

Commercial Strawberry (*Fragaria x ananassa*, Duch.) Production

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Strawberry: Nutrition

- Are America's favorite fruit.
- Are enjoyed by 94% of Americans
- Are available year-round.
- Have more vitamin C per serving than an orange.
- Are naturally low in sugar - only eight grams per serving.
- May help reduce the risk of heart disease, fight some types of cancer, and lower blood pressure.



- **Single Serving = 8 strawberries**
- Potassium: balance electrolytes, maintain blood pressure, aid muscle contraction.

Anatomy and Morphology

- Non-woody perennial composed of crown, leaves, runners, and root system.
- Crown is compressed modified stem where leaves, runners, branch crown, and flower clusters arise.
- Leaf: Variable size. Production stops when temperature drops below 32 °F. Slows at > 86 °F
- Strawberry is an aggregate accessory fruit.

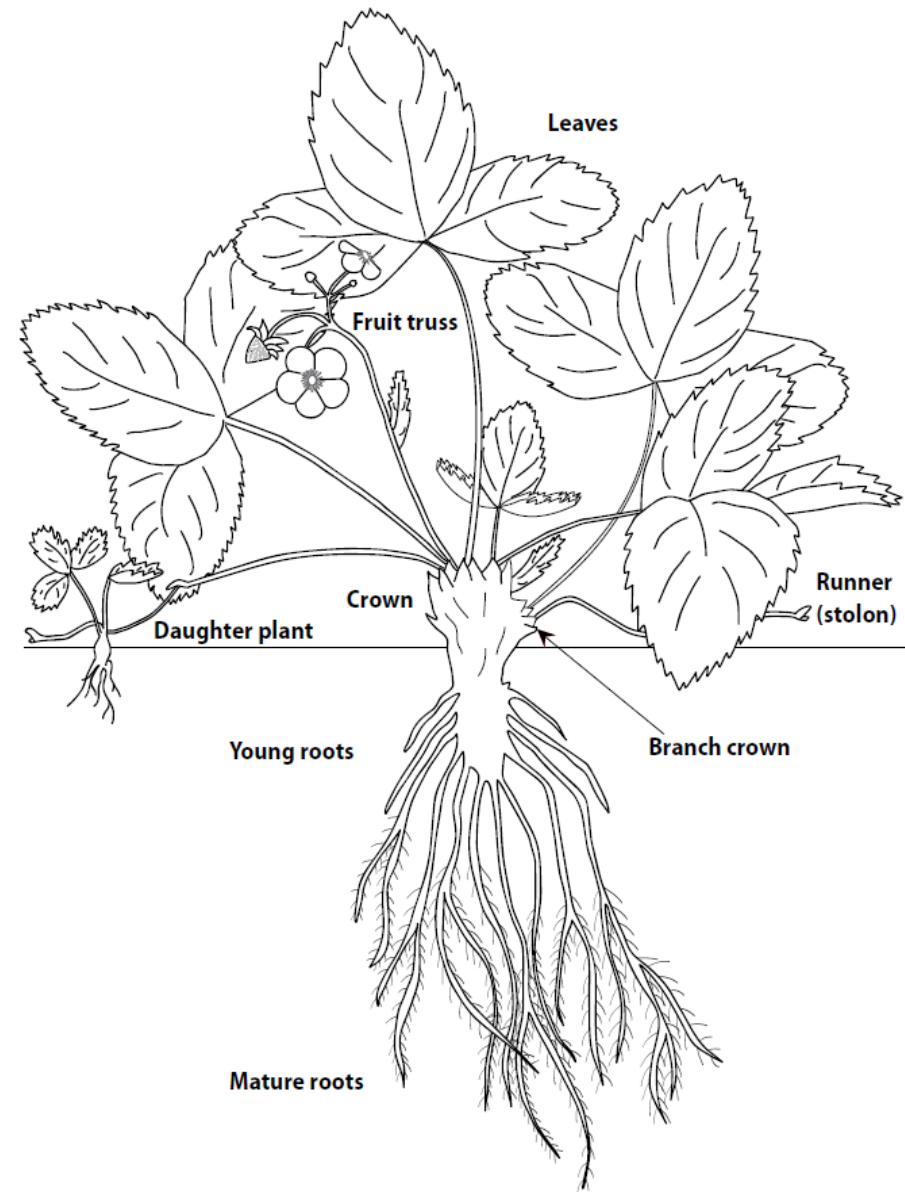


Figure 6.1. The strawberry plant.

Soils

- Sandy loam to sandy clay-loam.
Clay or rocky soils difficult to bed.
- Soil pH 6.0 to 6.2.
- Slope of 5 to 7% ideal.



Pre-plant preparation

- Soil test to determine how much limestone needs added.
- Apply 60 lbs. N, 60 P₂O₅ and 120 K₂O/acre.

Field Preparation

- Multi function tractor: shapes the bed, fumigates soil, lays plastic tarp.
- Reddick and Kennco.
- Plastic should be firm, and in contact with the soil.
- Ryegrass in the aisles @ 50 lbs/acre.
(Kill or stunt ryegrass when it is 6 in. tall, or prior to applying row cover).

Fumigation

Methyl bromide (MB):

- First used as an insecticide in 1932 and registered in the U.S. in 1961.
- Primary use: soil fumigant; Secondary use: perishable commodities and treatment on enclosed structures.
- Usage of MB restricted after 2005 and available only under critical use exemptions by USEPA, as MB is known to contribute to depletion of ozone layer.
- Corrosive to human skin, cause nausea, vomiting, and damage human DNA (<http://npic.orst.edu/factsheets/MBtech.pdf>.)

Fumigation

Alternative chemicals such as 1,3-D and Pic are heavily regulated

- In California, 1,3-D use per 36 square mile township is limited to 90,250 lbs i.e. township caps are imposed.

- Sensitive sites near schools, day care centers and hospitals where Pic rates are limited to 125 lb./A.

- In Virginia and much of the mid-Atlantic, high water tables and the close proximity of production areas to environmentally sensitive estuaries makes the use of 1,3-D limited.

Given these regulations and resistance from public to use of fumigants, there is a need to evaluate and find non-fumigant alternatives to methyl bromide fumigation.

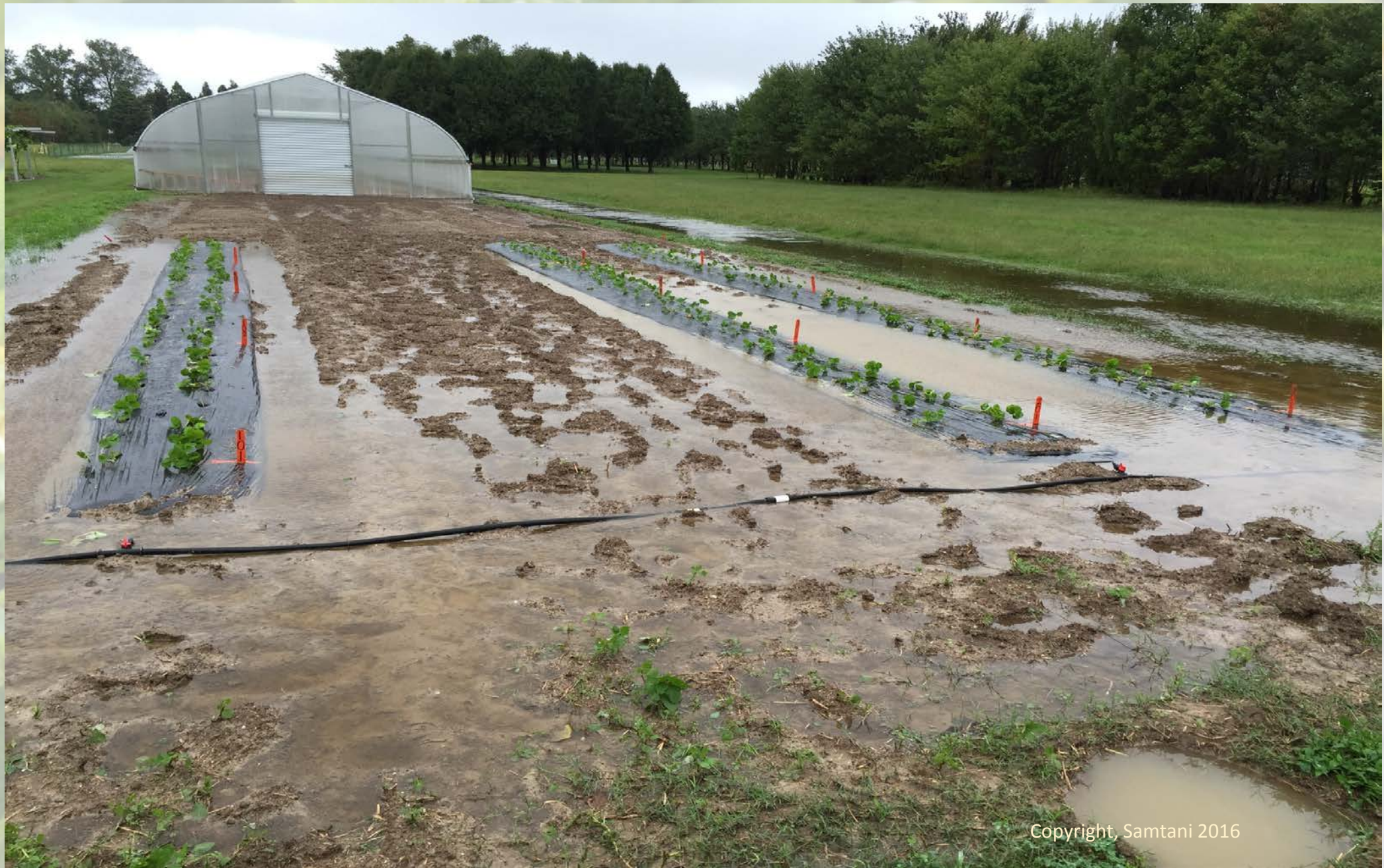




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Field Preparation

Drip irrigation: 12 in. emitter spacing: sandy loam and clay soils.

8 in. emitter spacing: coarse sand.

Irrigation needs:

1-1.5 inch/acre/week during bloom, fruit set, harvest. (1 acre inch = 27,154 gallons)

Warm/hot weather: 1.5-1.75 inches/acre/week.

Overhead sprinkler irrigation

40 x 40 feet triangular spacing will greatly improve water distribution.

Water supply: 150,000 gal. of water/acre to provide protection for three consecutive frost or freeze nights.

Pumping capacity: 90 gpm or 0.2 inches/hour.

Pump: An electric pump

Propagation:

Plugs: Runner tips rooted in peat based media and feature intact root ball. Most widely used method of starting plants in the field. Also the most expensive.



Fresh dug: Vegetative foliage retained. Transplanted by hand.

Cut offs: Vegetative foliage mowed prior to digging off the propagation bed.

Planting depths- Left: Too shallow; Center: Correct; Right: Too deep



Strawberry Plant Types

- Short day or June bearing types:

Fruit harvested in May-June season. Flower buds initiated in fall or short days in spring (March) less than 14 hours daylight or when temperatures are below 60 °F.

- Day-neutral or everbearing:

Perform well in cooler regions. Produce flower buds throughout season, however initiation can be hindered when temperatures are high.

Cultivars

- Chandler (early to mid-season): Does well in the mountains. Excellent for U-pick; limited shelf life. Good flavor, size.
- Camarosa (mid-season): Primarily a pre-pick variety. Pick when the berry color is dark red. Extends season.
- Sweet Charlie (early season): Early market niche. Ripens 5 to 7 days before Chandler. Two weeks earlier if row cover is applied.



Virginia Beach, VA, 25 Feb., 2013

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Pests

- Weeds
- Deer
- Anthracnose : Warm, wet conditions.
- Phytophthora
- Mites
- Botrytis
- Spotted wing drosophila



Virus complex, 5 March, 2013



Field Sanitation

- Continuous monitoring of weed population in the field and field margins.
 - Chemical options.
 - Mechanical and other non-chemical options.
- Special attending to weeds in flower or seed stage.
- Sanitation of equipment.
- Discard the uprooted plant material offsite.



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Virginia Beach, 22 March 2013

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Harvesting and Field Handling

Maturity selection: Overripe berries for processing. Flavor does not improve after harvest.

Minimize fruit injury while harvesting.

Grading to eliminate injured, diseased and defective fruit. Berries are normally picked with their caps.

Protection from warming.

Promptness to move fruit from field to cooler.

Packed for shipment in corrugated fiberboard crates that hold variety of baskets. Clear, thermoformed plastic clamshell baskets most common.



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Terry Berries

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Lois's Produce,
Westmoreland Co.,
19 April 2013.