

# How to Keep the Bugs Away

Discover which repellents work well—and those that don't—against mosquitoes and ticks.

by Jeneen Interlandi

**LIKE MOST UNINVITED** guests, mosquitoes and ticks tend to linger—in this case, well after summer celebrations end. Depending on where you live, you may need to take precautions against those bugs into autumn, according to the Centers for Disease Control and Prevention.

What's more, the number of diseases that the insects carry and the geographical range across which they can spread are growing. That includes familiar diseases, like West Nile and Lyme, and some lesser-known ones, such as Powassan. "Mosquitoes and ticks are being found in new areas," says a CDC spokesman, Benjamin Haynes. "We also know that many people do not recognize the risks of getting bitten or regularly take steps to protect themselves."

Those measures include things like ridding your yard of standing water (where mosquitoes breed), repairing any holes in the screens on your windows and doors, and wearing long pants and closed-toe shoes plus socks when in the great outdoors.

It also means using an effective repellent. But making sense of the options isn't easy. Do lotions work as well as sprays? Are store brands okay? Is the active ingredient the only thing you really need to know? And what about "natural" repellents?

## What Works Best

Our ratings focus on how long a repellent protects against mosquitoes. The highest-rated products protect for 6.5 hours or more, the lowest-rated

ones for 2 hours or less. Our tests have shown that repellents that work well against mosquitoes consistently protect against ticks, too.

We also found that the type and concentration of active ingredient were most important in identifying effective repellents. Among our nine recommended ones, there are only three active ingredients: deet, at 15 to 30 percent concentration; 20 percent picaridin; and 30 percent oil of lemon eucalyptus (OLE). Products with lower concentrations of those ingredients didn't work as well, nor did those with other active ingredients.

The Environmental Protection Agency says—and our experts agree—that when used appropriately, those three ingredients are safe.

## The Problem With 'Natural'

Picaridin and OLE are derived from plants. Picaridin is a synthetic chemical modeled after one found in black pepper plants; OLE is an oil extract of the gum eucalyptus tree.

Many other plant-based repellents, or botanicals, are also available, including those with citronella, geraniol, or soybean oil. But unlike picaridin- and OLE-based repellents, botanicals aren't registered with the EPA. That's because the agency considers botanicals unlikely to pose serious risks, so it doesn't require manufacturers to prove that the products actually work.

And our testing has repeatedly found that they don't work well. In addition, while botanicals may not pose serious safety risks, they can cause allergic

reactions. More important, using a less effective repellent leaves you vulnerable to dangerous insect-borne diseases.

## Face-Off: Lotion vs. Spray

Our top-performing repellents include sprays and lotions, suggesting that you don't have to worry too much about the form of your repellent—with one important exception.

We found that Sawyer's 20 percent picaridin lotion protected for less than an hour, while its 20 percent picaridin spray worked for 7 hours. Travis Avery, a company spokesman, suggests that the discrepancy stems from the amount of repellent we applied on our test subjects. People usually apply about 1.5 times as much lotion as we used in our test, he says, and at that higher amount the lotion is long-lasting, he maintains. "Sawyer stands by the effectiveness and longevity claims on our product," Avery says.

Consumer Reports tests all repellents using the same amount of each product, to ensure a fair comparison. The EPA doesn't require that manufacturers tell consumers exactly how much repellent to apply—and Sawyer's label doesn't recommend specific amounts (nor do any other repellents we tested).

Joe Conlon, an adviser to the American Mosquito Control Association, says there's no reason to apply more of one repellent than another. "Use just enough to cover your skin," he says. "That should be enough for any product to work as advertised."

**Ratings** > **Bug Busters** Focus on effectiveness against mosquitoes and ticks, but look at cost and risk to clothes and other materials, too. All products we recommend are safe when used properly.

POOR
 EXCELLENT
   
 CR BEST BUY
 RECOMMENDED

Recommended	Rank	Brand & Product	Price	Overall Score	Test Results		Active Ingredients	Type	Cost Per Oz. (\$)
					Protection Against Mosquitoes and Ticks	Resists Damage to Materials			
	1	<b>Total Home</b> (CVS) Woodland Scent Insect Repellent	\$7	95			Deet 30%	Aerosol	1.17
	2	<b>Off</b> Deep Woods Insect Repellent VIII Dry	\$8	94			Deet 25%	Aerosol	2.00
	3	<b>Repel</b> Plant-Based Lemon Eucalyptus Insect Repellent2	\$5	91			Oil of lemon eucalyptus 30% [Approx. 65% p-menthane-3,8-diol]	Pump Spray	1.25
	4	<b>Ben's</b> 30% Deet Tick & Insect Repellent	\$8	88			Deet 30%	Aerosol	1.33
	5	<b>Sawyer</b> Premium Insect Repellent 20% Picaridin	\$7	84			Picaridin, 1-Methylpropyl-2-(2-hydroxyethyl)-1-piperidine carboxylate 20%	Pump Spray	1.75
	6	<b>Repel</b> Insect Repellent Scented Family 15% Deet	\$4	84			Deet 15%	Aerosol	0.62
	7	<b>Sawyer</b> Ultra 30 Insect Repellent	\$10	84			Deet 30%	Lotion	3.33
	8	<b>Off</b> Deep Woods Sportsmen Insect Repellent II	\$5	74			Deet 30%	Aerosol	0.63
	9	<b>Natrapel</b> Tick & Insect Repellent	\$9	70			Picaridin 20%	Aerosol	1.50
	10	<b>Coleman</b> SkinSmart Insect Repellent	\$8	58			3-[N-Butyl-acetyl]-amino propionic acid ethyl ester IR3535 20%	Aerosol	1.33
	11	<b>Coleman</b> Botanicals Insect Repellent	\$6	56			Oil of lemon eucalyptus 30% [Approx. 65% p-menthane-3,8-diol]	Pump Spray	1.50
	12	<b>Avon</b> Skin-So-Soft Bug Guard Plus Picaridin	\$16	56			Picaridin 10%	Aerosol	4.00
	13	<b>HOMS</b> BioUD Insect Repellent & Clothing Treatment Mini Trigger	\$9	38			2-Undecanone (CAS # 112-12-9), 7.75%	Pump Spray	1.50
	14	<b>Cutter</b> Lemon Eucalyptus Insect Repellent	\$5	36			Oil of lemon eucalyptus 30% [Approx. 65% p-menthane-3,8-diol]	Pump Spray	1.25
	15	<b>Cutter</b> Skinsations Insect Repellent1	\$6	21			Deet 7%	Pump Spray	1.00
	16	<b>Up &amp; Up</b> (Target) 7% Deet Insect Repellent Unscented	\$5	10			Deet 7%	Pump Spray	0.67
	17	<b>All Terrain</b> Herbal Armor Natural Insect Repellent	\$10	9			Oil of soybean 11.5%, oil of citronella 10%, oil of peppermint 2%, oil of cedar 1.5%, oil of lemon grass 1%, oil of geranium 0.05%	Pump Spray	2.50
	18	<b>Off</b> FamilyCare II Insect Repellent Clean Feel	\$6	9			Picaridin 5%	Pump Spray	1.00
	19	<b>Cutter</b> Natural Insect Repellent	\$4	9			Geraniol 5%, soybean oil 2%, sodium lauryl sulfate 0.4%, potassium sorbate 0.1%	Pump Spray	0.67
	20	<b>All Terrain</b> Kids Herbal Armor Natural Insect Repellent	\$10	7			Oil of soybean 11.5%, oil of citronella 10%, oil of peppermint 2%, oil of cedar 1.5%, oil of lemon grass 1%, oil of geranium 0.05%	Pump Spray	2.50
	21	<b>EcoSmart</b> Insect Repellent	\$6	5			Geraniol 1%, rosemary oil 0.5%, cinnamon oil 0.5%, lemon-grass oil 0.5%	Pump Spray	1.00
	22	<b>California Baby</b> Natural Bug Blend Bug Repellent	\$16	5			Pure essential oils of cymbopogon nardus (citronella) 5%, cymbopogon schoenanthus (lemon grass) 0.5%, cedrus atlantica (cedar) 0.5%	Pump Spray	2.46
	23	<b>Sawyer</b> Picaridin Insect Repellent	\$9	4			Picaridin, 1-Methylpropyl-2-(2-hydroxyethyl)-1-piperidine carboxylate 20%	Lotion	2.25
	24	<b>Up &amp; Up</b> (Target) Deet-Free Insect Repellent	\$5	4			Oil of citronella, 2.5%, geraniol, 2.5%, soybean oil, 1.5%, potassium sorbate, 0.1%	Pump Spray	0.67
	25	<b>HOMS</b> Organic Bite Blocker Insect Repellent Itch & Sting Relief	\$9	3			Soybean oil, 2%, geranium oil, 5%	Lotion	2.25

**HOW WE TEST** We apply a standard dose of repellent to a measured, exposed area on the forearms of test volunteers, and have them stick

each arm into a cage of disease-free mosquitoes. This is done at 30 minutes and 1 hour after applying, then hourly until the tester receives either two bites

in one 5-minute session or one bite in each of two consecutive sessions. Excellent repellents protect for more than 6.5 hours; poor ones for 2 hours

or less. Repellents that work well against mosquitoes also work well against ticks, our tests have shown. For more information, go to [CR.org/repellents0917](http://CR.org/repellents0917).