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## How You Can Grow Food Organically

*By Wesley Judkins and Floyd Smith*

Organic matter is extremely important for improving the physical condition and productivity of the soil. It makes plowing and cultivating easier. It also increases the nutrient reserve and water-holding capacity of sandy or clay type soils.

The gardener derives several benefits by mulching with organic matter. It reduces erosion caused by runoff of rain or irrigation, increases infiltration of water into the soil, and conserves this moisture by reducing evaporation. Organic matter helps to suppress weed growth.

Some good organic materials to use as mulch are leaves, lawn clippings, fresh sawdust, fine wood shavings, pine needles, chopped straw, ground corncobs, shredded tobacco or sugar cane stems, peanut hulls, or cottonseed hulls. These materials do not add important amounts of nutrients or have a significant effect on the pH (relative acidity) of the soil.

The dead vegetable plants in your garden should be chopped down and left on the ground as a protective mulch during winter. This trash mulch reduces erosion and improves organic matter content of the soil when the garden is prepared for planting in spring. Unmulched areas in gardens and fields, not occupied by growing crops, should be planted to green manure crops such as rye, ryegrass, millet, sorghum, or crimson clover. They will reduce leaching of nutrients and increase organic matter for the next crop as they are worked into the soil.

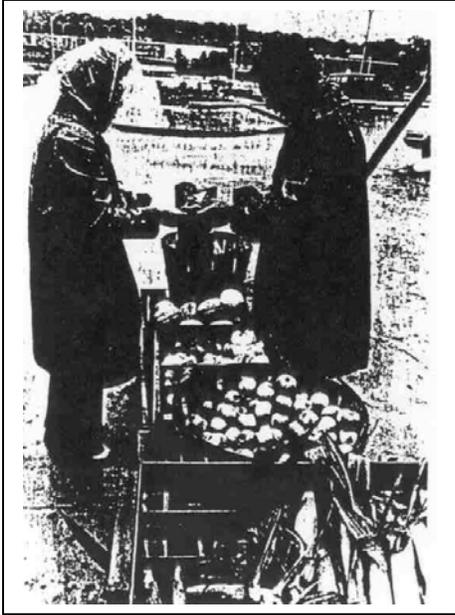
Organic waste materials such as leaves, manure from livestock and poultry, treated sewage sludge, and the organic portion of urban trash collections can be used as fertilizer, mulch, or compost.

Some cities accumulate leaves in huge piles during fall collection periods. After several months of composting, the material is available at little or no cost to gardeners. This is a practical way to reduce environmental pollution and supply organic material for gardens and farms.

The solid portion of sewage may be effectively salvaged and used as fertilizer. Composted sewage sludge has a composition of about 5 percent nitrogen and 2 percent phosphoric acid, and is an excellent organic fertilizer.

### **Insects, Disease**

Time of planting is important in avoiding losses by diseases and pests in certain regions. Since seed corn maggots destroy early plantings of beans and corn, you should delay planting until the soil warms. Early maturing varieties of sweet corn can avoid the worst earworm problem. Delay plantings of summer squash to avoid early season activity and resultant damage by the squash vine borer.



Selling organically grown produce

During recent years, plant breeders have made tremendous contributions to agriculture by developing new varieties resistant to diseases. These allow large yields of high quality crops to be produced without the use of chemical sprays.

When planning for vegetable production in a home garden or commercial enterprise, consult your county Extension agent or seed catalog for information on disease-resistant varieties. Excellent new introductions are available each year. Comparable insect-resistant varieties have not been developed.

Some vegetable crops are highly subject to damage by pests or disease organisms. Others are relatively pest-free. The beginner should first plant only trouble-free crops, later trying the more difficult ones after gaining experience.

Attack by cutworms can be prevented by placing a simple collar of stiff paper (cut from a drinking cup or milk carton) around newly set tomato, cabbage, and pepper plants—and even sweet corn. The collar should extend about 7 inch into the soil and 2 inches above ground.

Slugs that emerge at night from hiding places in wall crevices, loose mulch, piles of plant stakes or trash, can be trapped under pieces of board, shingles or flat stones laid in the garden. Lift them each day and destroy the slugs.

Slugs are attracted to shallow vessels partially filled with beer into which they crawl and expire. Slug baits moistened with a teaspoon of beer will be twice as effective.

Aluminum foil mulch around low growing plants reflects the ultraviolet rays from the sky and repels flying insects (including aphids, leafhoppers, thrips Mexican bean beetles, and cucumber beetles) from landing on the plants. Summer squash, Chinese cabbage, lettuce, and peppers have been protected from virus infection transmitted by aphid feeding. Beans and cucurbits have been protected from chewing and sucking insects. Black polyethylene mulches, used extensively by commercial fruit and vegetable growers, help to control weeds, conserve moisture and prevent leaching of fertility in the garden. They also keep the produce from resting on the soil, thus reducing rot infection from soil contact.

Blacklight traps are frequently advertised for control of insect pests in gardens and on farms. Although great numbers of moths and other insects are attracted to individual black lights and captured in the attached traps or killed on electric grids, there is little or no reduction of the pest insects that attack vegetables.

Sometimes insect pests in the vicinity of the trap will be greater than normal. Insects attracted to the light may not enter the trap, but linger to lay their eggs in the vicinity. Likewise, certain bait traps—as for the Japanese beetle—may increase the infestation in the trap's vicinity.

Routine inspection and handpicking of tomato hornworms on a small planting of a dozen or so tomato plants is highly effective and less time consuming than preparing and applying a

spray. In some years, hornworms may not appear at all. Handpicking can also eliminate small infestations of squash bugs, Mexican bean beetles, and potato beetles.

### **Interplanting**

A recent calendar for home gardeners lists a number of plants that should be placed among your vegetables to deter cabbage worms, Mexican bean beetles, Colorado potato beetles, Japanese beetles, borers and tomato hornworms.

Experiments by research entomologists at State and Federal Experiment Stations have shown no beneficial results from such interplantings except for the reduction of one type of nematode by marigold roots.

Moreover, these experiments showed that Mexican bean beetles and Colorado potato beetles found their respective host plants in mixed plantings. Onions and garlic supported thriving populations of onion thrips and mites, and had no measurable repelling effect on cabbage worms, bean beetles, cucumber beetles and aphids that infested their respective interplanted host plants.

Few gardeners ever see the most efficient parasites and predators at work among the pests on their plants. Examples of beneficial insects are: the yellow and black banded thrips; the tiny Orius plant. bug; syrphid fly larvae; aphid lions-the ugly looking larvae of the delicate lacewing flies; and larvae and adults of our native ladybird beetles that suck the juices from plant-feeding thrips, spider mites, aphids, young caterpillars, and leafhoppers.

Often during periods of cool damp weather, epidemics of insect disease caused by bacteria, fungi, or viruses will suddenly destroy thriving populations of pests-especially aphids cabbage worms, cabbage loopers and other caterpillars.

Until recently the Mexican bean beetle has defoliated beans, lima beans, and soybeans over wide areas without the depressing effect of parasites or predators. A tiny wasp was recently introduced from India that lays 10 or more eggs in each bean beetle larva, and soon the larva turns black and dies.

This microscopic parasite disperses for 10 miles or more in search of bean beetle infestations.

The parasite does not survive our winters, for lack of food. But if reintroduced each season from laboratory cultures, it has the potential for reducing the bean beetle to a minor pest.

Each Orius bug destroys 20 or more flower thrips per day. He and his fellows are responsible for reducing high spring populations of this insect to low levels for the remainder of the season.

Our native ladybird beetles, that come into our gardens in late spring, lay their orange-yellow eggs among aphids on vegetables where each alligator-like larva sucks the juices from 10 to 20 aphids per day for a total of 300 or more during its growth period. Thus, thriving aphid colonies developing in early spring virtually disappear for the summer and do not reappear until autumn when temperatures are lower and the ladybird beetles less active.

## Praying Mantis

In contrast to the highly efficient parasites and predators discussed above, much attention is given to less effective techniques. Some amateur ecologists urge you to buy praying mantis egg masses and pints of ladybird beetles and release them in your garden for season-long insect control.

You should realize that the praying mantis hatch from the egg masses in late spring. The tiny mantids (mantis) scramble for safety-usually into dense shrubbery-to avoid being eaten by their brothers and sisters. Of the hundreds that hatch in the spring, only a few survive until fall and they are usually found in the shrub border; rarely on the more exposed vegetables where you need them.

One authority has stated that "the chief benefit to be derived from the purchase of mantid (mantis) egg masses is the feeling of virtue in believing that you have established a highly beneficial insect which will protect the neighborhood by destroying many harmful garden pests. "Of the hundreds of young mantids that come tumbling out of a case, perchance a few will survive. With avid appetites and rapacious front legs they capture many insects; including their brothers and sisters, and harmful insects as well as beneficial insects.

"Nevertheless, the mantid is a handsome insect that is interesting to have around. So let us continue to protect it and encourage others to do the same, but do not depend upon it to rid our garden of all noxious pests."

The ladybird beetles you buy are collected from their hibernating quarters in California canyons and shipped to you. When you release them in your garden they usually disperse to other areas just as they disperse from their hibernating quarters in canyons or woodlands-often for several miles in search of cultivated fields. Few, if any, remain for long in your garden. Ladybird beetles found in your garden are local, naturally occurring beetles which migrate from hibernating sources in early spring.

The information set forth in this chapter will aid you in producing an abundance of many but not all kinds of vegetables in most years, without resorting to use of chemical fertilizers or sprays. In some years with poor crops it will be necessary to accept foods of lower quality. Experience will enable you to select and grow only the more reliable, trouble-free vegetables.

### **Further Reading:**

- Biological Control of Plant Pests, Handbook No. 34, Brooklyn Botanic Garden, Brooklyn, N. Y. 11225. \$1.75.
- Encyclopedia of Organic Gardening, The, Rodale Books, Inc., Emmaus, Pa. 18049. 1971. \$14.95.
- How To Grow Vegetables and Fruits by the Organic Method, Rodale Books, Inc., Emmaus, Pa. 18049, 1971. \$13.95
- Judkins Wesley P., Organic Gardening-Think Mulch. 1977 Yearbook of Agriculture, pp 78-83, on sale by Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402. \$6.50.
- Natural Gardening, Handbook No. 77, Brooklyn Botanic Garden, Brooklyn, N. Y. 11225. \$1.75.