Module 20:
Home Fruit Production Basics

LSU AgCenter Home Gardening Certificate Course

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• Vegetables can be grown virtually everywhere (varieties available)
• Fruits that can be grown are very much determined by the climate (USDA Zone)
# Fruit USDA Hardiness Zones

<table>
<thead>
<tr>
<th>Fruit</th>
<th>Hardiness Zone</th>
<th>Fruit</th>
<th>Hardiness Zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple</td>
<td>5-8</td>
<td>Papaya</td>
<td>9-10</td>
</tr>
<tr>
<td>Avocado</td>
<td>8-11</td>
<td>Pawpaw</td>
<td>5-9</td>
</tr>
<tr>
<td>Blackberry</td>
<td>5-10</td>
<td>Peach</td>
<td>4-8</td>
</tr>
<tr>
<td>Blueberry</td>
<td>3-9</td>
<td>Pear</td>
<td>4-8</td>
</tr>
<tr>
<td>Cherry</td>
<td>5-7</td>
<td>Persimmon</td>
<td>8-10</td>
</tr>
<tr>
<td>Citrus</td>
<td>9-11</td>
<td>Plum</td>
<td>3-8</td>
</tr>
<tr>
<td>Fig</td>
<td>8-10</td>
<td>Pomegranate</td>
<td>7-10</td>
</tr>
<tr>
<td>Grape</td>
<td>4-10</td>
<td>Raspberry</td>
<td>4-8</td>
</tr>
<tr>
<td>Kiwifruit</td>
<td>7-9</td>
<td>Strawberry</td>
<td>3-10</td>
</tr>
</tbody>
</table>
Chill Hours

Chill hour – usually calculated as number of hours that the temperature is between 45°F and 32°F.

Actual accumulation of chill hours is more complex than this easy-to-calculate model. Research indicates fruit tree chilling 1) does not occur below about 30-34°F, 2) also occurs above 45°F up to about 55°F, 3) is accumulated most effectively in the 35-50°F range, 4) is accumulated most effectively early in the dormant period, and 5) in early dormancy can be reversed by temperatures above 60°F.
**Chill Hours – Very Variety Dependent**

<table>
<thead>
<tr>
<th>Fruit</th>
<th>Chill Req.</th>
<th>Fruit</th>
<th>Chill Req.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple*</td>
<td>300-1000</td>
<td>Papaya</td>
<td>none</td>
</tr>
<tr>
<td>Avocado</td>
<td>none</td>
<td>Pawpaw</td>
<td>250-850</td>
</tr>
<tr>
<td>Blackberry</td>
<td>200-800</td>
<td>Peach*</td>
<td>150-1200</td>
</tr>
<tr>
<td>Blueberry</td>
<td>150-600</td>
<td>Pear</td>
<td>400-1500</td>
</tr>
<tr>
<td>Cherry*</td>
<td>200-1200</td>
<td>Persimmon</td>
<td>100-500</td>
</tr>
<tr>
<td>Citrus</td>
<td>none</td>
<td>Plum*</td>
<td>150-1100</td>
</tr>
<tr>
<td>Fig</td>
<td>100-500</td>
<td>Pomegranate</td>
<td>100-300</td>
</tr>
<tr>
<td>Grape</td>
<td>100-1000</td>
<td>Raspberry*</td>
<td>200-1000</td>
</tr>
<tr>
<td>Kiwifruit*</td>
<td>100-800</td>
<td>Strawberry</td>
<td>200-300</td>
</tr>
</tbody>
</table>

* Much breeding went into developing low-chill varieties.
Chill Hours Map

Continental United States
yearly hours between the
temperatures of 32 - 45°
# Cross-Pollination

<table>
<thead>
<tr>
<th>Fruit</th>
<th>Cross-Pol. Req.</th>
<th>Fruit</th>
<th>Cross-Pol. Req.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple</td>
<td>Yes, mostly</td>
<td>Papaya</td>
<td>No</td>
</tr>
<tr>
<td>Avocado</td>
<td>Yes, frequently</td>
<td>Pawpaw</td>
<td>Yes</td>
</tr>
<tr>
<td>Blackberry</td>
<td>No</td>
<td>Peach</td>
<td>No</td>
</tr>
<tr>
<td>Blueberry</td>
<td>No, but improves</td>
<td>Pear</td>
<td>Yes &amp; No</td>
</tr>
<tr>
<td>Cherry</td>
<td>No-Sour; Yes-Sweet</td>
<td>Persimmon</td>
<td>No, Japanese</td>
</tr>
<tr>
<td>Citrus</td>
<td>No</td>
<td>Plum</td>
<td>Yes</td>
</tr>
<tr>
<td>Fig</td>
<td>No</td>
<td>Pomegranate</td>
<td>No</td>
</tr>
<tr>
<td>Grape</td>
<td>No</td>
<td>Raspberry</td>
<td>No</td>
</tr>
<tr>
<td>Kiwifruit</td>
<td>Yes, most are M or F</td>
<td>Strawberry</td>
<td>No</td>
</tr>
</tbody>
</table>
## Plant Spacing

<table>
<thead>
<tr>
<th>Fruit</th>
<th>Spacing</th>
<th>Fruit</th>
<th>Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple</td>
<td>S 15-18’; D 4-8’</td>
<td>Papaya</td>
<td>10-20’</td>
</tr>
<tr>
<td>Avocado</td>
<td>25-35’</td>
<td>Pawpaw</td>
<td>10’</td>
</tr>
<tr>
<td>Blackberry</td>
<td>Erect 3’; Trailing 10’</td>
<td>Peach</td>
<td>S 15-20’; D 10-12’</td>
</tr>
<tr>
<td>Blueberry</td>
<td>3-5’</td>
<td>Pear</td>
<td>15-20’</td>
</tr>
<tr>
<td>Cherry</td>
<td>Sweet S 35-40’; D5-10’</td>
<td>Persimmon</td>
<td>10-20’</td>
</tr>
<tr>
<td></td>
<td>Sour S 20-25’; D 8-10’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Citrus</td>
<td>S 12-25’; D 6-10’</td>
<td>Plum</td>
<td>S 20-25’; D 10-15’</td>
</tr>
<tr>
<td>Fig</td>
<td>10-20’</td>
<td>Pomegranate</td>
<td>10-15’</td>
</tr>
<tr>
<td>Grape</td>
<td>6-10’; Mus. 16’</td>
<td>Raspberry</td>
<td>3-5’</td>
</tr>
<tr>
<td>Kiwifruit</td>
<td>8-15’</td>
<td>Strawberry</td>
<td>18-24”</td>
</tr>
</tbody>
</table>
Growing Conditions

• Full sun – 8-10 hours/day
• Well-drained soil, high in organic matter
• pH most 6.0-7.0, Exceptions Blueberry pH 4.5-5.5, Strawberry 5.5-6.2, Raspberry 7.5
• Water especially important during fruit maturation – may require irrigation
Fruit In Containers

- Peach
- Strawberry
- Blackberry
- Citrus
- Apple & Pear
- Avocado
- Fig
- Blueberry
Fruit In Containers

Points to Remember:
• Except for berries, think large containers
• Choose dwarf varieties if available
• Need more attention regarding water and fertilization (especially N)
• Smaller harvest
• Likely need repotting and root pruning regularly
• Can grow varieties that wouldn’t normally survive
Grafting

Most fruit trees are grafted
• Increased plant vigor
• True varietal performance
• Disease resistance
• Earlier fruiting (2-3 yrs. vs 5-15 yrs.)
• Dwarfing
• Apple, Avocado, Cherry, Citrus, Grape, Pawpaw, Peach, Pear, Persimmon, Plum, Pomegranate
Propagated Asexually

Virtually all commercially available fruit plants are asexually propagated.

• Plants will be true-to-type.
• Besides grafting
• Rooted cuttings – grape, fig, blueberry, raspberry, blackberry, kiwifruit
• Tip layering – raspberry, strawberry, blackberry
• Tissue culture – raspberry, papaya, strawberry
• SEED - papaya
Trellising

Usually required for blackberry, grape, kiwifruit, raspberry
Pruning

Fruit trees should be pruned for several reasons:
• To develop desired tree shape;
• To maintain tree at a desired size;
• To allow sunlight and spray materials to enter the center of the tree;
• To improve tree strength and encourage new shoots;
• To improve air circulation within the tree and reduce the potential for disease;
• To remove dead, broken, crossing branches, water sprouts and rootstock suckers.
General Principles of Pruning Fruit Trees

- Do your pruning in late winter when trees are dormant (February or March);
- Prune young trees (up to 10 years of age) lightly;
- Excessive pruning encourages excessive shoot growth, delays fruiting, and reduces quality of fruit on young trees;
- Tipping, or pinching off, the terminal one-half inch of new shoot growth in mid-June will encourage lateral branching. Trees from 1- to 4-years-old are best suited to this practice;
- Older trees (25 years and older) will produce higher-quality fruit following a vigorous pruning;
- Use clean, sharp, properly sized pruning tools;
General Principles of Pruning Fruit Trees

• Make your thinning cuts back to the branch collar—do not leave stubs;
• Thinning-out cuts (entire limb or shoot removal) are associated with increased flower bud production on apples;
• Heading-back cuts (shortening the ends of branches) encourage shoot growth and strength;
• Remove and dispose of prunings away from the orchard area. Dead wood will harbor disease organisms that can spread into the tree.
Pruning & Training Types

Apples Avocado Cherries Citrus Pawpaw Pears Plums
Pruning & Training Types

Open center system

Fig Peach Plum
Pruning & Training Types

Blueberry

Removal of one-fourth to one-fifth of major limbs at base of a mature blueberry plant.
Pruning & Training Types

Blackberry Raspberry

Summer pruning
Pinch out growing tips on primocane during summer.

Before dormant pruning

After dormant pruning
Remove floricanes and shorten primocane laterals.
Annual pruning of muscadines is a must if the vineyard is to be kept at its optimum production level.
Pruning & Training Types

Kiwi vine growing on a T-bar trellis

Kiwifruit

Papaya need no pruning.
Managing Diseases and Insects in the Home Orchard

Start Clean – Stay Clean

- With most, multiyear crop (ca. 25 years) LOCATION
- Use certified disease-free plants
- Choose resistant varieties/rootstocks
- Prepare the soil BEFORE planting
- Maintain with proper pruning, fertilization, irrigation
- Keep weeds controlled
- Remove plant debris
- Identify problems before taking action
Managing Diseases and Insects in the Home Orchard

Start Clean – Stay Clean
- Systemic infections cannot be cured, in most cases
- Remove diseased plant material immediately
- Use mulch and replenish as needed
- Avoid Overhead Watering
- Disinfect tools between plants
- Prophylactic treatments during high disease pressure
Enjoy Your Harvest
A garden requires patient labor and attention. Plants do not grow merely to satisfy ambitions or to fulfill good intentions. They thrive because someone expended effort on them.

— Liberty Hyde Bailey (American horticulturist and botanist who was cofounder of the American Society for Horticultural Science)
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