

## Community Pest Control

M. Waldvogel, Entomology and Plant Pathology and M. Reiskind, Entomology Research

**NOTE: Insecticides recommended for use by Certified Applicators only. For rodents, see Animal Control, Chapter 9.**

**Table 5-12A. Community Pest Control — Mosquito Adults<sup>1</sup>**

Read pesticide labels carefully. Some pesticide products are not approved for application to edible plants. Avoid spraying when pollinators are actively foraging. KEY: Dv 0.9 = 90% of the spray volume droplets are smaller than value given VMD = Volume Median Diameter;  $\mu\text{m}$  = micrometer

TYPE OF APPLICATION Insecticide and Formulation	Mixing Instructions and Application Equipment	Application Rate at 10 mph	Droplet Size Requirements on Label ( $\mu\text{m}$ )	Precautions and Remarks
<b>Ground Application</b>				
bifenthrin 7.9L	0.33 to 1.0 fl oz/gal water in backpack or hydraulic sprayer			Apply at a rate of 1 gallons per 1000 square feet for thorough coverage of lawns and/or ornamentals.
deltamethrin (Suspend Polyzone)	0.33 to 1.0 fl oz/gal water in backpack or hydraulic sprayer			Treat with mist or spray around landscape plants, turf, ground cover, under decks, around building foundations where mosquitoes may rest.
etofenprox (Aqua Zenivex E20)	Apply undiluted or up to 1:4.5 dilution	Varies with dilution	VMD-7-30 $\mu\text{m}$ Dx 0.9 < 50 $\mu\text{m}$	Do not apply more than 0.18 lbs per acre per site per year. Do not make more than 25 applications per site per year.
garlic oil% (ATSB concentrate)	38 fl oz/ga water in a backpack or hydraulic sprayer			Apply at a rate of 15 ounces per 100 linear feet to vegetation 1 to 5 feet above the ground wetting both surfaces of foliage to the point of runoff. Do not apply with handheld or truck-mounted cold ULV or thermal foggers or by aircraft.
lamda-cyhalothrin (Cyonara 9.7, Demand CS, Cysmic CS)	0.8 fl. Oz/gal. water in backpack or hydraulic sprayer			Treat resting areas on structures as well as surrounding shrubs.
malathion 96.5% concentrate (Fyfanon ULV)	Use undiluted on aerosol ULV sprayer.	2 to 4.3 fl oz	VMD < 30 $\mu\text{m}$ Dv 0.9 < 50 $\mu\text{m}$	Do not spray when wind speed is more than 5 mph.
	Dilute 3.9 to 5.2 gal to 100 gal with No. 2 fuel or diesel oil; use in thermal fog sprayer.			Avoid direct application to vehicles; these insecticides may damage paint. Apply when air temperatures are cool and wind speed is 3 mph or less. Toxic to fish, aquatic invertebrates, and wildlife.
naled (Dibrom) 87.4% concentrate	10 fl oz to 10 gal No. 2 fuel or diesel oil; use in thermal fog sprayer.	80 gal/hr	VMD < 40 $\mu\text{m}$ Dv 0.9 < 75 $\mu\text{m}$	Toxic to fish, aquatic invertebrates, and wildlife. Restricted Use Pesticide.
	Dilute 0.5 gal to 5 gal with soybean oil or HAN; use in ULV sprayer.	6 to 12 fl oz/min	VMD < 40 $\mu\text{m}$ Dv 0.9 < 75 $\mu\text{m}$	Do not directly apply to water or to areas where runoff into water is likely to occur.
permethrin 10% to 57% concentrate	Apply undiluted or mix with refined mineral or soybean oil.	0.31 to 15 oz/min depending on dilution	VMD = 150 to 300 $\mu\text{m}$	Permethrin 57% is not for use in residential misting systems. Do not allow drift onto cropland, poultry ranges or potable water supplies. Do not use on crops used for food or forage.
(Permanone) 10% EC	Dilute 1:20 with water (6.5 fl oz/ 1 gal of water).			Treat surfaces using course wet spray. Spray to runoff.
permethrin (20%) and piperonyl butoxide (20%) (Aqua-Reslin)	Dilute 1 gal with 2 to 12 gal water	2.1 to 9 oz/min depending on dilution	VMD < 30 $\mu\text{m}$ Dv 0.9 < 50 $\mu\text{m}$	Dilute with water only. Toxic to fish and aquatic invertebrates. Can be used as barrier spray on building foundations (maximum height of 3') and vegetation around structure but not within 100 feet of lakes and streams. Structural applications to areas other than foundation limited to crack & crevice.
permethrin and piperonyl botoxide (Permanone 31-66, Biomist 4+12 ULV)	Dilute 1 gal to 2.4 gal with light weight oil; use in ULV sprayer.	0.5 to 3 fl oz/min	VMD < 30 $\mu\text{m}$ Dv 0.9 < 50 $\mu\text{m}$	
prallethrin (1%) and sumithrin (5%) and piperonyl butoxide (5%) (Duet)	Apply undiluted in aerosol ULV sprayer	2.5-7.5 oz/min	VMD = 8 to 30 $\mu\text{m}$ Dv 0.9 < 50 $\mu\text{m}$	Do not allow drift onto pastureland, rangeland, or potable water supplies.
pyrethrins (5%) and piperonyl butoxide (25%) (Aquaahalt)	Apply undiluted or diluted with water and applied as an ultra low volume (ULV)	0.27 to 0.76 oz/ac	VMD < 30 $\mu\text{m}$ Dv 0.9 < 50 $\mu\text{m}$	Do not apply more than 0.2 pounds of pyrethrins/acre/year or 1.0 pound PBO/acre/year in any treated area
resmethrin (18%) + piperonyl botoxide (54%) (Scourge)	Dilute 0.67 gal with 1 gal of light mineral oil; use in ULV sprayer.	4.5 to 9 fl oz/min	VMD < 30 $\mu\text{m}$ Dv 0.9 < 50 $\mu\text{m}$	Restricted-Use Pesticide. Can be applied ULV or diluted with refined soybean oil, light mineral oil of 54 second viscosity or other suitable solvent or diluent.
sumithrin and piperonyl botoxide (Anvil 10+10 ULV or 2+2 ULV)	Use undiluted or dilute 10+10 formulation with light mineral oil.	1.3 to 18.6 oz/min	VMD < 30 $\mu\text{m}$ Dv 0.9 < 50 $\mu\text{m}$	
<b>Fixed Wing Aerial Application</b>				
etofenprox (Aqua Zenivex E20)	0.00175 to 0.007 oz (undiluted) per acre	Varies with dilution	VMD < 60 $\mu\text{m}$ Dx 0.9 < 100 $\mu\text{m}$	Do not apply at altitudes below 100 feet. Do not apply more than 0.10 lbs per acre per site per year. Do not make more than 25 applications per site per year.
malathion 96.5% concentrate (Fyfanon ULV)	Use undiluted	2.6 to 3 fl oz/acre	VMD < 60 $\mu\text{m}$ Dx 0.9 < 100 $\mu\text{m}$	Toxic to fish, aquatic invertebrates, and wildlife. Do not directly apply to water or to areas where runoff into water is likely to occur. Do not retreat a site more than 3 times in any one week except in emergencies. Do not spray by fixed wing aircraft below 100 feet or by helicopter below 75 feet.
naled (Dibrom) 87.4% concentrate	Use undiluted.	0.5 to 1 fl oz/acre	VMD = 60 $\mu\text{m}$ Dv 0.9 < 115 $\mu\text{m}$	Toxic to fish, aquatic invertebrates, and wildlife. Do not directly apply to water, except when necessary to target areas where adult mosquitoes are present or to areas where runoff into water is likely to occur. Not for use in or around homes.
	Dilute 50 to 100 fl oz to 100 gal with No. 2 fuel oil or diesel oil.	1 gal/acre	VMD = 60 $\mu\text{m}$ Dv 0.9 < 115 $\mu\text{m}$	Toxic to fish, aquatic invertebrates, and wildlife. Do not directly apply to water, except when necessary to target areas where adult mosquitoes are present or to areas where runoff into water is likely to occur. Not for use in or around homes.

**Table 5-12A. Community Pest Control — Mosquito Adults<sup>1</sup>**

Read pesticide labels carefully. Some pesticide products are not approved for application to edible plants. Avoid spraying when pollinators are actively foraging.  
**KEY:** Dv 0.9 = 90% of the spray volume droplets are smaller than value given VMD = Volume Median Diameter;  $\mu\text{m}$  = micrometer

TYPE OF APPLICATION Insecticide and Formulation	Mixing Instructions and Application Equipment	Application Rate at 10 mph	Droplet Size Requirements on Label ( $\mu\text{m}$ )	Precautions and Remarks
<b>Fixed Wing Aerial Application (continued)</b>				
permethrin (20%) and piperonyl butoxide (20%) (Aqua-Reslin)	Dilute 1 gal with 2 to 12 gal water	2.1 to 9 oz/min depending on dilution	VMD < 60 $\mu\text{m}$ Dv 0.9 < 100 $\mu\text{m}$	Dilute with water only. Toxic to fish and aquatic invertebrates.
resmethrin (18%) + piperonyl butoxide (54%) (Scourge)	Dilute 0.67 gal with 1 gal of light mineral oil; use in ULV sprayer.	4.5 to 9 fl oz/min	VMD < 60 $\mu\text{m}$ Dv 0.9 < 100 $\mu\text{m}$	Restricted-Use Pesticide. Can be applied ULV or diluted with refined soybean oil, light mineral oil of 54 second viscosity or other suitable solvent or diluent.
prallethrin (1%) and sumithrin (5%) and piperonyl butoxide (5%) (Duet)	Apply undiluted on aerosol ULV sprayer	0.41 - 1.24 oz/ac	VMD = < 60 $\mu\text{m}$	Do not allow drift onto pastureland, rangeland, or potable water supplies.
pyrethrins (5%) and piperonyl butoxide (25%) (Aqua-halt)	Apply undiluted or diluted with water and applied as an ultra low volume (ULV)	0.27 to 0.76 oz/ac	VMD < 60 $\mu\text{m}$ Dv 0.9 < 80 $\mu\text{m}$	Do not apply more than 0.2 pounds of pyrethrins/acre/year or 1.0 pound PBO/acre/year in any treated area
sumithrin and piperonyl butoxide (Anvil 10+10)	Use undiluted.	3.8 to 5.7 fl oz/acre	VMD < 60 $\mu\text{m}$ Dv 0.9 < 80 $\mu\text{m}$	

<sup>1</sup> Avoid direct applications to flowering plants when pollinators are active. Do not allow drift onto adjoining non-target areas. When treating residential properties. Cover or remove pet food and water sources, grills, swimming pools and children's toys. Note: Treatment of structures (exterior or interior) requires a P-phase Structural Pest Control License in North Carolina.

**Table 5-12B. Community Pest Control — Mosquito Immatures and Other Pests**

PEST Insecticide and Formulation	Mixing Instructions and Application Equipment	Application Rate Per Acre	Precautions and Remarks
<b>Mosquito—Immatures</b>			
<i>Bacillus thuringiensis</i> , var. <i>israelensis</i> (Bactimos, Teknar, Vectobac) 50 WP 2 WP 14.3% aqueous conc. 15% aqueous conc. 1.2% aqueous conc. 0.8% aqueous conc.	Dilute with sufficient water to obtain uniform coverage.	6 to 12 oz 4 to 16 oz 0.5 to 3 pt 0.5 to 3 pt 0.25 to 2 pt 0.5 to 2 pt	Only effective against larvae. Can be applied to all breeding habitats, including potable water supplies.
<i>Bacillus thuringiensis</i> , var. <i>israelensis</i> (Bactimos) briquets 10% (Bactimos, Teknar, Vectobac) granules 0.2% pellets 0.4%	Ready to use	—	Use one briquet per 100 square feet of surface area regardless of depth. Apply 4 to 10 pounds per acre with aircraft or ground equipment.
methoprene (Altosid) 20% EC  (Altosid) briquet 2.1%, 8.6% pellet 4.2%  (Altosid) granule 0.27%, 1.5%	3 to 4 fl oz/gal water  Ready to use	1 gal  —	Apply when larvae are in 3rd and 4th instar. Methoprene will not kill pupae or adults. Water less than 2 feet; 1 briquet per 100 square feet; deeper or flowing water; 1 briquet per 10 cubic feet. 2.5- to 10-pound pellet per acre; use high rate in breeding sites with high organic content.
spinosad (Natular XRG) 2.5% granule	Ready to use	5 to 20 lb	
monomolecular surface film (Agnique MMF)	—	0.2 to 0.5 gal	Use in conjunction with indicator oil to avoid over treatment.
proprietary mosquito control oils (GB-1111, etc.)	—	1 to 5 gal	Dosage depends on amount of floatage and vegetation in water.
temephos (Abate) 43% EC 1 G 2 G 5 G	0.5 to 1.5 fl oz/gal water — — —	1 gal 5 to 10 lb 2.5 to 5 lb 1 to 2 lb	
<b>Midge ("fuzzy bits")</b>			
temephos (Abate) 1 G 2 G 5 G	— — —	5 to 10 lb 2.5 to 5 lb 2 lb	Double recommended rates for water high in organic content.
methoprene 20% EC (Strike)  4.25% pellet (Strike)	4 to 5 oz/ 1 million gal wastewater —	— 5 to 10 lb/acre	For use in wastewater treatment facilities. Uniformly apply at the influent side over a 24-hr period. Apply to natural and manmade aquatic habitats. High rate recommended for wastewater.
spinosad (Natular XRG) 2.5% granule	Ready to use	5 to 20 lb	