Integrated Pest Management (IPM): Non-Chemical Control (published 2024-10-19)
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This is part five of a multi-part series on Integrated Pest Management (IPM).

Non-chemical pest control is, in most cases, a safer alternative to chemical control. While some might argue that certain methods involve a "chemical" compound of some sort, we will define non-chemicals as those that do not require registration as a pesticide with the Environmental Protection Agency (EPA).

The first non-chemical control method is one that often receives little consideration as a pest control option—water. While some may see this as a tongue-in-cheek reference to those who overwater their plants, heated water can be an effective IPM tool.

Hot water treatments are a simple yet effective way to control certain pests, particularly those found in soil or on plants. This method involves using water heated to specific temperatures to kill pests without harming the environment or beneficial organisms.

One common application of hot water treatment is for controlling nematodes, which are microscopic worms that can damage plant roots. By soaking soil or plant roots in water heated to around 120°F for a short period, nematodes can be effectively eradicated. Hot water can also be used to kill pests such as aphids, mites, and spider mites on plants.

Boiling water or steam applications have also been successfully used to kill unwanted weeds. The hot water damages the exterior coating of the leaf, leading to the destruction of that part of the plant. While this may not kill the plant entirely since the roots may remain intact and viable, it works well for areas where the aesthetics of weed removal are important, such as expansion joints in sidewalks.

Boiling water is also an excellent choice for sanitizing garden tools and containers that may harbor pests and pathogens. By sanitizing your garden tools and containers after each use, you significantly reduce the spread of various garden pests.

Other temperature-related IPM controls include fire and heat treatments. Similar to boiling water, propane torches can be used to melt the exterior coating of leaves, leading to the destruction of the plant. Again, this may not completely kill the plant if the roots remain intact and viable.

Solarization is an environmentally friendly method for killing grass and other unwanted vegetation by harnessing the power of the sun's heat. This technique involves covering the targeted area with a clear plastic tarp during the hottest months of the year, typically for four to six weeks. The plastic traps solar energy, raising the soil temperature to levels lethal to grass, weeds, seeds, and even some pests and pathogens. Solarization works best in regions with prolonged periods of intense sunlight and can reach temperatures of 140°F or higher in the top few inches of soil. This process not only kills existing grass but also helps sterilize the soil, reducing the likelihood of future weed growth.

Another unconventional non-chemical control method is wood ash. Wood ash is an effective, natural way to control slugs and other soft-bodied pests in gardens. When sprinkled around plants or garden beds, wood ash creates a dry, abrasive barrier that slugs find difficult to cross. The ash dehydrates their moist bodies, deterring them from reaching the plants. In addition to controlling slugs, wood ash can help repel pests like ants and beetles. However, it should be used sparingly, as excessive amounts can raise soil pH and potentially harm plants. Regular reapplication is necessary, especially after rain, as moisture reduces its effectiveness.

The final non-chemical method is the use of diatomaceous earth (DE). DE is a natural, non-toxic pest control solution made from fossilized remains of diatoms, a type of hard-shelled algae. It is effective against a wide variety of pests, including ants, fleas, bed bugs, cockroaches, and other crawling insects. DE works by absorbing the lipids (fats) from the exoskeletons of insects, causing them to dehydrate and die.

When used as part of an IPM strategy, DE is typically sprinkled in areas where pests are known to travel, such as cracks, crevices, and entry points. It's important to use food-grade DE, as other types may contain harmful impurities. DE is safe for humans and pets, but it should be applied with care to avoid inhaling the dust. This method is especially effective in dry environments, as moisture can reduce its efficacy.

These are just a few examples of safer, non-chemical alternatives for managing garden pests. While some of these methods may require more frequent application than chemical controls, they offer a much safer option for those who wish to limit their use of chemicals.

Until next time, keep workin' th' dirt!

Resources

"Organic Gardening," https://content.ces.ncsu.edu/extension-gardener-handbook/17-organic-gardening

"Thermal Weeding," https://turfweeds.cals.cornell.edu/pfm/thermal-weeding

"Using the Sun to Kill Weeds and Prepare Garden Plots," https://extension.umn.edu/planting-and-growing-guides/solarization-occultation

"Diatomaceous Earth for Arthropod Pest Control: Back to the Future." https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8706096/

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