

STRAWBERRIES

Wild strawberries are native to all northern temperate climates and Chile. The modern strawberry, *Fragaria X ananassa*, was developed over 100 years ago in Europe. Breeders crossed the delicious *Fragaria virginiana* (native to North America) with the large fruited *Fragaria chiloensis* (native to the west coast of North and South America). The tiny, but tasty Alpine (aka Woodland) strawberry is native to Europe.

California farms grow 80% of the entire USA crop, about 25,000 acres total. Orange, Ventura, Los Angeles, and San Diego county farms account for about 1/3 of that (the Central Coast is about 2/3). The average yield is about one pound per square foot. Other states harvest less than 1/4 of that. California nurseries grow about 1 billion baby plants each year, 600 million for California farms.

Local commercial farms install new plants every fall to produce a very early crop starting in early winter. The early crop commands the highest prices. Nearly all use conventional chemicals. A few farm organically.

Strawberry plants require good to excellent drainage and perform best in sandy loam or loamy sand. They will perform in heavier soils if the bed is raised high enough to create better drainage. Local farms raise the soil about 18 inches which also makes harvesting easier. Drip irrigation lines are installed for high efficiency and to keep the foliage and fruit dry. From this point conventional farming techniques are quite different.

Conventional soil preparation

To promote an artificially early crop the rows are covered with clear plastic. The clear cover traps the sun's energy and the soil

stays quite warm. To prevent weed seed from germinating and competing with the crop the soil must be fumigated. The irrigation lines distribute fumigation chemicals underneath the plastic and in 5 days all seeds, diseases and bugs are killed. The plastic is then cut between the beds and the fields will be ready to plant 2 weeks later. Without fumigation the strawberry plants couldn't be planted every year and the use of transparent plastic mulch would just result in a crop of weeds.

Organic soil preparation

On organic farms, only a fraction of the land is planted with strawberries at a time. Unrelated crops are rotated to avoid a buildup of pest or disease problems in any one location. A crop of legumes (beans, peas, or alfalfa) will increase the soils nitrogen and a crop of broccoli seems to discourage a root disease (*Verticillium*). Weeds are a major problem. Weed competition can dramatically lower production. Some organic farms pull weed constantly, some cover the soil with black plastic, some apply a surface mulch. All options are a significant expense, but higher prices for organic produce usually offset the cost. Black plastic prevents about 90% of the weeds, but doesn't warm the soil as much as a clear plastic mulch.

Installing the Plants

All farms acquire and install bare root plants. These plants come pre-chilled. All strawberry plants need a period of winter chill between 34 °F and 55°F to initiate vigorous growth and complete development of flower buds. The farmer must guess how long they should refrigerate the bare root plants to balance the chill that they will naturally receive during winter following installation. Farms use a spiked roller to punch a deep hole into the bed (through the plastic mulch) at regular

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intervals. The workers then place each plant with its crown at soil level and firm the soil around the roots to hold it in place. The bed is then watered thoroughly with sprinklers to properly settle the plants. Once established the farms then use the soaker tubing for irrigation.

Local Farms Replant Annually

In order to get the early harvest, local farmers must install pre-chilled plants every year. Strawberry plants can produce for 3-4 years, but without clear plastic mulch and pre-chilling, the plants won't produce until spring.

Fertilization

Farms usually consult with soil labs to provide proper nutrition, however, strawberry plants do fine with levels of nitrogen, phosphorus and potassium that are fairly even. For short term results Osmocote 14-14-14 is fine. For long term results use organic fertilizers.

Harvesting

Berries are ready to pick about 4-5 weeks after blooming commences. It is best to pick off the first stalk of flower buds to allow the plant to build strength before production begins. Workers are sent through each field 2-3 times per week to pick ripe berries. To maximize shelf life the berries are gently picked, not allowed to get wet, and cooled immediately.

Growing Strawberries at Home

A typical strawberry plant can produce fruit for 3-4 years. On young plants remove the first set of flowers so that the plant can gain size and strength before production begins. A single, well-developed plant can grow over 18 inches wide and 10 inches high. Strawberry plants should be located in sun

(1/2 day is minimum) and planted in well-drained soil. Heavy soils should be elevated into substantial mounds or raised beds to improve drainage. Plants are placed 12-18" apart. Strawberry plants can be purchased in containers or as bare root. Bare root plants are more commonly planted during mild weather late fall through spring.

Strawberry plants perform quite well in pots. The berries are hanging over the edge but not touching the ground. This gives them some protection from birds, slugs, snails and pill bugs. You can grow a single, full-size plant in an 8-inch container. Our *Laguna Hills Nursery* custom potting soils, ACID MIX and TOP POT POTTING SOIL are superb. Most commercial potting soils will provide mediocre results. Perhaps the best potting soil is construction sand. We've grown some beautiful plants in pure sand. Our favorite soil in containers is a mixture of sand with ACID MIX (lighter weight).

Strawberry plants require ample moisture at all times. Plants that get severely dry often don't recover until the following year. Small pots placed in deep saucers filled with water can last a week on a single irrigation. The "moat" that is created will also guard against snails, earwigs and pill bugs. During summer most plants produce baby plants on long stems called "runners". These baby plants will grow roots where they touch the soil. These can be removed to increase production of berries or saved to increase the number of plants. The baby plants start production the next year. Do not allow too many baby plants to grow. Try to keep them a minimum of 6-inches apart on center. Older plants and dead plants can be removed to make room. Results are improved greatly if several handfuls of soil are also removed and replaced when removing old plants or when rooting the baby plants. Strawberry

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plantings require crop rotation, just like any other crop. The plants that grow from runners are clones and genetically identical to the parent. Strawberry plants will also grow from seed, however these will be genetically different.

CULTIVARS

Strawberry varieties can be classified as to when they bear fruit and how they grow.

June Bearing (Short day) varieties are most common. They generally have the largest, highest quality berries and are the most productive. They also produce the most runners during summer. They produce few fruit between August and November. The Southern California commercial varieties currently are *Camarosa*, *Palomar*, and *Ventana*. These were chosen for heavy *early* production (using clear plastic mulch), storage characteristics, beauty, and ease of production.

Camarosa This is a popular commercial variety with high yield and large to very large firm fruit of good flavor. Mildew may be a problem.

Chandler This is probably the most popular variety for home use and U-pick farms. The berries are medium to large with medium firm flesh and are very sweet and fragrant. Outstanding flavor. Long harvest period.

Palomar A new commercial variety for local growers that has excellent flavor. The flesh is firm.

Sequoia This variety set the standards for flavor and sweetness in Southern California. The large berries are not firm and require frequent harvesting. Outstanding flavor. Long harvest period.

Ventana Similar to *Camarosa* with slightly larger fruit and slightly better flavor (considered very good).

Everbearing & Day Neutral

These varieties produce continuously, although lightest in summer and sporadically through fall. Mild coastal conditions promote more constant production. High temperatures inhibit flower production.

Albion This new variety has very attractive, long conical, unusually symmetrical fruit with dark red skin and dark red flesh. Outstanding flavor. It is resistant to various root diseases. It produces a high number of runners compared to other ever-bearers. Remove these to increase production. **THIS HAS BECOME OUR TOP SELLER**

Monterey This variety has outstanding flavor and is the only variety with a notably sweet after taste. The flesh is firm. Unfortunately it is susceptible to mildew.

San Andreas Similar to *Albion*, perhaps a better producer with the same outstanding flavor and very firm flesh. Doesn't share *Albion's* problem of excessive runner production.

Seascape The fruit are large and attractive with glossy skin and very good flavor. The plants are extra vigorous. This variety resists many viral diseases and is highly productive.

Alpine (Woodland)

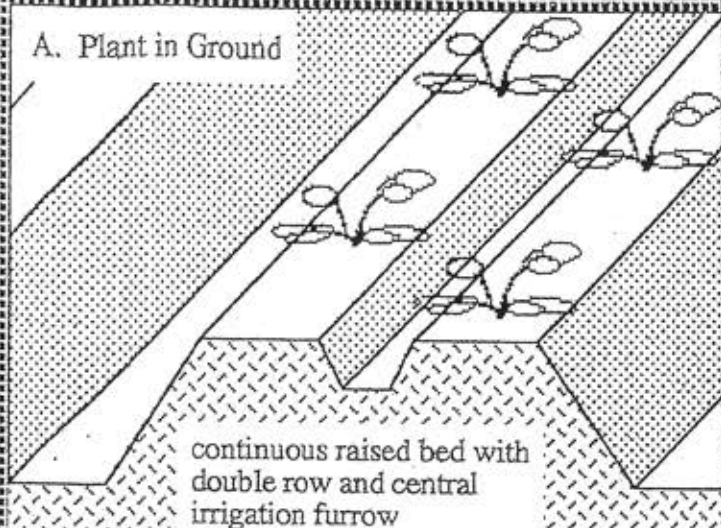
These small, clump-forming, plants produce small (tiny), highly fragrant berries over a long period during warm weather. These can be grown from seed or divisions.

Alexandria The fruits are red with unbelievable flavor.

Strawberry Planting

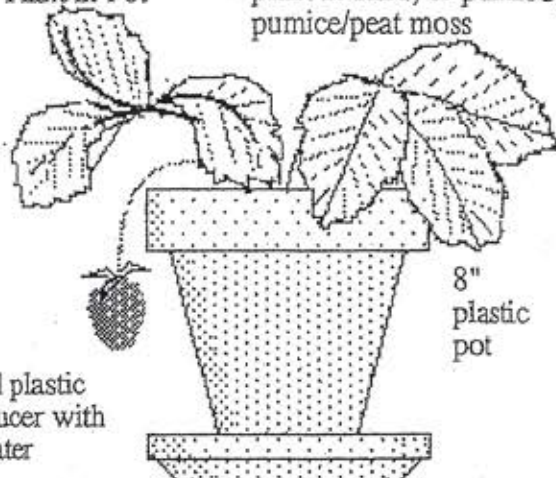
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A. Plant in Ground



continuous raised bed with
double row and central
irrigation furrow

B. Plant in Pot



plant in sand, or pumice, or
pumice/peat moss

8"
plastic
pot

fill plastic
saucer with
water

One strawberry plant will typically produce 1 to 1-1/2 quarts of berries each year. On farms, a new crop is planted each fall. This is because new plants produce earlier than recycled plants. You can get a decent harvest for several years from one planting. Remember to rotate crops. Replanting strawberries in the same soil every year results in declining harvests.

GROWING IN THE GROUND Strawberries prefer full sun, well-drained soil, preferably sandy loam with a pH between 5.8-6.5. There are many different methods of growing good strawberries in the soil. We will discuss the double row bed:

1. Form the soil into a continuous bed at least 6 inches high and 18 inches wide. The bed can be as long as you desire. Short beds are easier to water uniformly.
2. Make a shallow furrow down the center for irrigation. (or install a soaker tube)
3. Place the plants in a zig-zag pattern alternating down each side of the irrigation furrow about 18 inches apart.
4. Set the individual plants even with the soil surface. It is important not to bury any part of the leaf stem structures, and it is also important not to leave any roots exposed.
5. Water thoroughly to settle in the plants.
6. Mulching the surface helps stop weeds, and also prevents salt buildup.

Commercial growers cover the beds with clear plastic. This warms the soil and results in quicker production. Home gardeners rarely use this method, because unless the bed is fumigated (or sterilized) first, weed growth under the plastic would ruin the crop.

CONTAINER CULTURE Growing strawberries in containers presents a major advantage. Berries hanging off the side of the container are much less likely to be attacked by birds, slugs, snails, pillbugs, or mold.

Any size container at or above 8 inches in diameter is fine. Several plants can be planted in one container, but 1 per pot is easier to care for and harvest. We recommend a 9 inch diameter clay pot filled with 4 quarts of 'soil'. There are several types of soil that work well:

- A. Sand. Strawberry plants love sand.
- B. A mixture of 1 part Pumice and 1 part Peat Moss. This mixture gives outstanding results.
- C. Pumice. This creates a hydroponic set up. Place the pot in a plastic saucer filled with water. The pumice will draw water from the saucer. The water-filled saucer acts as a moat to isolate the berries from crawling bugs.

We DO NOT RECOMMEND commercial potting soils. Strawberry plants in these soils grow only a fraction of their normal size. Apparently the decomposing organic matter that makes up the bulk of commercial soils consumes oxygen required for proper root growth and health.

CARE AFTER PLANTING Do not allow flowers to set fruit until plants are well established. This is usually a month or so. Small plants cannot make berries and grow at the same time.

Strawberries do not require much fertilizer. Their fertilizer requirements are similar to most other plants. We recommend fertilizing organically in the ground. In containers Osmocote may work better.

Any runners that appear in spring should be pinched off. This will put more energy into fruiting.