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Tips to Deter Mosquitoes from Ponds, Fountains and Water Gardens?

by Andrew Sutherland, UC IPM Program

Many home landscapes feature fountains, ponds and other water elements as focal points. Water gardens are beautiful and calming, but, if not managed properly, can add an unpleasant element to the landscape … mosquitoes. There are some simple tips to help prevent mosquito infestations, but first it is important to understand mosquito biology.

Backswimmer Insect, a mosquito predator

Mosquitoes are small flies. They have a 4 stage insect lifecycle: egg, larva, pupa, adult. They lay their eggs in, on, or near stagnant water. The eggs hatch and the larvae (also called wigglers) live in water and feed on organic debris until they transform into the next stage, a motile pupa (yes, they move). An adult mosquito emerges from a pupa. This process, from egg to adult, requires as little as one week, when conditions are favorable. Emerging females must mate and ingest blood in order to produce new eggs.

Mosquito fish eats mosquito larva

Mosquitoes can be managed using an integrated approach that relies mostly on prevention, using biological and chemical controls when necessary. The key strategy is to eliminate all potential breeding sites; even one ounce of standing water can support a population of larvae. How can you tell if you have mosquito larvae? It is rather interesting that mosquito larvae have a breathing tube called an abdominal siphon that is used to breathe air. Check the water surface and watch for the larvae's characteristic wriggling movement as they come to the surface to breathe. Or you can dip a fine net to monitor for larvae.

Mosquito larvae just under the surface of the water

Three above photos by J.K. Clark, UC

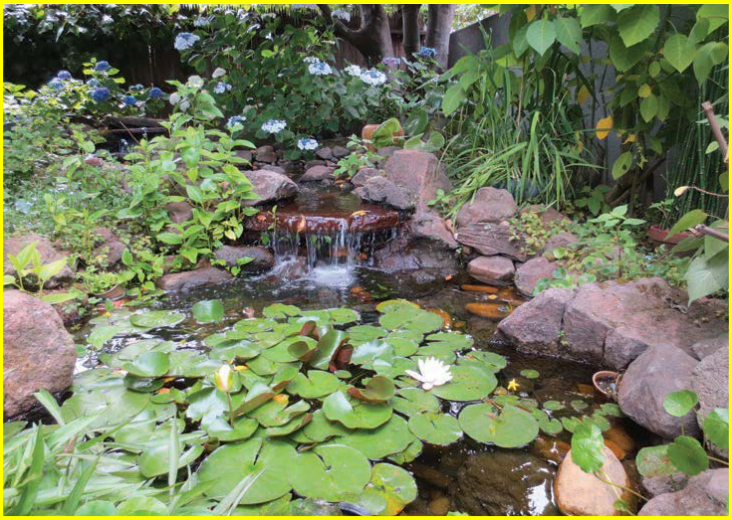
Water will attract adult mosquitoes, but trying to control the adults or prevent them from laying eggs is difficult. It is a lot easier to manage the larvae, since they are concentrated in known areas, they don't yet bite, and they can't fly away. If you are constructing a pond, keep in mind that mosquito larvae prefer shallow water that is less than 24 inches deep. Ponds or features with steep slopes, or vertical walls that quickly drop off into deep water are less favorable to

mosquitoes. Fountains or waterfalls that increase water circulation also reduce water stagnation. Moving water deters mosquito breeding.

Remove excess vegetation and algae on the water that provide mosquito larvae with food, shelter from the sun, and hiding places from predators. Smaller ponds may just need to be cleaned with skimmer nets, but large ponds will require a mechanical pond skimmer.

The mosquito has natural enemies like bacteria, nematodes, other insects, crustaceans, and fish that help keep numbers of mosquito larvae low in nature. The homeowner should recognize and nurture a couple of beneficial insect predators that commonly colonize ponds and water features: the dragonfly and the backswimmer. Another predator is the mosquito fish (*Gambusia affinis*), a voracious consumer of mosquito larvae and pupae, usually available for free from mosquito abatement districts.

Although these measures will prevent problems, mosquito larvae may still develop in some ponds. In gardens with lots of plants growing in still water, it may be impossible to keep mosquitoes from breeding. Larvicides have been specially designed for use against mosquitoes in water. They contain spores or metabolites of the bacterium *Bacillus thuringiensis israelensis* (Bti), which acts as a stomach poison and kills larvae within a few days. Bti affects only fly larvae, so it won't harm other predatory insects. Trade names include Mosquito Dunks, Mosquito Bits, Microbe-Lift, etc.



A well-managed water garden keeps mosquito numbers in check.

Photo by M.L. Flint, UC

Another effective larvicide is the insect growth regulator (IGR) methoprene (e.g. Pre-Strike Torpedos). IGRs interfere with molting and also take a few days to kill but they have a broader spectrum of activity affecting most juvenile insects and arthropods that might be in the pond.

Both Bti and methoprene are available as granules or pellets, remain effective for about a month, and as with all pesticides, should be used only according to label directions. Avoid using broad spectrum insecticides in pond-like water features or your mini ecosystem will be knocked out of balance.

For more information about mosquitoes, visit http://www.ipm.ucdavis.edu and download the Mosquito Pest Note.

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