

Creating Sustainable School and Home Gardens: Organic Pest Management

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03/19/2025



What Is Organic Pest Management?

“A person who is growing a garden, if he is growing it organically, is improving a piece of the world. He is producing something to eat, which makes him somewhat independent of the grocery business, but he is also enlarging, for himself, the meaning of food and the pleasure of eating.”

- Wendell Berry

Organic farming, an agricultural method that focuses on ecological balance, avoids using synthetic chemicals while relying on natural methods of soil enrichment and pest control to produce plants and animal products. This approach strives to create a healthy ecosystem that minimizes soil fertility decline and pest problems while enhancing biodiversity. Organic farming and gardening proactively minimize the negative impacts of conventional, intensive farming while maximizing soil health and supporting biodiversity.

Why Use Organic Pest Management?

Pests threaten crops of all kinds and can be particularly damaging to organic crops that farmers grow without using synthetic pesticides and genetically modified organisms. Conventional farmers can wait for a pest problem to arise and then use an array of synthetic chemicals to control them. In contrast, organic farmers adopt proactive,

environmentally friendly strategies to prevent pest-related problems before they arise. Organic pest management approaches protect crops as well as the soil health and surrounding environment.

Types of Organic Insecticides



Figure 1. *Tomato Leaves*

Contain Alkaloids That Kill Many Insects

Photo credit: North Carolina State University Extension

While organic farmers use few synthetic chemicals, they still have access to some natural solutions that act as effective pest control agents.

- **Sulfur:** This natural fungicide and miticide works by disrupting the metabolic processes of pests like spider mites, thrips, fungi, and other pests that absorb it.
- **Neem oil:** Extracted from the neem tree, neem oil has both insecticidal and fungicidal properties that are effective against pests such as caterpillars, leaf miners, whiteflies, thrips, and mealy bugs.
- **Alkaloids in tomato leaves:** The alkaloids in tomato leaves are fatal to many insects.
- **Rosemary oil:** The oil of this herb kills soft-bodied insects and mites without damaging plants.

Unique Pest Control Methods in Organic Farming

In addition to organic insecticides, there are other clever ways to manage pests in your garden.

- **Beer for slugs:** Slugs can cause substantial damage to fruit and vegetable crops. Studies have shown that slugs are attracted to yeasty substances, including various types of beer. While beer traps can lure slugs, they don't always kill them. However, adding insecticidal materials to the beer can be lethal to slugs. A combination of 50 ml of beer and a small amount of cigarette ash placed in a dish can kill up to 25 slugs per night.



Figure 2. Slugs Can Cause Extensive Damage to Garden Crops

Photo credit: University of Minnesota Extension

- **Cinnamon and cloves:** These aromatic spices offer more than tasty baking ingredients—they also act as a natural repellent for ants and other pests. A sprinkle around plants can help keep pests away, preventing herbivory and infestation.
- **Ash for ants and snails:** A ring of wood ash around plants can help keep ants and snails at bay. The gritty barrier causes damage to their tissue, offering an effective, natural barrier.
- **Beneficial nematodes for slugs:** These microscopic worms attack and kill slugs, making them a powerful tool to reduce slug populations. "Beneficial Nematodes" (Kujawski, 2011) further explains the pests nematodes control. Note: harmful nematodes can damage or destroy plant roots. Learn more in "Nematode Diseases of Plants" (Williams et al., 2017).
- **Coffee grounds:** Coffee grounds repel most pests, especially ants.
- **Diatomaceous earth:** Made from fossilized algae, this insecticide smothers insects and draws moisture from their exoskeletons.
- **Eucalyptus oil:** The strong scent of eucalyptus can deter pests like mosquitoes and flies.
- **Plant-based hand soap or liquid dish detergent:** You can use these soaps in solution as a contact insecticide.

Plants That Naturally Repel Pests



Figure 3. Mint's Strong Aroma Can Repel Pests
Certain plants have natural properties that repel harmful pests while attracting beneficial insects.

- **Mint (*Mentha spp.*):** The strong aromas of some mint plants repel a variety of pests, including ants, aphids, and mosquitoes. The strong scents can also deter cabbage moths, which are notorious for damaging brassica crops like cabbage, broccoli, and kale. Gardeners must be careful with mint because it can spread aggressively. To minimize this issue, consider growing mint plants in pots or confined spaces to prevent them from overtaking and outcompeting other plants.
- **Marigolds (*Tagetes spp.*):** Marigolds are famous for their ability to attract beneficial insects such as ladybugs, lacewings, and beneficial predatory beetles, which help control pest populations. Their strong scent also deters harmful nematodes, aphids, whiteflies, and beetles.
- **Lavender (*Lavundula spp.*):** Lavender's strong fragrance keeps fleas, mosquitoes, and moths away. Its flowers also attract beneficial pollinators like bees and butterflies.
- **Garlic (*Allium sativum*):** Garlic, a natural insect repellent, keeps pests like aphids, spider mites, and whiteflies at bay.
- **Onion (*Allium spp.*):** Onions are an ingredient in several organic insecticide recipes because they contain sulfur compounds that repel insects and have antimicrobial properties.

Maintenance



Figure 4. Remove Weeds

That Harbor Pests and Compete With Desired Plants for Nutrients

Keeping a garden healthy and pest-free requires planning and regular care. Here are some tips for maintaining a healthy and pest-free garden.

- **Pruning:** Regularly remove dead and diseased material, which can help prevent the spread of disease and pest infestations.
- **Mulching:** Apply mulch around plants to retain moisture, regulate soil temperature, and create a physical barrier that deters pests like slugs and snails.
- **Composting:** Add compost to the garden to improve soil quality and introduce beneficial microorganisms that help prevent pest infestations.
- **Weeding:** Weeds can harbor pests and compete with garden plants for nutrients. To keep a garden weed-free, manually remove the pest plants (weeds) or use organic mixtures to kill weeds and prevent infestations. The following are Extension service resources offering organic weed control options.
 - “Eco-Friendly Herbicides – a New Era in Home Weed Control” (Pettis, 2024).
 - “Weed Management in Organic Cropping Systems” (Curran, 2005).
 - Video: “Organic Weed Control Techniques in Vegetable Production” (Martin, 2024).

Tips

- **Companion planting:** Pair pest-repellent plants (e.g., marigolds, garlic, nasturtiums) with plants that are more vulnerable (e.g., basil, broccoli, cabbage, cucumbers, eggplant, gourds, kale, melons, potatoes, squash, tomatoes) to protect them from pests.

- **Regular inspections:** Detecting pests early is key. Inspect the undersides of leaves and the soil around plants regularly for signs of pests.
- **Physical barriers:** Row covers or mesh can protect vulnerable plants from insects without other interventions.

Additional Resources

- Munz, H., Miller, R., & Alston, D. (2016, April). *Alternative pest control methods for homeowners* [Fact sheet]. Utah State University Extension. https://digitalcommons.usu.edu/cgi/viewcontent.cgi?article=1809&context=extension_curall
- National Pesticide Information Center. (2017). *Sulfur*. Oregon State University and U.S. Environmental Protection Agency. <https://npic.orst.edu/ingred/sulfur.html>
- Utah State University. (2024). *What is certified organic?* Utah State University Extension. <https://extension.usu.edu/certifiedorganic/organic/>
- Walliser, J. (2011). *Good bug, bad bug: Who's who, what they do, and how to manage them organically (All you need to know about the insects in your garden)*. St. Lynn's Press. <https://books.google.com/books?id=N22qcQAACAAJ>

Acknowledgments

Smart Foodscapes (usu.edu/smart-foodscapes)

Learn more by scanning the QR code.



USDA – National Institute of Food and Agriculture (NIFA) – Sustainable Agricultural Systems (SAS) Grant #2021-69012-35952

Unless otherwise noted, Utah State University Extension provided the photos in this fact sheet.

References

- Al-Harbi, N. A., Al Attar, N. M., Hikal, D. M., Mohamed, S. E., Latef, A. A. H. A., Ibrahim, A. A., & Abdein, M. A. (2021). Evaluation of insecticidal effects of plant essential oils extracted from basil, black seeds, and lavender against *Sitophilus*

- oryzae*. *Plants*, 10(5), 829. <https://doi.org/10.3390/plants10050829>
- Amaro, C., Guiné, R. P. F., Costa, D. V. T. A., Correia, H. E., & Nave, A. (2023). Pest control in organic farming. In *Elsevier Ebooks* (pp. 111–179). <https://doi.org/10.1016/b978-0-323-99145-2.00003-3>
 - Coleman, P. (2012). *Guide for organic crop producers*. Appropriate Technology Transfer for Rural Areas (ATTRA) and U.S. Department of Agriculture (USDA). <https://cms.organictransition.org/wp-content/uploads/2023/08/CropProducersGuide.pdf>
 - Curran, W. S. (2005, February 12). *Weed management in organic cropping systems* [Fact sheet]. Pennsylvania State University Extension. <https://extension.psu.edu/weed-management-in-organic-cropping-systems>
 - Fabrick, J. A., Yool, A. J., & Spurgeon, D. W. (2020). Insecticidal activity of marigold (*Tagetes patula*) plants and foliar extracts against the hemipteran pests, *Lygus hesperus* and *Bemisia tabaci*. *PLOS ONE*, 15(5), e0233511. <https://doi.org/10.1371/journal.pone.0233511>
 - Grewal, P. S., Grewal, S. K., Taylor, R. A. J., & Hammond, R. B. (2001). Application of molluscicidal nematodes to slug shelters: A novel approach to economic biological control of slugs. *Biological Control*, 22(1), 72–80.
 - Kujawski, R. (2011, October). *Beneficial nematodes* [Fact sheet]. University of Massachusetts Amherst Extension. <https://ag.umass.edu/landscape/fact-sheets/beneficial-nematodes>
 - Martin, J. (2023, June 18). *Organic weed control techniques in vegetable production* [Video]. YouTube and Utah State University Extension. https://www.youtube.com/watch?v=FTa4WjX_8iY
 - Pettis, Jr., S. (2024, July 19). *Eco-friendly herbicides – a new era in home weed control* [Fact sheet]. North Carolina State University Extension. <https://henderson.ces.ncsu.edu/2023/09/eco-friendly-herbicides-a-new-era-in-home-weed-control/>
 - Tedeschi, P., Leis, M., Pezzi, M., Civolani, S., Maietti, A., & Brandolini, V. (2011). Insecticidal activity and fungitoxicity of plant extracts and components of horseradish (*Armoracia rusticana*) and garlic (*Allium sativum*). *Journal of Environmental Science and Health. Part B, Pesticides, Food Contaminants, and Agricultural Wastes*, 46(6), 486–490. <https://doi.org/10.1080/03601234.2011.583868>
 - Williams, S. D., Boehm, M. J., & Lopez-Nicora, H., (2017, February 1). (n.d.). *Nematode diseases of plants* [Fact sheet]. Ohioline, Ohio State University Extension. <https://ohioline.osu.edu/factsheet/plpath-gen-8>
 - Yoon, J.-C., Park, J.-H., Shim, C.-K., Ryu, K.-Y., & Jee, H.-J. (2007). Control of slugs by using beer and cigarette mixture. *Korean Journal of Applied Entomology*, 46(2), 325–330. <https://doi.org/10.5656/ksae.2007.46.2.325>

March 2025
Utah State University Extension

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