

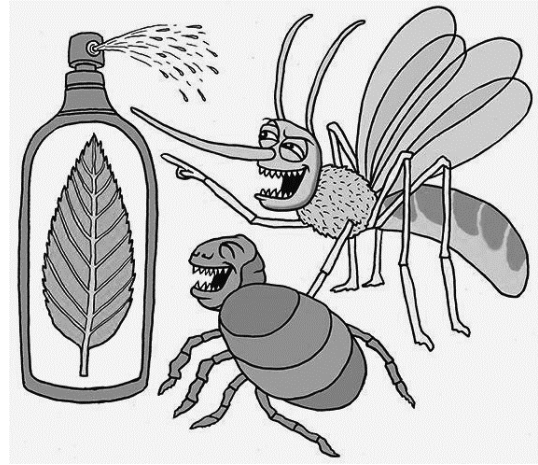
How to beat the bugs

adapted from an article by Brooke Borel

It was a long winter for many of us, so the return to warm weather makes upcoming plans for barbecues and picnics sound all the sweeter. Those outdoor activities, of course, come with an itchy, harsh reality: mosquitoes and ticks, as well as the nasty illnesses they spread. How should you protect yourself?

- 1 In the United States, there are two categories of insect repellents: those that are registered and those that are not. The Environmental Protection Agency regulates the distribution, use, and sale of all insect repellents, along with all other pesticides. For registered products, this means that any company that would like to sell a particular pesticide must hand over a slew of safety and efficacy data to the EPA. If the data are sufficient, the EPA registers a label for that product specifying exactly where and how it can be used.
- 2 For certain products, there is 20 — specifically for those all-natural bug sprays that your well-meaning, chemical-fearing friend is pressing into your hand at the picnic. In 1996 the EPA exempted 31 pesticide ingredients from registration, in part to make it easier for companies to bring related products to market. These minimum-risk pesticides, as they're called, are "demonstrably safe for the intended use" and mainly include foods and essential oils such as citronella, cloves, and mint. Because the EPA has already deemed these ingredients safe, the agency doesn't need to see related safety data for each new product that includes them. The trouble is, the agency doesn't require efficacy data either. Many exempt products boast "EPA-Approved" on their labels, which is a little misleading. For safety, this is true. But this does not mean that the EPA says the products repel any insects.
- 3 Of course, just because the EPA doesn't require efficacy data doesn't mean these ingredients fail to repel biting pests. But the science isn't promising. Take citronella, among the most commonly sold exempt ingredients. Undiluted, citronella oil may repel mosquitoes for two hours. Common products with 5 percent to 15 percent concentrations, however, may last just 20 to 30 minutes, and other studies suggest citronella candles don't offer much protection at all. 21 show up for many ingredients on the list, if data even exist. And while higher concentrations work best for some of these products, they are also more likely to cause irritation of the eyes, lungs, and skin.

- 4 There are other options that may please everyone. Newer EPA-registered (not just approved) alternatives have proved to be nearly or as effective as DEET, one of the most effective and long-lasting insect repellents available. One is picaridin, a synthetic version of piperine, the chemical that gives black pepper its kick; another is IR3535, a biopesticide based on the amino acid alanine that Europeans have used happily for many years and that the EPA approved for use in the United States in 1999.



- 5 For full-on chemophobes who seek a registered product, there is lemon-eucalyptus oil, which works as well as low concentrations of DEET and may last for up to six hours. For adventurous chemophobes, there is PMD, the synthetic version of lemon eucalyptus. Both are generally safe, although neither should be used on children under the age of 3 (just another example of the fact that 23).
- 6 24, there are those who will still tout the 100 percent all-natural repellents. They're welcome to it. I, for one, as a resident of a region plagued with both West Nile virus and Lyme disease, will stick with science and use products with the ingredients recommended to protect against mosquitoes and ticks. Biting, disease-carrying arthropods don't heed the all-natural fad. I won't, either.

Brooke Borel writes for Popular Science and TED.com, among others, and is working on a book about bedbugs.

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