



# FactSheet

**Extension**

## Ohio State University Extension Factsheet

### Horticulture and Crop Science

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## Intensive Organic Gardening

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Intensive organic gardening offers a means to produce large quantities of fresh vegetables in a small area without the use of synthetic pesticides or fertilizers. It is an excellent gardening method for city dwellers who have limited yard space and who do not wish to expose themselves, their children, or their pets to potentially dangerous chemicals. It is also well-suited to small market garden operations.

### Why garden organically?

Many people choose to garden organically because of concerns about the use of synthetic chemicals on their food. In addition to having possible health effects, these chemicals can affect the environment on farms and in neighboring areas through disruption of beneficial insect populations and through groundwater contamination. Fresh food grown locally may also have higher nutritional value than food shipped long distances.

### History

Intensive organic gardening has its roots in the French market gardens of the 19th century. Parisian gardeners at this time were able to grow over 100 pounds of produce annually for every person in the city. They achieved this remarkable productivity through the use of raised beds (up to 18 inches in height) built with horse manure, which was abundant at the time, close plant spacing, and the use of glass cloches to allow for growth even in the winter. These techniques were brought to the United States by Alan Chadwick in the 1930s, and have continued to be refined and promoted by John Jeavons. Simultaneously, J. I. Rodale began demonstrating organic practices on his Pennsylvania farm. Rodale emphasized the creation of healthy soil through the use of organic amendments. The Rodale Institute now promotes the same philosophy of soil management for small gardens as well as farms, and Rodale Press has published much literature on organic gardening.

## Intensive Organic Gardening Practices

A key element in intensive organic gardens is the raised bed (Figure 1). These beds are made of loose rich soil that provides excellent growing conditions for most vegetables. They should be narrow enough that a person standing on the path can reach comfortably to the middle of the bed. Raised beds can be permanently defined by landscape timbers (the use of non-treated lumber is recommended), boards, bricks, or any number of other materials. They may also simply be shaped out of the soil. The latter practice makes it easier to build a curved bed shape which increases the relative growing area. The soil in a raised bed is typically turned and amended at the beginning of each growing season. This can be done with a rototiller, by hand, or through the process of double-digging.



**Figure 1.** Photo by Travis Beck.

Double-digging involves loosening the soil to a substantial depth, and amending the top layer. The steps in double-digging (Figure 2) are as follows:

1. Spread a layer of compost and other soil amendments on the surface of the area to be dug.
2. Using a spade or short-handled shovel, remove a trench of soil approximately one foot deep and one foot wide along the narrow end of the bed.
3. Loosen the soil at the bottom of the trench with the shovel or a spading fork. Avoid mixing soil layers as much as possible.
4. Dig a one foot by one foot trench next to your existing one and place the soil removed on top of the loosened soil in your first trench.
5. Repeat steps 3 and 4 along the length of the bed.

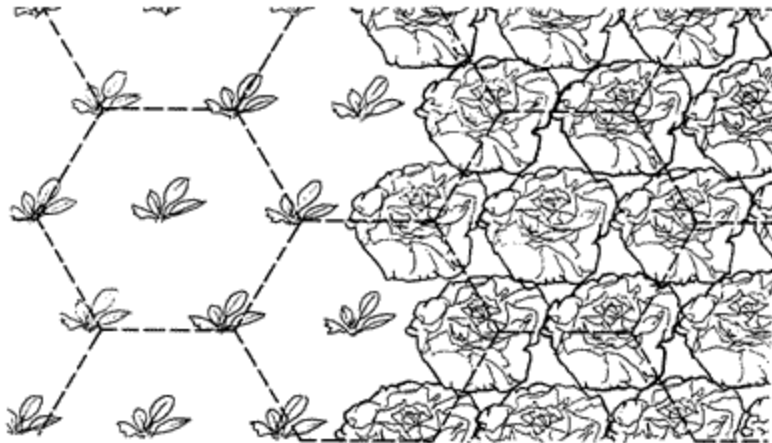


**Figure 2.** Illustration by Alison Kolesar and Susan Berry Langsten from Stell, Elizabeth P. 1998. *Secrets to great soil: A grower's guide to composting, mulching, and creating healthy, fertile soil for your garden and lawn.* Pownal, VT: Storey Communications, Inc. p. 141.

This process will create a raised bed simply by loosening the soil and incorporating additional organic matter. The bed can then be shaped with a rake to achieve a rounded surface. It is important not to double dig when the soil is too wet, as this will create large clumps. A lightly moist soil is ideal. An initial double dig is quite

demanding, but in future years the job becomes easier.

The second most important element in an intensive organic garden is a close planting pattern. Close planting shades the soil, keeping it cooler and moister for good root growth, and discourages the growth of weeds. Instead of planting in rows, use triangular or hexagonal spacing to maximize the number of plants that can be fit into the bed (Figure 3). Make use of those rounded edges. Also, consider intercropping. Carrots, for instance, can be planted in the spaces between lettuce. The lettuce will shade the soil and keep it moist, allowing for easier germination of the carrot seedlings. Then, when the lettuce is harvested for the season, the carrots will grow up and fill the space. Through intercropping, two or more crops can grow in the same area of bed in a single season.



**Figure 3.** Illustration by Pedro J. Gonzalez from Jeavons, John. 1995. *How to grow more vegetables than you ever thought possible on less land than you can imagine*. Berkeley, CA: Ten Speed Press. p. 57.

To maintain the fertility of the soil, intensive organic gardeners use crop rotation, cover cropping, and compost. Crop rotation means alternating plantings each year between heavy feeders (most vegetable crops), soil-building crops (such as nitrogen-fixing legumes) and light feeders (most root crops). More elaborate rotation schemes are possible. Cover crops are soil-building crops that are not harvested, but are composted or tilled back into the soil. They can be part of a crop rotation, or can be used over winter to prevent soil erosion and improve fertility. Examples of winter cover crops include winter rye and hairy vetch. Composting is the breakdown of organic materials, typically in a bin or pile (see "Composting at Home," HYG-1189-99, <http://ohioline.osu.edu/hyg-fact/1000/1189.html>). The finished compost is then used as a soil amendment in the garden. In addition to composting all healthy garden wastes, intensive organic gardeners may grow certain crops specifically to put in their compost because of their high nutrient content. Compost crops include stinging nettles and fava beans.

Additional fertilization can be provided by foliar (leaf applied) fertilizers, the incorporation of specific amendments into the soil near certain plants, and through manure or compost teas. Specific amendments used include fish meal and blood meal for nitrogen. Many recipes for fertilizing teas exist, requiring various levels of equipment and sophistication. A simple recipe is to fill a bucket or trash can 2/3 full with manure or compost. Fill the container with water to a few inches below the rim. Cover with a sheet of plastic tied around the rim and leave in the sun. Stir every day or two until the contents are rank and bubbly (around a week). Strain out the liquid, dilute at a concentration of 1:10, and water the entire garden with this "tea."

## Pest Management

Pest management in the intensive organic garden begins with the soil. Healthy soil leads to healthy plants that are better able to withstand damage. Garden design is also important. Some plants and varieties of plants

are more susceptible than others. Learn what grows well and what does not grow well in your area. Plant a number of different crops so that losses of certain varieties will not mean loss of the entire garden, and plant enough of each variety to share with the pests. Plants such as marigolds, sunflowers, and dill can attract beneficial insects that will help control pest populations. Crop rotation can reduce the build-up of certain pests.

If pests are present, it is important to assess whether or not they are causing sufficient damage to warrant taking measures against them. Also note whether their predators and parasites are present. Measures taken against the pests can negatively affect these populations as well. Maintaining a low level of pests actually encourages the predators and parasites to stay in the garden.

The first measures taken against pests should be physical. Rodent pests can be trapped or fenced out of the garden. Birds can be kept off with netting. Tomato hornworms and many other bugs can be picked off the plants and squashed. Aphids can be controlled by spraying the affected plants with a hose. Horticultural oils will smother pests such as scales. Yellow sticky traps capture large numbers of white flies.

The next step is to make the plants distasteful to the pests. Solutions made by soaking garlic or hot peppers in warm water can be applied to the leaves of affected plants. Preparations of animal urine to discourage mammal pests are also commercially available. All of these products will need to be re-applied often to achieve effective control.

Enhancing the natural biological controls of the garden is another possibility. Predators such as ladybugs and praying mantises can be released, though they seldom stay in the garden long enough to provide long-term control. Release of parasites such as trichogramma wasps can be effective, though it may not be worth the expense for small gardens. Application of Bt (*Bacillus thuringiensis*) can control populations of certain caterpillars.

If recourse is taken to chemical controls, begin with the mildest options. The classic low-toxicity control is insecticidal soap. Insecticidal soaps containing pyrethrin (derived from a daisy) are commercially available. Sprays made with water and a small amount of liquid dish detergent are equally effective against soft-bodied pests. Home-grown preparations of *Nicotiana* (tobacco) are also mildly insecticidal. All of these are contact insecticides, so be sure to spray the pests themselves and check the undersides of plant leaves.

More highly toxic preparations of pyrethrin and rotenone (an extract from certain leguminous plants) are available. Be aware, however, that these are broad-spectrum insecticides and will kill beneficial insects and soil organisms as well as pests. Many organic gardeners choose to lose certain plants or varieties entirely rather than resort to toxic sprays.

For more information, see HYG-2205-94, "Integrated Pest Management for the Home Vegetable Garden," <http://ohioline.osu.edu/hyg-fact/2000/2205.html>.

## Conclusion

Intensive organic gardening is a set of practices and techniques that allows for the production of large quantities of fresh produce in a limited area in an environmentally-friendly manner. It is ideal for backyard gardens, community gardens, and small-scale market operations.

## Further Reading

Bradley, Marshall. 1993. *Rodale's All-New Encyclopedia of Organic Gardening: The Indispensable Resource for Every Gardener*. Emmaus, PA: Rodale Press. An excellent all-around reference book for organic gardening.

Coleman, Eliot. 1995. *The New Organic Grower: A Master's Manual of Tools and Techniques for the Home and Market Gardener*. White River Junction, VT: Chelsea Green Publishing Co. Tips and techniques from one of America's foremost organic gardeners.

Jeavons, John. 1995. *How to Grow More Vegetables Than You Ever Thought Possible On Less Land Than You Can Imagine*. Berkeley, CA: Ten Speed Press. The classic book on the Biointensive method. Contains detailed planning tables and step-by-step instructions.

Ohioline vegetable information. (<http://ohioline.osu.edu/lines/vegie.html>). Link to Extension fact sheets with lots of information on growing specific crops in the home garden.

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