



# for the Gardener

CENTER FOR AGROECOLOGY  
& SUSTAINABLE FOOD SYSTEMS,  
UC SANTA CRUZ

## A Garlic Primer

The genus *Allium* has long been banded back and forth between nomenclatural families. Although in “The Literature” it is more commonly found in the Amaryllidaceae family, Alliums have most recently been placed in the Liliaceae family. Wherever its nomenclatural hearth and home, there is no doubt that the genus *Allium* is horticulturally the family’s preeminent grouping.

There are approximately 400 species of wild onions and garlic found worldwide. The principal garden species are:

*Allium cepa* – bulbing onions

*Allium cepa aggregatum* – shallots, multiplier onions, potato onions

*Allium cepa proliferum* – topset onions, Egyptian onions, tree onions

*Allium sativum sativum* – softneck, artichoke garlic

*Allium sativum ophioscorodon* – stiffneck, ophio, topsetting garlic

*Allium ampleoprasum (porrum)* – leeks, elephant garlic

*Allium fistulosum* – bunching onions, scallions

*Allium schoenoprasum* – chives

*Allium tuberosum* – Chinese chives

*Allium sativum*, the modern garlic, is thought to have evolved from a wild species, *A. longicuspis*. It is native to south-central Asia in the steep ravines and mountains of the Tien Shan Plateau of northwestern China into southern Uzbekistan. But in fact, a broad area referred to as the “garlic crescent” runs from the Tien Shan Plateau across northern Afghanistan, Iran, the Southern Caucasus Mountains to the Turkish shores of the Black Sea, and is said to be the primary center of distribution for modern garlic. Garlic was spread across this region and beyond by both nomadic cultures and early trade routes in times before written history.

### THE MAJOR GARLIC TYPES

Human distribution coupled with climatic effects fostered the evolution of two groups or subspecies of garlic:

*Allium sativum ophioscorodon*—the stiffneck garlic of northern (harsh winters) continental Europe, and *Allium sativum sativum*—the softneck garlic of milder Mediterranean climates.

Within the *A. sativum sativum* group several distinctive garlics developed in the milder regions of China, Korea, and Japan. These are referred to as Turban and Asiatic types, and offer growers some of the earliest maturing of all garlics. They possess characteristics of both softneck and stiffneck and are highly recommended to kitchen gardeners and niche marketers alike (see varietal descriptions, pages 4–6).

### *Allium sativum ophioscorodon* – Stiffneck or Ophio Garlic

This group or subspecies has a host of common names: stiffneck, topsetting, ophio, serpent, rocambole, etc. Stiffneck or ophio garlics are wilder than their softneck counterparts and are probably quite similar to any number of the 150 species of wild garlic. While there are records of this type of garlic being in cultivation for 3,000–6,000 years, there is very little evidence that it has ever produced viable flowers and seed.

Stiffneck garlics have a distinct set of characteristics that distinguish them from their more highly domesticated softneck relatives. Stiffnecks are aptly named in that they produce a solid, stiff, false flower stalk. The seed stalk coils in a circular fashion (see illustration) as it emerges and sometimes reaches a height of 3–4 feet. These stalks can be used as either fresh or dried flowers and often bring high prices in florist shops and direct-marketed bouquets. When the stalks are young they can be harvested, dried and included in stir fry dishes, adding a tangy zing.

If the flower stalks are left on the plant, they terminate in a capsule that contains up to 150 aerial bulbs (Bulbils) the size of a small popcorn kernel. These Bulbils can be nursified and grown for a year to produce a bulb with clove size that can be planted



Stiffneck garlic with bolted flower stalk

© EMMA SUDNICK

again and will produce a marketable size bulb the second year. Because most stiffnecks produce only 4–8 cloves per bulb, this method of propagation allows the home gardener to quickly increase the number of bulbs for planting. However, leaving the false seed stalk on the plant is done at the extreme expense to bulb size, and stiffnecks already are smaller bulb producers genetically.

Because of their stiff neck, ophio garlics generally are poor candidates for braiding. However, the necks can be soaked in water and bent or broken, dried, and then braided.

Stiffneck garlics naturally produce smaller bulbs than softnecks. While the bulbs are smaller, the clove size to bulb size ratio is greater. Sometimes stiffnecks produce cloves that are actually bigger than softnecks. They also feature more uniform clove size and a low number of cloves per bulb—commonly 6–10, but sometimes as low as 3–5 large cloves. Some varietal examples of low clove count: Georgian Fire, Georgian Crystal, Music, Korean Red, Brown Tempest and German Porcelain. See varieties section for more complete descriptions.

Stiffnecks are diverse in terms of shape size and bulb wrapper color. They feature a single circle or layer

of large cloves arranged around the woody remnants of the stiffneck stem. Upon close examination, there is a separating skin that divides the layer in half. Stiffnecks often have a more elongated, tall symmetrical bulb shape with a delicate paper tail at the top of the clove. There are several distinctive sub groupings of stiffneck garlics based on the color, sheen, shape of bulbs and cloves. As a group, stiffneck garlics have a much shorter storage life than softnecks.

**Allium sativum sativum – Softneck Garlic**

*Sativum* means domesticated or cultivated in Latin. Thus, this subspecies of garlic commonly referred to as softneck or artichoke garlic is highly domesticated (*sativum sativum*). Indeed, softnecks are thought to have evolved under cultivation from their wilder progenitors, the ophio or stiffneck garlics. As such the softnecks are more responsive to inputs of water and nutrients, and yield both bigger bulbs and greater yields per area than stiffnecks.

Generally, softnecks have large leaves and produce an overall bigger plant than ophios. Softnecks do not send up a false seed stalk and thus shuttle more nutrients and energy into bulb size. They have large, heavy bulbs and a soft (braidable) neck. While the bulbs are big, they are lumpy and not as highly colored or attractive as stiffnecks.

Softnecks have a higher clove count per bulb, ranging from the high teens to forty. These cloves are arranged in 3–5 layers and have extreme variability in clove size. Particularly towards the center of the bulb, the cloves become small, rectangular and extremely difficult to use in the kitchen.

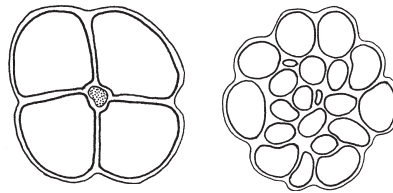
Additionally, softneck cloves are much more difficult to peel than stiffnecks. The joke regarding stiffnecks and peeling is that all you have to do is sneeze on them to get the skin to separate from the clove. Conversely, the peeling of softnecks usually involves the chipping of fingernails and sometimes the loss of skin from fingers and mumbled (or shouted) expletives.

Because of their response to cultivation, greater yields and longer storage life (6–10 months), softneck garlic is almost the only garlic used in commerce. With softnecks, more rather than

less, one variety tastes about the same as another.

It is assumed that softnecks are for mild winter areas and stiffnecks for cold winter areas. But as a class softneck garlics are better at adapting to cold weather than ophios at “crossing over” to mild winters.

Softneck varieties, with their higher soluble solids content, are the garlics for roasting. When roasting garlic, remember that distinctive varietal taste characteristics tend to be obscured (see page 6 for details on roasting garlic).



Cross sections of stiffneck (left) and softneck garlics showing the clove arrangements. © Emma Skurnick

**Allium ampeloprasum (formerly porrum) – Elephant Garlic**

Elephant garlic or great-headed garlic, as it was once called, is botanically a leek. Big is the operative word when referring to this plant: the plant itself is large, with a bulb exceeding 6 inches in diameter and weighing close to a pound each, containing 4–6 cloves which can reach 4” tall by 1” across.

While the plant’s characteristics are strong, the taste of elephant gar-

lic is mild. It can be used in quick stir fry dishes, salad dressings (raw), and roasted whole. When roasted, it produces a large amount of a smooth-textured paste with very little garlic “zing.” Compared to the more robust *Allium sativum*, elephant garlic is a bit like the taste of light beer.

Elephant garlic was first introduced into commerce by Nichols Garden Nursery in Albany, Oregon, after purchasing stock from local Eastern European immigrant gardeners. Unlike stiffneck and softneck garlics, there is only one variety.

Elephant garlic should be spaced farther apart than true garlic, with 8”–10” between planted cloves to achieve optimal bulb size. It is much easier to grow than true garlic and is much more responsive to fertility inputs. Production of a seed stalk indicates that the plant received an adequate winter chill (<50°F, >32°F) for 6–8 weeks, and thus will produce a segmented bulb.

**CULTIVATION, HARVEST, AND STORAGE**

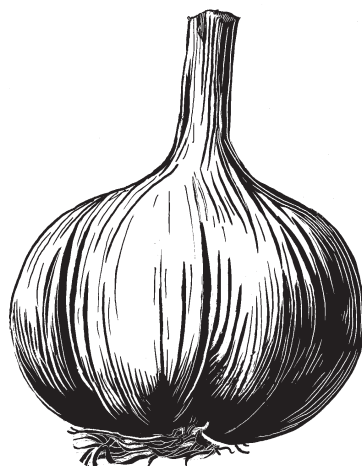
**Garlic’s Growing Cycle**

In mild Mediterranean climates like that of Central California, garlic can be thought of as the “holiday plant.” You plant it just prior to Thanksgiving, top dress, foliar feed, or otherwise add supplemental nutrients on Valentine’s Day and St. Patrick’s Day, start to taper off watering on Memorial Day, and harvest around the Fourth of July.

This catchy way of looking at the garlic cycle is not literally true all around the U.S. Stiffnecks are planted a month earlier than softnecks, and in the north the goal is to establish root but not shoot growth before frost and snow, while fertilizing and harvest take place later in the cycle in areas with more severe winters. Still, the holiday reference can be a helpful guide in thinking about garlic’s needs and its long, slow growth pattern.

**Soil Preparation**

Like most *Allium* species, garlic has a fibrous but non-branching root system. It is both superficial (4”–8” deep by 4”–8” wide) and inefficient at marshalling water and nutrients from the soil. This inefficiency, combined with garlic’s extended growth cycle, means that growers must provide high fertility levels and supplemental feeding throughout all but the last part



Elephant Garlic, *Allium ampeloprasum*

© Emma Skurnick

of its growth period. Because garlic often grows in the wettest part of the year, good drainage is essential. A well-dressed raised bed with a shallow incorporation of nutrients is requisite for good results.

The garlic bulb is a modified leaf, thus it has a high nitrogen requirement. Phosphorous promotes early root development and helps establish the plant early in its growth cycle. Potassium is important for bulb development and food storage. A mixed compost made from horse manure with straw bedding (high potassium) and chicken manure (high nitrogen and phosphorous) is one fertility option. The goal is to establish a large plant prior to bulb initiation—the bigger the plant, the bigger the resultant bulb at harvest.

#### **Planting – September-November**

Bulb cracking and clove popping are laborious but important processes. Sizing and sorting in the post-harvest phase will expedite this stage. Gardeners often have three grades for sorting: the biggest bulbs for replant stock; the remainder of 1st grade and the next size down for sales; the smallest size for processing and generic kitchen use.

It is important not to pop garlic cloves from the bulb until just prior to planting (one week at the most). An increase in oxygen at the basal plate (where roots emerge) causes early root growth and can lead to rot if cloves are not in the ground. To the degree possible, the protective bulb and clove wrappers should be left intact. These wrappers have evolved to protect the cloves from the environment both in storage and in the ground. Any soft, injured, or diseased cloves should be discarded. The biggest bulbs (assuming good care) will result from planting the biggest-sized cloves from the biggest bulbs, and then big cloves from any size bulb. The purpose of the clove is to feed carbohydrates into the emerging shoot tip and root growth, getting the new plant off to a vigorous start irrespective of growing conditions.

Garlic cloves should be planted pointed tip up, basal plate down, with the top of the bulb 1"–2" below the soil level in mild climates and 2"–4" deep in cold weather areas. Garlic is a narrow-leafed monocot, and never really establishes enough leaf cover to protect the soil from the harsh influences of wind, rain, sun, freeze and thaw cycles.

A light leaf litter or straw mulch can remedy this situation. Using a partially aged mulch of straw bedding from horse stalls also has the benefit of serving as a manure tea as the rains wash nutrients into the root zone. Within rows, cloves can be spaced 4"–6" apart (stiffneck types), 6"–8" apart (softneck types), or 8"–10" apart (elephant garlic). Leave a minimum of 10"–12" between rows. In a 4' wide x 50' long raised bed, 5 rows x 6" will net 500 plants. Higher fertility levels allow for closer spacing without sacrificing bulb size at harvest.

#### **Irrigation**

After planting, soil moisture should be brought up to field capacity (a measure of how much water a soil can hold when saturated; field capacity occurs 2–3 days after a heavy rain or irrigation). Allow a good dry down to 50%–60% of field capacity before irrigating again. Prior to emergence, garlic cloves are prone to rot with overly wet soils. Once emergence has occurred (10 days–3 weeks in mild climates, 3–6 months in cold climates), soil moisture should be checked once or twice a week and plants should be watered when the soil is dry 4"–8" deep.

#### **Weeds**

You can have garlic or you can have weeds, but not both. As a narrow-leafed, inefficient, restricted-rooted plant, garlic is a poor competitor with aggressive, broad-leaved weeds. Weeding is most effective before the seedlings get established, both above and below ground. It is important to control weeds all the way through harvest.

#### **Bolting/Flowering**

Stiffneck garlics will send up a false flower stalk in late spring. This stalk should be cut just above the foliage. If left on the plant, it will significantly reduce bulb size at harvest (remember, stiffnecks already produce smaller bulbs than softnecks).

#### **Pre-Harvest Care**

Late fertilization of garlic is virtually useless and can lead to poor storage qualities, as high nitrogen and water content make bulbs prone to rot. During the last month of growth, the water needs of garlic decrease. It is important to have available moisture in the root zone, but care should be taken to avoid constant moisture near the bulb. The fi-

nal irrigation is usually 2–3 weeks prior to harvest. In the latter stage of growth the plant will translocate nutrients from the foliage into the rapidly expanding bulb. As this starts to happen, the lower leaves will begin to yellow and eventually senesce. Bulbs should be approaching harvest size, with visible clove segmentation when approximately 25% of the foliage has senesced.

#### **Harvest and Curing**

Most softneck garlics are harvested when 4–5 green leaves remain on the plant. Note that some early stiffneck types and the Asiatic and Turban type softnecks (described below) reach full bulb maturation even though all plant leaves are green or when one or two lower leaves start to brown. Stiffneck types are generally harvested when 5–6 green leaves remain (a mature plant will have 12–15 leaves). If left in the ground past this stage the bulb wrappers will decay, the bulbs will split open and be prone to rot in the ground or early in storage.

Each green leaf on the plant represents an intact bulb wrapper at harvest and in storage. Inevitably, two to three wrappers will be destroyed in the harvest or during postharvest handling. Garlic stores best with a minimum of two intact bulb wrappers; with fewer than two wrappers, cloves can split apart, turn green from sunburn, and suffer the effects of dehydration, or rot from too much moisture. Harvesting garlic at the *slightly* green or immature stage is safer than waiting until it's overmature. Good drying and curing conditions can compensate for a slight degree of immaturity.

When ready for harvest, garlic bulbs should be pulled by hand or dug from the soil, depending on soil moisture and structure. In areas with little or no summer precipitation, garlic can be field cured. As the whole plants are pulled, they can be "shingled," that is, 6–10 plants can be laid out, with the foliage of the next bunch covering the bulbs of preceding group. This technique protects the bulbs from sunburn. Garlic stores longer and better if cured or dried with the whole plant intact. In areas with summer precipitation, garlic is best cured in an unused greenhouse or well-ventilated shed on wire screens. In humid areas, forced air is a good aid to dry down. This curing process can

take as little as 5–10 days or as long as 3–4 weeks, depending on the maturation of the plants/bulbs at harvest and subsequent environmental conditions.

### **Cleaning and Storage**

Once the garlic bulbs have cured and lost sufficient moisture, the tops can be clipped to 1/2"–1". It is critical to get good dry down in the neck. Remember, the purpose of a stem on any fruit or vegetable is to act as a buffer between the potential for rot from the environment and the items being stored. Note that overly long stems of stiffneck garlic cut at an angle can puncture surrounding bulbs in storage. Roots should be trimmed to 1/4"–1/2". Next, any soil should be gently brushed from the bulb wrapper and roots. Using either a toothbrush or a small fingernail scrub brush, exert a gentle but quick stroke from top to bottom on the bulb. Try to keep as many bulb wrappers in place as possible, but peel off any that are broken. The aim is minimal bulb wrapper damage, while netting an undamaged, vibrantly clean bulb with an unbroken outer wrapper. This usually entails removing no more than one or two wrapper layers. Culling for damaged or misshapen bulbs and size grading occurs at this stage of post-harvest handling.

Fully cured, graded garlic can be stored in burlap or synthetic net onion bags. The synthetic material breathes better and is less subject to harboring molds and fungi that can rot the contents. Garlic should be stored at low light levels, at temperatures above freezing and below 40°F or at 50°–60°F with a relative humidity of less than 75 percent. Good air circulation between bulbs adds to storage longevity. Remember, 6 months is considered long-term storage for stiffnecks, and 9–10 months for softnecks, so eat and sell your stiffnecks first.

### **Green Garlic**

Green garlic is a marvelously broad concept. Basically, it entails harvesting, selling and best of all, consuming whole immature garlic plants. The plants can be planted at 2" spacing and harvested at the bunching onion stage all the way through mature (but still green) plants with full-size, segmented bulbs. The flavor is basically garlic (varietal characteristics express themselves during the curing stage), but because of the high water content, it is suc-

culent and delicate—sweet and mild. This concept affords growers cash flow (\$4–\$7 per pound) early in the season. It is also appreciated in the kitchen by cooks clamoring for garlic after the winter stock has dwindled away or gone soft.

### **GARLIC VARIETIES**

#### **Subgroups of Stiffneck Garlics**

There are several distinctive sub groupings of stiffneck garlics based on the color, sheen, and shape of bulbs and cloves.

#### **Rocamboles**

Rocamboles perform best at latitudes greater than 40 degrees North. In wet, mild winters they often bulb poorly if at all or fail to form cloves. These are arguably the highest flavored of all garlics, peel most easily, and thus are preferred by cooks in the know. The plants are short and squat with broad, spreading leaves. The flower stalks make 1–3 tight coils (360 degrees) and then resume their vertical growth. Other varieties form coils that shoot off at random angles. The bulb wrappers are a light streaked purple. The cloves are rounded and plump with high soluble solids (dense) and number 6–11. The clove color is usually brown, often a rich mahogany with a purple splash.

Rocamboles mature midseason to late and have the shortest storage life of all stiffnecks (2–4 months). Varieties of note –

Russian Red – large, thick, nearly round bulbs with a copper hue and purple blotches. 8–12 cloves per bulb. The taste is fiery but quickly turns sweet and buttery.

Spanish Roja – the standard when judging true garlic flavor. Cloves vary from teak to brown in color; bulb wrappers are purple streaked. Rich, spicy flavored bulbs mature in midseason and store 4–6 months. May produce poorly in mild wet winter areas.

German Red – produces large bulbs with deep red color and 8–12 cloves. Fiery, spicy rich garlic flavor. Does best in cold winter climates. Matures mid season.

Kilarney Red – high yields, late maturation, one of the better Rocamboles for mild, wet winter areas. Similar in appearance to German Red and Spanish Roja. Sustained heat, rich garlicky-but-ter aftertaste.

#### **Porcelain Group**

This is an eye-catching group of stiffnecks. Porcelains have almost pure white bulb wrappers with a reflective sheen and feature tall, symmetrical bulbs with 5–8 cloves. The cloves are a plump, crescent shape with an elongated paper tail at the top. The clove skins are usually light brown to pink with some rose or red streaking. Clove size sometimes rivals Elephant garlic. The cloves are easily separated from the bulb and peel with great facility. The vigorous plants can reach 4–5 feet in height with the seed stalk extending up another 2–3 feet. These are the longest storing of all stiffneck types (5–8 months). Varieties of note –

Music – indeed it is music to the garlic lover's eyes and mouth. White skinned with a touch of pink blush. 5–6 large cloves per bulb. Highest yielding variety with a long storage life (7–9 months). A medium heat index that sticks around in the back of the mouth.

Georgian Crystal – native to the Republic of Georgia. Large pure white, satin bulb wrappers cover light brown, red-streaked tall cloves that peel easily. 5–6 cloves per bulb. Mild, almost sweet flavor, even raw.

Georgian Fire – very similar to Georgian Crystal except it has a strong kick that shows off well in salsa.

#### **Purple Striped and Marbled Group**

These two very similar groups of stiffneck garlics indeed have purple stripes on the bulb wrappers and a smooth satin sheen. The slender bulbs are not as tall as Porcelain types and contain 5–6 cloves with a distinctive paper tail. The taste of the purple stripes is moderately fiery initially but mellows quickly. This group roasts well. Varieties of note –

Chesnok Red – large bulbs, 6–10 easy-to-peel cloves. One of the best roasting and cooking garlics as it holds its shape and flavor. White bulb wrappers with purple streaks. Stores 4–6 months. Performs best in northern climes.

Red Rezan – bulb color is a glazed purple with a hint of gold or copper and a satiny finish. Moderate storage (4–5 months). High flavor but not overwhelming.

Purple Glazer – similar to Red Rezan but with fatter cloves. Originally from the Republic of Georgia.

**Brown Tempest** – satiny bulb wrappers with faint, fine purple stripes. Light brown, rose-tinged cloves are short and plump. 6-9 cloves per bulb. 5-6 month storage. Fiery with a buttery aftertaste.

**Siberian** – perhaps the most outstanding of the purple stripe group. Large, white, purple-striped bulbs. 7-8 cloves are wrapped by light pink blush-red bulb wrappers.

**Korean Red** – extremely large, tall bulb with intense red to almost black-red coloring. 4-8 cloves. Longest storage of stiffnecks (up to 9 months). Hot, lingering taste.

### Subgroups of Softneck Garlic

#### Artichoke Types

These have a lumpy, spreading bulb that vaguely resembles an artichoke flower. Varieties of note –

**Inchellium Red** – the best for roasting. 9-20 uniform cloves, bulbs often greater than 3" in diameter. High soluble solids give this variety a denser, heavier feel and more edible portion than other garlics. Stores 6-9 months. Mild but lingering buttery taste.

**California Early and California Late** – the garlic of Gilroy and the California garlic industry. Very large, vigorous, and productive. Lumpy off-white bulbs with pink-tinged cloves. Tight bulb wrappers beget long (7-10 month) storage. Mild flavored, slightly sweet, tame taste. Many small unusable cloves in center of bulb.

**Machashi** – good-sized flat, uniform bulbs. Cloves often occur in a single

'California Late' variety



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layer and are thus user friendly. Silky buttery aftertaste follows initial tongue-tingling fire.

**Simoneti** – a large, uniform bulb with a rosy patina on bulb wrappers, with pink cloves. Very productive, with a mellow taste.

**Polish White or New York Polish** – a monstrosously big, uniform-shaped bulb; often the largest softneck type. Extremely cold hardy and does well in mild winter areas. Only 10-13 large cloves. Initially hot, but tones down quickly with a "sticks around" buttery sensation on the lips.

#### Creole Types

Genetically, these are softnecks that bolt early and appear stiffneck-like in their bulb and clove arrangement. They perform best in mild southern climates. Bulb wrappers are white, with distinctive red and purple clove skins. Harsh tasting when raw, these types are mild and sweet when cooked. Varieties of note–

**Ajo Rojo** – from Spain

**Burgundy** – deep, solid burgundy, with 8-12 uniform cloves per bulb

**Creole Red** – best tasting of its class

**Spanish Morado** – intense purple clove color

#### Silverskin Types

These softneck garlics are more demanding (à la stiffnecks) about climate conditions and soil fertility. Because of their silver-white exteriors, clean appearance and long, thin necks, they are excellent for braiding. Varieties of note –

**Nichol's Silverskin** – the whitest of all silver skin types.

**Silver White** – highly productive in both coastal and hot interior climates, with a large bulb.

**Nootka Rose** – from the San Juan Islands off Washington State's Olympic Peninsula; 5 clove layers with up to 35 cloves, streaked red. Large bulbs with strong flavor.

#### Asiatic Types

While genetically softnecks, these unique garlics combine large bulbs with the single layer clove arrangement, false flower stalk, purple or marbled color, and plump cloves of stiffnecks. They generally mature early (a month before all but the turban types, May 15 – June 1 in Central California). Asiatics need to be harvested as soon as *any* leaves show browning, or the bulbs will split apart. Varieties of note –

**Asian Tempest** – from South Korea. Large, finely striped with a purple blush. 5-7



'Tzan'

'Georgian Fire'

'Dushambe'

'Creole Red'

'Asian Tempest'

© EMMA SKURNICK

big cloves. Produces well in wet, mild areas as well as cold ones. Rich, long-lasting flavor. Moderate keeper (4-6 months).

Pyongyang – from North Korea. 6-8 cloves per bulb, with a rose-purple blush to the cloves, which have an elongated paper tail. Very early harvest, poor keeper (3-5 months).

Russian Red Streak – Big bulbs, firm and plump, with a very sharp initial taste and a heat that sticks around. Long storing (7 months).

Japanese – 5-7 large cloves, similar in size and shape to elephant garlic. Tan/yellow cloves.

### Turban Types

Another cross-over type – technically a soft neck, but exhibiting stiff-neck characteristics: poor storage (3-4 months), bolting flower stalk, high aromatic flavor, red and purple striping, and easy-to-peel cloves. As with the Asiatics, Turbans must be checked almost daily as they approach maturation and harvested at the first sign of any leaf senescence. These are the earliest-maturing of all garlics (May 1-15 in Central California). Varieties of note –

Chinese Purple – early maturation (June 1). 7-10 brownish cloves with a purple splash. Pure white bulb wrapper. Mid size, tight bulb, with a fiery hot taste. Stores well (7-9 months).

Dushambe – 8-11 cloves with a bronze/mahogany color. Easily separated and peeled cloves. Rich, buttery taste.

Tzan – from China's Shandong Province. Often grown and marketed from Mexico as Mexican Red. Striped bulbs with purple blush. 8-10 cloves in a single layer, stiffneck style.

Xian – similar to Tzan but even earlier maturation.

- Orin Martin  
Manager, Alan Chadwick Garden

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*Growing and Using Garlic*, by Glenn Andrews. Storey Country Wisdom Bulletin A-183. North Adams, MA: Storey Publishing, 1998.

*Growing Great Garlic*, by Ron L. Engeland. Okanogan, WA: Filaree Productions, 1991.

### Garlic "Seed" Sources

Filaree Farm  
182 Conconully Highway  
Okanogan, WA 98840  
(509) 422-6940  
www.filareefarm.com  
*wide array of organic varieties, both softneck and stiffneck*

Irish Eyes-Garden City Seeds  
(509) 964-7000  
www.gardencityseeds.net  
*good selection of softnecks, stiffnecks, and novelty alliums*

Johnny's Selected Seeds  
955 Benton Ave.  
Winslow, ME 04910  
(877) 564-6697  
www.johnnyseeds.com  
*German X-tra Hardy, NY (Polish) White*

Nichols Garden Nursery  
1190 Old Salem Rd. NE  
Albany, OR 97321-4598  
(800) 422-3985  
www.nicholsgardennursery.com  
*high quality elephant garlic along with soft-neck and hardneck varieties*

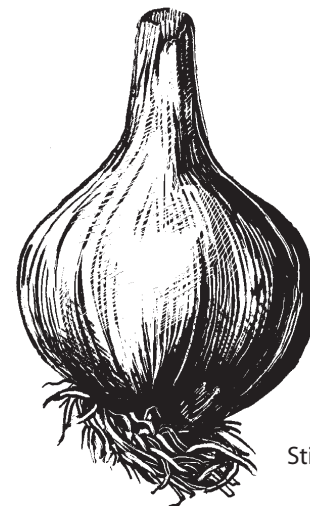
Peaceful Valley Farm Supply  
PO Box 2209  
Grass Valley, CA 95945  
(530) 272-4769, (888) 784-1722  
www.groworganic.com  
*10-15 varieties*

Territorial Seed Company  
PO Box 158  
Cottage Grove, OR 97424  
(800) 626-0866  
www.territorial-seed.com  
*20+ varieties*

### How to Roast Garlic

Roasted garlic (be it stiffneck or softneck) is at its pinnacle from just after harvest to about the time it would normally be planted in the fall. At this time it starts to lose some of its sweetness and succulence and develop a green shoot in the center. While usable thereafter it doesn't have its premier qualities as winter progresses.

To roast garlic: arrange upright in a ceramic pan with a lid (or use foil). Remove the outer bulb wrappers from the top portion of the bulb and cut off the tip of the bulb (1/4-1/2"). Pour 1/4" of soupstock or olive oil marinade into the bottom of the pan. Drizzle the bulbs with olive oil, salt, and herbs. Cover tightly and bake at 375° F for about 30-45 minutes (depending on size and type of garlic). The roasted puree can be squeezed out onto grilled bread or crackers. Or it can be added to soups, sauces, or vegetable purees.



Stiffneck garlic

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*The Center manages the Alan Chadwick Garden and the UCSC Farm on the UCSC campus – both sites are open to the public daily from 8 am to 6 pm. For more information on CASFS and its activities, call 831.459-3240, write to the University of California, CASFS, 1156 High St., Santa Cruz, CA 95064, or see our web site, casfs.ucsc.edu.*