers such as fouled ornamental ponds can support *Cx. tarsalis* breeding in urban landscapes. Although *Cx. tarsalis* may prefer birds when taking a blood meal, they are not fastidious in the preference, and bite humans as well. When arbovirus-infected mosquitoes are discovered where humans cohabitate, insecticides may be used by vector control workers to reduce mosquito abundance and the risk of arbovirus transmission. Knowledge of insecticide resistance would inform vector control workers of which products should be used to protect public health from arbovirus transmission. Insecticide resistance can be detected by increased activity of enzymes that quickly metabolize the insecticide to reduce its effect on the mosquito. Insecticide resistance also can be tested using a CDC Bottle Assay, which is used to calculate percent mortality at different concentrations of insecticide, over time.

METHODS

The CDC Bottle Assay was performed using permethrin and mosquitoes collected from a coastal regional park (RP) and from a nearby coastal national wildlife refuge (NWR).

RESULTS

Of the mosquitoes collected at the RP, 74 % were *Cx. tarsalis*. This mosquito population had an LD_{50} of 9.17 mg/bottle after 90 minutes and an LD_{50} of 1.78 mg/bottle after 24 hours. Mosquitoes collected from NWR were 97 % *Cx. tarsalis*. This mosquito population had an LD_{50} of 53.4 mg/bottle after 90 minutes and an LD_{50} of 1.69 mg/bottle after 24 hours. The RP is located approximately 1.8 miles from the NWR. Evidently, mosquito populations in close proximity to one another can differ significantly in their susceptibility to permethrin. Such data may be useful for tailoring appropriate insecticide concentrations to discrete regions for controlling mosquitoes.