

AGRICULTURAL ALTERNATIVES

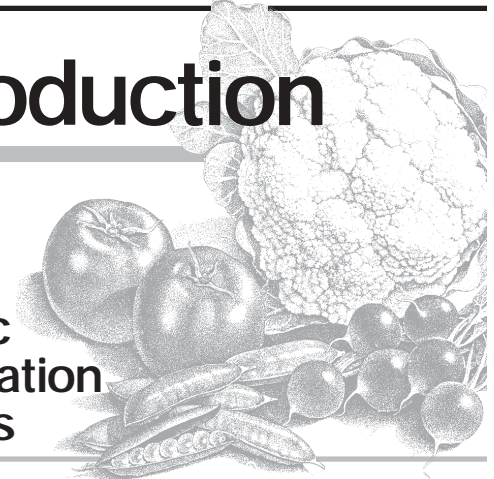
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Organic Vegetable Production

Organic production is a system that lends itself well to small-scale and part-time farming operations. Although the cost of certification and the time and labor involved in managing the system are high, returns can also be, on average, 20 percent higher than conventionally produced products, provided that a market exists. The U.S. Department of Agriculture (USDA) regulates the use of the term "organic." In order to become certified organic, a grower must use production and handling practices in accordance with the National Organic Standards (NOS) and become certified by a USDA-accredited certifying agency. Growers whose gross income from organic production is \$5,000 or less are exempt from this rule. In this case, growers must still use production and handling practices in accordance with the NOS, but other restrictions regarding labeling and combination with other organic products apply. It takes a minimum of 3 years to transition from nonorganic production to certified organic production. During this period the products harvested cannot be labeled as organic and may not command the higher prices associated with organic products. Growing organic is not for everyone since it requires detailed record keeping and more management and planning time than most other production systems.

Between 1997 and 2001, organic cropland acreage increased nearly 75 percent nationally. In Pennsylvania, organic cropland increased nearly 222 percent during the same period. In 2001, 1.3 million acres of land were devoted to certified organic crop production and another 1 million to certified organic pastures in the United States. While certified organic production is increasing at a high rate, the overall percentage of land in certified organic crop production is low—0.3 percent and in certified organic pastures 0.2 percent. In 2001, 21,000 acres were certified organic in Pennsylvania, up from 19,000 acres in 2000 and 6,500 acres in 1997.

Organic Certification Process



Organic certification is a process where a third party accredited by the USDA assures or certifies that an operation follows production and handling practices required under the NOS.

The steps in becoming certified are as follows:

1. Select an accredited certifying agency and request application materials.
2. Develop a certifiable organic system plan and begin using certified organic production practices and procedures according to the organic system plan on the transition field(s).
3. Submit the application materials to the certification agency in the last year of the transition.
4. Schedule an inspection of the field(s) in organic production.
5. Wait for a review of the inspection records by the certification staff.
6. Become certified organic or receive information on why certification is denied.

Certification lasts for 1 year, after which the grower must become recertified (repeat steps 2–6).

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Organic System Plan

The organic system plan is a thorough record describing the protocols that the operation will use to achieve and maintain the requirements of the NOS. Each organic system plan is unique to the operation. Thus, it is important to discuss options with a certifying agency when developing the organic system plan. The certifying agency will determine whether the organic system plan is in adherence with the NOS. The organic system plan is required to contain the following six elements:

1. A description of practices and procedures, including the frequency that they will be used in the operation.
2. A list of each substance, including composition and commercial availability, to be used in the operation and where it will be used.
3. A description of monitoring techniques, including frequencies to be used.
4. A description of the recording-keeping system, including sales. The records must be maintained for a minimum of 5 years and made available during business hours for inspection.
5. A description of the establishment and management of a physical barrier or buffer zone on operations with organic and nonorganic components. In addition, methods to avoid commingling of organic and nonorganic products and prevent contact with prohibited substances must be described.
6. Other information deemed necessary by the certifying agency.

Accredited Certifying Agencies

Always use a certifying agency accredited with the USDA. To determine if an agency is certified, the National Organic Program Web site has a list of accredited agencies (see “For More Information”). Currently, there is one USDA accredited certifying agency based in Pennsylvania, Pennsylvania Certified Organic. However, an accredited certifying agency from any state can be used to certify an organic farm. When producing an organic crop for export, you should verify if the accreditation extends to the importing country. Costs for becoming certified vary depending on the certifying agency. Costs generally include certification fees, the annual cost of inspection, administrative fees, and additional assessments. Cost-share money is available through the USDA to assist limited-resource and minority farmers in obtaining organic certification.

Production Practices

Plant Selection

The use of genetically modified organisms is prohibited in certified organic production. Seed, transplants, and other planting stock must be organically produced. Exceptions can be made when no commercial organic seed or planting stock is available (due to a crop failure, for example). In this case, untreated, nonorganic seeds and planting stock can be used (except for the production of edible sprouts). If untreated, nonorganic seed or planting stock is not commercially available, materials, seeds, or plants treated with substances allowed according to the national list can be substituted. The national list catalogs the allowable and prohibited substances in certified organic production provided for in the Organic Foods Production Act of 1990. A temporary variance can be obtained for nonorganic transplants when an unavoidable event, such as a fire, flood, or frost, has occurred. In addition, planting stock that is used to produce perennial crops can be sold as organic after it has been managed using certified organic practices for a minimum of 1 year. Seeds, transplants, and planting stock that have been treated with prohibited substances can be used to produce an organic crop when the application of the substance is a requirement of federal or state phytosanitary regulations. It is best to work closely with the certifying agency to ensure that exceptions can be made without compromising your organic certification. Additionally, organic growers cannot use lumber treated with arsenate or other prohibited substances for new installations or as replacement for lumber in contact with soil or livestock.

In addition to following the NOS criteria, select cultivars with good market characteristics. Also, seed and plant selection can be used as a preventative tool for pest management. Select seed and plant cultivars with resistance or tolerance to insect and disease pests common in your area or field. When using transplants and other planting stock, buy certified stock when possible and only purchase from reputable suppliers.

Soil Fertility

The goal of soil fertility management is to maintain or improve the soil condition and minimize erosion. Organic practices used include sound crop rotations, the use of green manures and cover crops, the application of plant and animal matter, and the application of nutrients or soil amendments allowable according to the national list. Soil testing should be used to determine the amount of nutrients needed for optimal growth of a particular crop. Soil test kits are available through local extension offices. The nutrient levels in the soil will determine the amount of nutrients needed through green manures, cover-cropping, the application of composted and uncomposted (raw) manures, and allowable fertilizer.

Plant and Animal Materials

Plant and animal materials not treated with a prohibited substance can be applied composted or uncomposted. Composted plant or animal materials can be incorporated into the soil as necessary, provided the compost meets carbon-to-nitrogen ratio (C:N) and temperature requirements. The compost used must have a C:N ratio between 25:1 and 40:1. In addition, when using an in-vessel or static aerated pile composting system, the pile must reach a temperature between 131°F and 170°F for a minimum of 3 days. If using a windrow composting system, the pile temperature must be maintained between 131°F and 170°F for a minimum of 15 days and turned a minimum of five times during that time. Uncomposted plant materials can also be used in certified organic production. Uncomposted animal manure can be used only 1) on fields with crops not to be consumed by humans, or 2) if it is integrated into the soil a minimum of 90 days before harvest, provided that the edible portion of the crop does not contact the soil, or 3) if it is integrated into the soil a minimum of 120 days before harvest for a product that does come into contact with the soil. Using municipal sewage sludge is prohibited in certified organic production.

Composted materials can be tested to determine the amount of nutrients supplied (kits are available through local Extension offices). It is also useful to determine the pH of the compost because, depending on the source material, the compost may have an unsuitably high pH for crop production. The amount of nitrogen (N), phosphate (P₂O₅), and potash (K₂O) in several uncomposted manures and green manures can be found in the Pennsylvania Commercial Vegetable Production Recommendations guide.

Fertilizers and Soil Amendments

Fertilizers and soil amendments that meet the NOS are available to complement other fertility practices. In addition, mined materials of low solubility can be used to supply plant nutrients. Plant or animal ashes can also be used to improve soil fertility as long as they have not been combined or treated with a prohibited substance and are not themselves a prohibited substance. Some fertilizers and soil amendments labeled as “natural” or “organic” may not meet the NOS. It is best to check allowed and prohibited materials for certified organic production through a certifying agency.

One of the limitations to using organic fertilizers growers should be aware of is that allowable fertilizers are sometimes difficult to find commercially. In addition, allowable fertilizers frequently cost considerably more than synthetic fertilizers. They tend to be low in the amount of nutrients they supply and therefore may need to be applied in large amounts. As a result, it can be difficult to apply enough of the product. Lastly, organic fertilizers can be difficult to blend.

Pest Management

Pests must be managed primarily through the use of preventative practices. Options include cultural techniques, the use of physical barriers, and the use of biological management strategies. Some of the cultural techniques available for pest management include good site and cultivar selection, proper moisture and nutrient management, sanitation, rouging, vector management, manipulating harvest schedules, crop rotation, using cover crops and green manures, mechanical cultivation, hand weeding, using trap crops, creating habitats for beneficials, mulching, and livestock grazing. Physical barriers include plastic or organic mulches and row covers. When using plastic mulches they must be removed at the end of harvest. Burning of crop residues is prohibited except when used for disease management or to promote seed germination. When preventative practices are not sufficient to prevent a pest, biological, botanical, or synthetic pesticides can be used, providing they are allowable substances.

Pests commonly associated with particular crops should be determined prior to planting. Cultural techniques and physical barriers can then be selected specific to potential pests. Preventative pest management can require increased management and labor to monitor pests and implement compared to a primarily pesticide based approach. If preventative strategies fail, allowable pesticides can be used. Organic growers should expect to have more pest damage than anticipated in some years.

Selected Crops

The crops listed in the table on the following pages are rated for their ease of production in an organic system. They are listed from less difficult to more difficult. Criteria used to determine the ratings were the number of potential pests (insect, fungal, and bacteria; based on those listed in Agricultural Alternative publications) and cultural management techniques for those pests, fertility requirements of the crop, the availability of organic seed, and the number cultivars sold.

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Table 1. Factors to consider when producing organic vegetables.

Crop	Organic Seed Availability	NUTRIENT REQUIREMENTS				Pest Management Intensity	Success of Organic Pest Management Practices	POTENTIAL PEST PROBLEMS IN AN ORGANIC SYSTEM	
		N	P	K	Insects			Diseases	
Pumpkin	High	Low	Medium	Medium	Medium	High	aphids, squash vine borers, rindworms	bacterial wilt, powdery mildew, phytophthora, viruses*	
Snap Bean	High	Low	Low	Low	Medium	High	leaf hoppers, European corn borers	white mold, root rot	
Cucumber	Medium	Medium	Medium	Medium	High	Medium	cucumber beetles, cutworms, aphids, thrips	bacterial wilt, gummy stem blight, viruses*	
Tomato	High	Medium	Medium	High	Very High	Medium	aphids, tomato hornworms, European corn borers, thrips, whiteflies	bacterial canker, bacterial speck, bacterial spot, early blight, late blight, Tomato Spotted Wilt Virus, Tobacco Mosaic Virus	
Onion, Bulb	Low	Medium	Medium	Medium	Low	High	thrips, onion maggots	purple blotch	
Onion, Green	Low	High	Medium	Medium	Low	High	thrips, onion maggots	purple blotch	
Cantaloupe	Low	Medium	Medium	Medium	High	Medium	cucumber beetles, rindworms, squash vine borers, aphids	bacterial wilt, fusarium wilt, powdery mildew, viruses*	
Broccoli	Medium	Medium	Medium	Medium	High	Medium	flea beetles, aphids	bacterial head rot	
Potato	Medium	High	Medium	High	Very High	Low	potato beetles, flea beetles, aphids, leaf hoppers, wireworms, corn borers	scab, rhizoctonia, verticillium wilt, early blight, late blight	
Sweet Corn	Low	High	Medium	Medium	Medium	High	corn borers, armyworms, flea beetles, Japanese beetles, corn earworms	Stewart's wilt, rust, Maize Dwarf Mosaic Virus	

(continued on next page)

Table 1 (continued)

Crop	Organic Seed Availability	NUTRIENT REQUIREMENTS			Pest Management Intensity	Success of Organic Pest Management Practices	POTENTIAL PEST PROBLEMS IN AN ORGANIC SYSTEM	
		N	P	K			Insects	Diseases
Bell Pepper	Low	Medium	Medium	Medium	High	Medium	aphids, thrips, European corn borers, pepper maggot	bacterial leaf spot, anthracnose fruit rot, phytophthora, viruses**
Asparagus	Very Low	Medium	Medium	Medium	Medium	Medium	asparagus aphids, cutworms, Japanese beetles	fusarium root rot, rust

*Viruses: Cucumber Mosaic Virus, Watermelon Mosaic Virus Z, Papaya Ring Spot Virus, Zucchini Yellow Mosaic Virus, and Tobacco Mosaic Virus.

**Viruses: Tobacco Mosaic Virus, Potato Virus X, Cucumber Mosaic Virus, Tobacco Etch Virus, Potato Virus Y, and Alfalfa Mosaic Virus.

For More Information

The National Organic Program: www.ams.usda.gov/nop/

Organic Materials Review Institute (OMRI): www.omri.org/

Agricultural Analytical Services Lab for soil testing:
www.aasl.psu.edu/

Appropriate Technology Transfer for Rural Areas (ATTRA):
attra.org/

Pennsylvania Commercial Production Recommendations.
University Park, PA: Penn State Cooperative Extension.
AGRS-28. Cost: \$9.00.

Accrediting Agencies Based in Pennsylvania

PENNSYLVANIA CERTIFIED ORGANIC
406 S. PENNSYLVANIA AVE.
CENTRE HALL, PA 16828

Phone: 814-364-1344; Fax: 814-364-4431

E-mail: info@paorganic.org

Web site: www.paorganic.org

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