

# Area-wide Management of the Asian Tiger Mosquito Truck-mounted Larviciding Standard Operating Procedure<sup>1</sup>



## Methoprene (Insect Growth Regulator)

### Introduction:

The goal of this work was to develop and document a successful method for applying the insect growth regulator methoprene (Altosid SR-5, SR-20) on an area-wide basis to manage larval populations (and ultimately impact adult populations) of *Aedes albopictus* in urban/suburban residential neighborhoods. In our experience this technique provides greater efficacy and longer residual control than the traditional door-to-door interventions employed for *Ae. albopictus*. Door-to-door larval control strategies are hampered by a need for unrealistic manpower resources, limited access to private property, and the inspector's ability to find cryptic or inaccessible (dangerous) larval habitat.

Altosid<sup>®</sup> Liquid Larvicide (ALL) (Central Life Sciences, Schaumburg, IL) is dispensed using traditional (adulticide) ultra low-volume (ULV) sprayers, such as the Clarke Cougar<sup>®</sup> (Clarke Mosquito Control, Roselle, IL). This allows any mosquito control district in the USA to implement a truck-mounted larval control strategy, based on existing equipment that they currently possess in inventory.

NOTE: Operational trials were conducted as part of the control strategy of the USDA Area-wide ATM project. During the operational trials we performed bioassays to assess both the spray penetration and treatment efficacy by deploying open cups with water and 20 ATM larvae in three locations (front, center, and back) of 10 parcels within the treated site and 3 parcels within the untreated site. After the application was completed the cups were closed and taken to the laboratory where larval emergence was quantified. We will provide detailed protocols for the bioassays upon request.

Bioassays showed corrected emergence inhibition of 81%. Bioassay cups placed at locations of 300 ft from the spray line did not show significantly different emergence inhibition than those

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<sup>1</sup> Mention of trade names or commercial products in this publication is solely for the purpose of providing specific information and does not imply recommendation or endorsement by the USDA or other involved parties.

adjacent to or 150 ft from the spray line (road). Altosid Liquid Larvicide (ALL) (SR-5) was used neat at 4 fl oz per acre for two trials but efficacy in the bioassays was significantly reduced, so all subsequent applications were done with the SR-20 as outlined below.

→As of 2012 the Altosid<sup>®</sup> Liquid Larvicide label specifically allows for application using ULV equipment.

## **Personnel, Equipment, & Materials**

### **Personnel**

1. Use two people (driver and navigator) per vehicle. This increases safety during the early morning applications.

### **ULV Sprayer**

1. Clarke Cougar<sup>®</sup> (Clarke Mosquito Control, Roselle, IL) cold aerosol ULV generator (or similar machine capable of delivering ULV droplets and rates).
  - a. Fitted with a SmartFlow system (Clarke Mosquito Control, Roselle, IL) and GPS to accurately control the flow of larvicide based on varying truck speeds.
  - b. DataMaster<sup>™</sup> real-time tracking to record location, miles driven/sprayed, amount of larvicide used, acres sprayed, and average speed of vehicle.
  - c. Mount the sprayer in the back of a pickup truck at a height of 0.79 to 0.89 m bringing the spray nozzle to a height of 1.76 to 1.86 m, and angle the spray head up at 45° and pointing directly towards the back of the truck. Reduce nozzle air pressure as low as possible (3 psi – Clarke Cougar<sup>®</sup>) to increase the droplet size. The slightly larger droplets allow for wind-based movement of the drops to achieve the 300 ft (91 m) swath width and deposition of the product into the larval mosquito habitats.

Note: We do not have an actual measurement of the final droplet size but are working on ways to obtain those measurements. The strategy described produced excellent penetration of product based on multiple bioassays.

- d. Use a 15-gallon (57 liter) formulation tank to mix and dispense the larvicide.

### **Vehicle**

1. Use a pickup truck for the sprayer during applications.
  - a. The truck bed must accommodate an ULV sprayer with average dimensions of 42”L x 38”W x 43”H (107cm x 97cm x 109cm).
  - b. Drive vehicle at an average speed of 10 mph (16.1 km h<sup>-1</sup>).
  - c. Use small pickup truck (Ford Ranger 4x4) for increased maneuverability (cars parked on both sides of the roads during the early morning create a very narrow street and dead-end streets require the spray truck to turn around at the end of the street).

## **Larvicide**

1. Altosid<sup>®</sup> Liquid Larvicide (ALL) Concentrate (SR-20)
  - a. Active ingredient (S)-methoprene 20% formulation contains 1.72 lb/gal (205.2 g/l) active ingredient
  - b. Apply at maximum label rate of 1 fl oz of ALL per acre.
  - c. Dilute ALL 1:1 with water and apply at 2 fl oz per acre. This increases the number of droplets but still allows for flow rates typical of ULV adulticide machines
  - d. Dilute and mix ALL directly in the 15 gallon spray tank provided with the ULV sprayer.
  - e. Agitate ALL prior to dilution while it is still in its original container because it will separate on standing.
  - f. Fill tank first with water then add ALL and mix. Once mixed ALL must be used within 48 hours.

## **Procedure**

### **Application Time**

1. Conduct truck-mounted larvicide applications in the early morning hours between 1:00 and 5:00 a.m., when human activity and vehicle traffic is at a minimum.
2. An application within a suburban 400 acre site will take approximately 3 to 3.5 hours for a single truck to complete.

### **Swath & Area**

1. Set insecticide flow rates to accommodate a 300 ft (91 m) swath width in suburban treatment areas.
2. In highly urbanized residential areas with dense housing, such as duplexes or row homes, conduct applications from both streets and alleys located within the site. In this case base insecticide flow rates on a swath width of 150 ft (46 m).

### **Environmental Conditions**

1. Perform larvicide applications when convection currents are minimal, ground wind speed is above 1mph and rain is negligible. An application may be performed during light fog or light rain (drizzle) as long as wind speed is above 1mph.