

# Garlic Growing 101- A Garlic Growers Beginners Reference Guide

Are you a backward gardener or new to gardening? Below is a step-by-step guide to growing garlic for beginners.

Hardneck garlic has thrived for millennia in the northern hemisphere in a wide range of soil conditions and climates.

With a little patience and a few bulbs, you can build up a sizable crop. The cloves are broken off the bulb and planted in the fall. The cold of winter, also known as vernalization, prompts the clove to break open after a period of dormancy. The mature plant is harvested the following year, in late July. Here is a thumbnail sketch on growing garlic, good for both a tiny patch with a single clove or a field with up to five hundred plants. Each step, from planting to weeding and harvesting, is done by hand. This is how to do it:

1. Inspect and prepare your soil
2. Plant cloves in the fall
3. Mulch for winter
4. Spring chores
5. Summer harvest and curing

## Inspect and Prepare the Soil

All soil is made up of finely ground rock particles, created over millions of years, plus living and dead organic matter. It is the size of the particles— from the large particles of sand to the very fine ones found in clay—as well as the presence of minerals and organic matter, that characterizes each soil type. Each type presents specific advantages and disadvantages for growing vegetables, including garlic.

Sandy soil is light and crumbly, or friable. This means garlic bulbs can be harvested with minimal effort. But it is also porous, with lots of space between each particle of sand (imagine the space between beach balls). It cannot retain nutrients and moisture as well as other soil types. However, bulbs grown in a sand-organic soil mix are easier to clean at harvest time.

Clay particles tend to cling together (imagine stacked dish plates). This allows the soil to hold on to water molecules and nutrients important for plant growth.<sup>127</sup> But it can be a nightmare in very dry or wet conditions. Too dry, the clay turns to concrete, resulting in damaged bulbs during harvest. Too much moisture, the clay soil poses other problems. The weight of vehicles, even walking, compacts the particles in soil, making it more difficult for water and nutrients to move freely and for plant roots to develop.

Whether the soil is high in clay, silt or sand, the addition of compost (which contains organic matter) will improve the soil condition for growing garlic. Before planting, add two inches (five centimetres) of manure or other composted material, mixed into the soil with a shovel or garden fork (an implement with four tines.) Compost adds nutrients and organisms important to your soil ecosystem. It also retains moisture, especially important for sandy soil. This is a good excuse to start composting your kitchen waste if you are not already. Consider raised beds if the soil is heavy, to facilitate drainage.

## Plant Cloves in the Fall

### Purchase Seed Garlic

Do not use imported table garlic for planting. Not only will it grow poorly, but you risk the possibility of infecting your garden or farm field with foreign-based diseases. Planting garlic from stock produced near your growing zone will be better acclimated than bulbs ordered from out of province. Garlic bulbs suitable for planting—seed garlic—can be found through mail-order, at garlic festivals and in farmers' markets from late July until October.

To release cloves, “crack” the bulb by breaking the skin on the bulb. Courtesy of Toronto Garlic Festival.

### “Crack” the Garlic

Each head or bulb of garlic is cracked or opened to release the individual cloves for planting. Each clove, once planted, will grow into a mature garlic plant. To crack a bulb of garlic, hold it in both hands, stem facing up. Pierce the skin with one thumb, using the other thumb to lever the stem back and forth. Once you have removed one clove, the others will easily breakoff the basal root plate. With a little practice, you will find the sweet spot on each bulb. It's preferable to crack bulbs as close to the time of planting as possible. Be sure to leave as many layers of skin (also known as “wrappers”) as possible intact on each clove.

### Plant the Cloves

Once your bulbs are separated into cloves, they are ready for planting. Plant in the fall, before the first frost. Garlic cloves can vary considerably in length from a quarter inch to an inch or more (0.6 to 2.5 centimetres), so it is recommended to use a planting depth that is relative to the length of the clove. Use a trowel to dig a hole at a depth of three to four times the length of the clove. Place the clove in the hole, pointy end facing up and flat end down, and cover with soil. Soil depth is measured from soil surface to tip of the clove.

In heavy and clay soil, plant at three times the length of the clove. In loose or sandy soil, plant deeper—four times the clove length. Plant each clove six inches (fifteen centimetres) apart. Pat soil firmly. Plant rows at ten inches (twenty-five centimetres) between rows. Plant in straight rows, as this makes it easier to weed in the spring if using a hoe or mechanical weeder.

A simple way to create straight rows is to tie each end of a string to a stake and align the string in the row intended for planting. Pull the string tight and push the stake at each end into the soil. Once your row is planted move the string and stakes to the next row.

Plant garlic in straight rows to make weeding easier. Courtesy of Toronto Garlic Festival.

### Make a Map

If you grow more than one type of garlic, do not forget to mark each section with bamboo poles, wooden stakes, or other suitable markers. Since they can be displaced over the winter by wind,

animals, and heavy rain, it is recommended to draw a map of your garlic patch, with the length of each section indicated on the map. Keep it in a safe place.

## Bulbils

Bulbils are an inexpensive alternative to planting from bulbs. Bulbils are found in the scape of hardneck garlic. They are tiny, undivided bulbs as small as a grain of rice or as large as a chickpea (see garlic bulbils in pod in color section). They do not carry any known pests or disease (although they may harbour viruses) and are a low-cost way to grow out your garlic crop. To gather bulbils for planting, farmer Paul Pospisil recommends leaving garlic plants in the ground, with scape still attached, for a week or two after your other garlic plants are harvested. Remove the bulbils from the scape and store in a dry place until planting time. If you grow more than one type of garlic, be sure to label your bulbils. They are planted at the same time as garlic cloves, two inches (five centimetres) deep, and may be planted directly into the soil.

Pospisil recommends planting bulbils in containers with sterilized soil or potting mix to protect them from soil-borne disease. Bury the containers in the garden, slightly raised above the surface. Cover with mulch and take care to weed and water the following spring. Harvest the young plants at the same time you harvest your other garlic. In the first two to three years, the plants will produce small “rounds”—small undivided bulbs (no cloves). Replant the rounds each fall. Within two to five years, they will produce a mature garlic plant with a fully formed and divided bulb. The Purple Stripe variety can produce a mature plant in as soon as one year.

Why plant bulbils in sterilized, disease-free soil? The quick answer is that it buys time. All plants, including garlic, are susceptible to disease and pests in the soil. Some of these organisms can harbour in the plant from year to year, remaining dormant until the right conditions occur for them to grow. Growing bulbils and rounds in sterilized soil help ensure that the mature garlic plant, once planted into the field or garden, will be disease free. In other words, they are given a head start compared to if they had been planted into soil that potentially contains disease and pests.

## City Growing

Growing garlic in the city presents special challenges. If your garlic is planted in containers, there is the risk of sudden freezing. It is recommended to use a container that is at least thirty gallons (approximately one hundred litres) in volume. A smaller container can also be used if it is insulated from the cold. Keep it inside a garage or cold room in the basement as long as the temperature is below ten degrees Celsius (fifty degrees Fahrenheit). If kept outside (against a wall helps), cover the whole container with a good insulator—bags of leaves, straw, or an insulating blanket such as natural coir (made from coconut husks) or even an old blanket. If the container is on the ground, it will receive some latent heat from the ground. If the container is on a balcony or deck, insulate the bottom. Finally, garlic is not afraid of heights, but plants on a high floor in an apartment building or condominium will be exposed to high winds and possibly colder temperatures—a few extra layers of insulation are recommended.

## Mulch for Winter

Cover your planted garlic with mulch, using weed-free straw, leaves or shredded newspaper. Mulch should be twelve to eighteen inches (thirty to forty-five centimetres) deep. Newspaper or leaves, although readily available, may form a thick mat, impeding young garlic plants. To prevent this, check in early spring to see if some layers should be removed. Mulch serves several functions. Although the ground will likely freeze solid during the winter months, mulch lessens the damaging effect of sudden changes in temperature. In the spring and summer, it suppresses weed growth and helps retain moisture in the soil by blocking the sun's rays. Come spring, do not be surprised to find snakes, toads and nesting birds hanging out in your mulch, snacking on insects, including potential garlic pests. These animals are a natural pesticide. As the mulch breaks down over the season, it contributes to the organic content of your soil. A snow cover also serves as mulch, although by spring it will have melted into the soil. Be prepared to do some weeding.

## Spring Chores

### Apply Fertilizer

If your location gets less than four hours of direct sun per day, work compost or vegetable fertilizer into the soil beside the row in mid to late April, when the plant starts to grow rapidly. Does the soil need water? Here is a simple test. Take a small handful of soil from your garlic patch and shape it into the size of a marble. Squeeze it. If it does not crumble, it has enough moisture. If water squeezes out of the ball, it has too much. For this test, be sure to gather soil from a few inches below the soil surface.

### Weeding

A typical acre of topsoil contains millions of weed seeds—they can lie dormant in the soil for decades. The garden hoe—developed 2,000 years ago—is one of the best tools to manage weeds. A quick pass with a hoe agitates the soil surface, disrupting newly sprouted weeds. Check the weather forecast before weeding—it is recommended to weed prior to a dry period, when the sun and heat will ensure that uprooted weeds shrivel up. A garden hoe easily removes weeds when they are just three to four inches high (Courtesy of Toronto Garlic Festival).

### Scaping

Hardneck varieties produce a scape (see hardneck garlic scape in color section). If the scape is left on the plant, bulb size may decrease because energy is diverted to bulbil production. Remove the scapes by breaking or cutting them immediately after they have curled and before they straighten out.

## Summer Harvest and Curing

The harvest is when the mature plant is dug up from the soil. Garlic should be harvested when the tip of three to five of the leaf sheaths have turned brown. It means the plant has reached its maturity and is starting to decay. Why do the leaves provide a clue when to harvest? Each leaf is part of a structure that serves different functions, from photosynthesis to structural support for the stem, to providing a protective layer for the bulb. Because the leaf sheath and covering on the bulb are part of the same structure, the change in colour is an indicator that the plant has reached peak maturity. Leaving the plant in the soil beyond this point will cause the layers on the bulb to decay. It is important to preserve as many of these layers as possible—they protect the bulb during curing and storage. Some farmers advise digging up and examining a few test plants before the leaves have started to turn brown, especially in wet weather. Moist soil can cause the layers on the bulb to degrade prematurely. If this is the case, do not wait for the leaf tips to turn brown. It is time to harvest.

### How to Harvest

Loosen the soil with a fork, spade, or other digging tool, taking care to dig straight down—parallel to the stem of the plant, six to eight inches (fifteen to twenty centimetres) deep and at three to four inches (eight to ten centimetres) from the stem—far enough not to damage the bulb. Lever the tool back and forth, gently loosening the soil around the bulb. Now, grasp the base of the plant, near to the soil surface. Pull straight up, taking care to not bend the stem, and gently brush off loose dirt and dead leaves, as these can potentially harbour moisture-loving pests and disease during curing and storage. Lay each bulb on the ground. Before digging up too many plants, check your already harvested bulbs to ensure they have not been damaged by your digging implement. If necessary, adjust your digging method with the next plants to be harvested and send those damaged bulbs to the kitchen!

To harvest, use a garden fork, spade, or trowel to loosen each bulb (Courtesy of Toronto Garlic Festival).

### Plants for Curing

Tie garlic plants together in bundles of five or ten (or of your choosing), with a string approximately four feet long—two bundles per length of string. Wrap each bundle twice around using a wide-diameter string, such as hemp rope, to lessen the possibility of cutting into the stem of the plant. Tie tightly to avoid having plants slip out of their bundle—the stems will shrink as they dry. Each set of two bundles is hung by the string to dry or “cure.”

Remember, a cut or bruise in the stem or in the leaf sheaths that cover the bulb can allow fungus, mould, or other undesirable organisms into the plant.

### Curing

Immediately after harvest, garlic is hung to cure for two to three weeks. This allows moisture to escape and prepares the plant for long-term storage. Hang garlic bundles in a shaded, ventilated locale. In places with high humidity, set up a fan.

## Cut the Bulbs from the Stem

After curing, use household scissors to trim the roots and gardening cutters to cleanly cut the bulb from the stem. Most growers cut the stem very close to the bulb, in part because any amount of stem left behind can pierce adjacent bulbs while in storage. For bulbs that have tight-clinging skins and are difficult to crack, such as the Music strain (a porcelain variety), farmer Patrick Carter prefers to leave about two inches (five centimetres) of the stem on the bulb, as this makes it easier to crack the bulb in preparation for planting.

## Storage

Table garlic (for eating) stores best in a cold room or cellar, or in a clay garlic keeper. Avoid storing in higher humidity, or in temperature extremes, such as near a stove or sunlit windowsill. Table garlic stored at room temperature may dehydrate faster. Do not refrigerate garlic!

Depending on the variety and strain, garlic can be stored for up to one year. The variation is due to inherent factors in each type of garlic, such as the tightness of the skin on the bulb. No matter the variety of garlic you grow, how you handle the plant during growing, harvest, bundling, curing and storage affects how well the bulbs will store. Since the leaf sheaths covering the bulb serve a purpose similar to human skin—protecting the bulb from potentially damaging organisms—you should ensure that as many sheaths as possible remain on the bulb after harvest. Bulbs with tight-clinging leaf sheaths will likely store the longest. Bulbs with exposed areas on their surface should be the first to be eaten (table garlic) or planted in the fall.

## Pest and Disease Prevention

Fortunately, mammals are not especially interested in garlic, but they can be an indirect nuisance. Squirrels will dig in the soil, looking to bury acorns, and in the process may uproot garlic. The real threat to garlic is smaller and more menacing. Insects and diseases present a serious and often hidden threat. Beware of penicillium mould, bulb and stem nematode, white rot, fusarium, basal plate rot, aster yellows and the leek moth. None of these will make it to the eleven o'clock news, but they are a garlic farmer's worst nightmare. Each manifest in a different way and at different times in the garlic lifecycle.

Penicillium mould causes garlic to decay during storage. When infected bulbs are cracked for planting, airborne mould spores can infect healthy cloves, with potentially damaging results.

Bulb and stem nematode is a microscopic parasite that enters through the root plate or wounds in the bulb. It can lie dormant in the plant until the right conditions arise—it travels well in wet conditions, when it moves from plant to plant, including on a hapless gardener's boot.

The leek moth is an insect pest that lays its eggs on the leaves of garlic. Once hatched, the larvae tunnel into the plant's leaves, leaving it susceptible to bacterial or fungal diseases.

Here are a few common-sense practices as the first line of defence against such threats. Conduct regular inspections during the growing season, culling weak and stunted-looking plants and disposing plant material well away from the field or garden. Practice crop rotation, allowing three to five years between planting of any allium species or plants that are susceptible to the same pests

and diseases as garlic. Avoid walking in your garden or garlic field in wet conditions, as your boots (or garden equipment) can transfer water-loving pests from one area of the field to another.

Source: Ontario Garlic: The Story from Farm to Festival (Arcadia Press 2015) by Peter McClusky

## Garlic Growing 202 - A Guide to Starting A Commercial Garlic Farm

Are you considering growing garlic on a commercial scale? Drawing on the experiences of the members of the Garlic Growers Association of Ontario, here are a few very important questions to consider.

**Marketing** – What is your plan for selling your crop, including wholesale, retail distribution? Many options include farm gate retail, farmers markets, garlic festivals, processing and value-added products, grocers, and Ontario Food Terminal.

**Submarkets** – Have you considered secondary markets for small and damaged bulbs? Having a market for your small and slightly damaged bulbs can help increase your profits.

**Soil Crop Rotation** – Alliums should have a 3–5 year rotation. What is your plan to grow other non-alliums in the 3-5 year period between growing garlic in a spot? Viruses and disease need to be properly managed, and a good crop rotation is a great start.

**Disease and Pest Management** – What is your plan for inspecting your crop and harvest for bulb and stem nematode, leek moth, yellow aster and other pest and diseases? For example, do you have a regimen in place, such as hot water treatment, for pre-empting the possibility of bulb and stem nematode? Are you considering buying clean seed?

**Seed source** – What is your seed source, keeping in mind the importance of using seed that is free from disease and pest? Purchasing large quantities of seed takes a great deal of planning and research, be pro-active to ensure your crop is off to the best start possible.

**Mechanization & Labour** – What is your method for planting, weeding, harvesting, etc. Garlic is a very labor intensive crop, there are many labor saving tools available.

**Processing** - Will You provide your own value-added services, and products with your garlic? or source out processors of Ontario garlic?

**Curing** – Do you have facilities for proper curing (2-3 weeks) of garlic? Some environments require for air ventilation and curing systems. Will you hang your garlic, place it into produce bins or bulk store your crop?

Method – Will you grow your garlic using organic, conventional methods, and factored in this method when thinking about your market and type of mechanization?