



Garlic

by Eldon Everhart, Cindy Haynes, and Richard Jauron

Garlic (*Allium sativum*) is a member of the onion family (*Alliaceae*) along with onions, chives, shallots, leeks, and elephant garlic. Garlic is distinguished from other family members by its flat leaves and clove-like bulbs. Each garlic bulb contains several small scales or cloves enclosed in a white or purplish parchment-like sheath.

Cultivars

Garlic cultivars are classified as either hardneck or softneck. Hardneck cultivars (*Allium sativum* var. *ophioscorodon*) produce a flower stalk (technically a scape) and are often termed “top-setting” or “bolting” cultivars. Flowers, if they are produced, usually abort. Bulbils (small bulblets) are produced on top of the scape. The flower stalks of some hardneck garlic are distinctly coiled. These types are referred to as rocambole or serpent garlic. Typically, hardneck garlic cultivars have 4 to 12 cloves surrounding the flower stalk. Because of the hard flower stalk, they are difficult to braid. Another disadvantage of hardneck cultivars is that they do not store well and may either start to form roots or dry out within a few months of harvest.

Hardneck cultivars suitable for Iowa gardens include

- **Asian Tempest**—Not as productive as German Red, usually 4 to 8 large cloves per bulb
- **German Red**—Large cloves (8 to 15 per bulb), prone to double cloves
- **Merrifield Rocambole**—Slightly larger than German Red, prone to double cloves
- **Spanish Roja Rocambole**—Medium-sized bulbs, peels easily, stores up to 4 to 6 months

Softneck cultivars (*Allium sativum* var. *sativum*) are sometimes referred to as “artichoke” cultivars and do not

produce a seed stalk. These cultivars are commonly used in California for commercial production. However, some softneck cultivars are suitable for cold climates. Softneck cultivars are generally more productive than hardnecks because all the energy goes to producing a bulb rather than a bulb and flower stalk. Bulbs have 10 to 40 cloves arranged in layers. Softneck garlic tends to have a much longer shelf life than hardneck garlic and typically can be stored for 6 to 8 months without significant deterioration. They also are easy to braid.

Softneck cultivars suitable for Iowa gardens include

- **Inchellium Red**—Large bulbs, vigorous, mild, difficult to peel
- **New York White**—Often has purple streaks; may bolt, reducing bulb size
- **Susanville**—Stores well

Elephant, porcelain, or greathead garlic is actually a type of leek (*Allium ampeloprasum*). Elephant garlic is much larger than true garlic, often weighing as much as 1 pound per bulb. They also store well. The taste of elephant garlic is much milder than that of true garlic, but in cold climates it can develop a sharp or bitter taste.

Planting

Garlic grows best in well-drained, fertile soils that are high in organic matter. Misshapen bulbs may result when garlic is grown in heavy, clay soils. Incorporating compost or well-rotted manure into heavy, clay soils can be beneficial. The optimum soil pH for garlic is between 6 and 7. Before planting, soils should be well tilled to provide a loose growing bed for bulb development.

Because garlic plants do not produce true seeds, garlic is grown by planting cloves. Garlic cloves can be purchased at garden centers or from mail-order companies. Planting cloves from garlic purchased at the grocery store is not recommended because these are usually softneck cultivars that are mainly adapted to mild climates.

Cloves should be planted in fall (October to early November) or early spring (late March to early April). Fall-planted garlic should be mulched with a 4- to 6-inch layer of weed-seed free straw to help prevent winter injury. In early spring, move the straw to between the rows to allow the garlic foliage to emerge. The mulch helps control weeds during the growing season. Late spring planting results in smaller bulbs at harvest.

Plant cloves with the pointed side up. When planted upside down, misshapen bulbs often develop. Plant cloves about 1 inch deep.

Hardneck (top-setting) garlic cultivars also can be grown from the bulbils or bulblets. Plant the bulblets in early spring and allow to grow in the same area for 18 months. By the end of the first season, the bulblets will form “rounds” or unsegmented bulbs. Left undisturbed, they will form a cluster of cloves by the following summer.

Spacing

Place cloves 3 to 5 inches apart within the row. Rows should be spaced 18 to 24 inches apart.

Fertilizing

Garlic requires more fertilizer than many vegetables. Incorporate 1 to 2 pounds of an all-purpose garden fertilizer (10-10-10) per 100 square feet before planting. One month after planting apply an additional pound per 100 foot of row in a band 3 to 4 inches from the base of the plants. Avoid nitrogen applications after the first week of May because bulbing may be delayed. Soil tests should be taken before planting to determine phosphorus and potassium needs.

Maintenance

Water plants once per week during dry weather. Stop irrigating in late July to allow the foliage to yellow and die before harvest. Like an onion, garlic has a shallow root system. Weeds should be removed carefully to avoid disturbing or pulling up the garlic bulbs with the weeds. Mulches help control weeds and conserve soil moisture.

Potential problems

Most garlic diseases are either soil- or set-borne and usually can be controlled with proper rotation and planting disease-free sets. Before planting, check each clove for signs of disease. Discard any infected cloves or bruised cloves because they will decay in the soil.

Many garlic cultivars are susceptible to yellow tips. The development of yellow tips early in the season (before bulbing) may drastically reduce yields. It is usually a sign of water stress, nutrient deficiency, or disease.

Insects are not a major problem for garlic production.

Harvest and storage

Carefully dig garlic bulbs when the foliage starts to turn yellow and die. Yellowing normally occurs in August or September. Dry or cure the bulbs in a warm, well-ventilated, and shaded location for 2 to 3 weeks. After drying, remove the foliage 1 inch above the bulbs or use the foliage to braid the bulbs together.

Place the bulbs in a mesh bag or open crate and store where it is cool (32–40°F) and dry (65–70% relative humidity). Softneck types can be stored for 6 months, whereas hardneck types only store for approximately 3 months.

For more information

Additional information also is available from these Web sites:

ISU Extension Publications

<http://www.extension.iastate.edu/pubs>

ISU Horticulture

<http://www.hort.iastate.edu/>

This publication also is available in Spanish with the title, *Ajo*, PM 1894(S).

Prepared by Eldon Everhart, Cindy Haynes, and Richard Jauron, extension horticulturists; Diane Nelson, extension communication specialist; and Creative Services, Instructional Technology Center, Iowa State University.

File: Hort and LA 2-9

... and justice for all

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, and marital or family status. (Not all prohibited bases apply to all programs.) Many materials can be made available in alternative formats for ADA clients. To file a complaint of discrimination, write USDA, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call 202-720-5964.

Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Stanley R. Johnson, director, Cooperative Extension Service, Iowa State University of Science and Technology, Ames, Iowa.