



## HOW-TO BOOKLET #3147

# ORGANIC VEGETABLE GARDENING



### TOOL & MATERIAL CHECKLIST

- Limestone
- Seeds
- Rake
- Weeding Hoe
- Spading Fork
- Straw
- Black Plastic
- PH Soil Tester

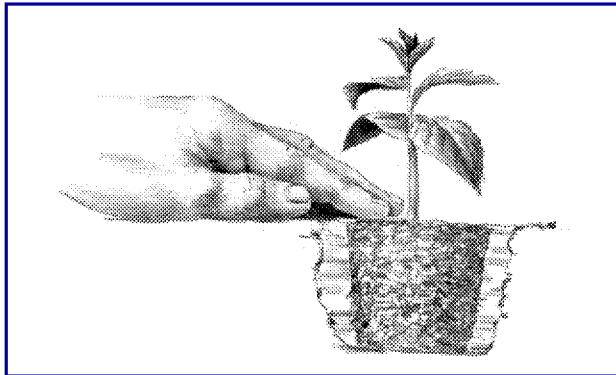
*Read This Entire How-To Booklet For Specific Tools and Materials Not Noted in The Basics Listed Above*

Growing tasty, chemical-free vegetables isn't hard. New vegetable gardeners—and veteran gardeners who want to reduce their use of toxic synthetic chemicals—will be delighted with their success if they follow these **6 steps to successful organic vegetable gardening**:

- 🏠 Choose a good garden site.
- 🏠 Feed and prepare your soil.
- 🏠 Select regionally adapted and problem-resistant plant varieties.
- 🏠 Plant, space, support, and water correctly.
- 🏠 Control weeds.
- 🏠 Control other pests.

### SELECTING A SITE

If you already have a garden, take advantage of it. If not, look around for a good place to start a garden. A poor site will reduce your yields and cause you headaches no matter how well you choose and care for your plants. Good soil is nice, but almost all soils can be made into productive gardens by adding lots of organic matter, as described under "Good Soil Care". Location is more important. Don't hide your garden away—a garden you walk by every day will be better cared for, more attractive, and more productive than one at the far end of the yard where no one ever goes.



### Choose a location with:

- 🏠 Full or nearly full sun.
- 🏠 Access to water.

### Avoid:

- 🏠 Low areas where water puddles after a rain.
- 🏠 Steep slopes.
- 🏠 Shaded areas or areas where tree roots will compete with your vegetables.
- 🏠 The center of established footpaths.
- 🏠 Very windy sites.
- 🏠 Sites next to streets where fumes and runoff can cause problems.

If you don't have an ideal site, there are ways to deal with most problems. Remove or prune trees to increase sun. Use raised beds to improve poor drainage or fill them with purchased topsoil if your soil is contaminated. Build terraces to make steep slopes usable. Strong fences can deter corner-cutting kids, and hedges or vine-covered fences block strong winds and road pollution. You can even plant vegetables in planters on decks or paved areas if they are your only sunny space.

## GOOD SOIL CARE

Organic gardeners feed their soil instead of their plants. Well-fed and cared-for soil is full of tiny living organisms that feed your plants so you don't have to. Plants growing in well-fed soil are also naturally problem resistant.

### Guidelines for Building Healthy Soil

- 🏠 Establish permanent walkways and don't walk on planting areas.
- 🏠 Test and adjust the soil's pH.
- 🏠 Add abundant quantities of organic matter.
- 🏠 Add specific nutrients if soil test indicates.
- 🏠 Till only when needed.
- 🏠 Don't use synthetic fertilizers or herbicides.

### Adjusting Soil pH

The correct soil pH—or acidity—helps plants absorb the food they need to grow and yield well. Test your soil pH or have it tested by your State Cooperative Extension Service in early spring every year (be sure to ask for organic recommendations). Use the guidelines at right to correct your soil's pH to 6.5.

A pH of more than 7.0 means your soil is alkaline. Spread sulfur on the surface of your soil and work it into the top few inches (see "To Lower pH" for how much to use) to acidify it.

A pH less than 6.5 means your soil is quite acid. Spread ground limestone or oystershell lime (see "To Raise pH" for how much to use) on your soil and work it into the top few inches to sweeten it.

### Adding Organic Matter

Organic matter is anything that was once alive. In nature, plant and animal waste (organic matter) falls to the ground and breaks down slowly, providing nutrients for new plants and animals. Organic gardeners manage their gardens to mimic this natural nutrient recycling.

Spreading straw or shredded leaf mulch around your plants is a good way to add some organic matter and slowly release nutrients to the soil.

Growing a "green manure" or "cover crop" in the off-season also adds organic matter and protects soil from erosion. Winter cereal rye and buckwheat are two common choices.

But most gardeners count on compost and/or blended organic fertilizer for most of their organic matter. Compost is crumbly, sweet-smelling, partially broken down organic matter. It makes a perfect pre-planting fertilizer for vegetables. See How-To Booklet #3144 for more information on making your own compost.

To add organic matter and nutrients, spread one of the following each spring before planting:

- 🏠 100 to 200 pounds of compost per 100 square feet
- 🏠 50 pounds of alfalfa, soybean, or fish meal;

### To Raise pH

Pounds of limestone needed per 100 square feet to raise the pH to 6.5.

Starting Soil pH	Soil Type		
	Sand	Loam	Clay
4.5	5.0	13.5	19.5
5.0	4.0	10.5	15.5
5.5	3.0	8.0	11.0
6.0	1.5	4.0	5.5

### To Lower pH

Pounds of sulfur needed per 100 square feet to drop the pH to 6.5.

Starting Soil pH	Soil Type	
	Sand	Clay
7.0	0.5	1.0
7.5	1.0	2.0
8.0	3.0	4.5
8.5	4.5	7.0

plus 4 pounds of rock phosphate; plus 1 pound of kelp meal per 100 square feet.

- 🏠 Pre-blended organic fertilizer as indicated on the label.

### Adding Specific Nutrients

If your soil test indicates your soil is low in one particular nutrient, sprinkle a few handfuls of one of the organic sources below over each 100 square feet of soil.

**Phosphorous.** Granite meal (4% phosphorous) or rock phosphate (30% phosphorous)

**Potassium.** Greensand (7% potassium) or Sul-Po-Mag (22% potassium)

**Magnesium.** Epsom salts (10% magnesium), limestone (3–40% magnesium—check bag analysis), or Sul-Po-Mag (10% magnesium)

**Calcium.** Bonemeal (24% calcium), Gypsum (22% calcium), limestone (50–80% calcium—check bag analysis), oystershell lime (96% calcium), or wood ashes (35% calcium)

## Working The Soil

Soil should have a sponge-like texture, with plenty of small air spaces. Frequent tilling, or tilling when the soil is very wet or very dry, will harm the sponge. Squeeze a handful of soil in your hand before you start—if you can squeeze water out of it, the soil is too wet to till. Wait a few days and feel again. If you can't feel any moisture, don't till. Give the area a good soaking, and feel it again the next day.

A spading fork is good for small gardens and permanent garden beds. Turn over the top 4 to 6 inches, break up the clods into 1/2-inch pieces, and remove any large rocks. Loosen the lower soil by inserting the fork as deeply as you can and rocking it back and forth every few inches. A power tiller is easier for large areas, at least for the first season.

## SELECTING SUITABLE PLANT VARIETIES

Read seed packets and choose disease- and pest-resistant varieties whenever you have the choice. And don't try to grow plants that don't grow well in your region or in a particular season of year unless you want to spend time fighting problems.

## GOOD PLANT CARE

Give every plant exactly what it needs. Thirsty, hungry, overwatered, or overfed plants are stressed plants. Stressed plants are prime candidates for problems.

**Planting.** The time you choose to plant is crucial to your success. Cool-season crops, such as lettuce, peas, and cabbage, won't thrive in heat. Warm-season crops, such as tomatoes, corn, and melons, will refuse to come up or be stunted in cool weather. Check with your local weather service to find the average date of your last spring frost and first fall frost (if you have frost) and follow the recommendations on the seed packets. Check with your local garden club or Extension Service for their recommendations for dates to plant cool-season seeds, cool-season transplants, warm-season seeds, and warm-season transplants.

**Spacing.** Follow the recommendations on your seed packet for spacing and thinning your plants.

Crowded plants are less productive and more prone to pest and disease problems.

**Supporting.** Stake tomatoes to keep them off the ground. Use a sturdy wooden stake or a heavy-duty cage. Pole beans grow well on pole teepees or mesh trellises. Read your seed packets for recommendations.

**Watering.** In most areas of the country, your plants will need more water than Mother Nature delivers. Vegetables need 2 to 3 inches of water each week to thrive. You can water with a hose, but water the soil and keep it off the plants as much as possible. The best watering method for the plants, the least work for you, and the most water-thrifty way of watering is drip irrigation. See How-to-Booklet #3123 for specifics.

## CONTROLLING WEEDS

Get rid of as many weeds as you can before you plant your vegetables. When you prepare your beds or rows, remove all the weeds with fat roots (the perennial, or long-lived, ones). Pay special attention to weeds with long sideways roots that connect one plant to another. Pick out every little bit of them and get them out of the garden and into the trash.

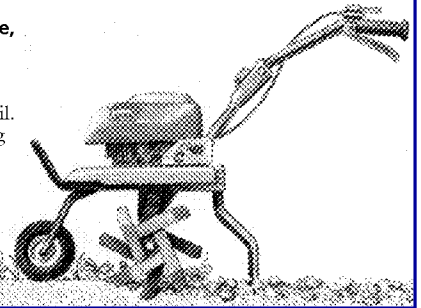
### Reduce Potential Weeds

Even if you can't see a single weed plant, every inch of the soil in your garden is loaded with weed seeds just waiting for the chance to grow. Here are three ways to prevent more seeds from coming in and reduce the number that are there.

🏠 **Weed seed patrol.** Remove flowering weeds in or near your garden before they set seed. A weed-picking walk once a week or so can prevent millions of new seeds from being formed. Be careful not to buy hay for mulch, as it may be loaded with weed seeds. Use straw instead.

🏠 **Stale seedbed.** If you've ever prepared a garden bed you know how fast the surface becomes a green mat of tiny weeds. But thank goodness weed seeds only sprout if they are near the surface of the soil. Take advantage of this! Prepare your planting rows or beds a few

To use the stale seedbed technique, rake or till newly germinated weed seedlings into the top 1 inch of the soil. This avoids bringing new weed seeds to the surface where they can germinate.

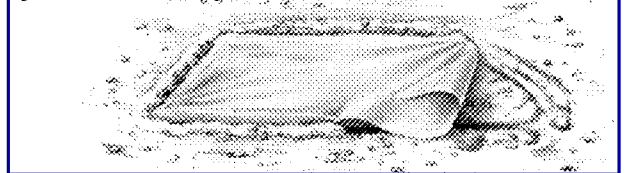


weeks before you need them. When the little weeds are only 1/2-inch high, use a rake or tiller to stir their roots out of the soil. Be careful not to stir more than an inch deep, or you will bring up more weed seeds. Repeat until few weeds germinate, then plant your vegetables.

🏠 **Soil Solarizing.** If the stale seedbed technique doesn't work, don't plant vegetables. Try solarizing the soil in midsummer, and plant a fall crop of cool-season vegetables afterward. Follow these steps:

- 1 🏠 Till the area and rake it smooth.
- 2 🏠 Dig a 3-inch-deep trench all the way around it.
- 3 🏠 Soak the soil with water.
- 4 🏠 Immediately cover the area—including the trench—with one continuous sheet of clear plastic.
- 5 🏠 Fill the trench with earth, pulling the plastic tight as you go.
- 6 🏠 Remove the plastic after 4 to 6 weeks of sunny weather.

Use the sun's heat to cleanse—or solarize—problem areas of your garden.



## Mulch

Weeds need light to grow. If you cover the soil to keep the light away, they won't come up. Many gardeners swear by mulches because they also conserve soil moisture and prevent soil-borne diseases from splashing onto your plants.

**Organic mulches.** Straw (not hay!), shredded leaves, dry grass clippings, corncobs, seed-free weeds, newspapers, and just about any other dry organic material makes a good mulch and adds organic material to the soil. Four sheets of newspaper covered with 2 inches of dry grass clippings makes a good weed-resistant garden mulch. Spread the mulch, then cut small holes to transplant into or mulch on either side of seed rows.

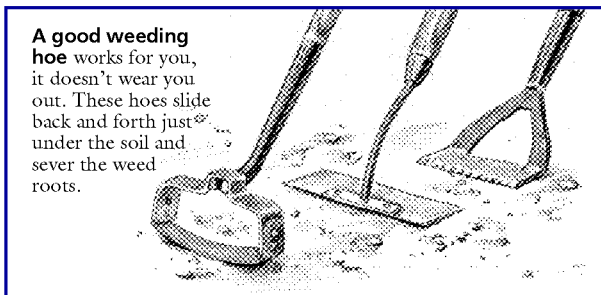
Organic mulches keep soil cool, so use them on cool-season plants or wait until the soil is warm to put them around warm-season plants. If slugs are a problem, organic mulches can make them worse—consider plastic instead.

**Plastic.** Black plastic is a great mulch for heat-loving plants in all but the warmest climates because it warms the soil and suppresses weeds. It is also perfect for warming the soil for early planting. Unfortunately, it only lasts a season or two, and rain can't soak through it. For the benefits of black plastic without its disadvantages, try a black, porous landscape fabric instead. Cut holes in either to plant through or place strips beside rows.

**Deep mulch for problem weeds.** If you are fighting a bad case of a stubborn perennial weed such as thistle, bindweed, or blackberry, you need a heavy-duty mulch. Give up on gardening for a few seasons and try this. Cover the entire area with old carpet, layers of heavy cardboard, and/or a sheet of heavy plastic. Then pile on a foot or so of straw, weeds, or other mulch and leave it for a year. Pull it up and check for live roots. If you find any, remove them and repeat the treatment.

## Remove or Kill Weeds

No matter how carefully you prepare and mulch, chances are you will still have a few weeds. Take



care of them before they get the upper hand—while they are still just a few inches high.

**Hand pulling.** Your hands are great weed-control tools. Tweak out occasional weeds as soon as you see them.

**Hoeing.** If you have large unmulched areas, you'll need more than your hands. Get a good hoe, one that cuts on both the push and the pull stroke, and sharpen it up with a file. This hoe is not for swinging and chopping—use it with a gentle push-pull action to undercut the roots of weeds while they are still small. Sharpen it regularly.

**Tilling.** Your tiller can make quick work of small weeds. Set it 1 inch deep and spin over the area. Larger weeds can be tilled deeper, but you'll bring up weed seeds at the same time. Caution: If you are fighting a weed that spreads by long, sideways roots don't till it. You'll chop it up, and each little bit will grow. Dig such roots up by hand, or use a deep mulch to smother them.

**Flame weeding.** Cook your weeds—no, not in the kitchen—right where they grow. A hand-held, propane-fueled weeder makes short work of small or large weeds. Just pass the flame over the weeds (2 or 3 seconds is plenty) and the cooked weeds shrivel and dry up in a few days. With practice, you can flame close to your plants without harming them, but you might want to practice along the fence or in unplanted areas first.

**Organic herbicides.** There are a few non-selective, fatty-acid-based, organic herbicides available

(SharpShooter is one). They kill any living plant they touch, but may not kill the roots of perennials. These are of limited use in the vegetable garden. Weed-specific biocontrols are being developed that make use of weed-eating bugs or weed diseases. Watch for them.

## CONTROLLING OTHER PROBLEMS

As a gardener, you will encounter many insects and other small potential guests. Hand picking or spraying with insecticidal soap or summer oil will control many garden pests. Floating row covers can keep plants pest-free. See product labels for directions. Or see How-To Booklet #3148 for general organic insect control techniques and directions for controlling 21 common vegetable pests.

To control most animal problems, you need a fence. A 2-strand electric fence (strands 4 to 6 inches apart and 18 inches high) is quick to set up and stops all above-ground animals smaller than deer. To stop burrowing critters, you'll need to dig a 12-inch-deep (2-foot-deep for gophers), and 6-inch-wide trench and line the bottom and one side with chicken wire. Connect that chicken wire to an above-ground 3- to 4-foot-tall fence. Leave the top 1 foot unattached so climbing critters will fall back down outside, and you'll keep out anything smaller than a deer. Deer will keep their distance if you add a single-strand electric fence 3 feet outside the mesh fence and 2 feet off the ground.

Gardeners everywhere compete with the local wildlife for their harvest. This fence will keep out just about anything on four legs, from rabbits to deer.

