

## SUSTAINABILITY LIVING GUIDE:

### 26. ELEVEN WAYS TO CONTROL WEEDS WITHOUT CHEMICALS<sup>1</sup>

Steve Graham<sup>©</sup>

Weeds are many home gardeners' biggest enemy. Roundup and other chemicals may seem like the best weapon in the arsenal against weeds. However, many experts discourage the use of chemicals. They can leach into fruits and vegetables. They also runoff and trickle down into groundwater. Moreover, they are more expensive and less effective than many other methods. Ronald Smith of the North Dakota State University Department of Plant Sciences said, "Weed and seed" combinations in particular are typically weak and practically useless on home gardens and lawns. He said a blanket herbicide application cannot reverse a heavy weed infestation in a lawn. "This is not a debatable point. It is something we nailed down here at NDSU years ago in field trials," Smith said.

Fortunately, there are better ways to prevent and control weeds before they take over. However, Smith notes that only a full-time assault on weeds can keep out every weed. "It is totally unrealistic to think that anything short of the efforts, budget, and fanaticism that a professional golf course superintendent puts into caring for the greens, tees, and fairways, will produce a weed-free lawn," he said.

Here are seven strategies for preventing weed growth, and four methods of controlling existing weeds, with the advantages and disadvantages of each method.

- (1) **Crowd out weeds with thick lawn cover:** The best defense is often a good offense. This means keeping the lawn thick and healthy to keep weeds from having any room to grow. You can also add groundcover plants and other thick plantings to crowd out weeds in decorative beds. "Weeds are simply plants that take advantage of open areas with available resources," said Robert Hartzler, an extension weed specialist and professor of agronomy at Iowa State University. "The simplest way to control weeds is to eliminate the open niches that they take advantage of."

Richard Zollinger of the North Dakota State University Department of Plant Science offers a simple two-prong strategy. "To minimize weed problems in my lawn as a home owner, I mow my lawn high and optimally fertilize to keep the lawn as competitive as possible," he said. Smith recommends reseeding lawns in the fall to prevent weed growth. Since many weeds are already dead late in the season, there is less competition for space as grass seeds try to take root. Smith also recommends strong, high-quality grass seed. Look for the highest germination and purity percentages available.

- (2) **Maintain healthy soil:** Once you have put in desirable plants that crowd out weeds, keep your plants healthy with fertile, aerated and well-drained soil. Test your soil and talk to local specialists to create the optimal fertilization plan. Unfortunately, weeds can grow

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<sup>1</sup> Networx, July 08, 2010

in virtually any soil, but soil improvements will at least create a level playing field with your plants. “Most weeds don’t have specific requirements for growth other than open areas. It usually isn’t possible to eliminate weeds simply by supplying some specific nutrient,” Hartzler said. “However, anything that can be done to promote the growth of the desirable plant will reduce weed problems. Weeds often benefit as much, if not more, from the application of fertilizer, so blindly applying nutrients in the hope of suppressing weeds can be counterproductive.” Soil compaction is a concern under lawns, but can be overcome with core aeration every three or four years, said Smith.

- (3) **Till the garden:** Loosening and turning over the soil is useful for managing weed populations, but tilling should be performed with caution. Tilling may simply rotate weed seeds. Hartzler explains the advantages of tilling. “It provides a clean start for the crop and simplifies weeding. It can bury a lot of seeds at depths where they are unable to successfully establish. This can be a real benefit if a lot of seeds were produced the previous year and are laying on the surface,” he said. However, dormant weed seeds may be brought back to life with tilling. “Seeds buried more than three to four inches deep are much more persistent since there is a lot less biological activity at this depth. The next time the garden is tilled, some of them will be brought to the surface where they can germinate,” Hartzler said.
- (4) **Hoe the topsoil:** Carefully hoeing the topsoil can effectively control some weeds but, like tilling, hoeing has its limits. “Hoeing can be very effective for controlling annual weeds. However, perennials often re-sprout from the roots after the tops are removed,” said B. Rosie Lerner, an extension consumer horticulture specialist at Purdue University. Lerner said only the surface needs to be hoed to pull away young, small weeds. “Hoeing should consist of short, shallow strokes that simply cut off the weeds at soil level,” she said. “Hoeing deeper will only bring more weed seeds to the germination zone and may injure the roots of desirable plants growing nearby. Weeds will be much easier to pull or hoe while they are still small.”
- (5) **Mulch garden beds:** Tom Lanini, a professor of plant sciences at the University of California Davis, said mulch is the most important factor in preventing weed growth. Nearly any barrier that blocks light works as a mulch. Bark and other decorative mulches work, but dried leaves, cardboard and newspapers are also effective. “I think organic mulches are definitely the way to go. They have benefits beyond weed control,” Hartzler said. Lerner notes that organic mulches improve soil structure, and add nutrients, particularly when used near the end of the growing season. They also keep the soil cool and reduce water loss to evaporation. Straw and hay are among the cheapest mulches, but they must be free of weed seeds to be effective. Like other methods, mulch may be less effective on established perennial weeds. They are better at blocking smaller annual weeds.
- (6) **Cover the ground with landscape fabric:** Landscape fabrics are thin barriers covered with tiny holes. They are typically made of plastic, but may also be sheets of burlap or other natural fibers, or recycled plastics. They are effective at blocking weed growth while allowing water and air into the soil. They should be used in conjunction with thick, effective mulch. “As a garden mulch, fabrics do provide good early-season weed protection. However, because fabrics allow some light to penetrate, weeds will germinate below and break through the cover unless some other material, such as rocks or bark mulch, are placed on top,” Lerner said. According to Dr. Andrew Senesac of the Long Island Research Laboratory, landscape fabric will block many weeds, but it also limits

some desirable flower production by restricting the spread of shoots, and inhibits the spread of some groundcovers and other spreading plants. Some particularly hardy weeds and grasses can even germinate with no soil on top of porous weed barriers, then force their roots down.

- (7) **Block everything with plastic sheets:** Solid plastic sheets are another alternative for covering the ground and blocking growth of weeds (and other plants). The plastic blocks water and light penetration killing the plants underneath. This is also known as solarization. It is a fast and effective way to kill grass before replacing it with a vegetable garden or different type of lawn. Lerner said there are many plastic sheeting colors, which each have different uses. “Black plastic tends to warm the soil, which is beneficial for warm-season crops, such as tomatoes and peppers,” she said. “White plastic also works well as a mulch, but it does not have as much effect on soil temperature as black plastic. Recent studies have found that other colors of plastic, particularly red, may enhance plant growth. Clear plastic should not be used since it allows light to penetrate, resulting in germination of weed seeds and excessive heating.” Also, plastic is not a good way to avoid chemicals usage. Lanini notes that most plastic is derived from petroleum, and may be even less organic than chemical sprays.
- (8) **Keep weeds from going to seed:** Again, no matter what you do, you will never completely prevent weed growth. However, you can keep them from getting deeply established and spreading. Keep an eye on weeds and pull them before they can go to seed. For many species, you have days or weeks of growth before weeds flower and distribute seeds. For example, if you want to get rid of dandelions, pull them before the flowers turn into puffballs and blow around the yard. A single dandelion plant can produce 15,000 seeds each year, and each seed can survive for up to six years in the soil.

Though most professors avoid recommend certain products and brands, Lanini swears by the Weed Hound. It allows you to grab and pull out weed roots with a foot lever for quick removal without bending over. He said he doesn't mind a few dandelions, but persistently eliminates perennial nuisances. He said every two weeks he pulls all his bindweed, an invasive plant that will choke out other plants and take over a yard or lawn. After two weeks, the weed starts sending energy to its roots, so pulling them will starve the roots. Two years of vigilant pre-flower weeding has long-term advantages. “Preventing weeds from going to seed for a few years can deplete the seedbank and minimize efforts in future years,” Hartzler said. “If someone wants to reduce the amount of handweeding required in a garden, this is the key,” he added. “While a small percentage of seeds remain viable for long times in the soil, the majority either emerge or are lost to predation or decay in a couple years. Thus, the size of the weed seedbank can be dramatically reduced with a couple good years of weed control.”

- (9) **Burn weeds:** As a chemical-free alternative, though it still uses gas, Lanini recommends torching weeds with small landscape flamers, which are hooked to standard propane tanks. He said this method is quick and effective for ridding weeds in sidewalk cracks and lawn edging. “There is a real satisfaction in turning them to charcoal.” However, he said flames kill weeds long before the weeds are reduced to ash. He suggests pinching the weed leaf with a thumb and forefinger. If it leaves a fingerprint, the weed is dead.
- (10) **Use biological controls such as insects and animals:** Some garden stores sell beneficial insects that can kill weeds or other insects, but they have very limited use in

home gardens. Likewise, geese can kill weeds, but many experts don't recommend setting geese loose on the lawn. Lanini said geese are natural grass and weed eaters, but require constant babysitting. He suggests homeowners with small orchards might employ a single goose, but other homeowners shouldn't use them. Hartzler said beneficial insects typically won't stay in the yard, and may be killed or driven away by mowing and other measures. They may take several years to generate benefits. "Biological control of weeds doesn't work that great for garden and residential weeds because of all of the disturbance, and biocontrol usually is a long-term process," he said. "There are opportunities in rangelands and other areas with little disturbance."

- (11) **Vinegar and other organic herbicides:** Herbicides aren't all made of nasty chemicals. Organic soaps, plant oil blends and even common household products are all used as natural herbicides. Concentrated vinegar is perhaps the most common. Some research suggests vinegar, or acetic acid, is not as effective as some believe. Micheal D. K. Owen, an extension weed management specialist at Iowa State University, said vinegar does not kill root systems or some larger weeds. However, Lanini said his research shows drenching targeted weeds with vinegar can kill them, without any risk of toxic runoff. It is not selective, meaning it may kill everything it strikes. It also may be dangerous. Avoid eye contact and always follow label directions, even with natural herbicides.

## Conclusion

None of these methods will work by themselves, but some vigilance, regular control of undesirable plants and proper care for desirable plants should minimize weed growth without the need for any chemical controls.

Also consider controlling your reaction to weeds. Some homeowners and even experts suggest a live and let live philosophy, so to speak.

"If you look at my lawn, you would think this is my approach. It all depends on the persons wants," Hartzler said. "My lawn has deep shade from trees, and two labs using it as their playground, so I realize it will be impossible to get a vigorous lawn, so I accept weeds. In my garden I weed enough to eliminate competition between the vegetables and weeds, but I accept a few weeds that emerge later in the season."

Lanini agrees. He notes that some grasses are technically weeds, but he doesn't worry about them. Though he hunts down his perennial bindweed, he lets annual angel bluegrass grow every year.