

## GROUND APPLICATION OF INSECTICIDES FOR CONTROL OF ADULT MOSQUITOES

C. B. RATHBURN, JR.

Florida Department of Health and Rehabilitative Services  
West Florida Arthropod Research Laboratory  
Panama City, Florida 32401

The following tables were presented as part of a panel discussion entitled "Current Status of Public Health Pesticides" at the New Orleans meeting of the AMCA and LMCA, March, 1977. They are believed to be self-explanatory.

Table 1. Label recommendations of insecticides for use as ultra low volume (ULV) non-thermal aerosols in ground applications for adult mostquito control.

Insecticide	Trade name	Concentrate		Formulation	Application		
		lb/gal	%	% solution v/v in oil	discharge fl. oz/min	speed mph	swath ft.
chlorpyrifos	Dursban <sup>b</sup>	6.00	61.5	None	0.67- 1.33	10	300
fenthion <sup>a</sup>	Baytex LC	9.67	93.0	None	0.3 - 0.5 0.6 - 1.0 0.9 - 1.5 1.2 - 2.0	5 10 15 20	300 300 300 300
malathion	Cythion <sup>c</sup>	9.74	95.0	None	1.0 - 2.1 2.0 - 4.3	5 10	300 300
naled (tech.)	Dibrom 14 Conc.	14.00	85.0	10 <sup>e</sup>	3.0 - 6.0 6.0 - 12.0 9.0 - 18.0	5 10 15	300 300 300
pyrethrins and pip. butoxide	Pyrocyde <sup>d</sup>	....	12 & 60	5 & 25 <sup>f</sup>	2.0 - 2.25 <sup>g</sup>	5	300
resmethrin	SBP-1382 40 MF	3.34	40.0	10 <sup>h</sup>	9.1 <sup>h</sup>	5	300

<sup>a</sup> Registered for use in 8 southern states only.

<sup>b</sup> Dow Mosquito Fogging Concentrate.

<sup>c</sup> Or Malathion ULV Concentrate.

<sup>d</sup> Pyrocyde Mosquito Adulticiding Concentrate.

<sup>e</sup> Dilute in soybean oil or HAN.

<sup>f</sup> Label states dilute 1 part concentrate to 1.4 parts (by wt.) of light mineral oil. Consult label for oil specifications.

<sup>g</sup> Up to 8 fl. oz./min may be used to control certain mosquito species.

<sup>h</sup> Label states mix 12½ fl. oz of concentrate per gal. of light mineral oil (54 sec. viscosity) and apply at 3 fl. oz per acre at indicated speed and swath.

Table 2. Label requirements for droplet size of ultra low volume (ULV) non-thermal aerosols.

Insecticide	Trade name	VMD-MMD $\mu\text{m}$	Size range $\mu\text{m}$	Largest size $\mu\text{m}$	Smallest size $\mu\text{m}$
chlorpyrifos	Dursban <sup>b</sup>	10-15	5-30	..	..
fenthion <sup>a</sup>	Baytex LC	15 or <	5-20	44	5
malathion	Cythion <sup>c</sup>	17 or <	6-32 <sup>e</sup>	48	..
naled (tech.)	Dibrom 14 Conc.	15	11-20	..	..
pyrethrins	Pyroicide <sup>d</sup>	..	5-50	..	..
resmethrin	SBP-1382-40 MF	12	.... <sup>f</sup>	..	..

<sup>a, b, c, d</sup> Same as for Table 1.

<sup>e</sup> Label states more than  $\frac{1}{2}$  total spray mass in droplets 6-18  $\mu\text{m}$ , minimum of  $\frac{2}{3}$  preferably  $\frac{4}{5}$  of total spray mass in droplets not exceeding 24  $\mu\text{m}$  in range, and a maximum of 3% by number of spray droplets can exceed 32  $\mu\text{m}$ .

<sup>f</sup> Label states definitely within aerosol size range.

Table 3. Label recommendations of insecticides for use as thermal aerosols in ground applications for adult mosquito control.

Insecticide	Trade name	Concentrate		Formulation	Application		
		lb/gal.	%	gals. conc. per 100 gals. oil <sup>a</sup>	dischg. gph	speed mph	swath ft.
chlorpyrifos	Dursban <sup>b</sup>	6.00	61.5	2.0	40	5	300
fenthion	Baytex LC	9.67	93.0	0.4-0.8	40	5	350
	Baytex 4	4.00	45.0	1.0-2.0	40	5	350
malathion	Cythion <sup>c</sup>	9.74	95.0	2.6-3.9	40	5	...
naled (tech.)	Dibrom 14 Conc.	14.00	85.0	0.775	40 <sup>d</sup>	5	350

<sup>a</sup> No. 2 diesel oil, No. 2 fuel oil or kerosene may be used. Addition of  $\frac{1}{2}$  to 4 qts. of additive may be required as a sludge inhibitor or to prevent formation of precipitates. Consult manufacturers recommendations as to type, amount and mixing instructions.

<sup>b</sup> Dow Mosquito Fogging Concentrate.

<sup>c</sup> Or malathion ULV concentrate.

<sup>d</sup> Label also states use at 80 gph at 10 mph and 120 gph at 15 mph.

Table 4. Label recommendations of insecticides for use as mist in ground applications for adult mosquito control.

Insecticide	Trade name	Concentrate		Formulation	Application		
		lb/gal.	%	gals. conc. per 100 gals. water	dischg. gph	speed mph	swath ft.
chlorpyrifos	Dursban M	4.0	41.2	(0.8 - 1.6 fl. oz/a)	... <sup>b</sup>	..	...
	Dursban 2E	2.0	22.4	(1.6 - 3.2 fl. oz/a)	... <sup>b</sup>	..	...
fenthion	Baytex 4	4.0	45.0	2.125- 4.25	100	4	350
	Baytex LC <sup>a</sup>	9.67	93.0	0.875- 1.75	100	4	350
malathion	Cythion EL	4.0	57.0	2.0	60-100	3-5	100-200
propoxur	Baygon 1.5E	1.5	13.9	5.5 - 8.0	100	4	350
	Baygon WP	...	70.0	11.75 -17.25	100	4	350

<sup>a</sup> Baytex LC requires addition of emulsifier and aromatic solvent. Consult manufacturers recommendations as to type, amount and mixing instructions.

<sup>b</sup> Label states to apply using sufficient volume to give uniform coverage of area.

Table 5. Some ground application equipment available for control of adult mosquitoes.

Type	Equipment	Manufacturer
ULV	Buffalo Turbine Sonic ULV	Buffalo Turbine Ag. Equip. Co.
	Leco Model HD	Lowndes Engineering Co.
	London Aire Model XW	London Fog Co.
	Micro-Gen. Model ED2-20	Micro-Gen. Equipment Co.
	Tifa Model 100E ULV	Tifa (C.I.) Ltd.
Thermal Aerosol	Curtis Dyna-Fog Model DH440	Curtis Dyna-Products Corp.
	Leco Model 120	Lowndes Engineering Co.
	London Fogger Model 100	London Fog Co.
	Tifa Model 100E	Tifa (C.I.) Ltd.
Mist	Buffalo Turbine Model FS	Buffalo Turbine Ag. Equip. Co.

Table 6. General recommendations for ground application of insecticides for adult mosquito control.

Speed	—Most labels recommend a vehicle speed of 5–10 mph (8–16 kph). An increase in speed must be accompanied by a proportional increase in discharge. (See Tables 1, 3, and 4).
Swath	—Most labels recommend a swath of 300–350 ft. (90–107 m.) or one average city block. (See Tables 1, 3, and 4).
Wind	—Most labels state to apply in winds of 5 mph (8 kph) or less.
Temperature	—Apply at temperatures above 60–65 ° F (16–18° C) with good inversion conditions.
Time-of-day	—Apply from early evening to early morning to coincide with periods of greatest mosquito activity. This is also the period of optimum wind and inversion conditions.
Calibration	—Calibrate equipment prior to initial use and periodically thereafter. Check setting before each use.
Droplet Size	—For ULV machines determine droplet size initially and periodically thereafter to see if it conforms to insecticide label criteria. (See Table 2).
Formulation	—Use only according to label recommendations. Consult manufacturer for information on storage of formulated insecticides (See Tables 1, 3, and 4).
Discharge Rate	—Use only according to label recommendations. For ULV machines, changes in insecticide temperature usually require a change in flowmeter setting. (See Tables 1, 3, and 4).

## A MOSQUITO MANAGEMENT PROGRAM FOR THE NORTH PLATTE VALLEY OF NEBRASKA

WILLIAM F. RAPP

Entomologist, Division of Housing and Environmental Health  
Nebraska State Health Department, Lincoln, Nebraska 68503

The North Platte Valley of Nebraska extends from the Wyoming state line to the head end of Lake McConaughy, an area approximately 125 miles long and varying from 5 to 20 miles wide. Within this area, ditch irrigation has been practiced since about 1912. The mosquito problem first came to national attention during World War II when a prisoner of war camp was located approximately 5

miles east of the City of Scottsbluff. Surveys conducted by the staff of Malaria Control in War Areas (U.S. Public Health) under the direction of Dr. John L. Rowe showed that this area had a very high mosquito population; but no *Anopheles* were found and no control work was recommended in spite of the fact that the prisoners complained about the mosquitoes.

In the late 1940's the Center for Disease