

# **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.



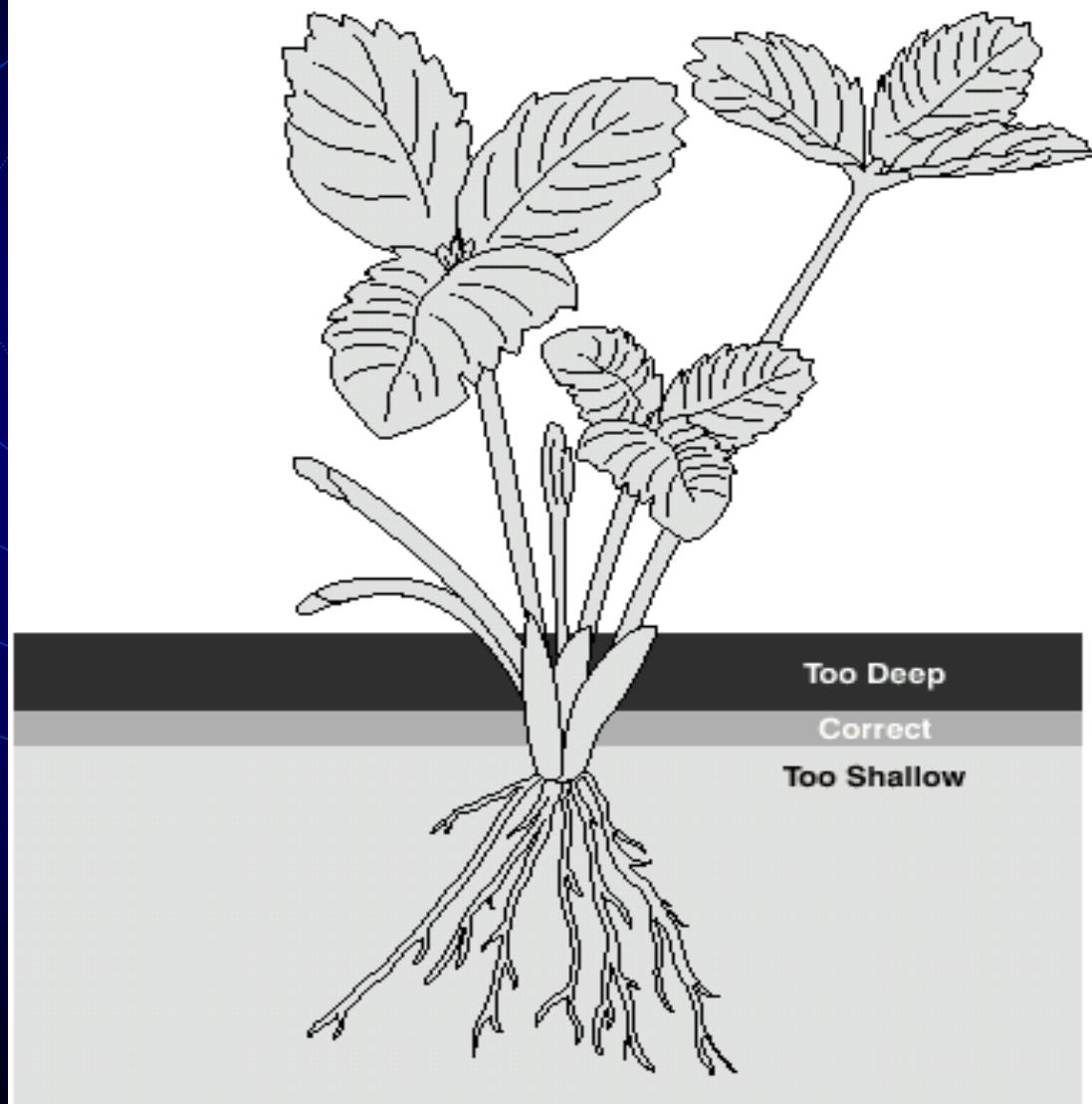
# Strawberry Planting Cont.

- 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.

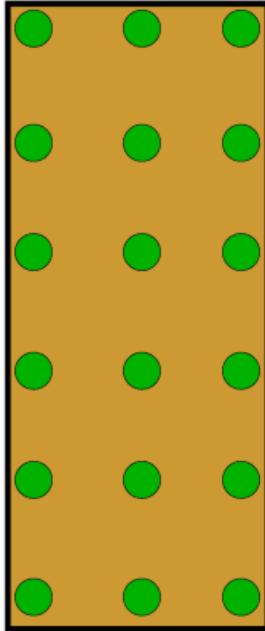
# Strawberry Planting Cont.

- 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**

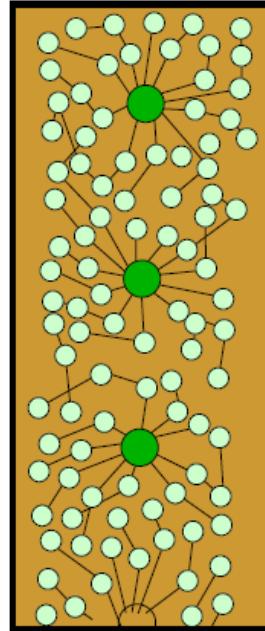


# Strawberry Row Systems



## HILL

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



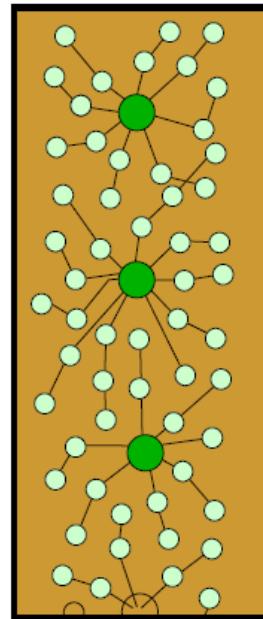
## MATTED ROW\*

- 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.

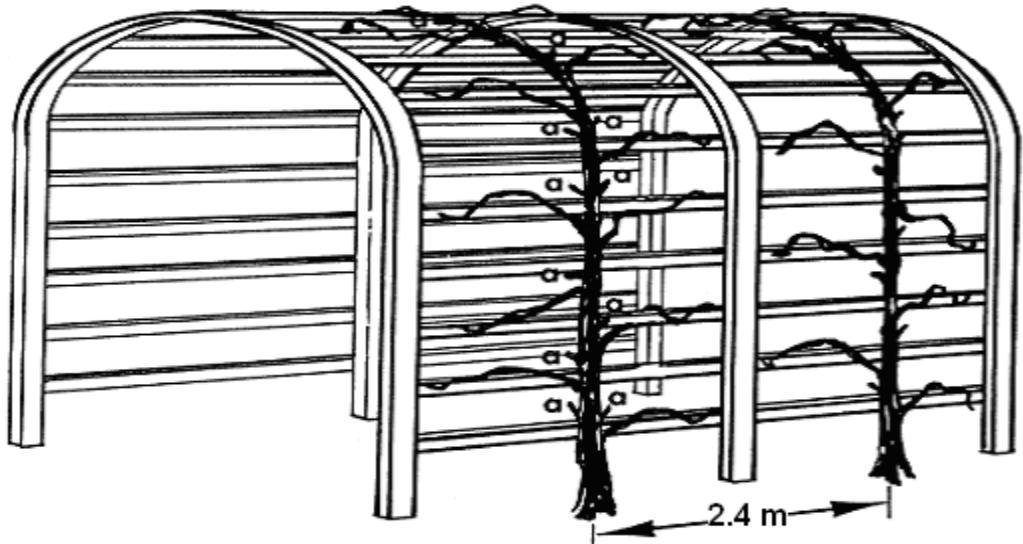


## SPACED PLANTING

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

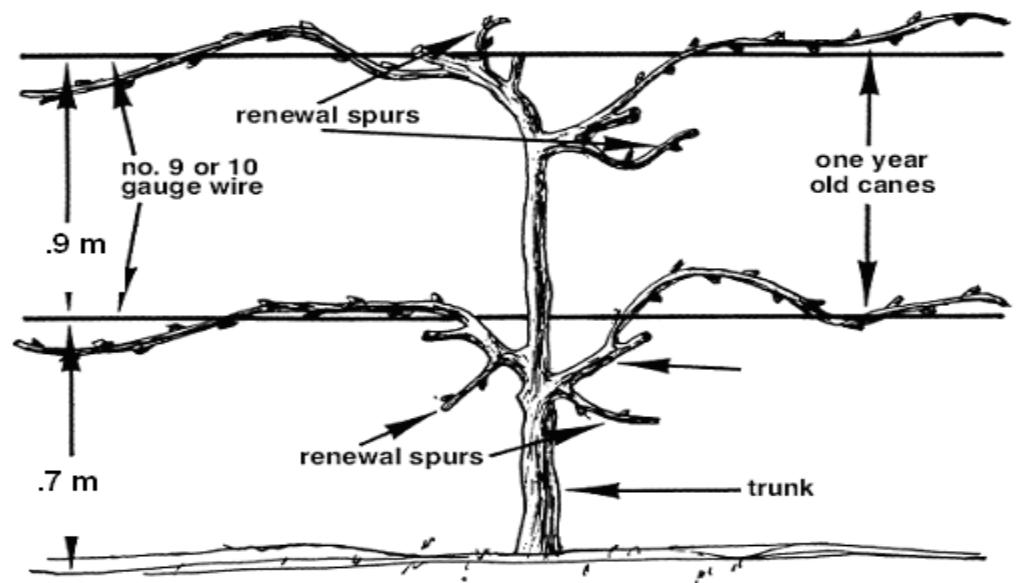
# Site Preparation and Planting Cont.

- 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.



Mature grapevines trained and pruned on an arbor.

# Grape Arbor



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

# Grape Trellis

# 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 ( $K_2O$ ) 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?