Growing Strawberries in the Home Garden

UC Master Gardeners of Monterey & Santa Cruz
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Agriculture and Natural Resources

UCCE Master Gardener Program
Monterey and Santa Cruz Counties

This class covers:

- The different types of strawberries
- When, where and how to plant strawberries
- How to care for strawberry plants
- Nutrient deficiencies and pests that affect strawberries

Types of strawberries

- Short day: requires temperatures below 15° C (59° F) and days of less than 14 hours of light to induce flowering.
- Day neutral: Day length does not matter, produces fruit regardless.
- Everbearing: Produce a crop in spring and another in fall, and a few throughout summer.

Short Day Strawberry Varieties

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Chandler

- Chandler produces semi-early delicious sweet fruit. Fruit size is medium to large and medium in firmness.
- Typically a winter-planted cultivar, but have also been bare-root planted in mid-August.
- Disease susceptible

Camarosa

- Is an early short day variety. This plant produces large to very large firm fruit with excellent flavor throughout most of its fruiting cycle.
- Yield potential is high to excellent.
- Disease tolerant

Ventana

- Short-day (June bearing) cultivar similar to Camarosa. Fruiting plants of Ventana are large and vigorous, similar to Camarosa, but more open than plants of Camarosa.
- Ventana has similar fruit size but produces greater individual-plant yields than Camarosa.
- Disease susceptible

Camino Real

- A short-day cultivar similar to Camarosa in all aspects including production pattern.
- Fruit color for Camino Real is darker than Camarosa.
- Subjectively, Camino Real has very good flavor.
- Susceptible to common leaf spot and sensitive to powdery mildew.
- It is resistant to Verticillium wilt, Phytophthora crown rot and somewhat resistant to Anthracnose crown rot. When treated properly it shows tolerance to two-spotted spider mite.

Fronteras

- A short day variety, meaning it responds to day length, produces the bulk of its fruit in the shorter days of spring and fall, and is adapted to the fall planting and winter production system of the California coast.
- Fronteras is a large and vigorous plant, more so than the short day variety Ventana in use for many years by growers.
- Disease tolerant

Day Neutral Strawberry Varieties

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Diamante

- Known for large fruit size, exceptional fruit quality and excellent sweet flavor, Diamante is ideal for eating fresh or using in preserves or pies, and is a popular choice for chocolate covered strawberries.
- This high yielding, day-neutral selection provides a bountiful harvest from spring through frost.

Albion

- The gold standard of the industry in terms of flavor, Albion is a day-neutral (ever-bearing) cultivar. “Albion” is resistant to Verticillium wilt, and Phytophthora crown rot, and relatively resistant to Anthracnose crown rot.
- When treated properly, Albion has tolerance to two-spotted spider mites. Fruit from “Albion” is typically long, conical, and very symmetrical. Albion fruit is firm and is dark red inside and out.
- Albion fruits consistently throughout the season. One downside of this variety is that it produces a lot of runners that must be cut in order to maintain high production.

Portola

- A strong day-neutral cultivar with broad adaptability. This cultivar can be used in standard winter planting systems, where it initiates fruiting slightly earlier than Albion to initiate. Due to a strong flowering response, Portola is especially well adapted to spring and summer planting systems.
- Portola is a vigorous plant and may require a slightly lower plant density than Albion. The fruit for Portola is similar in size to Albion but lighter in color and somewhat shinier. It is slightly less tolerant to rain.
- Fruit flavor for Portola is excellent and especially consistent throughout the fruiting season. Portola has a good disease resistance profile.

San Andreas

- A moderate day-neutral with a production pattern very similar to Albion. Plant vigor for San Andreas is somewhat higher than for Albion early in the season but plant size throughout the fruiting season is similar to Albion due to its high and consistent productivity. This cultivar produces few runners in the fruiting field. The fruit for San Andreas is exceptional in appearance and especially superior to Albion early in the season.
- The fruit color for San Andreas is slightly lighter than for Albion. The flavor of San Andreas is outstanding similar to Albion. San Andreas has a good disease resistance profile.
- Fruit productivity for San Andreas is similar to or slightly below that for Albion.

Aromas

- This plant produces high yields of large fruit with excellent flavor.
- Produces large quantities of late-season fruit.
- Has a broader environmental tolerance and is resistant to mildew, and is especially tolerant of spider mites.

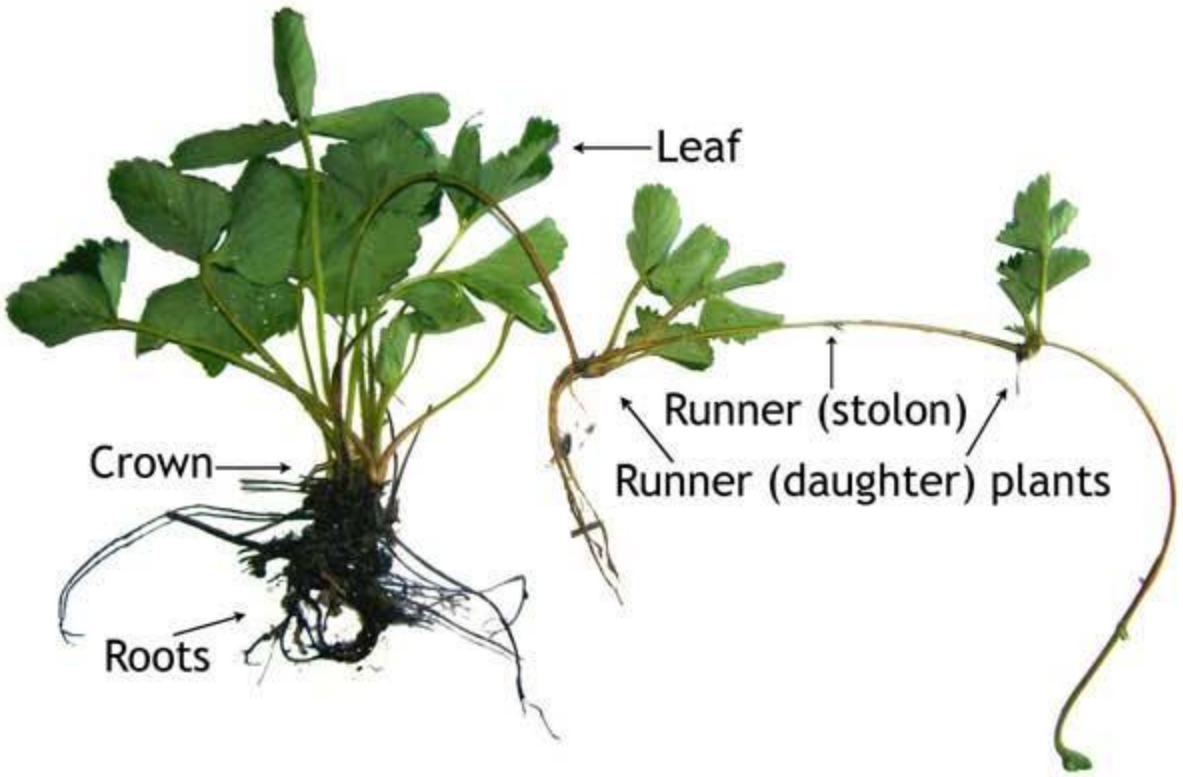
Monterey

- Moderate in day-neutrality, slightly stronger flowering than Albion with a similar production pattern. It is a vigorous plant and may require slightly more space than Albion. This variety does well in organic applications.
- The fruit from Monterey is slightly larger but less firm than fruits from Albion. Monterey has outstanding flavor with a distinct sweet aftertaste that is unique among California cultivars.
- Monterey has a good disease resistant profile, although it is susceptible to powdery mildew.

Everbearing Strawberries

- Quinault
  - Large. Soft, and very flavorful fruit
  - Produces many runners
  - Good disease resistance except for botrytis (gray mold)

Anatomy of a Strawberry Plant



Anatomy of a Strawberry Plant

- The leaves and the roots of a strawberry plant engage in photosynthesis or absorb water and nutrients from the soil in order to facilitate growth and reproduction. As the top three inches of soil contain about 70% of a strawberry plant's roots, they are particularly susceptible to drought conditions.
- The productive engine of a strawberry plant is contained within the crown. It is from this region that strawberry plants produce both runners (stolons) and flowering fruit stalks that eventually yield strawberries. Containing the growth energy of a plant by clipping runners and early flower buds can cause crown multiplication, which will often result in more, higher-quality fruit per plant in subsequent years.
- The daughter plants are maintained by the runners until their root bud comes into contact with soil and establishes an independent root system. At that point, the runner will dry, shrivel, and eventually separate completely leaving a new and independent strawberry plant clone.

Site Selection

- Choose a convenient location
  - level ground
  - can check it frequently
  - near an abundant supply of water
  - full sunlight (at least 4 to 6 hours a day)
  - plant away from areas that will be watered by lawn sprinklers
- Select a location that is not heavily infested with weeds
  - especially weeds such as field bindweed, nutsedge, and bermudagrass
  - avoid areas that have had previous disease problems
- Strawberries will do well on a wide range of soils
  - they do best in well-drained soils
  - Damp soil surfaces encourage snails, slugs, sowbugs, and root diseases; fruit decay and leaf spot diseases may also increase.

Soil Considerations

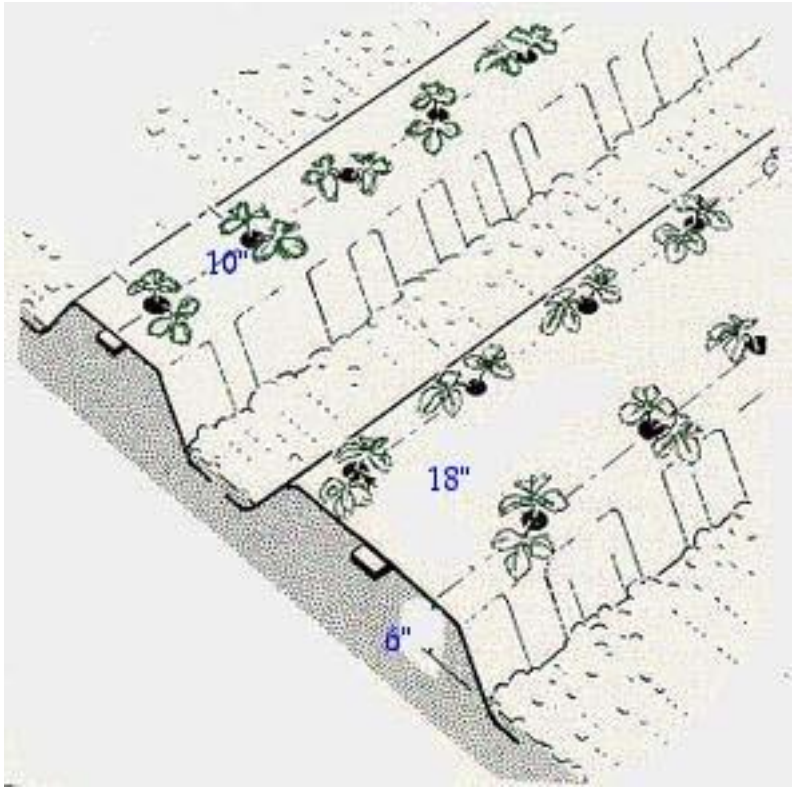
- Strawberries need well draining soil
- Adding organic matter (compost, peat moss, manure, sawdust, ground bark) makes clay and sandy soils easier to work with. The soil should be kept at a pH level of 6.0 to 6.5. Lime or gypsum can be added to soils low in calcium.
- Texture is an important consideration when choosing an amendment. An amendment that is granular and fine grained is important for container mixes. For gardens, a more coarse-grained amendment can improve drainage and aeration. Work amendments into soil by rototilling, raking, or double-digging.

Soil Preparation

- Cultivate and rake.
  - Cultivate top 1” to 2”
  - Remove weeds and crop debris (roots)
- Irrigate the plot deeply.
- Cultivate the new weed seedlings.
- Plant while soil is still wet.

Bed Preparation

- Make raised beds about 6 inches high and about 10 inches wide across the top if you are planting one row of strawberries, or 18 inches wide if you are planting two rows.
- Two rows of plants work well, and you can run a drip line down the middle of the bed between them.
- Orienting the beds in a north-south direction provides the best sunlight exposure for the plants.



Bed Preparation

- Make sure the furrows between beds are sloped enough in the direction of the rows that water drains away during rainy weather. Standing water promotes root and crown diseases.
- If you are planning to water the strawberries by flooding furrows, make the slope shallow enough that furrows can be filled with water by blocking the ends.
- If you have problems with moles or gophers, place a wire mesh barrier beneath raised beds before you plant.

Time to Plant

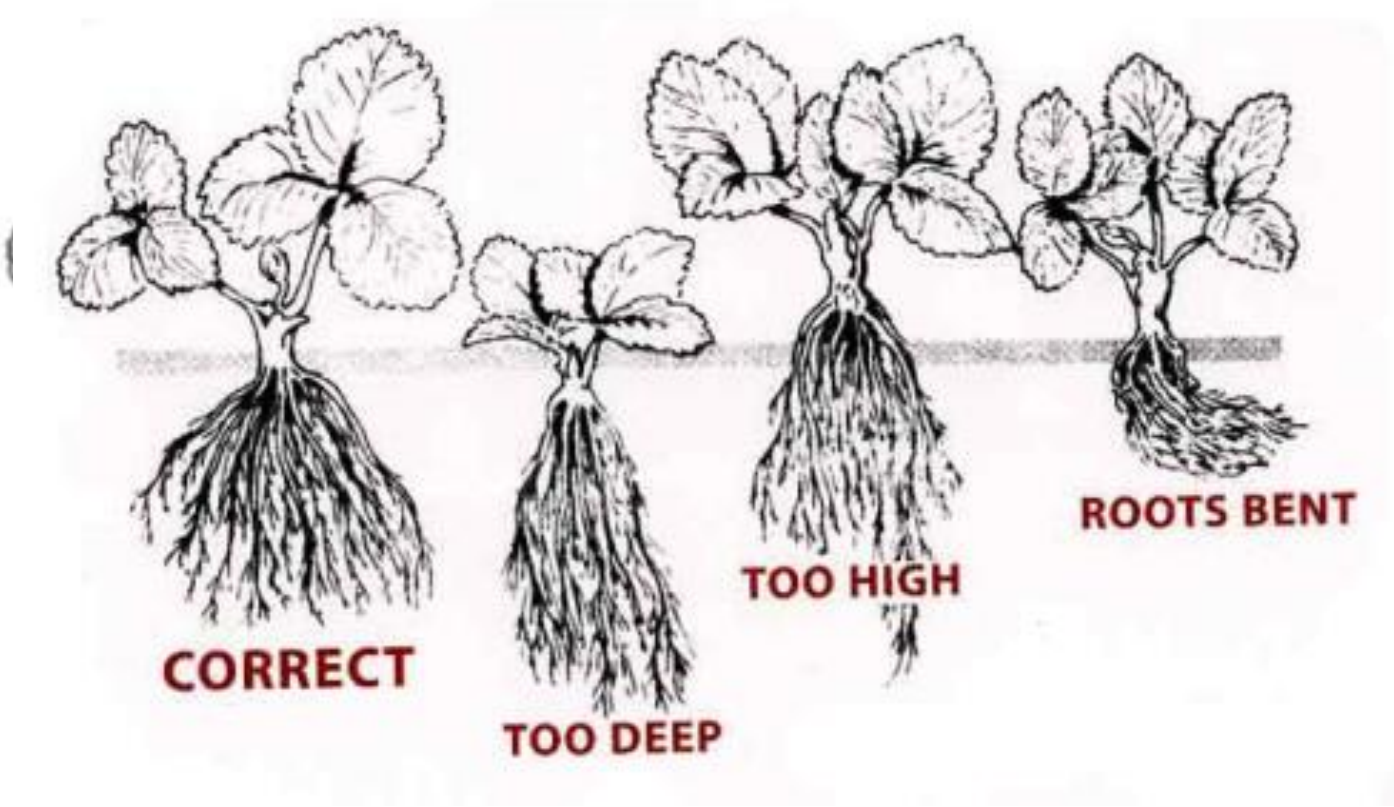
- Middle to late August generally is the best time to plant strawberries in all locations.
- Day-neutral cultivars also can be planted in the fall or in February and March.
- Fruit production is usually highest in the first full season after planting and declines after that.

Recommended Planting Dates for Strawberries in California		
Short-Day Cultivars		
Area	Summer plantings	Winter plantings
Central coast	Aug. 15–Sept. 5	Oct. 15–Nov. 5
Day-Neutral Cultivars		
Area	Summer plantings	Winter plantings
Central coast	Sept. 25–Oct. 10	Oct. 25–Nov. 26

Transplanting

- Use a trowel to open a hole from 6 to 8 inches deep.
- Add fertilizer (slow release or organic fertilizer such as blood, feather or fish meal) and cover with an inch of soil.
- Insert plant, fill in and pack with soil.
  - Spread roots out
  - Keep growing point above soil line
- Space plants about 12 inches apart in each row with rows about 12 inches apart in two-row beds, and stagger the plants in the two rows to give them maximum growing room.
- In single-row beds, space plants about 10 inches apart.

Proper Transplant of Strawberries



A Discussion on Mulching

- Mulch with straw, sawdust, compost, wood chips, grass clippings.
- Plastic mulch in commercial agriculture.
- Purpose of color in mulch:

  -clear

  -opaque

Irrigation

- Overhead irrigation at first, drip irrigation later.
- Do not leave free moisture on flowers for any length of time!!
- Strawberries require 1 to 2 inches of water per week during the growing and fruiting season. Soil should remain moist at all times.

Fertilizing

- Slow release fertilizers.
- Addition of fertilizers six weeks after planting of strawberries.
- Broadcast ammonium nitrate, or fish, or feather, or blood meal at the rate of 0.5 lb per 100 sq. ft. and irrigate in.
- Strawberries need additional fertility through the growing season – continue to fertilize, especially with nitrogen.

Pruning strawberries

- For best results with your garden strawberries, remove runners to encourage single plants to produce several crowns.
- During the first year of your strawberry planting, allow a few runners to form daughter plants, which can be used to replace any plants that die.
- If growth of day-neutrals is weak after they are planted, cut off the first two flower clusters that form, which increases the vigor of the plants.
- Prune off most leaves from short-day plants in the late fall after the first full year of growth.
- From day-neutrals, remove the older leaves that are turning color.
- Be sure to remove any leaves that show signs of disease. Collect all prunings and discard them well away from the planting; they can be a source of disease inoculum.

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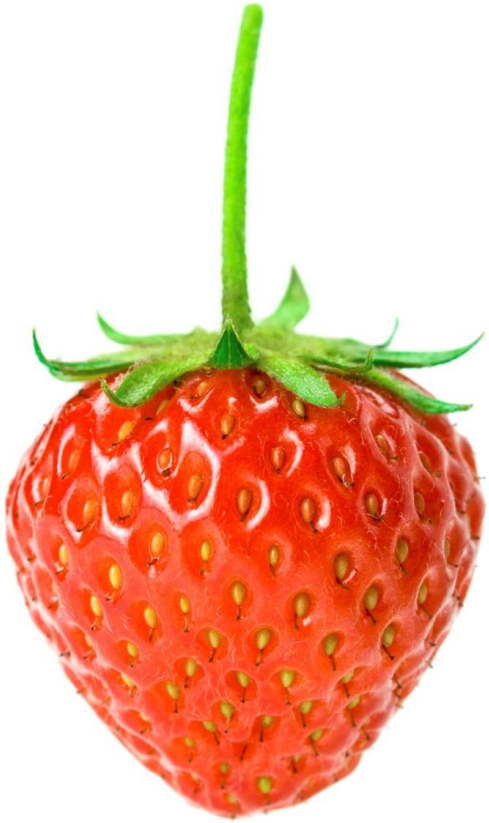
Pruning

Harvesting

- Harvest when fully ripe or when pink to three-fourths colored. Overripe fruit is more easily damaged and decays more quickly after harvest. Leave the calyx and stem on fruit to help prolong its shelf life.
- Handle fruit carefully during harvest and discard all overripe fruit and any fruit with signs of decay
- Provide shade for fruit held in the garden, protect fruit from warm winds, and remove fruit from the garden within 1 to no more than 2 hours following harvest.



Rotating Plants

- **Possible rotation sequences**
- Remove old strawberry plants in late summer.
- Plant a winter crop of cauliflower, cabbage, or another crucifer.
- In spring, spread all crop residue from the crucifer over the planting area, allow it to dry and rototill it in.
- Solarize the soil in summer. (http://ipm.ucanr.edu/PMG/PESTNOTES/pn74145.html)
- After removing plastic film at end of summer, water the treated area regularly for two months.
- Plant new strawberries in late fall or late winter.
- **Variations**
- As an alternative to steps 2 and 3, plant a winter crop of ryegrass and rototill it in with dried crucifer residue collected from another area of the garden.
- As an alternative to steps 5 and 6, follow solarization with ryegrass, rototill in spring, and plant in August.

Nutrient Deficiency Issues

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Yellow Plants

- Nitrogen
  - plants are stunted and yellowing occurs in older, outer leaves first (mobile nutrient)
- Iron
  - first indications of deficiency appear in young leaves, with the development of interveinal chlorosis
- Zinc
  - 0lder leaves are vaulted downward or contorted and show interveinal chlorosis

Leave and Fruit Distortion

- Calcium
  - younger leaves develop tip burn
  - become cupped and distorted
  - marginal leaf yellowing
  - fruit are smaller and have a hard texture
- Boron
  - flowers are smaller, petals deformed or fail to develop
  - fruit fails to fully expand and are deformed and bumpy
  - Leaf symptoms can mimic calcium deficiency

Pest Issues

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Twospotted spider mite

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Damage of twospotted spider mite

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Twospotted mite control

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Mite Predator

Cultural Management of Twospotted Spider Mite

Use practices which give the plant strength and power.

1. Adequate vigor
2. Adequate water
3. Reduce dust

For More Information

- See the UC Davis IPM site:
- http://ipm.ucanr.edu/PMG/GARDEN/FRUIT/strawberries.html

Help Us Grow!

Our follow-up survey provides us the tools we need to grow and improve the quality of our program.

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