

Outdoor Mosquito Management

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L. K. CUTKOMP, R. D. SJOGREN*,
D. M. NOETZEL, and J. R. SANDVE**

The most common pest mosquitoes (*Aedes*) in Minnesota hatch from eggs after heavy rainfalls and grow as larvae or "wrigglers," in temporary pools of water.

Adults of some species can fly 10 to 15 miles, but mosquitoes are usually most abundant close to their water-breeding area. Adults rest in dense shrubbery, weeds, tall grass, and shaded lawns. The large number of eggs produced, the numerous pools of water, and the mosquito's extensive flight range make localized chemical control difficult.

However, bothersome biting by some kinds of mosquitoes and the possibility of disease spread by others is justification for control. For example, one kind of mosquito, which lays its eggs in tree holes, can transmit California encephalitis (sleeping sickness) and a second kind can transmit Western encephalitis to humans. The third kind is capable of transferring heartworms from one dog to another. All these mosquitoes are present in Minnesota.

For maximum effectiveness a control program must cover a large area and involve more than chemical control. A complete program should be considered for a community. This fact sheet is limited to recommendations which will aid in reducing biting by *Aedes* around your home and yard.

CHEMICAL CONTROL**Treatment for adult mosquitoes**

You can make residual or space treatments in backyards and outdoor areas as well as in parks and towns. Residual treatments are coarse sprays applied to resting places such as shrubbery, weeds, and grass. Space treatments are finer mists or fogs, which must kill the mosquito on contact. They leave almost no residue.

In both residual and space treatments, the larger the area treated the more mosquito reduction. If nearby wooded areas are not treated, residual yard treatment may not decrease the annoyance, as the adults will fly over the treated areas in search of a host. None of the presently recommended insecticides lasts very long outdoors, so nightly treatments with foggers may be necessary in locations where mosquitoes are moderately abundant. Such applications should be made in the 2-hour period following dusk when adult mosquitoes are in flight and can be contacted most effectively.

In all cases the insecticide applications, whether spraying, or fogging, should be made before food is served in the treated area so food contamination does not occur.

Proper precautions to protect humans, pets, and wildlife, should be followed in the use of all the listed materials. To reduce hazard, treat specifically defined areas; time treatments to avoid immature birds, and flowers in bloom.

* R. D. Sjogren is director, Metropolitan Mosquito Control District, St. Paul.

** J. R. Sandve is senior entomologist with the Minnesota Department of Agriculture.

Residual sprays

If you have a hand sprayer that you use for a variety of purposes, be sure that it is clean and free of contaminants before you use it to spray for mosquitoes. Residues of a herbicide left in the sprayer may be very damaging to plants. It is best to have a separate sprayer for weed spraying.

A hose-end sprayer can be used with emulsifiable concentrates. However, it is difficult to adequately regulate the dose with the hose-end sprayer.

Prepare your materials according to table 1. Increasing dosage rates is illegal and no additional control will be achieved.

Table 1. Insecticides for the hand sprayer

Chemical	Formulation	Amount for 1 gallon
carbaryl (Sevin)	50% WP	4 tbsp.
	80% (sprayable)	2½ tbsp.
methoxychlor	25% EC	4 tbsp.
	50% WP	8 tbsp.
malathion	57% EC	2 tsp.

WP = wettable powder EC = emulsifiable concentrate

A mixture of methoxychlor and malathion can also be used. Do not spray fish-bearing water with malathion. Carbaryl is highly toxic to bees and wasps and should not be sprayed where plants are in bloom. Emulsifiable preparations will sometimes cause "burning" of plants.

Be sure that potential mosquito resting places such as shrubbery, tall grass, and low-growing plants are thoroughly treated. Dark humid areas under porches, shrubbery, and on the north sides of buildings are also mosquito resting sites.

Space sprays

Fogging provides a rapid, temporary treatment but has little residual effect. It is effective only where there is little or no wind in the evening or at night. Fogging equipment ordinarily uses diluted oil solutions. Table 2 contains the materials and formulations normally used.

Two types of fogging machines are available. In one type, the fog is produced by a heat generator. A second type does not employ heat. The latter type has proved most effective, particularly when weather conditions are not ideal.

Table 2. Insecticides to be mixed with oil for use in foggers

Chemical	Formulation	Amount for 1 gallon	
malathion (Cythion)	57% EC	2/3 cup	
	95% technical	1/3 cup	
dichlorvos (Vapona)	23.5% EC	2/3 cup	
naled (Dibrom)	8 lb. concentrate	1 tbsp.	
synergized pyrethrins	.15-.20% pyrethrins	Use as is	
	heated fog	12% pyrethrins	1 cup
	cold fog	12% pyrethrins	2/3 cup

Various prepared mixtures Materials approved by the Environmental Protection Agency for fogging can be used as labeled.

A small fogger can be expected to provide about a 25 foot swath for controlling adult mosquitoes in moderately dense vegetation. If 1 pint of material is to be used per acre the fogging should be carried out over a distance of 1740 feet.

Add the concentrate to a sample of the fuel oil you intend to use and shake well in a disposable glass jar. A new or different insecticide concentrate should be used if a sludge forms.

Most small foggers will have recommendations as to the type of insecticide and formulation to use. These should be carefully followed so the piece of equipment will continue to function properly.

Naled (Dibrom) is very corrosive; equipment should be thoroughly cleaned after each use.

Treatment for mosquito larvae

Treatment of one or two small pools has little value because adult mosquitoes can fly several miles. Therefore, larval control programs should cover a large area.

However, the homeowner should empty all containers such as tires and cans that hold water and should also help to prevent temporary pools of water which will produce mosquitoes along roadsides, in ditches, etc.

Homeowners in wooded areas should also fill tree holes with sand because such sites can produce disease bearing mosquitoes.

Malathion or fuel oil can be used for larviciding. Remember that permanent bodies of water should not be treated. These rarely produce mosquitoes.

Repellents

Mosquito repellents are very useful where it is not feasible to use an insecticide, such as when camping or fishing. They also can be used when mosquitoes are few in number and insecticide control is not warranted. In any event use only enough repellent to provide the relief desired.

Commercial repellents such as Deep Woods Off, D-Con, Cutters, Off, 6-12, and others are very effective against mosquitoes. The first two are more effective against other biting flies. Generally, combinations of two or more repellent chemicals provide the best protection.

Mosquito control myths

Purple martins — Dietary studies indicated mosquitoes are insignificant in the purple martin diet.

Bats — The insect prey of bats will tend to be larger insects. Studies of bat stomachs show beetles to be a dominant food. Bats also are reservoirs for rabies and it is perhaps unwise to encourage large numbers of these in areas where human activity is high.

Black lights — From time to time black, or ultra-violet lights are advertised for mosquito control. Numerous studies show that they are ineffective.

Sonic devices — More recently sound devices for repelling mosquitoes have been marketed. Tests to date indicate they do not repel.

PRECAUTIONS

1. Understand the piece of application equipment. Read the manufacturer's instructions and follow them!
2. Before using any pesticide read the label, then read it again to be sure you understand it.
3. Keep all pesticides out of the reach of children, pets, and irresponsible people. If accidents happen with the pesticides, contact your doctor immediately.
4. Store pesticides in the original containers with the original labels—NEVER in pop bottles or other food and drink containers.
5. Do not smoke or eat while mixing or applying pesticides. Avoid inhaling sprays, dusts, and fumes.
6. Do not spill insecticides on skin or clothing. If spills occur, remove contaminated clothing immediately and bathe with plenty of soap and wash contaminated clothing before wearing again. Always wash after you have applied chemicals.
7. Cover or remove food and water containers when treating around animal areas.
8. To avoid injury to susceptible plants, use separate equipment for applying insecticides and herbicides.
9. Dispose of empty containers and unused pesticides preferably by burying, so they create no hazard to people, plants, animals or water supplies.
10. When treating around sensitive plants use wettable powders, not emulsions or oils.
11. Some of these pesticides are especially toxic to fish and honey bees. Do not spray fish ponds or flowers in bloom. Spray late in the evening when there is little or no wind.
12. Do not use higher rates than those recommended.

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