



# Growing Garlic in Montana

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**Garlic is very adaptable and tolerates our cold winters and short growing season. Planted in the fall, garlic requires very little care.**

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**FROM THE OLD ENGLISH WORD GARLEAC,** translated as “spear leek,” garlic is believed to have originated in Central Asia. A long-time staple of many regional diets, garlic has been cultivated for at least 5000 years.

### Types of Garlic

A close relative of onion, shallot, chive and leek, garlic (*Allium sativum*) is a hardy perennial that can overwinter but is grown as an annual because it is harvested in its first year of growth. Garlic is classified into two types:

**Hardneck (*Allium sativum* var. *ophioscorodon*)**  
Hardneck garlic is the most winter hardy garlic, milder in taste and easier to peel than softneck. Unfortunately, it is difficult to braid because of its woody flowering stalk (scape) and has a shorter storage life than softneck garlic.

Its scape makes a 360-degree coil, then forms a cluster of bulbils at its tip. Increase bulb size by pinching off the scapes. Remove scapes when they are 5-7 inches long and begin to curl into a loop. Use them as you would a scallion or chive; they are especially good on their own when sautéed in butter. The bulbils that form in the flower head of the scapes can be planted the following year to get full-sized bulbs in two years, however, planting garlic cloves is more common.

There are three main subtypes of hardneck garlic: Rocambole, Porcelain and Purple Stripe. Rocambole produces cloves that are large, tan-brown colored and easy to peel. Cultivars include ‘Spanish Roja’, ‘Montana Giant’ and ‘German Red.’ Porcelain types are harder to peel and produce 4-6 large cloves around a thick center scape. ‘German Extra Hardy’ and ‘German Red’

are reliable Porcelain cultivars. Purple Stripe garlic is so named due to vivid striping on the skins. This subtype is very cold hardy and is long storing. The cultivar ‘Chesnok Red’ should do well in a garden.

**Softneck (*Allium sativum* var. *sativum*)**  
These garlic bulbs have necks so soft that mature, harvested plants can be easily braided. It is the strongest-flavored garlic and stores best, but is slightly less winter hardy than hardneck garlic. Softneck types do not produce a flowering scape and typically grow best in areas with hot summers and mild winters. Of the two subtypes of softneck garlic, Artichoke and Silverskin, Artichoke is the most common, but both have a very long storage life (10-12 months). Cultivars to try are ‘Italian Late’ and ‘Inchelium Red.’



**FIGURE 1.** Garlic scapes. Photo by Cheryl Moore-Gough, MSU.

Not a garlic at all, *Allium ampeloprasum*, referred to as elephant garlic, is a type of leek. It produces large bulbs but very few cloves.

## Development

Enclosed in a paper-like wrapping, a garlic bulb is made up of several cloves held together by a thin membrane, which you leave intact when planting. Each clove consists of two miniature leaves and a vegetative bud.

Vernalization, a period of cool weather (below 40°F) for several weeks, is necessary for garlic. This exposure prompts the clove to sprout, initiating some vegetative growth, and roots begin to develop. In the early spring, with suitable moisture and rising temperatures, leaf growth occurs. As day length and temperatures continue to increase, the garlic bulbs mature up until harvest.

## Planting

In Montana garlic is traditionally planted in the fall, 4-6 weeks before the ground freezes, (typically mid-October), often until as late as November. A heavy

feeder, garlic performs best in loose, well-drained soil high in organic matter with a pH of about 6.5 in a location with full sun. Prepare the planting area by incorporating compost or a slow-release Nitrogen fertilizer at the rate of 5 pounds per 100 square feet.

Just prior to planting, break the bulbs apart and plant the largest cloves, keeping the individual membranes intact. If you accidentally tear the membrane, save that clove to eat as it will be more susceptible to rot and mold in the soil. Set the cloves in the soil root end down, pointed end up, about two inches deep and 4-6 inches apart in rows about 12 inches apart. Average yield per 10 foot row is approximately 4-7 pounds, or 40-60 bulbs. You'll need about ½ pound of cloves to plant 10 foot of row.

## Mulch

Garlic does not compete well with weeds. It is necessary to weed often and thoroughly, taking care not to disturb its small, shallow roots. Weed competition can reduce bulb size by up to 30%. Covering planted bulbs with 4-6 inches of weed-seed-free mulch, like straw, helps control weeds, preserves moisture, as well as protects them from winter heaving and desiccation. Omit the mulch if you can count on good snow cover for most of the winter.

## Fertilizer and Irrigation

In the spring, side dress with a complete fertilizer like 5-10-10 when the tops are about six inches tall. During spring and early summer keep the soil from drying out by supplying 1 inch of water per week. Cease watering when the leaves begin to brown, and the tops start to fall over to allow the bulbs to mature.

## Pests and Diseases

Establishing a 3-year crop rotation for Alliums (garlic, onions, leeks, chives) is crucial in maintaining a healthy garlic crop, as most of the major garlic diseases are soil-borne. The most common diseases that affect garlic are Basal Rot and White Rot.

**Basal Rot (*Fusarium culmorum*):** symptoms include slow development, yellowing and subsequent die-back of the stalks. The basal plate, at the root end of the clove, may show signs of rotting pre-harvest and post-harvest. Remove infected plants and take care to plant disease-free stock from a reputable source.

**FIGURE 2.** Average size of bulb at harvest. Photo by Cheryl Moore-Gough, MSU.



**White Rot (*Sclerotium cepivorum*):** symptoms can look very similar to basal rot with the leaves and bulb showing rot. Early indicators include fluffy, white mycelium at the base of the stalk and small, dark sclerotia (that overwinter) in the decaying tissue. Plant pathogen free cloves from a reliable source. Pre-treating cloves prior to planting by dipping them in hot (not boiling) water may help reduce infection.

Some garlic pests include the garlic bloat nematode (*Ditylenchus dipsaci*) and bulb mites. Symptoms of bloat nematode are deformation of garlic bulbs and swelling of the stems. Damage from bulb mites typically occurs in cooler, moist conditions and includes stunted growth and reduced yield. A microscope would be necessary to analyze infestations of either of these pests. Damage from any pest can allow for the introduction of rot-causing pathogens. A hot water treatment may help kill nematodes in garlic bulbs, but a 3-year crop rotation of Alliums is key to preventing and reducing pests and diseases of garlic in the garden.

## Harvest

Garlic is ready to harvest when about half the leaves on the plant have browned and dried. Do not wait too long or the bulbs will begin to separate in the ground and become susceptible to rot. The best time to harvest garlic is in early morning or late evening when it is cooler, as it is best not to leave garlic out in the hot sun.

Loosen the soil around the plant with a garden fork, and gently lift the plant from the ground, being careful to not separate the bulb from the stalk. Garlic bruises easily so handle with care when cleaning. Gently brush off any residual soil, leaving the outer skin intact.

## Curing and Storing (for Eating)

Air dry the bulbs (with the stalks intact) in a shady, dry, well-ventilated area for 4-6 weeks. Placing the bulbs on a window screen or a rack made from poultry fencing or hardware cloth works well. When the bulbs are cured the stalk will feel dry. Trim the roots to ¼ inch and cut the stalk back to 1-2 inches.

Store bulbs for eating in a wide-meshed bag, such as an onion or grapefruit bag, hung in a location with temperatures between 45-55°F with 50-60% relative humidity. Do not refrigerate. If you wish you can braid the tops of softneck garlic together into a garland to hang in the kitchen or garage. Save the largest bulbs for replanting the following season.

## Storing Seed Stock

The optimum storage conditions for garlic bulbs saved for planting stock are temperatures between 40-50°F with 65-70% humidity. If stored below 40°F, garlic cloves will sprout, and the developing plants will mature too early. Bulbs stored above 50°F will be late to sprout and mature.

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