

Unit D: Fruit and Vegetable Crop Production

Lesson 3. Growing and Maintaining Small Fruits

Terms

- Arbors
- Banded fertilizer
- Bleeding
- Broadcast fertilizer
- Crown
- Everbearing strawberries
- Four-arm kniffen system
- Frost protection
- Hill system
- K soil test
- Matted-row system
- P1 soil test
- Refractometer
- Small fruits
- Spaced-row system
- Spring-bearing (June bearing) strawberries
- Trellises

How can I Select Small Fruits to Grow?

- Understand site and fruit selection when planning a garden.

Selection

- **Small fruits** are the edible fruit that is produced on a small perennial plant.
 - They may be grown when space is limited.
 - A well-planned garden will supply fresh fruit from early spring to the first killing frost in the fall.
 - The fruits produced have a pleasing taste and dietary value as sources of vitamins, minerals, and acids.

Selection Factors

- The size of your family, personal taste preferences, the space available, and planned usage of the fruit are factors in determining what to plant.
 - Fruit can be eaten fresh, canned, frozen, or preserved as jellies or jams for use during the rest of the year.
 - Do not plant more than you can care for properly.

Selection Factors Cont.

- The ideal small fruit site would be near the house with fertile well-drained soil.
 - Full sun-light is preferred.
 - A moderately elevated or sloping site, which provides good drainage, will reduce losses from late spring frosts if applicable.

Selection Factors Cont.

- Varieties for home small fruit planting should be selected for high quality; either for eating fresh, preserving, or both.
 - Resistance to diseases and winter hardiness should be considered.
 - Selection of early, mid-season, and late-season varieties will provide a harvest of fresh fruit during a longer period.
 - The use of several varieties helps ensure a successful harvest.

Site Preparation and Planting

- Most small fruit plants occupy the same location for several years.
 - Therefore, it is desirable to build up the soil fertility of the proposed location.
 - Planning one or two years ahead can also help to reduce weed problems.
 - Plant small fruits where row crops have been cultivated for one or two years.

Site Preparation and Planting Cont.

- Application of 4 bushels of well-rotted manure per 9.3 square meters in the summer or fall before planting will add organic matter and nutrients to the planting bed.
 - Add 11 kilograms of 20 percent superphosphate for each 0.4 metric tons of manure.
 - Compost, decomposed leaves, or lawn clippings may also be used.
 - In the fall, sow rye as a cover crop at the rate of 1.3 kilograms per 93 square meters.
 - Plow it under in early spring to improve the soil.

Site Preparation and Planting Cont.

- All of the small fruits grow satisfactorily in a soil pH range of 5.5 to 7.5.
 - The pH refers to the acidity or alkalinity of the soil with 7.0 as neutral and 6.0 to 7.0 slightly acid.
 - Before planting, use a spade in small areas or a rototiller in larger areas to prepare the seedbed.
 - The soil should be loose and the organic matter and fertilizer thoroughly incorporated.

Site Preparation and Planting Cont.

- If you happen to get your plants before you are ready to plant, you have a couple options.
- Plants that arrive early should be placed in cold storage if available (0 to 4 °C) or “heeled-in”.
 - Heeling-in is placing plants in a trench deep enough to permit covering the roots and long enough to spread the plants side-by-side one layer deep.
 - The soil is firmed over the roots.
 - The plants are watered and kept shaded until the weather and the seedbed are ready for planting.

Site Preparation and Planting Cont.

- Planting and spacing requirements vary with the type of small fruit you plant.
 - Strawberries can be planted as soon in the spring as the ground can be prepared.
 - Plant them so that the top of roots is just covered with soil and add one pint of water.
 - The **crown** is where the shoot and roots come together. It should be exposed at ground level.
 - **Spring –bearing strawberries** produce berries mainly in the month of June while **everbearing strawberries** produce berries throughout the summer.
 - The type of strawberry you plant could have an effect on which planting method you choose.

Strawberry Planting

- The *matted-row system* requires setting plants 60 centimeters apart in rows 1.1 to 1.2 meters apart.
 - This popular method allows the plant to form runners (horizontal shoots) to fill in the row to about 0.6 meters wide.



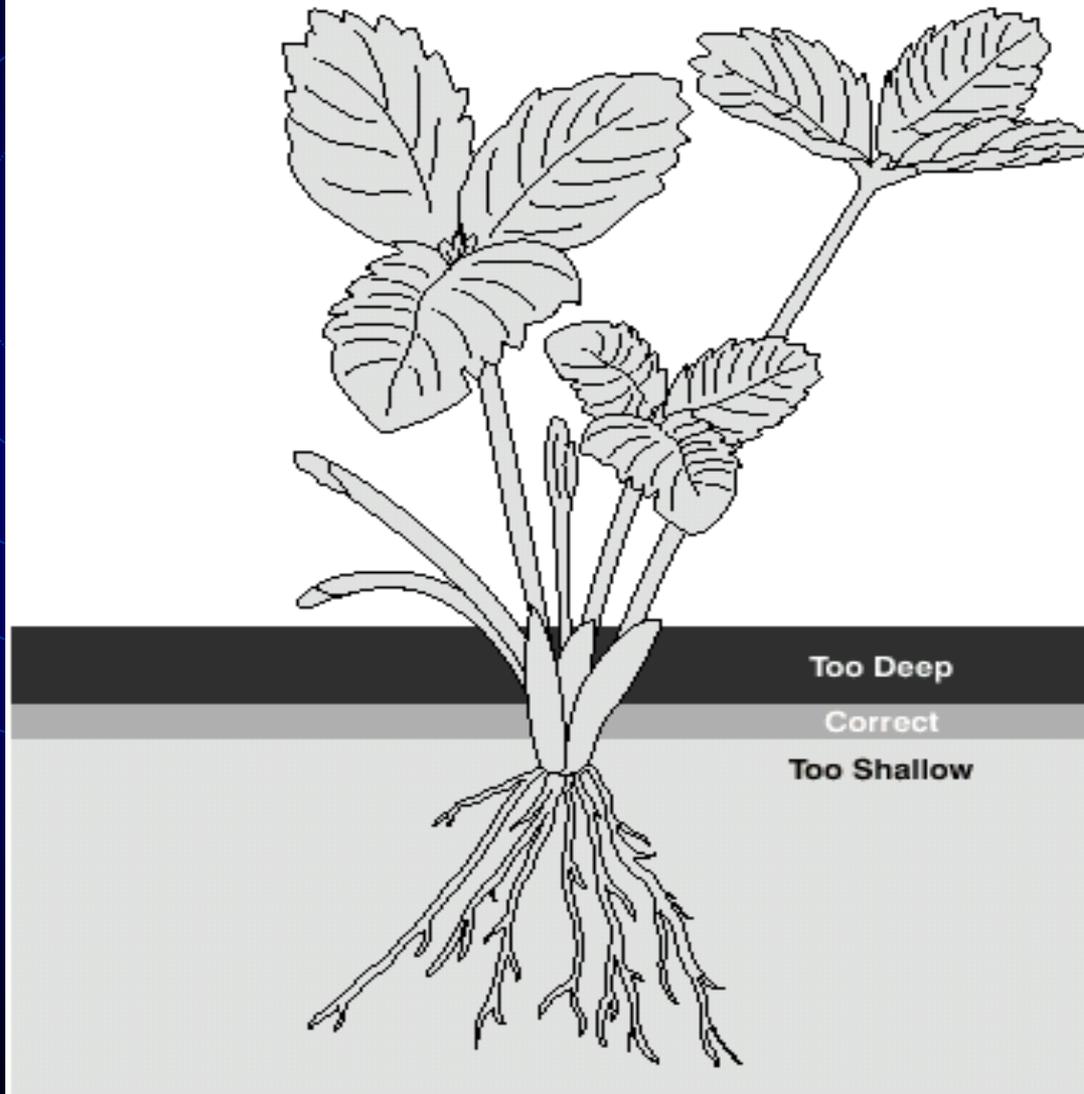
Strawberry Planting Cont.

- The spaced-row system is a modification of the matted-row system.
 - The *spaced-row system* includes setting plants 60 centimeters apart in rows 1.1 to 1.2 meters apart but the runner plants are spaced to make roots not closer than ten centimeters apart.
 - After the spaced-row about 0.6 meters wide is obtained, all new runners are removed. This will give optimum growing conditions since strawberry rows can often be too dense for good production.
 - Spaced-row culture requires more care than matted-row culture but higher yields, larger berries, and fewer disease problems are the rewards.

Strawberry Planting Cont.

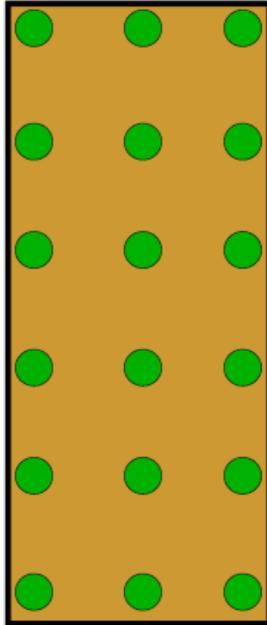
- The *hill system* requires the removal of all runners.
 - The plants are set 0.3 to 0.4 meters apart in rows that are 0.3 to 0.4 meters apart.
 - Often the rows are arranged in groups of three or four, with a 0.6 meter walkway between each group of rows.

STRAWBERRY PLANTING DEPTH



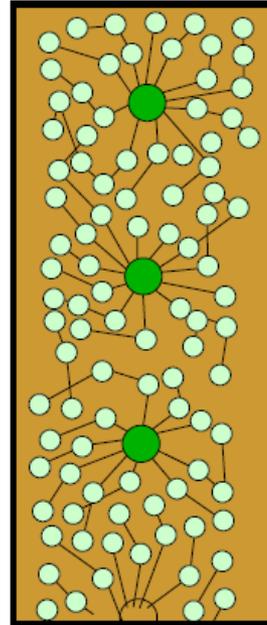
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Strawberry Row Systems



HILL

- plants spaced 30 cm apart
- multiple rows (3 or 4)
- no runners allowed
- .6 meter aisles



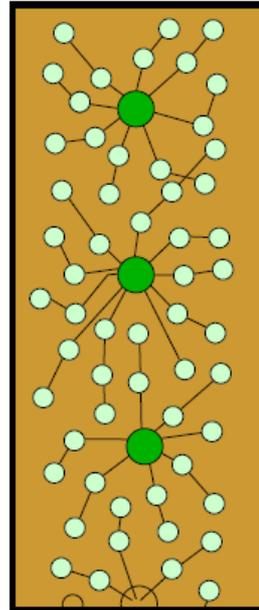
MATTED ROW*

- plants spaced 45 to 76 cm apart
- single rows
- runners fill in row to width of .6 meters
- .9 to 1.2 meter aisles

● Parent plant

○ Runner plant

*Matted row is actually a modification of the broadcast system:
BROADCAST: plants spaced 45 to 76 cm apart, single rows, runner freely, no aisles maintained.



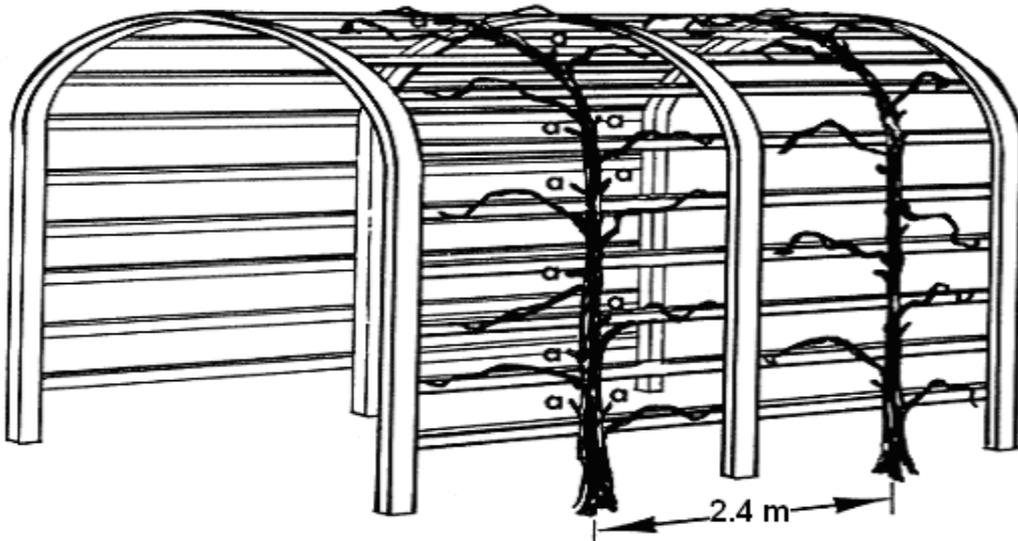
SPACED PLANTING

- plants spaced 45 to 60 cm apart
- single rows
- runner plants at 15 cm intervals
- .9 to 1.0 meter aisles

Site Preparation and Planting Cont.

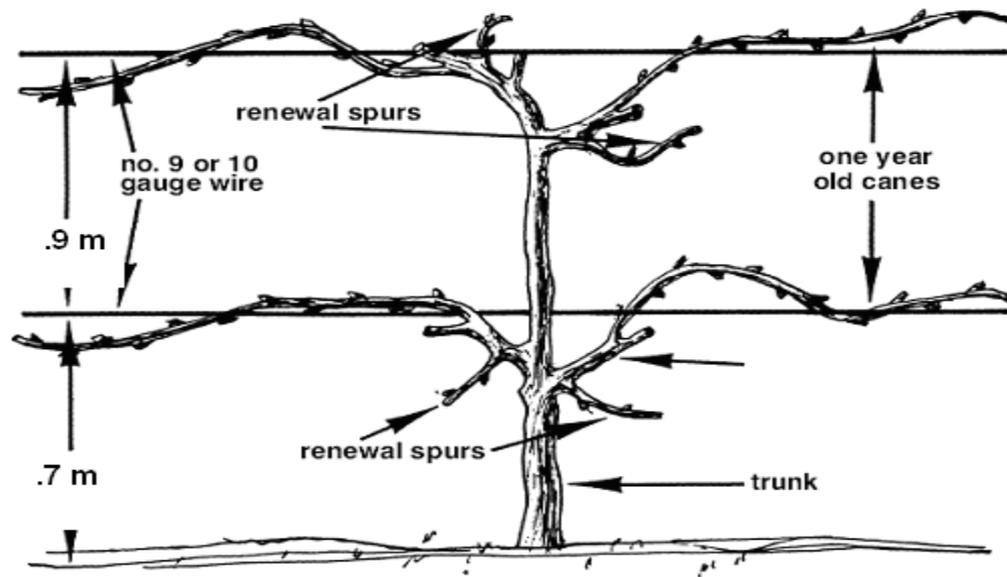
- Grapes are popular for home gardens.
 - Some grape varieties ripen from early August until mid-October, thereby providing a long season of fresh fruit.
 - Set the plants slightly deeper than they grew in the nursery.
 - Space the plants 2.4 meters apart and space rows 2.4 meters apart.
 - As the plants develop they need supports.
 - **Trellises** are two or three wire supports stretched between wood or metal posts.
 - **Arbors** are curved wooden supports that may also provide shade and interest to your garden.

Grape Arbor



Mature grapevines trained and pruned on an arbor.

Grape Trellis



A grapevine after three growing seasons.
A maximum of 12 to 15 buds may be left on each lateral cane.

How are Small Fruit Plantings Maintained?

- Discuss the maintenance of small fruit plantings.

Small Fruit Maintenance

- Small fruit maintenance includes weed control, mulching, fertilizing, irrigation, frost control, pruning, and pest control.
- Weed control, especially with the low growth habit of strawberries, is important.
 - Hoeing or tilling should be shallow to prevent damage to plant roots.
 - As plants become established, mulch with black plastic and/or organic mulches such as straw, sawdust, ground corncobs, or wood chips.
 - Mulching not only reduces weed growth but conserves moisture, prevents soil erosion, and helps keep fruit clean.

Small Fruit Maintenance Cont.

- Soil tests taken before planting should guide fertilizer application during seedbed preparation.
 - The **P 1 soil test** is a soil test for available phosphorus.
 - The **K soil test** measures potash (K₂O) levels in the soil.
 - Soils showing a high P1 test (50 and up) and a high K test (300 and up) need only nitrogen fertilizer.
 - Apply fertilizer in the early spring.
 - **Banded fertilizer** is placed only on the row while **broadcast fertilizer** is placed over the entire area.
 - Broadcast fertilizer can stimulate unwanted weed growth between the rows.

Small Fruit Maintenance Cont.

- Irrigation/watering depends on the amount of natural rainfall.
 - Water is a key to successful small fruit production especially with strawberries.
 - Insufficient moisture results in undersized berries, delayed maturity, less flavor, and dull fruit color.
 - Like most other plants, 2.5 cm of water once a week is ideal.
 - Use of overhead sprinklers allows the adaptability for spring frost control.
 - Because strawberries grow close to the ground where cold air (which is heavier than warm air) accumulates, they are particularly susceptible to frost damage.

Frost Protection

- **Frost protection** is the practice of using water sprinklers in the patch when temperatures drop to 1°C at plant level in the field or garden to prevent frost damage.
 - The sprinklers are run continuously until the ice that forms on the plants has melted.
 - As water freezes, it releases heat (heat of fusion), which warms objects in contact with the water and ice.
 - If some free water is maintained on a bud covered with ice, the temperature of the bud will remain approximately 0°C .
 - At 0° , there will ordinarily be no injury since flower tissue damage generally begins at -2°C .
 - Winter freeze protection can be accomplished by covering plants with straw.

Small Fruit Maintenance Cont.

- Pruning is the removal of plant parts to regulate crop size and quality and to direct growth.
 - Pruning of small fruits requires an understanding of their growth habits.
 - Whether strawberry runners are to be pruned/pinched off depends on the planting system you selected.
 - Renovation of a strawberry patch is the renewing the plants by mowing off the tops within 10 days of the final harvest.
 - Rows can be narrowed and fertilizer added at that time. This process will result in higher yields.

Pruning Small Fruits Cont.

- With grapes, pruning usually refers to the removal of canes during the dormant season and is based on the number of buds needed to produce the next year's growth.
 - Avoid late spring pruning that results in **bleeding**, the oozing of plant sap.
 - Prune after the coldest part of winter is past and before the buds begin to swell.
 - When vines were planted they should have been pruned to a single stem with two buds.
 - A shoot grows from each bud.
 - In the second year all but the strongest cane are pruned.
 - During the third year strong lateral canes develop and can be trained to supports.

Pruning Grapes Cont.

- Leave two buds (renewal spurs) on each shoot near the lower and upper trellis wires.
- Fruiting canes for next season grow from these buds.
- After the third year, most vines can be treated as mature vines.



Pruning Grapes Cont.

- The **four-arm kniffen system** is the use of a two-wire trellis to support vines that have a main trunk and four major lateral canes or “arms”.
 - For this system in early spring prune the vine to four lateral canes, each with 6 to 12 buds arising from the main trunk.
 - Each of these buds is capable of producing two or three clusters of grapes.
 - Leave two renewal spurs near the main trunk for future fruiting canes at each trellis wire.
 - Remove all other growth.
 - Over-pruned vines become too vegetative and under pruned vines are weak and produce small cluster of fruit.
 - Healthy canes have a darker color and shorter internodes.

Pruning Grapes Cont.

- The thinning of vines should result in good exposure to sunlight of pencil diameter (6 to 8 millimeter) canes, consistent yield, and high quality fruit.
- Proper pruning necessitates removal of 80 to 90% of the wood.
- A vigorous growing vine can support 45 to 60 buds.
- After pruning, loop or spiral the canes over the support wires and tie with twine or other durable material.

Small Fruit Maintenance Cont.

- Pest control begins with the selection of a suitable planting site, the use of disease resistant varieties, purchase of healthy plants, and the use of good cultural and sanitation practices.
 - The home gardener may use individual chemicals or multipurpose mix containing insecticide and fungicide.

What Harvesting and Marketing Systems can be Used With Small Fruits?

- Understand harvesting and marketing systems for small fruits.

Harvesting and Marketing Systems

- Most small fruits are harvested by hand.
 - The owner harvests small gardens while larger areas requires hired labor.
 - Picked fruit may be eaten fresh, used in cooking (pies, jellies, jams, preserves, juices) or frozen.
 - Small fruits vary greatly in their keeping ability at harvest.

Harvesting and Marketing Systems Cont.

- Strawberries are perishable products so harvest time, handling, and storing are key to quality.
 - Color change is a good indication of ripeness.
 - Flavor is the best indication of harvest ripeness.
 - Berries picked too early will continue to ripen but sweetness, quality and size will be sacrificed.
 - Overripe berries will be soft, poor quality, and rapidly deteriorate.

Harvesting and Marketing Systems Cont.

- With grapes, color, sugar content, taste, aroma, and ease of berry separation from the stem are indications of ripeness.
 - For wine grapes, extensive testing is done to determine harvest readiness.
 - The **refractometer** is a hand-held instrument used in the field to estimate the sugars present in grapes.
 - Laboratory tests are made to determine the acid level of the grapes.
 - It is important to note that grape clusters do not continue to ripen after being cut from the vine, so they should not be harvested before they are fully ripe.

Review/Summary

- How can I select small fruits to grow?
- How is a small fruit site prepared and planting done?
- How are small fruit plantings maintained?
- What harvesting and marketing systems can be used with small fruits?