

Growing Garlic in the Garden

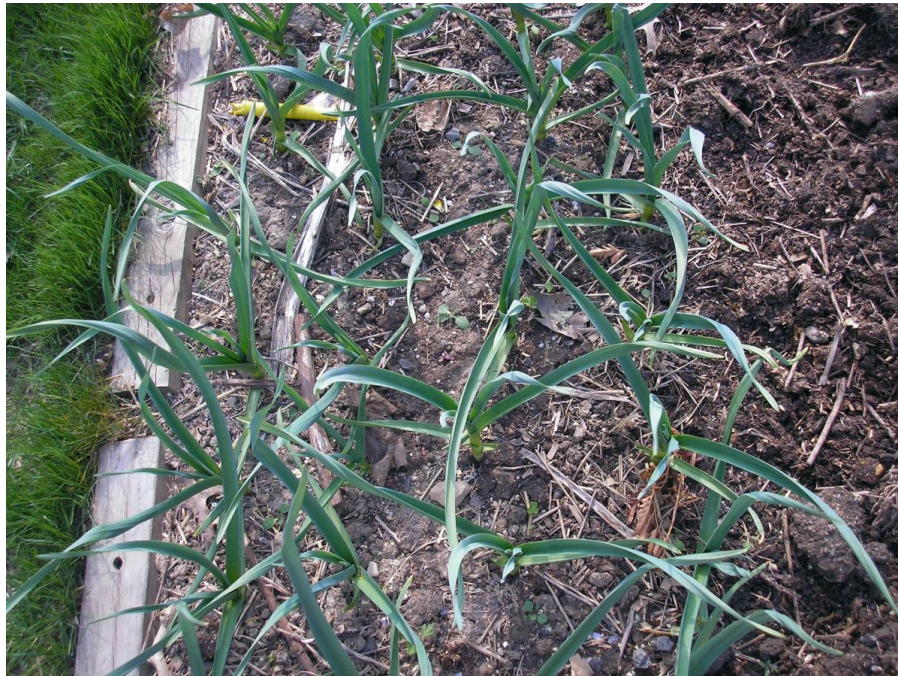
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Agriculture and Natural Resources

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Garlic (*Allium sativum*) is a culinary necessity in many kitchens. Native to Central Asia, it can be easily grown and takes up very little space in the garden. Garlic is a relative of the onion, shallot, and leek. Garlic and onion can be differentiated by their leaves — garlic leaves are flat while onion leaves are round and hollow. A head of garlic is composed of individual cloves enclosed in a papery bulb cover. Each clove is actually a small bulb; that bulb is a collection of unexpanded leaves.



A small corner of the garden can produce a year's supply of garlic. Garlic works well into a crop rotation with other vegetables. *Photo by Timothy J. Malinich, Ohio State University Extension.*

Garlic Site Requirements

Garlic prefers rich loamy soil but is tolerant of a wide range of soil pH between 6.0 and 8.0, with 6.0 to 6.5 being ideal. Growing garlic in poorly drained, highly compact soils can lead to more disease problems during wet years and small or misshapen heads in drought years.

It is important to prepare garlic beds the season prior to planting. Since garlic is planted in the fall, it can easily follow other vegetables harvested earlier such as summer squash, green beans, or garden peas. Before planting, labeled herbicides or tillage (mechanical cultivation) can be used to remove perennial weeds and any newly emerged winter annuals. Garlic competes poorly with weeds and benefits greatly from an aggressive weed control program.

Suggested Cultivars: Groups of Garlic

There are three groups of garlic that are commonly grown: hardneck, softneck, and elephant. Hardneck and softneck garlic are both *Allium sativum* and elephant garlic is *Allium ampeloprasum*.

Hardneck

Hardneck garlic produces fewer, but larger cloves. Hardneck cloves peel easily but do not store as long as softneck types. Hardneck are further divided into purple stripe, porcelain (with thick white papers), or rocombole types. Rocombole types do not grow well in warmer climates, so these types may not do well in southern Ohio, but can be more successfully grown in the northern part of the state. Some commonly planted hardneck cultivars in Ohio are:

- 'Music'
- 'Georgian Fire'
- 'Georgia Crystal'

It is beneficial to experiment with several cultivars to see which is best suited for an area. Hardnecks also produce a coiled flower scape, which is not a flower but a cluster of small garlic bulbs, also called a bulbil. The scape will develop during the growing season and must be removed to gain better bulb size. The bulbils can be used for propagation, but they will lead to unwanted garlic plants as weeds if left in the garden.

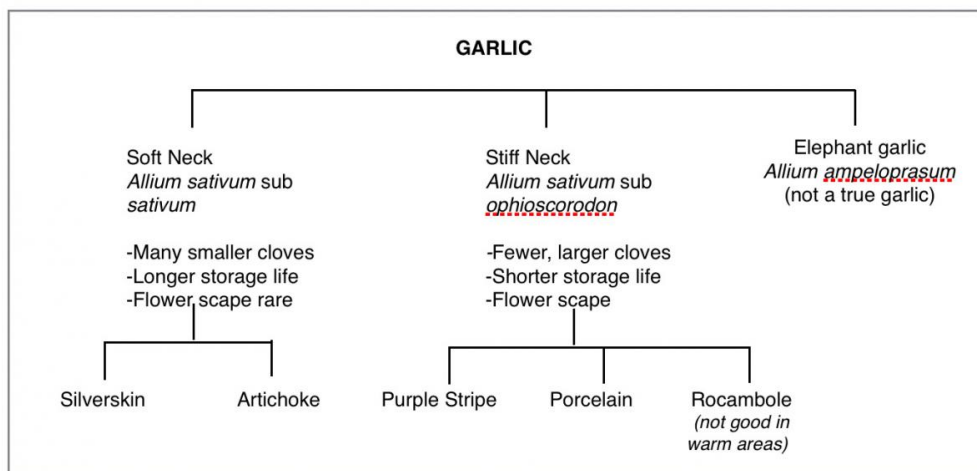
Softneck

Softneck garlic can be further classified into artichoke and silverskin types. Also known as artichoke garlic, these softneck garlics produce many cloves per head, usually 14 to 20 depending on the variety. Soft neck types store well and silverskin types have the best storage characteristics. As the softneck name implies, the stem emerging from the head is soft so these are the garlic that are often displayed as a braid of dried garlic heads. Some commonly planted softneck cultivars in Ohio are:

- 'Broadleaf Czech'
- 'Italian Late'
- 'Red Toch'

Elephant

Elephant garlic is actually not a true garlic, but more closely related to leeks. It has a mild flavor and very large cloves that range in color from cream to yellow.



Experiment with several varieties and types of garlic before choosing one for larger scale production.

Planting

Garlic can be planted late in the fall, after other tasks are finished. The cloves will produce roots and minimal shoot growth before going dormant late in the season. Growth resumes in the spring and the bulbs develop, called bulbing, in mid-summer. Fall planted garlic plants are more mature and will form a larger bulb while spring plantings of cloves will result in smaller heads of garlic.

Ideally, the first garlic leaves should emerge above the ground prior to freezing temperatures in the fall. Planting too early can result in more above-ground growth that will be vulnerable to winter damage. Do not plant store-bought garlic from the grocery store produce aisle. It may have been treated to prevent sprouting—good for shelf life, but bad for planting. Select the healthiest bulbs for replanting. Since garlic is propagated asexually (without flower or seed) selecting propagation stock with ideal characteristics will maintain those characteristics from year to year.

Separate the head of garlic into individual cloves. Each clove will have a flat bottom, called the basal plate where the roots emerge, and a pointed top where the leaves will emerge. Use only undamaged large cloves for planting. Plant cloves with the basal plate down, spaced 4 to 5 inches apart in rows, and 2 inches deep in prepared beds. Space rows 18 to 24 inches apart. Large plantings are made by digging a furrow and firmly pressing the cloves into the bottom of the furrow so they remain upright when the soil is replaced. Small numbers of cloves are easily planted

by digging individual holes. Plant the cloves 2 inches deep with the flat basal plate placed firmly on the bottom of the hole. Planting the clove upside down or sideways will result in small or misshapen cloves.



Heads of garlic, shown at the top, are separated into individual cloves. Select large healthy cloves to use as planting stock. *Photo by Timothy J. Malinich, Ohio State University Extension.*

To control winter annual weeds, pre-emergent herbicide or thick mulch can be applied after planting. Four inches of clean straw works well as a mulch; however, do not use hay as weed seeds may be present. The mulch also provides winter protection. When growth resumes in spring, the mulch should be raked off of the emerging garlic and left between the rows to reduce germination of spring and summer weeds. Summer germinating weeds can be controlled with pre-emergent herbicides, but only use products that are labeled for garlic and follow the pre-harvest interval restrictions on the label of the days that must elapse between the herbicide application and when the garlic can be harvested.

Garlic will produce scapes (seed heads) in the late spring. The unexpanded scapes can also be harvested early in the season and prepared fresh, like green onions. Removing scapes will also increase bulb size.

The bulbils from the scape of hardneck neck types can also be planted, but will take two years to produce a head. Plant bulbils about ½-inch deep and spaced 2 to 3 inches apart in the fall. In the following year, the bulbils will produce a single, solid garlic bulb. These can be lifted when the other garlic is harvested for replanting later

in season. In the second year, the bulbils will produce a mature multi-cloved head. These bulbils are not seeds, so they will produce the same variety of garlic as the parent plant.

Fertilizing

Garlic is a heavy feeder, requiring a high level of nutrients. Have the soil tested and analyzed for site-specific recommendations for fertilizer applications. Contact your local OSU Extension office for information on soil testing. Garlic prefers a soil pH between 6.0 and 7.0, so you may need to correct pH prior to planting, based on the soil test. Soils higher in organic matter will generally need fewer applied nutrients. Also, highly organic soils can discolor the bulb wrappers, especially if harvest is delayed. Soil testing is important to determine the nutrients available and those that may be needed for garlic.

Fertilizing should be split into two, or even three, separate applications. Apply one-half of the recommended fertilizer at planting to aid in root development. Make the second application when growth resumes in spring, when plants are 4- to 6-inches tall to encourage leaf growth and subsequent bulb development. If a third application is needed, wait until about six weeks after the early spring application. If soils tests indicate there is adequate phosphorus levels, high-nitrogen or nitrogen-only fertilizers can be used instead of balanced complete fertilizers. In soils with high organic matter content, fertilizer rates can be cut by 10 to 20 percent. Avoid over watering the garlic as this or heavy rain or over-irrigation can remove nutrients. If plants appear to be yellow, small-leaved or not vigorous, an additional fertilizer application before bulbing could help restore plant vigor.

All fertilizer labels will contain information on nutrients contained in the mixture. The three most prominent numbers will show the percentage of a pound of fertilizer for nitrogen, phosphorus, and potassium. So, a pound of 10-10-10 fertilizer will have 10 percent nitrogen, 10 percent phosphorus, and 10 percent potassium. Below is a table with typical rates for garlic in various situations:

Typical fertilizer application rates for various situations:

- 1 to 1.25 pounds of 19-19-19 fertilizer per 100 square feet of bed
- 1.5 to 2 pounds of 12-12-12 fertilizer per 100 square feet of bed
- 2 pounds of urea (which is nitrogen-only fertilizer) per 500 square feet of bed
- 80 to 100 pounds of nitrogen per acre

Irrigation may be needed, especially during bulb formation, so the plants receive about 1 inch of water per week through June. Drip irrigation provides better control than overhead sprinklers, and saves water by only applying to the rows.

When the leaves begin to yellow, reduce irrigation as the bulbs are forming and the plant needs to dry down. Continued irrigation can lead to problems with bulb rotting

organisms.

Pest Management

Garlic are generally pest-free, or the pests found are well-tolerated by the plant. Scout or observe the garlic planting regularly for any plant injury and make control decisions based on the pests found in the planting. Some of the more common pest problems include:

Insect Management

Thrips are insects that suck juices from the leaves, causing damage. Thrips injury will cause the garlic leaves to turn a silver color with patchy, dry spots. Typically, this damage will not reduce the quality of the garlic bulbs.

Bulb maggot is a fly larva that feeds on the developing bulbs. It is rarely a significant pest of garlic. Soils high in organic matter can encourage maggots. Crop rotation will help control bulb maggot.

Disease Management

Bloat nematode can be a major problem if introduced to the garlic planting. These microscopic worms feed inside the heads causing swollen or misshapen heads and cloves. Once nematodes get into the soil, they cannot be controlled without significant treatment. Purchase plant stock only from trusted and clean sources to avoid introducing nematodes to your garden. Inspect cloves for signs of nematode at harvest and during the season.

Bulb rots will be a problem in wet years or in poorly drained soil. Correct management and handling of the bulbs such as well-drained beds and proper fertilization will help prevent problems. *Fusarium*, *sclerotinia*, and *botrytis* are the common fungal problems. Crop rotation and proper soil drainage will control most of the diseases like these.

Proper rotation for garlic, even in small plantings, involves not planting garlic where anything in the onion family had grown the previous year or two. A longer rotation (more years without repeating a crop in that spot) will improve pest control.

Harvest and Storage

When the lower leaves begin to yellow, the garlic is ready for harvest. The leaves are actually connected to the garlic bulb wrappers below. Waiting until leaves turn brown will result in rotted or missing wrappers. Also, as the bulbs mature, they may dry and split, leading to shorter storage life or bulb rot.

To prevent injury to the head or stem, garlic should be dug, not pulled. Remove the soil, but do not wash the heads of garlic. Take care not to remove the papery bulb cover. Allow the heads to dry out of the sun for several days.



Garlic should be dug, not pulled. Allow the bulbs to cure for two to three weeks before storing. *Photo by Timothy J. Malinich, Ohio State University Extension.*

Heads of garlic can be sold or used immediately after harvest. For longer storage, bulbs should cure for two to three weeks by storing at a temperature above freezing but not higher than 40 degrees Fahrenheit and no more than 75 percent humidity. For storage quality for the different types of garlic, refer to the section on suggested cultivars in this fact sheet. Do not store garlic in plastic bags. Net bags or open containers that allow air to circulate will provide better storage.

Original author: Charles T. Behnke, Professor Emeritus, Ohio State University (Originally published in 1992).

References

- Everhart, E., C. Haynes, R. Jauron. 2003. Garlic. Iowa State University Horticulture Guide.
- Ford, T., et. al. 2014. Garlic Production. Penn State Extension Agricultural Alternatives.

- Johnny's Selected Seeds. 2010. Growing Garlic. 2010 Seed Catalog.
- Engeland, R. 1991. Growing Great Garlic. Filaree Productions: Okanogan, WA.
- Purdue University. 2015. Midwest Vegetable Production Guide for Commercial Growers.
- Russ, K. 2003. Onion, Leak, Shallot and Garlic. HGIC 1314. Clemson Cooperative Extension.

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