



Growing Vegetables Organically

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Growing vegetables organically can be rewarding and productive. This publication explains the basic elements of successful organic vegetable production, from initial site location, soil preparation, irrigation and variety selection to insect and disease control, composting, mulching and fertilization, and successive planting and crop rotation.

Garden Location

Planting your vegetable garden in the right location will help ensure the best production. The garden should have a southern exposure, such as on the south side of your home, or be located in an open field if at all possible. The chosen location should receive a minimum of 6 to 8 hours of direct sunlight every day. It is also important to have a water supply nearby. For convenience, a location near the house is desirable. A site that drains well even after a heavy rain is ideal. Poor drainage may be improved by re-grading, digging ditches, installing a tile drain field or building raised beds.

Nearby trees and shrubs may have extensive root systems that can interfere with water and nutrient uptake of plants at your site. Locate the garden away from these areas to minimize or avoid this problem. As a last resort, consider removing trees and shrubs that may interfere with production.

Land with a slope of 1.5 percent or greater (an 18-inch elevation change in 100 feet) should be avoided or terraced to prevent runoff and soil erosion. Contour planting, or setting the rows to follow the contour of the land, can also help with runoff problems. Ask your local county Extension agent for more information on dealing with this situation.

Sites with serious weed problems such as nutsedge, Bermudagrass or kudzu should be avoided unless adequate measures are taken to control them. The presence of these weeds does not preclude you from using a site, but considerable work is required to remove and control these weeds.

Consider fencing the site if you have a significant wild animal population nearby. Deer, raccoons and rabbits, to name a few, may become problems. Domestic animals such as dogs may also become a problem because many like to dig. Fences as high as 6 feet, an electric fence or some combination may be required to control animals such as deer.

Not all of the above recommendations can be accommodated in all situations. Many established neighborhoods have large shade trees and extensive landscaping. This may preclude having a large row garden, but container gardens may still be possible in places where they can be moved to sunny locations as needed. Growing leafy greens is possible in a less-than-ideal light situation, but they will require some full sun during the day.

Garden Planning

The size of your garden will partly determine many aspects of your garden plan. Large gardens where tractors will be used can be worked more easily with long rows; small gardens may be worked more easily in small beds with footpaths surrounding them.

There are many things to consider when planning your garden. Fertility requirements vary by crop, so heavy feeders and light feeders can be grouped separately to help manage fertilization. Long-season crops such as eggplant, tomato, pepper and okra should be planted so they don't interfere with replanting short-season crops such as beans and lettuce. Tall-growing crops such as pole beans, tomatoes and corn should be planted so they don't shade shorter crops. You may not be able to accommodate

all of these recommendations in your garden, but incorporating as many as possible will help ensure success.

An important part of garden planning is record keeping. General information about soil amendments used and weather information (particularly rainfall and first and last frost dates) can be useful, especially when tracked from year to year. Specific information about a particular vegetable can also be helpful for future planning. Information such as variety selection, planting date, days to harvest, and disease and insect problems should be noted. This data can help you determine which vegetables and varieties are best for your location. Watering, fertilizing and any cultural practices should also be recorded. This helps determine what should be done in the garden from day to day. Finally, keep track of what is grown where in your garden. This information will help with successive plantings and crop rotation.

When to plant is also an important part of garden planning. Table 6 lists the hardiness and days to maturity for several vegetables. Vegetables can be classed into two broad categories: warm- and cool-season crops. Warm-season crops can be further subdivided into tender and very tender vegetables, and cool-season crops can be subdivided into hardy and half-hardy crops. Very tender crops cannot stand any frost and will not do well under cool nighttime temperatures (below 55°F). Tender crops also don't like frost but can stand cooler night temperatures. Hardy cool-season vegetables can withstand frost and can be grown during the winter in all but the coldest northern parts of Georgia. Half-hardy cool-season vegetables can withstand cool temperatures and light frosts, but hard freezes and heavy frost can be detrimental.

Irrigation

Growing a crop without irrigation is possible, but irrigating will enhance your success. Several different irrigation methods can be used, although overhead and trickle irrigation are the most common.

Trickle irrigation is the most water-use efficient because water is delivered directly to plant roots via a low-volume soaker hose, drip tape or emitters. There are some disadvantages to trickle irrigation, including installation and maintenance costs. These types of systems may need to be monitored more closely, especially with newly transplanted plants, because they may not wet the soil sufficiently or

evenly for new plants. Drip irrigation tape or soaker hose placement may have to be adjusted, particularly during plant establishment.

Overhead sprinkler systems are easy to use and require less maintenance and monitoring; however, they can result in uneven water application and use water inefficiently. For more detailed information on irrigation see *Irrigation for Lawns and Gardens*, Bulletin 894 from the University of Georgia Cooperative Extension.

Soil Preparation

Organic gardening requires a long-term outlook with respect to soil preparation. In fact, the key to successful organic gardening is to feed the soil with organic matter, which feeds the plant, rather than to feed the plant with inorganic fertilizer as in conventional production. An ideal soil has equal parts sand (0.02 to 2.0 millimeters), silt (0.002 to 0.02 millimeters) and clay (0 to 0.002 millimeters), and contains about 5 percent organic matter. Most mineral soils in Georgia will have less than 1 percent organic matter and are rarely ideal. However, with work, most soils can be improved and made productive.

Because it takes a long-term outlook to build a good soil, don't be disappointed if your results are less than ideal the first year or two. New sites should have all plant matter removed or turned under. Areas with Bermuda sods or other invasive plants should have the plants removed to the compost pile (see "Composting" in this publication) and the soil turned under to expose roots and rhizomes to desiccation. In addition, soil solarization (see "Soil Solarization" in this publication) can help manage these hard-to-control weeds.

Some soils may have hardpans, which are impervious layers several inches under the soil. These hardpans are often found on old farmland or new home sites where equipment has compacted the soil. In either case, these hardpans must be broken up. On clay soils this can be very difficult.

Soils should be turned to 10 to 12 inches deep. One method is to double dig the garden. To do this, dig a trench 6 to 8 inches deep along one side of the garden, placing the soil on the outside edge. Then use a spade or garden fork to loosen the soil 6 inches deep at the bottom of the trench. Soil on the inside edge of the trench is moved to fill the existing trench, creating a new trench in its place. With a spade or

garden fork, loosen the soil in the bottom of this trench to a 6-inch depth. Continue in this fashion until the entire garden has been double dug. The soil from the first trench can then be moved into the last trench. This method of garden preparation will leave a deeply turned soil but is very labor intensive. Alternatives include using equipment such as tractor-mounted plows or a Rototiller set to the deepest depth. Organic matter should be added during this deep-turning process.

Organic matter in soil is important for two reasons. First, as it breaks down it releases nutrients that crops can utilize, and second, it improves the water- and nutrient-holding capacity of the soil. The amount of organic matter to add varies with the chosen material, the type of soil and weather conditions. On sandy soils in tropical and subtropical regions, as much as 2,300 to 4,600 pounds per 1,000 square feet may be required to gain a benefit from the addition of organic matter. On heavier soils in regions with cooler climates and less rainfall, as little as 200 pounds per 1,000 square feet may be sufficient.

As an example, an acre of dry soil 6 inches deep weighs about 2 million pounds, which means that 1,000 square feet of soil to the same depth weighs approximately 46,000 pounds. If you wished to raise the organic matter of this soil 1 percent, you would have to add 460 pounds of organic matter. The amount of material required may actually be quite a bit more because most organic sources have a high water content – as much as 50 percent or more. In addition, many organic sources have high ash (non-organic residues) content – as high as 25 percent or more. Organic matter with 50 percent water content and 25 percent ash would require 1,840 pounds applied to 1,000 square feet to raise the organic fraction of the soil 1 percent. This may be impractical both in terms of obtaining the necessary organic matter and the fact that organic matter must be added each year to sustain the increase; however, low rates (200 pounds per 1,000 square feet of organic matter) can have a noticeable improvement in soil tilth. Additions of 500 to 1,000 pounds of organic matter per 1,000 square feet per year can have a beneficial effect on soil tilth and plant growth. Table 1 lists the minimum amounts of several types of organic matter that should be added to the soil. It is highly recommended that you have the organic matter tested for its nutrient content so that application rates can be adjusted accordingly and because fresh material can damage plants and be hazardous to the environment through runoff. In all cases, fresh

material should be composted to kill harmful pathogens and weed seed.

Composting

Compost is an excellent source of organic material for your garden. If you make it yourself, it has the added benefit of reducing the amount of waste your household generates. All organic kitchen and garden waste except animal products can be composted. Material such as bones and animal scraps should be avoided because they attract vermin, flies and scavenging animals. A convenient size for a compost pile is 4 feet wide by 5 feet long by 5 feet high. A frame made of pressure-treated lumber can be built to hold the compost, and containers specifically designed for composting can be purchased, including types that can be easily tumbled.

If you build your own compost pile, begin the compost by adding 12 inches of organic matter (kitchen scraps, yard waste, etc.) and applying 1 to 2 pounds of high-nitrogen organic fertilizer such as dried blood, guano or poultry manure. Finally, add 2 inches of soil. Continue building the compost pile in this layered fashion as you generate organic matter. Another method of composting is to combine 65 percent “brown” material with 35 percent “green” material. “Brown” materials include tree and shrub trimmings and raked leaves, while “green” materials include grass clippings and kitchen scraps. “Brown” materials such as tree and shrub trimmings should be chipped prior to use. For complete and rapid decomposition, the compost pile should be turned regularly, particularly during the initial stages. The center of the pile should be concave to hold rainwater and should begin to heat up within a couple of weeks. The composting process should be complete within two to three months, depending on materials and outside temperature.

Large material such as tree limbs and corn stalks should be chopped into smaller pieces to facilitate decomposition. Some materials, such as lawn clippings, will decompose very rapidly; others will require turning the compost pile and adding more high-nitrogen organic fertilizer. This will restart the heating and decomposition process.

If you use materials from outside sources (e.g., pasture hay or straw), you should check to make sure no persistent herbicides have been applied. Herbicides such as picloram (Grazon®) are extremely persistent and will damage your plants.

Green Manures

Any crop grown on land with the intent of turning it into the soil is called a green manure. Generally, legumes and various grasses are grown as green manure. Turning under a crop can provide a number of benefits, including increasing organic matter of the soil, decreasing certain disease problems and increasing the nutrient level in the soil. After the green manure is turned under, it decomposes and adds nutrients and organic matter to the soil.

When used as a green manure, grasses and small grains can decrease the incidence of nematodes, which are microscopic worms that feed on certain plant roots, weakening the plants.

Using various legume crops can increase the amount of nitrogen in the soil. The amount of nitrogen will depend on the crop, the time of year and when in the crop cycle the plants are turned under. Anywhere from 30 to 125 pounds of nitrogen may be added to the soil when a legume crop is turned under. Table 2 lists several crops that can be used as green manures.

Soil Solarization

Difficult-to-control weeds and soilborne pathogens may be controlled with soil solarization, which involves covering the soil surface with clear plastic for eight to 12 weeks or longer. Clear plastic is used because most of the light energy is transferred to the soil. Black plastic absorbs a lot of heat, but it also shades the soil and is not as effective as clear plastic.

In temperate regions where there can be a significant number of overcast days, soil solarization may require an entire season to be effective. For best results, solarization should extend over the entire summer. Although an entire growing season may be lost, weed and soilborne pathogen control will carry over to the following season. This can be particularly effective when done prior to winter vegetable production.

To begin with, all plant material and crop residue, as is practical, should be removed. The soil should be turned to break up any clods and raked smooth. The area should be watered thoroughly so the soil is saturated. The area then should be covered with a clear plastic sheet 1 to 4 millimeters thick. The sheet can be secured along the edges with soil or rocks. Soil solarization works best during the summer months when air temperatures are high and

sunlight is most intense. Soil solarization is not effective during extended periods of cool temperatures or overcast weather.

Starter Solutions for Transplants

Starter solutions can help get transplants and newly emerged seedlings off to a good start. High phosphorus is particularly important in these solutions because it encourages root growth; however, high-phosphorus organic fertilizers may not be readily available. Water-soluble fertilizers such as fish emulsion can also help plants get off to a good start. This material should be mixed with water at a rate of 2 to 4 tablespoons per gallon and applied to newly set transplants. Apply $\frac{1}{2}$ to 1 pint of this solution to each plant.

In the past, manure teas were recommended as a starter solution. This practice should be abandoned because of the possibility of transmitting human pathogens.

Successive Planting and Crop Rotation

Because of the relatively long growing season in Georgia (particularly south Georgia), it is possible to produce more than one crop a year on the same land. Planting a second or third crop on the same land within the same growing season is called successive cropping or double cropping. Crop rotation, on the other hand, refers to planting different vegetables on the same land from year to year. Related vegetables should not be planted on the same land in succession or rotation. For example, squash should not be followed by a related vegetable, such as watermelon, cantaloupe or cucumber. This practice helps minimize soilborne disease problems and helps maintain soil fertility. Table 3 lists related vegetables.

Crop and Variety Selection

One of the most important decisions an organic grower makes is crop and variety selection. Not all vegetables do well in all locations. Vegetables commonly grown in your area are your best bet for success. Trial and error will also help determine which vegetables are best suited to your area. As you try different varieties, keep records so that this information can be used in planning subsequent years. Climate, disease and insect problems will be important criteria when selecting vegetable crops. It should be pointed out, however, that one year's results may not be enough to determine the suc-

cess of a particular vegetable. For example, a mild winter may result in a greater insect problem than you might expect the following season. On the other hand, a cold winter may result in sufficient suppression of the insect to make for a successful year.

Variety selection is another important consideration. When available, varieties with disease and insect resistance are best. Resistance, however, is seldom 100 percent, and the plant may show less severe symptoms than susceptible varieties.

Varieties can be grouped into two broad categories based on how they were developed. F_1 hybrids are developed from crossing lines that have been inbred for several generations. These varieties have advantages of increased uniformity and, often, increased yield compared with open-pollinated varieties. The disadvantage of these varieties is that the seeds are more costly and seeds saved from hybrids don't come true-to-type. Their performance will be more varied and perhaps noticeably worse. In addition, seed companies are constantly changing F_1 hybrid varieties. Not all vegetables lend themselves to F_1 production. For example, because of the low amount of seed produced from each cross, beans and peas are not available as F_1 hybrids.

Open-pollinated varieties are less expensive, and popular open-pollinated varieties will remain on the market for years. In addition, these seeds will remain true-to-type from one year to the next. Most older varieties are open-pollinated types. Very old varieties are often referred to as heirloom varieties, and many can be dated to the previous century and beyond. These varieties are often sources of unusual colors, shapes and flavors.

Several vegetables, including sweet-potatoes and Irish potatoes, are reproduced vegetatively; that is, from parts of the plant itself. To improve your results with these crops, buy certified slips for sweet-potatoes and seed pieces for Irish potatoes. The certification process ensures true-to-type, disease-free material.

Mulching

Mulching serves several purposes in organic production, including reducing weed growth, conserving soil moisture and nutrients, regulating soil temperature, helping prevent soil erosion and limit water splashing on plants (which keeps them cleaner and reduces the spread of disease). An added benefit

comes from organic mulch: As it decomposes, it increases the amount of organic matter in the soil. Almost any organic matter can be used successfully as mulch, including hay, straw, leaves, pine straw or bark. Avoid materials that may have a lot of seed such as overgrown grass clippings. Fresh material, particularly sawdust, should be avoided because it can rob your soil (and thus your plants) of nitrogen. In addition, avoid organic material that may be contaminated with toxic chemicals or herbicides because these may damage your plants. Pastures are often treated with herbicides that can injure plants when mulch is used from such sources. Some herbicides, such as picloram (Grazon®), can even survive the composting process.

Mulches should not be applied too early in the spring because this can delay soil warming. Wait until the soil is 65°F to a depth of 4 inches before applying. Solid materials such as newspapers should be weighted with soil to prevent them from blowing away. Weed control with mulches may require the continual addition of new material to smother weeds as they emerge. Keep all mulches 2 to 3 inches away from the stems of plants.

Fertilization

You must have accurate information about your soil to fertilize properly. The soil pH is important in determining nutrient availability to the crop. Optimum pH for most vegetables is between 6.0 and 6.5. Soil testing is the only accurate method of determining the soil pH. Such tests will offer recommendations on the amount of lime to apply if the soil pH is too low. Approximately 1 ton of lime is required to raise the pH of an acre 1 point; this is about 5 pounds per 100 square feet. The actual amount of lime required, however, will vary based on soil texture, the crop grown and the soil's buffering capacity. In order to determine proper fertilization, it is important to know the soil's nutrient status, which a soil test will provide. To illustrate (using Tables 4 and 8), assume you are planting only heavy feeders in your garden and plan to use Fertrell Super as an organic fertilizer. Heavy feeders require 3 pounds of nitrogen per 1,000 square feet (Table 4). Fertrell Super contains 4 percent nitrogen (Table 8). Convert 4 percent nitrogen to its decimal equivalent by dividing 4 by 100 to get 0.04. Calculate the pounds of Fertrell Super required to provide 3 pounds of nitrogen by dividing 3 by 0.04 to get 75 pounds. If your garden is smaller or larger than 1,000 square feet, adjust the amount accordingly.

Most organic fertilizers are relatively low in nutrients that are usually of low solubility. In addition, since plants require nutrients in their simple ionic form, these nutrients must undergo a process of mineralization to become available for plants to use. This means that organic growers need to plan ahead concerning their fertility needs. Organic fertilizers generally will have to be applied earlier than conventional fertilizers and may have to be applied in greater quantities. Applications of organic materials such as manures and compost are not necessarily added to soils as fertilizers, but rather improve soil characteristics such as water and nutrient holding ability.

Insect and Disease Control

The best first-line method of reducing insect and disease pressure is to use resistant varieties when available. A good example is VFN tomatoes, where the VFN stands for Verticillium-, Fusarium- and nematode-resistance. Your local county Extension office or seed supplier will have the latest information on available resistant varieties.

Keep the garden as free of diseases as possible. Plants with disease symptoms should be removed and destroyed. A properly constructed compost pile, which should heat up in the center, can control many diseases.

Keeping your plants dry will help reduce disease pressure. Using trickle irrigation rather than overhead sprinklers will reduce the amount of time plants remain wet and also conserve water. Of course, there's nothing we can do about the rain.

Crop rotation also can be an important method of controlling some but not all soilborne diseases. Proper crop rotation can substantially reduce nematodes in the soil but will do little to reduce Southern blight.

Insect control begins with healthy plants. Don't bring problems into your garden; buy insect-free transplants. Timing is also important. Insect populations tend to increase as the season progresses, so planting early can avoid many insect problems. Encourage beneficial insects to stay in your garden. This can be as easy as nailing a horizontal board to a fence to encourage wasps to build a nest.

Finally, there are many organically acceptable products that can be applied to your crops. Check with your local county Extension agent, who can give you the latest information on these products.

Tables

Table 1. Amount of organic matter to add from various sources.¹

Material	Rate/1000 Sq. Ft.
Cattle manure	150-500 Lbs.
Compost	4 bushels
Horse manure	100-200 Lbs.
Poultry manure	50-200 Lbs.
Sheep manure	75-100 Lbs.
Swine manure	75-100 Lbs.

¹Rates are minimum initial applications; you may wish to experiment with more or have the material analyzed for actual nutrient content and adjust application accordingly. In addition, you may wish to have your soil tested to determine the amount of organic matter present.

Table 2. Green manure crops, season of growth, amount of seed and type.

Crop	Season	Seed (Lbs./acre)	Type	Nitrogen (Lbs./ton dry material)
Buckwheat	Summer	75	Non-legume	14
Crimson clover	Winter	15	Legume	45
Rye	Winter	75	Non-legume	21
Southernpea	Summer	90	Legume	60
Soybean	Summer	75	Legume	46
Sudan grass	Summer	25	Non-legume	28
Vetch	Winter	30-50	Legume	62
Wheat	Winter	75	Non-legume	20

Table 3. Vegetables in related groups or families.

Nightshade Family	Legumes	Cucurbits	Cole
Eggplant	English pea	Cantaloupe	Broccoli
Irish potato	Lima beans	Cucumber	Cabbage
Pepper	Peanuts	Pumpkins	Collards
Tomato	Snap beans	Squash	Mustard
	Southern pea	Watermelon	Turnips

Table 4. Comparison of fertilizer needs for heavy, medium and light feeders with a medium soil test for phosphorus and potassium in pounds per 1,000 square feet of actual nutrient (nitrogen, phosphorus or potassium).

Feeders	N	P	K
Heavy	3.0	2.8	2.8
Medium	2.2	1.8	1.9
Light	0.8	0.9	0.9

Table 5. List of vegetables based on whether they are light, medium or heavy feeders.

Light feeders	Southern peas		
Medium feeders	Asparagus Beans, all Beets Broccoli Cantaloupes Carrot Cauliflower	Corn Cucumbers Eggplant Greens Herbs Okra English peas	Peppers Pumpkin Radish Squash Sweet potato Swiss chard Watermelon
Heavy feeders	Cabbage Lettuce	Onions Potatoes	Tomatoes

Table 6. Vegetable hardiness and days to maturity

Crop	Hardiness	Days to Maturity
Asparagus	Perennial, winter tolerant	Second Season
Bean, bush	Tender	50-60
Bean, pole	Tender	65-75
Bean, lima	Tender	65-75
Beet	Half-hardy	55-65
Broccoli	Hardy	60-80
Cabbage	Hardy	65-80
Cantaloupe	Very tender	80-90
Carrot	Half-hardy	70-80
Cauliflower	Half-hardy	55-60
Collard	Hardy	55-70
Com	Tender	80-100
Cucumber	Very tender	60-65
Eggplant	Very tender	75-90
Kale	Hardy	50-70
Lettuce	Half-hardy	60-85
Mustard	Hardy	40-50
Okra	Very tender	55-60
Onion	Hardy	100-120
Peas, garden	Hardy	60-80
Pepper	Very tender	65-80
Potato, Irish	Half-hardy	70-90
Radish	Hardy	25-30
Southern pea	Tender	60-70
Spinach	Hardy	40-45
Squash, summer	Very tender	50-55
Squash, winter	Tender	85-120
Sweet potato	Very tender	90-150
Tomato	Tender	70-85
Turnip	Hardy	45-65
Watermelon	Very tender	80-90

Table 7. Recommended vegetable varieties for Georgia

Vegetable	Days to Maturity*	Cultivars**	Planting Dates		Seeds or Plants/ 100 ft.	Spacing Rows/ Plants	Depth to Plant***
			Spring	Fall			
asparagus	2nd year	Jersey Giant, Jersey Knight, Mary Washington, Purple Passion	Jan 15 - Mar 15	Nov 1 - Dec 1	50 roots	36" x 18-24"	6"
beans, bush	50 - 60	Bronco, Blue Lake 274, Half-Runners (State, White, Volunteer) Kentucky Runner, Roma	Mar 15 - May 1	July 5 - Aug 10	½ pound	36" x 2-4"	1" - 1 ½"
beans, pole	65 - 75	Blue Lake, Dade, Kentucky Blue, Moccasin	Mar 15 - May 10	July 1 - Aug 1	½ pound	36" x 4-12"	1" - 1 ½"
beans, lima	65 - 75	Henderson's Bush Fordhook 242, Jackson Wonder (Speckled)	Mar 15 - June 1	July 1 - Aug 1	½ pound	36" x 3-4"	1" - 1 ½"
beans, pole lima	80 - 85	Sieva, Florida Speckled	Mar 15 - June 1	July 1 - Aug 1	½ pound	36" x 6-8"	1" - 1 ½"
beets	55 - 65	Detroit Dark Red, Red Ace, Ruby Queen	Feb 15 - Apr 1	Aug 1 - Sept 20	1 ounce	18-36" x 2"	½'
broccoli	60 - 80	Marathon, Packman, Patriot, Premium Crop, Bravo, Decathion	Feb 15 - Mar 15	Aug 1 - Sept 1	100 plants	36" x 12"	—
butterpea	70	Dixie	Apr 1 - May 1	July 1 - Aug 1	½ pound	36" x 3-4"	1" - 1 ½"
cabbage	70 - 120	A&C No. 5+, Blue Dynasty, Bravo, Early Round Dutch, Rio Verde, Green Jewel	Jan 15 - Mar 15	Aug 1 - Oct 1	100 plants	36" x 12"	—
cantaloupe	80 - 90	Ambrosia, Athena, Satcoy Early, Sweet	Mar 20 - June 20	—	1 ounce	60" x 36"	1"
carrot	70 - 95	Chantenay, Scarlet Nantes, Sweetbites, Sweet Delight, Thumbelina (small)	Jan 15 - Mar 20	Aug 20 - Sept 15	½ ounce	18-36" x 2-3"	¼"
cauliflower	60 - 75	Absolute, Early Snowball, Graffiti (purple color), White Magic, Symphony	Mar 1 - Apr 1	July 15 - Aug 15	100 plants	36" x 12"	—
collards	55 - 85	Blue Max, Georgia Southern, Hevi-Crop	Feb 1 - Mar 15	Aug 1 - Sept 1	½ ounce	36" x 8-16"	½"
corn, yellow	65-90	Bodacious, Golden Queen, Honey Select, Mirai 131, Seneca	Mar 15 - June 1	—	¼ pound	36" x 12-18"	1" - 1 ½"
corn, white	65-90	Avalon, How Sweet It Is, Seneca Sensation, Silver King, Silver Princess, Silver Queen	Mar 15 - June 1	—	¼ pound	36" x 12-18"	1" - 1 ½"
corn, bi-color	65-90	Ambrosia, Butter & Sugar, Honey 'n Pearl, Mirai 301, Peaches & Cream, Serendipity, Sweet Breed Chorus	Mar 15 - June 1	—	¼ pound	36" x 12-18"	1" - 1 ½"

Vegetable	Days to Maturity*	Cultivars**	Planting Dates		Seeds or Plants/ 100 ft.	Spacing Rows/ Plants	Depth to Plant***
			Spring	Fall			
cucumber, slicing	50-65	Bush – Salad Bush Hybrid, Bush Crop, Fanfare Vine – Burpless Hybrid, Diva, Marketmore, Straight Eight, Sweet Slice, Sweet Success	Apr 1 – May 15	July 15 – Aug 15	1 ounce	60" x 12"	1/2" – 3/4"
cucumber, pickling	50-65	Bush Pickle, Calypso, County Fair	Apr 1 – May 15	July 15 – Aug 15	1 ounce	60" x 12"	1/2" – 3/4"
cucumber, gynoecious	50-65	Calypso, General Lee	Apr 1 – May 15	July 15 – Aug 15	1 ounce	60" x 12"	1/2" – 3/4"
eggplant	75 – 90	Black Beauty, Classic, Dusky, Ghost Buster's (white), Calliope	Apr 1 – May 15	July 10 – July 30	50 plants	36" x 24"	—
kale	50 – 70	Vates, Dwarf Siberian, Blue Armor, Blue Knight	Feb 1 – Mar 10	Aug 1 – Sept 1	1/2 ounce	36" x 8-16"	1/2"
lettuce	60 - 85	Butterhead, Romaine, Buttercrunch	Jan 15 - Mar 1	Sept 1 - Oct 1	1/4 ounce	18-36" x 8-12"	□"
mustard	40 – 50	Florida Broadleaf, Southern Giant Curled, Red Giant, Savannah	Jan 15 – Apr 1	Aug 15 – Sept 15	1/2 ounce	18-36" x 2"	1/2"
okra	55 - 65	Annie Oakley II, Burgundy, Cajun Delight, Clemson Spineless	Apr 1 - June 1	June 15 - July 10	1 ounce	36" x 12"	1"
onion, green	60 - 90	White Portugal	Jan 1 - Mar 15	Sept 1 – Dec 31	300 plants	18-36" x 3"	—
onion, dry bulb	100 - 120	Burgundy, Excel, Grano, Red Creole, Savannah Sweet	Jan 1 - Mar 15	Oct 10 - Nov 10	300 plants	18-36" x 3-4"	—
peas, garden (English) peas, edible pod	60 - 70 60 - 70	Lincoln, Jackson Wonder, Wando, Little Marvel, Green Arrow, Maestro	Jan 15 - Feb 15	—	1 pound 1 pound	36" x 2" 36" x 2"	1" - 2" 1" - 2"
peas, Southern	60 - 70	Sugar Daddy, Snow Pea, Sugar Snap Blackeyed - California #5, Pinkeyed - Purple Hull FVR, Cream Pea - Texas Crème, Crowder Pea - Mississippi Silver, Zipper Cream	Apr 1 - Aug 10	—	1/2 pound	36" x 3-4"	1" - 2"
pepper, bell pepper, hot	65 - 80 65 - 95	Big Bertha, Camelot x3a, Colossal, Karma Habañero, Jalepeno, Tula, Marbles	Apr 1 - June 1	July 25 - Aug 10	50 plants 50 plants	36" x 24" 36" x 24"	— —
pepper, hot-sweet		Banana Supreme, Kuberville, Sweet Banana	Apr 1 - June 1	—	50 plants	36" x 24"	—
potatoes, Irish	70 - 90	Red (Pontiac), White (Kennebec, Atlantic, Yukon Gold)	Jan 15 - Mar 1	—	12 pounds	36" x 12"	4" - 5"
potatoes, sweet	90 - 120	Centennial, Georgia Red, Giant Jet, Hermandes, Red Jewel	Apr 15 - June 15	—	100 plants	36" x 12"	—

pumpkin, tiny	85 - 120	Little Ironsides	May 15 - July 1	—	1 ounce	72" x 48"	1"
pumpkin, pie type	85 - 120	Small Sugar, Sugar Baby, Touch of Autumn	(depending on maturity date)	—	1 ounce	72" x 48"	1"
pumpkin, small	85 - 120	AutumnGold, Jack O'Lantern, Jack of All Trades		—	1 ounce	72" x 48"	1"
pumpkin, large	85 - 120	Aladdin, Gold Rush, Major Lantern, Merlin		—	1 ounce	72" x 48"	1"
pumpkin, giant	85 - 120	Dill's Atlantic, Giant, Prize Winner		—	1 ounce	72" x 48"	1"
radish	25 - 30	Cherry Bell, Scarlet Globe, Champion	Jan 15 - Apr 1	Sept 1 - Oct 15	1 ounce	24" x 1"	½"
spinach	40 - 45	Melody, Winter Bloomsdale, Hybrid #7	Jan 15 - Mar 15	Sept 1 - Oct 15	1 ounce	18-36" x 2"	½" - ¾"
squash, summer (zucchini)	40 - 55	Any yellow or green—all are good and easy to grow. Use compact varieties for limited space gardens	Apr 1 - May 15	Aug 1 - Aug 25	½ ounce	36" x 24"	1" - 2"
squash, winter	85 - 120	Acorn, Buttercup Bonbon, Butternut	Apr 1 - July 1	—	½ ounce	60" x 36"	1" - 2"
tomato, determinate	70-90	Bush - Celebrity, Early Girl, BHN 444, BHN 640, Celebrity, Mountain Fresh, Mountain Spring, Rutgers, Amelia, Mountain Pride	Mar 25 - May 1	June 15 - July 15	50 plants	48" x 24"	—
tomato, indeterminate	70-90	Early Girl, Better Boy, Big Beef, Big Boy, Beefmaster	Mar 25 - May 1	June 15 - July 15	50 plants	48" x 24"	—
tomato, cherry	70-90	Jolly, Sweet Baby Girl, Super Sweet 100	Mar 25 - May 1	June 15 - July 15	50 plants	48" x 24"	—
tomato, grape	70-90	Grape, Juliet	Mar 25 - May 1	June 15 - July 15	50 plants	48" x 24"	—
turnip	40 - 60	Purple Top, Royal Crown	Jan 15 - Apr 1	Aug 10 - Sept 15	½ ounce	18-36" x 2"	½"
watermelon, large	80 - 90	Mardi Gras, Royal Majesty, Sangria	Mar 20 - May 1	—	1 ounce	72" x 36-48"	1" - 2"
watermelon, round	80 - 90	Baby Doll, Crimson Sweet, Ice Box,	Mar 20 - May 1	—	1 ounce	72" x 36-48"	—
watermelon, small	80 - 90	Imagination, Jade Star, Palm Melon, Solitaire	Mar 20 - May 1	—	1 ounce	72" x 36-48"	—

*Days to maturity are from planting seed or setting transplants in the garden. The number of days will vary depending on cultivar (some mature earlier than others), temperature and general growing conditions. Check catalogues for individual maturity time.

**Cultivars listed in the chart represent a few of those recommended. There are many other good cultivars worthy of trial.

***Plant shallowly in heavy (clay) soil when adequate moisture is present.

Table 8. Guide to the mineral nutrient value of organic materials.				
Materials	Percent¹			Availability
	N	P₂O₅	K₂O	
Bone meal	0.7 – 4	18 – 24	0	Slow/medium
Compost	1.5 – 3.5	0.5 – 1	1 – 2	Slow
Cottonseed meal (dry)	6	2.5	1.7	Slow/medium
Blood meal	12	1.5	0.6	Medium rapid
Fertrell Blue Label	1	1	1	Slow
Fertrell Gold Label	2	2	2	Slow
Fertrell Super	3	2	3	Slow
Fish meal	10	4	0	Slow/medium
Guano	6 – 12	9 – 11	2 – 3	Medium
Chilean nitrate	15	0	0	Rapid
Green sand	0	0	3	Slow
Kelp				
<i>Fresh manures</i>				
Cattle	<1	<1	<1	Medium
Horse	<1	<1	<1	Medium
Poultry	3 – 4	1 – 3	1 – 2	Medium/rapid
Mushroom compost	0.5 – 1	<1	0.5 – 1.5	Slow
Peat	1 – 2	<1	1	Very slow
Soybean meal	6 – 7	2	2	Slow/medium
Wood ashes	0	1 – 2	3 – 7	Rapid
¹ The percentage of plant nutrients is highly variable; with some materials, average percentages are listed. ² Contains common salt, sodium carbonate, sodium and potassium sulfates. ³ Plant nutrients available during year of application. Varies with amount of straw and method of storage. ⁴ Potash content depends on the tree species burned. Wood ashes are alkaline, containing approximately 32 percent CaO.				