

Mass Aerosol Drift Component Sampling Device for Evaluating Mosquito Adulticide Applications

By

Jonathan Hornby

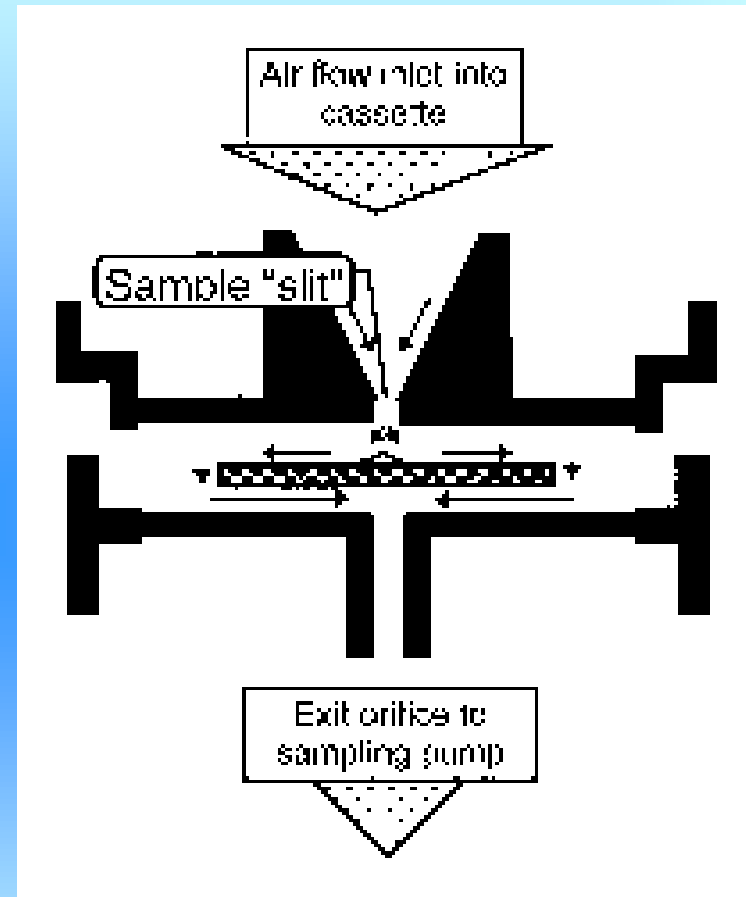
Milton Sterling, Wayne Gale

Lee County Mosquito Control District, Ft. Myers FL

Mass Aerosol Drift Component

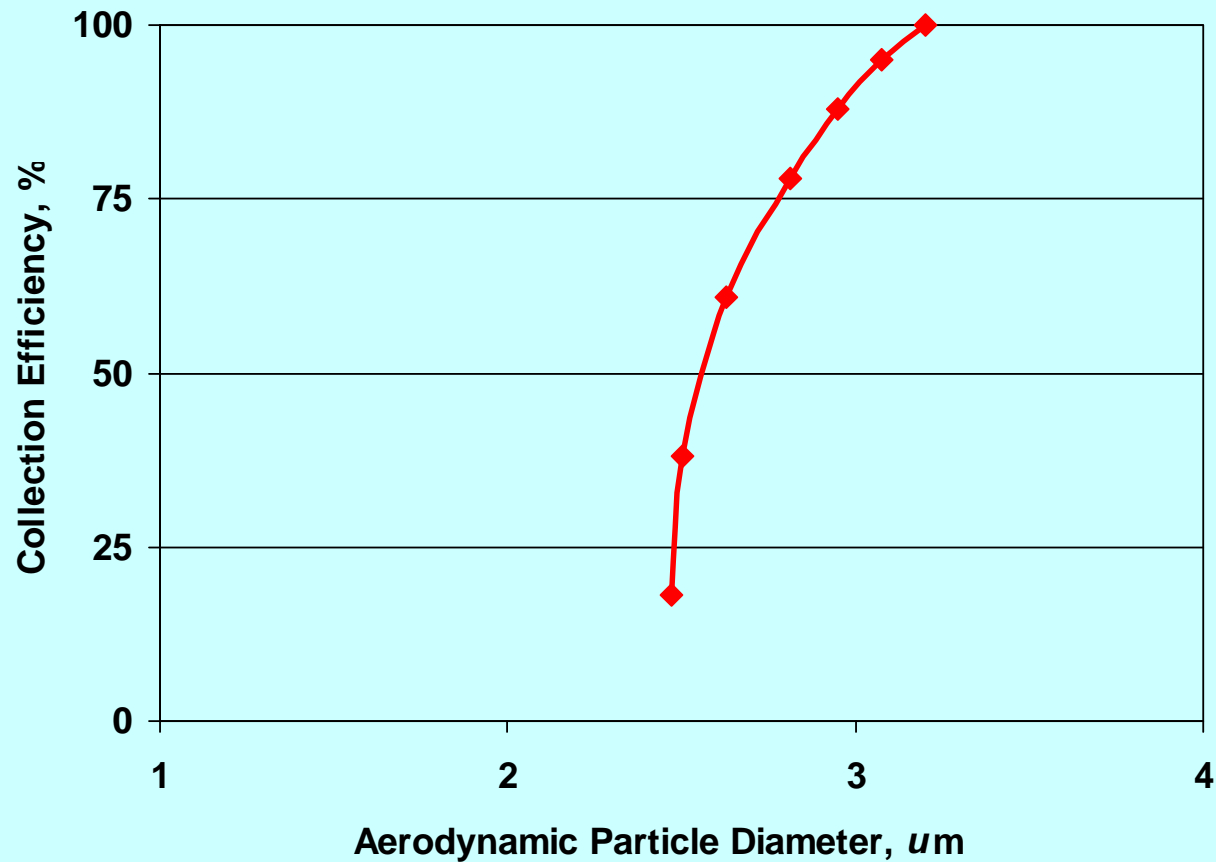
- **The mass (weight) of aerosol passing a particular point.**
- **Amount of aerosol available for adult control.**
- **Drop density when combined with aerosol spectra sampling.**
- **Part of the predictive equation for adult control.**
- **Related to the amount of aerosol available for inhalation.**

Air Sampling Cassette



The *Air-O-Cell*® operates upon the principle of inertial impaction. Particulate laden air is accelerated as it is drawn through the cassettes tapered inlet slit and directed towards a small slide containing the collection media, where the particles become impacted, and the air flow continues out the exit orifice.

**Collection Efficiency of the Zefon
Air-O-Cell for Liquid Particles
15 Lpm**



Willeke, K. 1998. *Final Report, Cut-Size Evaluation of Air-O-Cell Sampler*. Zefon International-Analytical Accessories, St. Petersburg, FL.

Sample Collection Slide



Sampler Features

- **Samples Drops $> 3 \mu\text{m}$.**
- **Wind Direction Neutral.**
- **Droplet Spectra Collection is Wind Speed Independent.**

Mass Aerosol Sampling Station



Evaluation Protocol

- The aerosol cloud was generated by a truck mounted Leco ULV unit.
- Inert oil Orchex 796 with 0.25% Uvitex OB fluorescent dye was used as the aerosol.
- The air flow for sampling was set to 15 Lpm.
- Quantification of aerosol collection was by fluorometry.
- Aerosol collections were made 50, 100, 200, 300 feet from spray line.
- Six spray passes were made for each collection.
- Air-O-Cell cassettes were placed in a closed box following sampling.
- Spray tank samples were taken at spray time for baseline oil fluorescence analysis.
- Blank samples were taken by sampling for 5 minutes without spray.
- Drop spectra was measured with rotary impinger (600 rpm).

Fluorescence Analysis

- 0.3 ml of tank sample was diluted in 30 ml hexane. Further dilution was as 0.03 ml placed in 10 ml hexane.
- Target slides from Air-O-Cell were place in 3 ml hexane.
- All materials used were tested previously for leaching of fluorescent dyes.
- Fluorescence was measured by a Turner Designs TD700 Fluorometer with appropriate filters for Uvitex OB dye.
- Eluted Samples were kept refrigerated prior to analysis

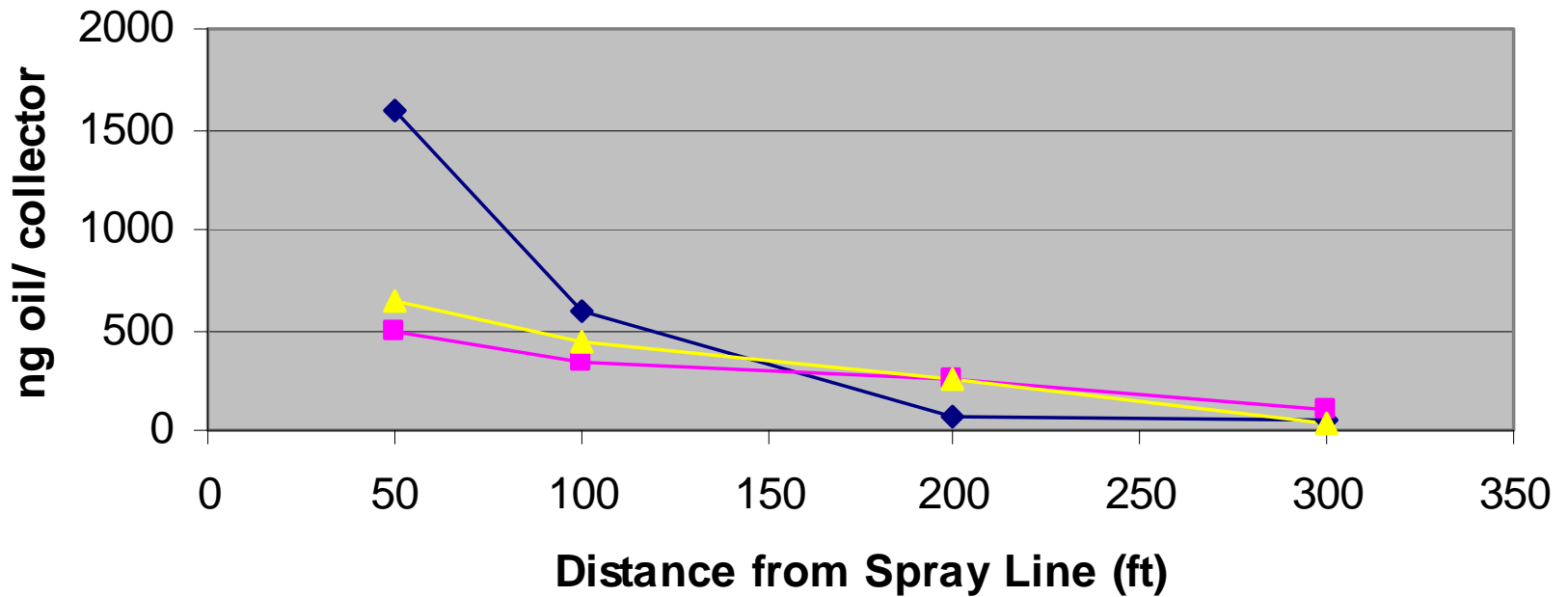
Oil/Fluorescence Recovery Efficiency

- 5 μ l of fluorescent tank sample was placed on a virgin target slide removed an Air-O-Cell cassette.
- The sample was deposited on the adhesive material in the center of the slide.
- The sample was kept in the dark and room temperature for 3 hours before placed in 3 ml of hexane.
- The sample was further diluted 5 μ l in 200 μ l hexane at the time of measurement.
- Procedure was performed in triplicate.
- Recovery from target slide was compared to direct dilution of tank sample.

Oil/Fluorescence Recovery Efficiency

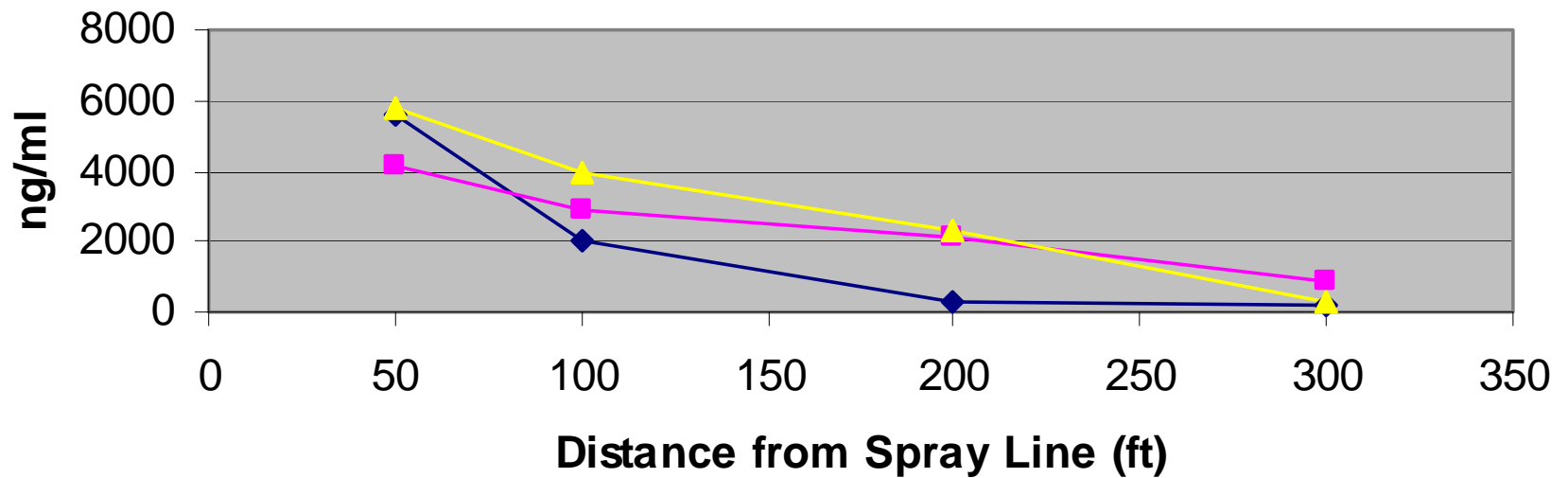
Tank Sample	0.00202 gm Uvitex OB/ml
Air-O-Cell target slide recovery	0.00193 gm Uvitex OB/ml
Recovery	95.5 %

Mass Aerosol Drift Component for ULV Truck Application



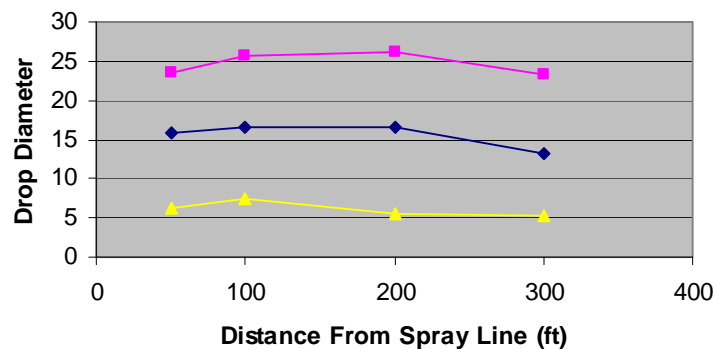
—◆— 2-5 mph Wind —■— 7-10 mph Wind —▲— 9 mph Wind

Mass Aerosol Drift Component Standardized on Wind Speed

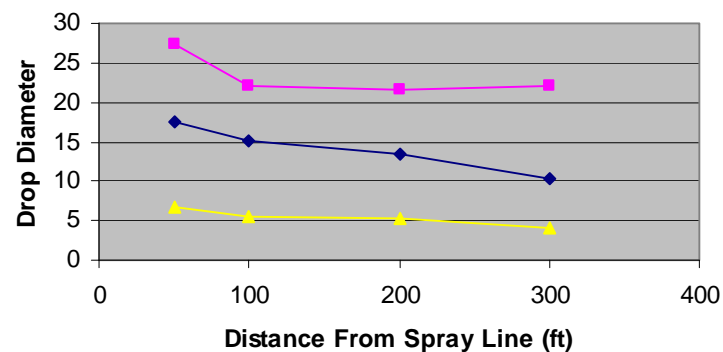


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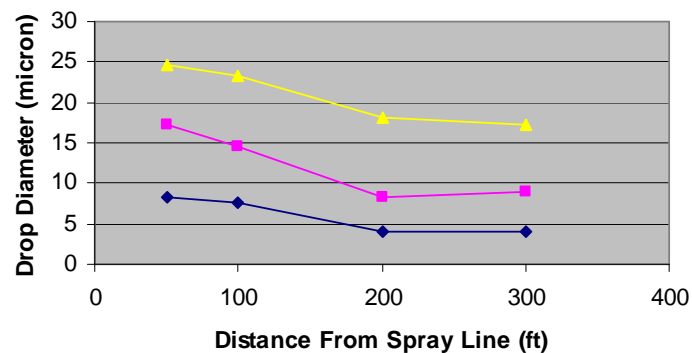
**ULV Truck Drift Component Spectra
7-10 mph Wind**



**ULV Truck Drift Component Spectra
9 mph Wind**



**Ulv Truck Drift Component Spectra
2-5 mph Wind**



Summary

- **The Air-O-Cell air sampler was successful in collecting aerosols generated by mosquito adulticide ULV equipment.**
- **A measure of the maximum amount of aerosol passing a particular point in the treated zone was obtained.**

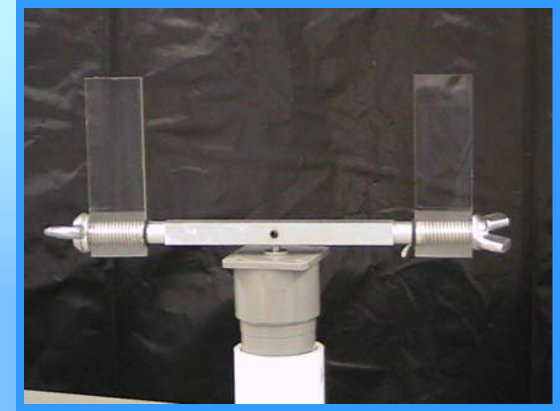
The Whole Enchilada



Adult Mortality



Quantification of pesticide



Droplet Spectra



Meteorology