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Garlic Production in Missouri

Garlic (*Allium sativum* L.) is part of the Amaryllis family, along with onions, leeks, chives, scallions, and shallots^{8, 10, 25}. It has a strong taste and smell due to its sulfur compounds, which also provide health benefits like fighting cancer, protecting the heart, lowering cholesterol, and reducing blood pressure^{8, 32, 33, 17}.

The world produces about 30 million tons of garlic each year, with China leading at 23.3 million tons and India at 2.9 million tons⁷. In the U.S., 24,000-26,000 acres of garlic produce 346 million pounds valued at \$246 million, with California being the top producer⁴. Gilroy, California, is known as the garlic capital of the world, producing 50% of the USA's garlic. The U.S. also imports garlic from China, Spain, Mexico, Argentina, and Peru^{4, 9, 10, 14}. In Europe, Spain is the largest garlic producer with 29,000 hectares producing 286,694 tons in 2022^{9, 12}. Garlic likely arrived in North America with Polish, German, and Italian settlers around the 1700s^{16, 20, 34}.

This fact sheet is intended to provide readers with information on garlic production. It should not be considered the whole information for your production and pest management needs for garlic. The mention of the name of a product does not mean the author endorses the use of the product over others not mentioned. Anyone using this information should consult the label before using it. The label provides all the legal information. Using the products will mean you accept all the risks associated with the products.

Varieties:

Garlic varieties can be categorized as softneck and hardneck. Both can be planted in Missouri.

Softneck varieties have tightly wrapped cloves that stay fresh for up to 9 months when stored properly ²⁷. They mature faster and store better ^{18' 24}. Varieties include Carpathian, Early Italian, Nootka Rose, Silver Rose, California Early, and California Late 13.

Hardneck garlic has fewer but larger cloves and includes over 200 varieties. Groups include Porcelain (4 cloves per bulb), Rocambole (12 cloves per bulb), and Purple Stripe [13]. Hardneck garlic varieties form scapes, stems from the bulb center, which should be removed in spring for larger bulbs ^{6' 7' 12' 17' 22}. Varieties include Music, German White, Violet Spring, Metechi, Spanish Roja, Georgian Crystal, Persian Star, Phillips, and Elephant Garlic ^{10' 12' 29}.

Planting:

First, prepare the soil by enriching it with well-rotted manure or compost to help retain water and improve drainage ^{5' 11' 17'}. Fertilizing before planting promotes healthy roots and bulb growth in spring. Plant garlic in October or early November, 6-8 weeks before the ground freezes ^{2' 5' 8' 11' 15' 17}. Choose large, healthy cloves and plant them 2-4 inches deep and 3-6 inches apart. Plant larger bulbs, like elephant garlic, 4-6 inches deep and 12 inches apart. ^{5' 15' 18' 22' 37}.

Adding mulch helps protect the bulbs, conserve moisture, and prevent weeds ^{2' 5'} ¹¹. Use 3 inches of clean straw in winter and early spring to stabilize soil temperature and conserve moisture. Remove the straw in spring to reduce disease and warm the soil

for growth ^{2' 5' 11}.

Garlic can be planted with peppers, potatoes, tomatoes, carrots, cabbage, beets, chamomile, and spinach, but not with beans, peas, parsley, and asparagus. Rotating crops every 3-4 years helps to control pests and diseases ^{5' 15' 19' 36}.

Irrigation:

Garlic needs at least half an inch of water per week during spring and summer until mid-June ^{15' 24}. Drip irrigation works best. Or use hose or sprinkler, stop watering 4-6 weeks before harvest to firm up bulbs and prevent rot ^{2' 35}.

Fertilization:

Garlic needs extra nutrients which can be supplemented through fertilizers. Apply water-soluble organic fertilizers such as chicken manure pellets, fish fertilizers, blood meal, and seaweed extract before planting ^{2' 17' 27' 31}. Forty-five to 60 days later, add potassium-rich fertilizer every six weeks. Alternatively, in the fall, incorporate 40 pounds of nitrogen broadcasting along with P2O5 (0-150 pounds) and K₂O (0-150 pounds) per acre. About 40 grams of nitrogen and 156 grams of potassium and phosphorus each per 100 square feet. Apply an additional 40 pounds of nitrogen as a side dress in the spring when shoots are 6 inches high. Administer the last 40-pound dose of nitrogen 3-4 weeks later. This regimen fosters healthy root development and maximizes bulb growth in the spring ^{15' 21}.

Harvesting:

Garlic is ready for harvest when the lower

third of the leaves turn yellow, brown, and dry. To harvest, carefully dig, or push a garden fork in the soil about 6-8 inches away from the plant, and lift the bulb out. Avoid pulling the bulb out by its leaves, as this increases the risk of breakage³. Harvesting garlic too early will result in small cloves that do not store well. Conversely, leaving the bulbs in the ground too long can cause the cloves to burst from their skins, making them prone to mold, dehydration, and shorter storage life ^{15' 21}.

Curing:

Cure garlic in a dry, shady place for 2-3 weeks ³. Tie bulbs in bundles of 5-10 and hang them with the bulbs facing down to ensure proper airflow ^{15' 20' 21' 26}. Curing is complete when the outer skins are dry and crispy, the neck is constricted, and the center of the cut stem is hard. After curing, clean the roots and trim the leaves to one inch above the bulb, removing only the dirtiest outermost wrapper leaves. Avoid washing to retain moisture and oils ^{15' 20' 21' 26}.

Storing:

Store garlic bulbs in a cool, dry, well-ventilated area. Keeping them in mesh bags or loosely woven baskets, at temperatures of 60-65°F in a dimly lit space is ideal. Softneck garlic can be stored at 32°F for 8-9 months, while hardneck garlic can be stored at room temperature for up to 7 months ^{17' 23' 25}. Avoid storing hardneck garlic under normal temperature conditions, as it may dry out, sprout, or become soft within 2-4 months.





Pests:

The most common pest affecting garlic is the onion thrip. To manage them, maintain a dry environment and use sticky traps to deter their presence ¹⁴.

Diseases:

White rot fungus causes garlic leaves to yellow, wilt, and eventually die. The most effective prevention method is to use certified disease-free seeds ¹⁴.

Garlic bloat nematode (*Ditylenchus dispaci*)

poses a significant threat as it spreads easily between farms. It is recommended to obtain seeds from reputable growers with negative garlic bloat (NGB) nematode-free stock. Avoid planting near Allium crops like onion, leek, chives, and shallot, as well as parsley, celery, and weeds for 3-4 years and rotate crops. Seeds can be treated with surface sterilizers such as a 10% commercial bleach solution, (1 part bleach to 9 parts water) or oxidate dip (32 oz per 25-gallon water), followed by immediate planting of cloves after dipping ^{1,38}.

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