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Do-It-Yourself

Backyard Mosquito Control

Mike Merchant[1], Sonja Swiger[1], and Steve Presley[2]

Concerns about mosquito-borne disease this summer are prompting many of us to learn what to do to reduce the chances of mosquito bites in our own backyards and gardens. Fortunately, there are good ways to manage mosquitoes around your home at reasonable cost.

Destroy or treat mosquito breeding sites

The first step in any mosquito control effort is to find and eliminate the mosquito breeding sites from your backyard. The most common biting mosquitoes in Texas, and the ones most likely to carry Zika virus, are not strong fliers. The yellow fever mosquito *(Aedes aegypti)* and the Asian tiger mosquito *(Aedes albopictus)* both tend to live and bite within 200 to 300 yards of their breeding sites.

Mosquitoes breed in standing water, especially if it stands for at least 7 days. Adult mosquitoes lay their eggs near the standing water, and their young (larvae) develop in the water before emerging to bite. Because these mosquito larvae feed on bacteria and other microorganisms, the water must be stagnant and contain some organic matter such as leaves, soil, bird droppings, or grass clippings.

For this reason, mosquitoes usually do not breed in running streams or maintained swimming pools; however, birdbaths, old tires, and clogged gutters make excellent mosquito breeding sites.

You can destroy many breeding sites by draining, dumping, or filling them. Dump water from buckets, flowerpot dishes, tarps, and wheelbarrows. If possible, turn over or cover them so they can't catch more water. Fill holes or low areas with sand or gravel and seal tree holes (Fig. 1) with expanding foam.

Figure 1. Tree hole mosquito breeding site.
Source: Sonja L. Swiger

If you find standing water that cannot be easily dumped, filled, or drained, treat it with an approved mosquito insecticide (larvicide):

- ***Bacillus thuringiensis israeliensis (Bti)*** is made from bacteria that kill mosquito larvae. A small amount, in the form of compressed donuts (Fig. 2), briquettes, or granules, is effective for up to 30 days.
- **Methoprene** is an insect growth regulator applied to water as a granule or briquette. Depending on the formulation, it may last for more than 30 days.

[1]Extension entomologist, Texas A&M AgriLife Extension Service, The Texas A&M University System
[2]Professor of Environmental Toxicology, Texas Tech University

Figure 2. Insecticide donuts containing Bti are safe to use in water with fish or around pets.
Source: JeepersMedia (CC BY 2.0)

Products containing these insecticides are sold online and in many hardware stores and garden centers.

Advantages: Without breeding sites, no mosquito larvae can grow up to be adults and bite you. These products are safe to use and apply around pets. They are toxic only to aquatic insects and do not hurt fish or birds.

Limitations: You must know where the mosquitoes are breeding and you must reapply these products throughout the mosquito season.

Use backyard foggers

For temporary relief from biting mosquitoes—such as for a backyard barbecue or another special event—your best choice may be a fogger.

Mosquitoes hide in plants or other shady sites after they leave their breeding sites and take a blood meal. Direct the fog there to kill these resting adult mosquitoes. Although fogger chemicals do not control mosquitoes long term, they can suppress them for several hours or more.

Mosquito foggers generate very small particles of floating insecticide that drifts through leaves and kill adult mosquitoes through direct contact. Thermal foggers use heat, usually from a propane flame, to create a thick white fog that can kill many resting mosquitoes.

Advantages: Foggers can suppress mosquitoes overnight and sometimes the following day(s). They are easy to use and apply.

Limitations: Because they do not control mosquitoes for long, foggers are best used just before an outdoor event.

Thermal foggers (Fig. 3) produce a highly visible smoke that can alarm neighbors. Some people mistake it for smoke from a real fire and call the fire department.

Aerosol foggers empty quickly and cost more than thermal foggers.

Both types of foggers may harm beneficial insects, such as bees, butterflies, and predator insects. Do not use them near plants where bees are active, and follow the label instructions carefully.

Figure 3. Small thermal fogger producing a dense fog to kill mosquitoes resting in backyard vegetation and shrubs. Fogs work best when applied in the evening or when there is little wind. Source: Mike Merchant

Apply backyard residual sprays

Residual sprays (sprays that stay for extended times on surfaces) can suppress mosquito activity for up to a month. They are applied to mosquito resting sites on the sides of homes, around doorways, in tall grass and shrubs, and even in backyard trees.

Residual spray applications can be made by professional applicators, or by you at home using aerosol sprays, pump-type garden-sprayers or hose end-sprayers.

Professional applicators (Fig. 4) typically use backpack units that blow a fine mist several yards up in the air and through dense foliage. The powerful fans in mist blowers can penetrate plants and tree canopies well.

Longer lasting aerosol sprays are also available through hardware and garden supply stores. These sprays penetrate foliage but tend to settle more quickly than do sprays applied with mist blowers. They do not produce smoke and do not penetrate as well, or travel as far, as thermal foggers. A variety of residual insecticides are available in aerosol form, including

Figure 4. Backpack mist blower being used by a pest-control company employee to treat mosquito resting sites with a long-lasting insecticide. Source: Mike Merchant

cyfluthrin, deltamethrin, lambda-cyhalothrin and others.

Residual sprays can also be applied with simple hand-held pump sprayers or using ready-to-use insecticide bottles designed to attach to the end of a garden hose. It is more difficult with these applicators to get sprays to the undersides of leaves, or within deep foliage compared to mist blower equipment. Nevertheless, even do-it-yourself sprays around the backyard can help reduce the numbers of biting mosquitoes for days after application.

Advantages: Residual sprays provide extended relief from biting mosquitoes without having to spray repeatedly. Drift of spray from aerosols or pump sprayers is generally less than from thermal fog, so they can be applied more precisely. Spraying around doorways can reduce the risk of mosquitoes entering the home. Hose-end and pump garden sprayers are inexpensive and easily purchased at most garden centers.

Disadvantages: Professional applications cost more than DIY treatments but can be more effective. They can also kill beneficial organisms such as butterflies, pollinators, and predatory insects. To minimize the harm to beneficial insects, spray in the evening, and avoid blooming plants. Using these chemicals repeatedly can cause some mosquitoes to develop resistance to these insecticides.

Other backyard control options

Mosquito traps (Fig. 5) often use carbon dioxide or human scent attractants to draw in and trap or kill mosquitoes. To work, they must be at least as attractive as a human and operate continuously when mosquitoes are active. Some of these traps are relatively expensive and effectiveness may vary depending on wind and airflow patterns.

Bug zappers use an ultraviolet light source to attract mosquitoes to an electrocuting grid; unfortunately, these traps attract and kill many beneficial insects and do not control the females of biting species.

Ovitraps are artificial breeding containers that sterilize or kill mosquitoes that come to the traps to lay eggs. Although some ovitraps can control some

Figure 5. A commercially available mosquito trap. Source: Mike Merchant

mosquito species, such as Asian tiger mosquitoes, few are available on the retail market, and those have not yet been thoroughly tested.

Attract-and-kill sprays mix sugar water with a toxicant. The sugary mix attracts adult female mosquitoes, and the chemical kills them. Although the products now being sold have not been well tested, the attract-and-kill concept shows some promise.

Backyard mister systems consist of a timer connected to a series of nozzles that disperse a fine mist, or fog, of insecticide throughout the yard. These systems are expensive and controversial. Continual use of these systems may contribute to creating insecticide-resistant mosquitoes. Daytime use of mister systems is also likely to harm beneficial insects.

Know your product's active ingredients

When choosing a pesticide to control mosquitoes, you first need to know the active ingredient. Look for the "Active Ingredient" statement on the front of the pesticide label, usually near the bottom of the label. This will allow you to compare to the list of active ingredients (Table 1) for outdoor mosquito control.

Table 1. Common active ingredients in outdoor mosquito insecticides and area repellents.

Active ingredient	Type	Use	Residual life[1]	Risk to beneficial insects[2]
Allethrin	PYR	Fast knockdown	Minutes–hours	Temporary
Bacillus thuringiensis	MIC	Larvicide	Days–month	Low
Bifenthrin	PYR	Long-lasting spray	Days–weeks	High
Cyfluthrin	PYR	Long-lasting spray	Days–weeks	High
Cypermethrin	PYR	Long-lasting spray	Days–weeks	High
Deltamethrin	PYR	Long-lasting spray	Days–weeks	High
Esfenvalerate	PYR	Long-lasting spray	Days–weeks	High
Geraniol	BOT	Fast knockdown	Minutes–hours	Temporary
Imidacloprid	NEO	Long-lasting spray	Days–weeks	High
Lambda-cyhalothrin	PYR	Long-lasting spray	Days–weeks	High
Lemongrass oil	BOT	Fast knockdown	Minutes–hours	Temporary
Linalool	BOT	Area repellent	Minutes–hours	Temporary
Malathion[3]	OPH	Short-lived spray	Hours–days	Moderate–high
Methoprene	IGR	Larvicide	Weeks– month	Low
Peppermint oil	BOT	Fast knockdown	Minutes–hours	Temporary
Permethrin	PYR	Long-lasting spray	Days–weeks	High
Phenothrin (Sumithrin)	PYR	Fast knockdown	Minutes–hours	Temporary
Prallethrin	PYR	Fast knockdown	Hours–days	Temporary
Pyrethrins	BOT	Fast knockdown	Minutes–hours	Temporary
Rosemary oil	BOT	Fast knockdown	Minutes–hours	Temporary
Tetramethrin	PYR	Fast knockdown	Minutes–hours	Temporary

Note: Inclusion in this list does not mean that all products provide satisfactory control of mosquitoes; that residual times are approximate. BOT: derived from a natural, botanical source; IGR: insect growth regulator; MIC: microbial based; NEO: neonicotinoid; OPH: organophosphate; PYR: pyrethroid. [1] The effective residual life of an insecticide may vary based on a number of factors including temperature, exposure to sunlight and water, whether the residual is indoors or outdoors, and the surface on which it lands. [2] Most insecticides are toxic to bees; do not spray them directly on blooming plants. The best time to apply many of these products is in the evening when the bees have returned to their hive. [3] When used by public health agencies, malathion is usually applied as an ultralow volume spray, and its residual life tends to be short. Consumer versions of malathion may provide some residual action.

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