

THE MOSQUITO IS THE MOST DANGEROUS CREATURE ON EARTH, transmitting diseases to both humans and animals. Malaria, dengue, West Nile virus, chikungunya, yellow fever, dog heartworm, Japanese encephalitis, Western equine encephalitis, Venezuelan equine encephalitis, LaCrosse encephalitis and Zika fever are all spread by mosquitoes.

Mosquito season in Indiana runs from May 1 through October 1. **Most mosquitoes in Indiana DO NOT come from swamps, rivers, streams, ponds, or lakes -- they come from our own backyards.** The best protection against mosquitoes is prevention – prevention of breeding sites and of mosquito bites. Mosquitoes breed in large numbers in human habitats. **Here are some things YOU can do to reduce the mosquito population and help protect yourself and your family from mosquitoes:**

HABITAT CONTROL

- *Make sure roof gutters drain properly. Clean clogged gutters.
- * Remove all discarded tires from your property. Used tires have become the most important mosquito breeding habitat in this country.
- * Do not allow containers to hold water. Dispose of tin cans, plastic containers, ceramic pots, or similar water-holding containers.
- * Drill holes in the bottom of recycling containers that are left out of doors.
- * Tightly screen rain barrels to ensure that mosquitoes cannot lay eggs on or in the water.
- * Clean and chlorinate swimming pools, wading pools, and outdoor hot tubs. If not in use, empty and cover them.
- * Drain water from pool covers.
- * Aerate ornamental pools or stock them with fish. Water gardens are fashionable but become major mosquito producers if allowed to stagnate.
- * Turn over wheelbarrows and change water in birdbaths at least twice a week.
- * Use landscaping as needed. Mosquitoes will develop in any puddle that lasts for more than 4 days.

- * Make sure doors and windows have tight-fitting screens. Repair or replace all screens in your home that have tears or holes.
 - * Help your neighbors eliminate mosquito breeding sites on their property.
 - * Drain or turn unused boats or canoes upside-down to prevent water from gathering inside.
 - * Repair leaking or failed septic systems. Water laden with organic material is especially attractive to *Culex* mosquitoes which spread St. Louis encephalitis and West Nile virus.
 - * Check watering troughs for horses, cattle, goats and sheep for the presence of mosquito larvae.
 - * Lagoons which hold animal waste can be particularly dangerous, producing tens of thousands of disease-spreading mosquitoes.
- Often, because of their location on private property, sites such as these must be eliminated and managed by the property owner.

LARVICIDING AND ADULTICIDING

Homeowners can do a lot to reduce mosquitoes around their homes. Many times, though, they have no control over sources such as catch basins, agricultural waste, or wetlands.

A larvicide is the most efficient type of mosquito control, second only to the elimination of breeding sites.

Bacillus thuringiensis

israelensis (Bti) is a bacterial spore that kills mosquitoes, black flies, and fungus gnats. After the spores are ingested by the larvae, they grow and reproduce, producing a crystalline toxin that paralyzes the larvae's digestive tract, causing it to stop eating. Non-target insects are not harmed. Larvae killed by Bti are not considered dangerous to birds or other insects that may feed on them. Bti is not considered harmful to the environment.

Hazards to humans are negligible, though inhalation or contact with eyes or open wounds should be avoided.



THINGS THAT ATTRACT MOSQUITOES

For mosquitoes that feed during the day, dark clothing is attractive. Their eyesight is poor and the dark coloring looks like the shadows where they like to hide. Carbon dioxide can be detected by mosquitoes up to 120 feet away. When we exhale, we are attracting them. Floral fragrances from perfumes, soaps, lotions, and hair-care products may also attract mosquitoes. Wear light-colored clothing, long pants, socks, and long-sleeved shirts.

REPELLENTS

Most mosquitoes actively search for blood meals in the evening and again at dawn. *Aedes albopictus*, (chikungunya, dengue virus, and canine heartworm) however, bites throughout the day, and usually lives near wooded areas filled with underbrush.

You can help prevent mosquito bites by staying inside when they are biting and by using mosquito repellents on clothing and exposed skin. A number of repellents are available, but some are more effective than others.

DEET is effective against mosquitoes, biting flies, chiggers, ticks, and fleas. It has a remarkable safety profile, but toxic reactions can occur, especially if the product is misused or overused on babies or young children.

Products with 10% to 35% DEET will provide adequate protection under most conditions. Repellents may be applied directly to the skin or to clothing, screens, tents, sleeping bags. If DEET-treated garments are stored in a plastic bag between wearings, the repellent effect can last for many weeks.

DEET can damage plastics such as watch crystals, eyeglass frames, rayon, spandex other synthetic fabrics, leather, and painted or varnished surfaces. It does not damage natural fibers such as cotton or wool and has no effect on nylon.

USE DEET ACCORDING TO MANUFACTURER'S DIRECTIONS.

* Do not use mixtures with more than 10% DEET on children. Never apply a repellent to an infant (1 year of age or under). Instead, avoid outdoor activities or use netting/screens to avoid bites.

- * Do not allow children to apply DEET themselves. Apply it to your own hands, then put it on the child.
- * Avoid putting DEET on children's hands or near their eyes and mouth.
- * Do not spray directly on the face; spray into the hands first, then apply to the face.
- * Do not apply to cuts, wounds or irritated skin.
- * Do not use under clothing.
- * Do not spray DEET products in enclosed areas.
- * DEET is effective for about 4 hours. Avoid prolonged or excessive use. Use sparingly; just enough to cover exposed skin and clothing.
- * Wash all treated skin after returning indoors.
- * Store DEET out of the reach of children.

OTHER CDC RECOMMENDED REPELLENTS

The CDC now also recommends repellents containing picaridin, oil of lemon eucalyptus or IR3535, all of which offer long-lasting protection against mosquitoes.

Picaridin repellents are pleasant to the skin and don't have the odor of DEET repellents.

Oil of lemon eucalyptus is a natural ingredient, which many people prefer. These two products provide 4 - 6 hours of protection.

IR3535 has been available in Europe for over 20 years and has been sold in the US since 1999. It is for use against mosquitoes, ticks, and biting flies. A 2008 study showed protection times up to 10 hours against mosquitoes, and up to 12 hours against black-legged ticks.

OTHER REPELLENTS

Consumers have reported Avon's Skin-So-Soft to be an effective mosquito repellent. When tested, Skin-So-Soft oil provided 40 minutes of protection from mosquito bites, 10 times less than that of 12.5% DEET. But if you will only be outdoors for a short time or are treating children, this may be enough, and will avoid the chemicals associated with DEET.



Citronella is the active ingredient found in most "natural" or "herbal" insect repellents. Studies show that it can be effective, but it provides shorter protection time than most DEET-based repellents.

Citronella candles have been promoted as an effective way to repel mosquitoes in the yard. In one study, people near the candles had 42% fewer bites than those who had no protection. However, burning ordinary candles reduced the number of bites by 23%.

Bite Blocker is a plant-based repellent. Studies showed that it gave more than 97% protection against mosquitoes, even 3.5 hours after application.



Pyrethrum is a powerful insecticide, derived from the dried flowers of the *Chrysanthemum cinerariifolium*. Permethrin is a man-made synthetic. Both are effective against mosquitoes, flies, ticks, and chiggers. **Permethrin should not be applied to skin**, only to clothing or other fabrics. Doing so may cause poisoning.

The combination of permethrin-treated clothing and skin application of a DEET-based repellent creates a formidable barrier against mosquitoes. In a field trial under intense biting conditions, persons wearing permethrin-treated clothing and a 35% DEET product had more than 99.9% protection over 8 hours. **Protected persons received an average of 1 bite per hour, whereas unprotected persons suffered an average of 1,188 bites per hour.**

**DON'T LET MOSQUITOES BREED OR BITE!
DRAIN WATER – USE REPELLENTS – USE
LARVICIDE**

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Protecting Your Family from Mosquitoes



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