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## Can I Use Vinegar to Control Weeds?

**A**cetic acid, also known as vinegar, is used in products for weed control. Many people choose it because it is natural. However, acetic acid can damage skin and eyes, especially at concentrations commonly found in weed killers (Figure 1).

### What is the difference between acetic acid, vinegar, and horticultural vinegar?

You may know acetic acid best as vinegar. Vinegar is a solution of acetic acid in water. Acetic acid is a naturally occurring substance that is found in all living things. It is formed during fermentation. Acetic acid can also be made industrially. It is used in many industrial processes, including the manufacture of dyes, plastics, some drugs, and other industrial chemicals. It is also used in textile printing.

Household vinegar such as distilled white vinegar used for cleaning or cooking generally contains 4–6% acetic acid, which is diluted in water. Higher strength acetic acid solutions are sold for other purposes. Horticultural vinegar typically refers to a concentrated solution of 20% or more acetic acid. It is sold to kill weeds. You may find even higher concentrations of acetic acid sold in stores or online.

### Are there health risks of using vinegar/acetic acid?




Acetic acid is irritating to the eyes and skin. At concentrations above those usually found in household vinegar, it can be extremely irritating or corrosive. Acetic acid can permanently damage the corneas if it gets into your eyes. It can burn skin and the tissues of your mouth and throat if you accidentally swallow it.



Figure 1. The potential health hazards of concentrated vinegar.

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# Vinegar for Weed Control

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People have had irritation in their nose, throat, and in their lungs if they breathed in enough of the vapor.

Never leave any pesticide unattended around children or pets. Never leave any pesticide in an unlabeled container. "Natural" does not mean "safe!" Remember, the dose makes the poison. The higher the concentration of acetic acid, the greater the risk.

## ***How does vinegar/acetic acid kill weeds?***

Acetic acid is a non-selective contact herbicide. It must touch the foliage of the plant in order to work. It does not damage tissue it does not touch. It does not travel throughout the plant. Acetic acid breaks open cell walls and causes cell death. The plants die by drying out.

Acetic acid breaks down rapidly in the environment. It does not leave a residue.

Acetic acid readily turns into a vapor. Like other chemicals, warmer temperatures increase volatilization, or turning into a vapor. The vapor can irritate the nose, throat, and lungs if breathed in. Prolonged exposure to high concentrations of the vapor can cause fluid buildup in the lungs.

## ***What sort of pesticide/herbicide products contain vinegar/acetic acid?***

Products containing vinegar/acetic acid that have been registered by the United States Environmental Protection Agency (U.S. EPA) as pesticides/herbicides will have a signal word and an EPA registration number on their packaging. Label information includes where and how to use the product, what precautions to take, personal protective gear to wear while using the product, and first aid instructions in case something goes wrong.

Products registered to be used as herbicides have high concentrations of acetic acid, typically 20% or more. All registered herbicides containing acetic acid have a signal word of DANGER because of the high concentrations and high toxicity. Specifically, it is because of the risks of the acid to the eyes and

skin. Low concentrations of acetic acid are used in insect lures.

Acetic acid is available commercially for many purposes. Consider purchasing a product registered as a pesticide if you plan to use acetic acid for weed control. Doing so means you will have directions for use as an herbicide and information on precautions you can take to keep risks low. Products that do not have an EPA registration number and signal word are not registered to be used as herbicides and may not have appropriate safety or precautionary information for that use. Look for an EPA Registration Number and a signal word to ensure you are purchasing a registered product.

## ***How can I reduce the risks when using vinegar/acetic acid?***

- \* Any time you use a pesticide, always read and follow all label instructions. The label is the law.
- \* If the label specifies personal protective equipment, you must use that equipment.
- \* Wear long sleeves, long pants, shoes, socks, and gloves at a minimum whenever using any pesticide.
- \* Consider wearing protective eye wear and chemical resistant gloves when mixing, diluting, or applying vinegar as an herbicide because of its acidic and corrosive nature. The label instructions may require their use.
- \* Keep everyone else away from the treatment area until dry.
- \* Keep all pesticides away from children and pets. Remember that horticultural vinegar can badly damage your eyes or blind you!

Consider integrated pest management strategies that do not use chemicals to control weeds.

For more information about pesticides and pesticide safety, visit the National Pesticide Information Center (NPIC) at [npic.orst.edu](http://npic.orst.edu).

—National Pesticide Information Center,  
Oregon State University Extension Services

# Organic, Natural, and Less Toxic: What's the Difference?

You've heard of terms such as green, organic, natural, ecofriendly, and less toxic to describe pest control products and services. But what do these terms really mean? To different people, they can mean different things, creating obvious confusion. But some of these terms have specific meanings, regulations, and rules when referring to pesticides and pest control. This article aims to clarify the differences.

## What is organic?

Some people think organic means no pesticides, but that is incorrect. The term organic (in the context of food production and pest control) can mean no pesticides were used, but it can also mean that only organically acceptable pesticides and fertilizers were used.

The term "organic" is regulated by federal agencies. The U.S. Environmental Protection Agency (EPA) determines whether a pesticide can be labeled organic. In addition, the United States Department of Agriculture's (USDA) National Organic Program (NOP) sets standards for organic pesticides and fertilizers. Pesticides that meet these standards may use the EPA's three leaf logo, and the NOP statement "For Organic Gardening".

Organic pesticides may be naturally derived from plants or made from natural elements, or they can be artificially made. While organic pesticides are often less toxic to people, beneficial insects, or other organisms, some can be just as harmful as certain conventional pesticides.

If you choose to use pesticides around your home or garden and want them to be organically acceptable, look for the EPA's three leaf logo with the NOP statement "For Organic Gardening" or the



FOR ORGANIC GARDENING

The EPA's three leaf logo may appear on pesticides that meet NOP standards. Some pesticides may also include the NOP statement "For Organic Gardening".



Figure 1. Some pesticides are derived from plants. The active ingredient pyrethrum is derived from chrysanthemum flowers.

HF Schwartz, Colorado State U. Bugwood.org

OMRI seal. The Organic Materials Review Institute (OMRI) is an independent nonprofit organization that reviews and determines whether inputs (fertilizers and pesticides) are allowed for organic use in accordance with one or more specific organic standards.

## What does natural mean?

You may have come across pesticide products that contain "natural" ingredients such as oils of rosemary, peppermint, or thyme. The term "natural" is not defined by any federal program or organization. For this reason, the terms "natural" or "naturally" are not allowed on pesticide labels registered by EPA.

Certain ingredients, like many plant-based oils, are exempt from EPA registration because they are

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The OMRI seal may appear on pesticides approved by the Organic Materials Review Institute.

# Organic, Natural, and Less Toxic continued from p. 3

considered to pose little to no risk to human health or the environment. Since EPA does not register these products, the product manufacturers may use the terms “natural” or “naturally.” These products do not have efficacy data to prove that they work against the target pests.

## **What is less toxic?**

Toxicity is the ability of a chemical to injure a person, plant, or other organism. The term less toxic is not officially defined by regulatory agencies, but it generally means a pesticide or practice presents fewer risks to people, the environment, and non-target organisms (such as pollinators, fish, and other wildlife).

Less toxic pesticides often include active ingredients that are organically acceptable but may also include others that are not.

Some less toxic pesticides that are often available in stores as organic formulations include pesticidal soaps (potassium salts of fatty acids), horticultural oils (vegetable or petroleum oils), botanicals

(neem, limonene, pyrethrin), minerals (diatomaceous earth, sulfur, boric acid), and biologicals (*Bacillus thuringiensis* (Bt), spinosad).

While you may assume products labeled organic or natural are better for you and the environment, that is not always the case. All pesticides, whether they’re less toxic, natural, or organic, can be harmful to the environment and non-target organisms when not used appropriately. Review the product label and look at the active ingredients listed.

For more information about specific pesticide active ingredients, see the UC IPM Pesticide Active Ingredient database or visit the National Pesticide Information Center’s (NPIC) pesticide fact sheets.

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UC IPM Urban & Community Team

## Updated UC IPM Pesticide Active Ingredient Database

UC IPM is excited to announce the update to our home and garden Pesticide Active Ingredient Database [ipm.ucanr.edu/home-and-landscape/pesticide-active-ingredients-database](http://ipm.ucanr.edu/home-and-landscape/pesticide-active-ingredients-database).

This database is designed to help residents and licensed professionals better understand the risks pesticide active ingredients pose to people and the environment.

Each active ingredient page includes what it is, how it works, and what pests it is designed to control, as well as potential hazards of the active ingredient. The potential hazards table includes toxicity information for water quality, natural enemies, honey bees, and people or other mammals. Most pages also include example products available to the general public and licensed professionals



The database is linked to the UC IPM’s *Pest Notes*, allowing viewers to compare toxicity ratings of pesticides listed as potential tools when selecting management options.

# Mosquito Management for Ponds, Fountains, and Water Gardens

**M**any gardeners have fountains, ponds, and other water features in their landscapes. Water gardens are beautiful and calming, but, if not managed properly, can add an unpleasant element to the landscape—mosquitoes. How can you prevent mosquito infestations?

## How do mosquitoes develop?

First, it is important to understand mosquito biology. Mosquitoes are small flies that lay their eggs in, on, or near stagnant water. The larvae, or wigglers (Figure 1), that hatch from the eggs live in water and feed on organic debris until they transform into a motile pupa, or tumbler, and finally into the familiar adults. This process, from egg to adult, requires as little as one week when conditions are favorable. Emerging females must mate and ingest blood to produce new eggs.

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. What can be done, however, when an outdoor space contains a water element?

## Tips for managing mosquitoes in water features

Water features in the landscape will invariably attract adult mosquitoes, but attempting to control them or prevent their egg laying is difficult. Larvae are easier to manage, since they are concentrated in known areas, don't yet bite, and can't fly away. Larvae prefer shallow water that is less than 24 inches deep, so install water features that are deeper than 2 feet. Ponds or features that provide a steep slope or have vertical walls that quickly drop off into deep water will also be less favorable to mosquitoes. Add a fountain, waterfall, or other device that increases water circulation and reduces the stagnation that allows mosquitoes to breed.



Figure 1. Mosquito larvae, like these *Culex tarsalis* encephalitis mosquitoes, must come to the surface to breathe air through abdominal siphons.

Jack Kelly Clark, UC IPM



Figure 2. The mosquito fish, *Gambusia affinis*, and four mosquito larvae with breathing siphons.

Jack Kelly Clark, UC IPM

Remove excess vegetation and organic debris that provide mosquito larvae with food, shelter from the sun, and hiding places from predators. For larger ponds, a pond skimmer will help keep mosquitoes and the algae that favors them under control. If you have a smaller pond, you can use pond skimmer nets. If fertilization is required, use pond spikes designed to prevent algae blooms.

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# Mosquitoes in Water Features continued from p. 5

In natural environments, bacteria, nematodes, other insects, crustaceans, and fish often keep numbers of mosquito larvae low. Protect predators such as dragonflies and backswimmers, which may have colonized ponds, by avoiding broad-spectrum insecticides and consider introducing fish. County vector control services may provide free mosquito fish (Figure 2), voracious consumers of mosquito larvae and pupae. Never release mosquito fish into natural water bodies, since these fish aren't native to California and can disrupt ecosystems.

Although these measures will prevent problems in most cases, 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. Regularly check their water features for larvae, which periodically come to the surface to breathe through abdominal siphons. Watch for the larvae's characteristic wriggling movement, or use fine dip nets to monitor for larvae. It is important to act quickly to kill mosquitoes when they are small, easiest to manage, and before they become adults and start biting.

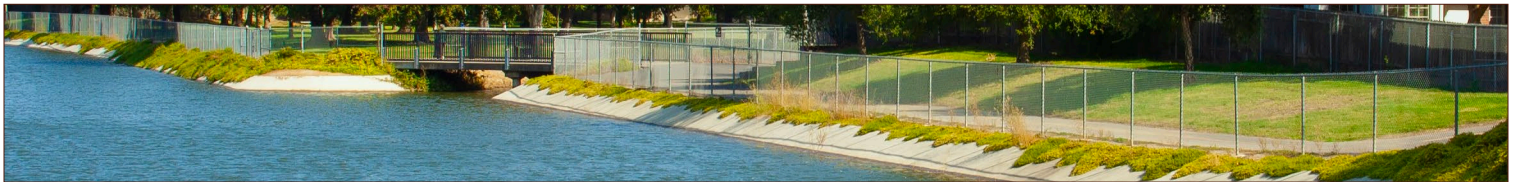
## *Pesticides for mosquito larvae*

Use larvicides specially designed for use against mosquitoes in water. Larvicides containing spores or metabolites of the bacterium *Bacillus thuringiensis ssp. israelensis* (Bti) (e.g., Mosquito Dunks, Mosquito Bits, Microbe-Lift, and other products) act as stomach poisons when ingested, killing larvae within a few days. Bti affects only fly larvae, so it won't harm predatory insects living in the pond or water feature. Another effective larvicide is the insect growth regulator (IGR) methoprene (e.g., Pre-strike Torpedos). IGRs interfere with larval molting and also take a few days to kill, but they have a broader spectrum of activity, affecting most juvenile insects and other arthropods that might be in the pond. Both Bti and methoprene are available as granules or pellets and remain effective for about a month. As with all pesticides, use these only according to label directions.

For more information about mosquitoes, visit [ipm.ucanr.edu/PMG/PESTNOTES/mosquitoes.html](http://ipm.ucanr.edu/PMG/PESTNOTES/mosquitoes.html).

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# Urban Water Quality Pages Updated



**P**esticides and fertilizers applied around homes, residential or commercial landscapes, school sites, and other areas can enter our creeks, rivers, and oceans, degrading water quality. While pesticides and fertilizers can be useful in controlling pests and helping plants grow, their overuse and misuse can harm the environment and human health.

To find out more, see our updated pages on urban pesticides, fertilizers, and water quality. These pages feature plain language definitions of toxicity and water quality and explanations of how pesticides and fertilizers get into our waterways. There's also information about how you can protect our creeks, rivers, and oceans when managing your home and landscape.

Learn about urban water quality at [ipm.ucanr.edu/home-and-landscape/urban-pesticides-fertilizers-and-water-quality/](http://ipm.ucanr.edu/home-and-landscape/urban-pesticides-fertilizers-and-water-quality/).

# What Are Exotic and Invasive Pests?

**E**xotic and invasive pests threaten California's natural environments, agricultural production, structures, landscapes and gardens. Exotic pests are organisms introduced into an area beyond their natural range and become pests in the new environment. Most introductions have been unintentional and accidental, but some invasive plant problems began as ornamental plants for sale.

Invasive species prevention is the most economical and desirable approach to invasive species management. However, when prevention isn't successful, pesticides may be needed to eradicate or control invasive species.

## *What are some of the most problematic invasive species?*

**Aedes mosquitoes** can transmit some of the most debilitating and deadly mosquito-borne pathogens to humans, such as Zika virus, dengue virus, chikungunya virus, and yellow fever virus. One *Aedes* species is also capable of transmitting heartworm to dogs. These invasive mosquitoes are now present in many regions of California, from Shasta County to San Diego County.

The **glassy-winged sharpshooter** (Figure 1) is a large leafhopper that can transmit several important, often fatal, plant diseases in California. This includes Pierce's disease of grape, alfalfa dwarf, almond leaf scorch, and mulberry leaf scorch. Pierce's disease is of most concern in California since the state produces 94% of U.S. grapes.

**Pampasgrass** is a common ornamental landscape plant that readily naturalizes throughout California's coastal areas and some interior regions. Historically, pampasgrass was planted for erosion control, but it has since escaped cultivation and spread along sandy, moist ditch banks throughout coastal regions of southern California. Pampasgrass can also grow in the hot, dry climate of inland areas of California.

**Hydrilla** is an invasive, aquatic weed that can be found in many slow-moving fresh water bodies in California. The plant forms large mats that can



Figure 1. Glassy-winged sharpshooter adult.

Jack Kelly Clark, UC IPM

crowd out native plants, restrict water flow, and interfere with boating and fishing. These mats can reduce habitat for fish and other wildlife, degrade water quality, and increase the risk of flooding

## *What can you do?*

- \* Learn to identify invasive species new to California. See the UC IPM Invasive and Exotic pests page [ipm.ucanr.edu/invasive-and-exotic-pests/](http://ipm.ucanr.edu/invasive-and-exotic-pests/).
- \* Use plants native to your area for landscaping. Native plants can require less water, provide habitat for native butterflies and pollinators, and usually have fewer pest problems, too.
- \* Don't release exotic or invasive plants into the environment. Never dump your aquatic plants or aquarium water into streams or creeks, since many aquarium plants are highly invasive.
- \* Be careful what you bring back when you travel. Don't bring foreign plant or animal material into California.
- \* Don't move firewood. Buy it where you burn it.
- \* Report invasive species in your area! Contact your local UC Cooperative Extension office or Agricultural Commissioner.
- \* Cooperate with authorities during invasive species control activities.

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# Invasive Pest Spotlight: *Aedes* Mosquitoes

The invasive pest spotlight focuses on emerging or potential invasive pests in California. In this issue we are covering invasive *Aedes* mosquitoes: the yellow fever mosquito (*Aedes aegypti*) and the Asian tiger mosquito (*Aedes albopictus*) (Figure 1).

## *Aedes* mosquito facts

*Aedes* mosquitoes can transmit some of the most debilitating and deadly mosquito-borne pathogens to humans, such as Zika virus, dengue virus, chikungunya virus, and yellow fever virus. Unlike most native mosquitoes, they prefer to bite during the day. They prefer to bite humans, often on the ankles and legs. The adults are small black mosquitoes with distinctive white stripes on their legs and body.

Many *Aedes* mosquitoes live in close contact with people and can breed in backyards and even inside homes. They are known as “container breeding mosquitoes” because they lay eggs in small containers, such as plant saucers, buckets, flowerpots or old tires (Figure 2). Eggs are laid in moist areas just above the water surface, can overwinter, and are resistant to drying so may remain viable for months or longer. Their entire life cycle can occur in as little as 7–8 days.

## What can you do?

Since these mosquitoes primarily breed on residential properties, you can help by eliminating mosquito breeding sources around your home. This includes draining standing water in rain gutters, buckets, and watering cans. Change the water in pet dishes and bird baths weekly. Clean up clutter in the yard since these mosquitoes can lay their eggs in anything that can hold water. If you have a pond, treat it with *Bacillus thuringiensis* subspecies *israelensis* (Bti) or add mosquito fish.



Figure 1. Adult Asian tiger mosquito, *Aedes albopictus*.

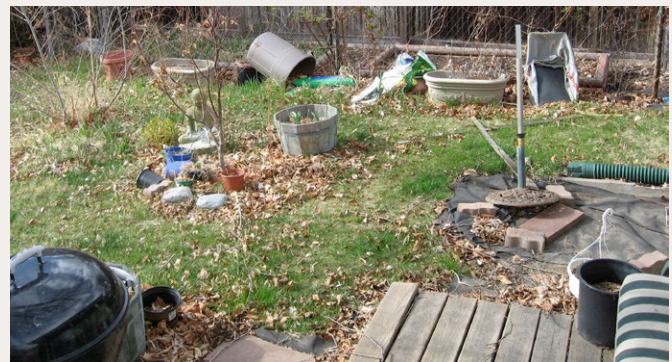


Figure 2. Cluttered backyard with multiple breeding sources for *Aedes* mosquitoes.

Wear mosquito repellents and protective clothing outdoors. Keep them out of your home by keeping fine mesh screens on windows and doors in good condition.

For more information, see the UC IPM *Pest Notes: Mosquitoes*:

[ipm.ucanr.edu/PMG/PESTNOTES/pn7451.html](http://ipm.ucanr.edu/PMG/PESTNOTES/pn7451.html)

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For more information about managing pests, contact your University of California Cooperative Extension office, or visit the UC IPM website at [ipm.ucanr.edu](http://ipm.ucanr.edu).

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Greater L.A. County Vector Control