Introduction to Berries

AgVentures:
In-depth Series for New Farm Enterprises

This educational program has been made possible through funding from:

Cornell University Cooperative Extension
Cornell Small Farms Program
NY Farm Viability Institute

And Senator Jim Wright
Keys for Success

- Plan ahead.
- Match plants to your site.
- Start small.
- Prepare the soil.
Plan ahead

Your county's Cornell Cooperative Extension

www.cce.cornell.edu/countyMap.php

Cornell Guide to Growing Fruit at Home

Cornell Fruit Resources

www.fruit.cornell.edu

Cornell Cooperative Extension

www.cce.cornell.edu

www.gardening.cornell.edu

www.gardening.cornell.edu
Match plants to your site.
Determine typical winter temperatures

<table>
<thead>
<tr>
<th>Zone</th>
<th>Average Minimum Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>3b</td>
<td>-35 to -30 °F</td>
</tr>
<tr>
<td>4a</td>
<td>-30 to -25 °F</td>
</tr>
<tr>
<td>4b</td>
<td>-25 to -20 °F</td>
</tr>
<tr>
<td>5a</td>
<td>-20 to -15 °F</td>
</tr>
<tr>
<td>5b</td>
<td>-15 to -10 °F</td>
</tr>
<tr>
<td>6a</td>
<td>-10 to -5 °F</td>
</tr>
<tr>
<td>6b</td>
<td>-5 to 0 °F</td>
</tr>
<tr>
<td>7a</td>
<td>0 to 5 °F</td>
</tr>
</tbody>
</table>

USDA Hardiness Zone
Determine typical spring & fall frosts
Microclimates

(From J. Janick, 1986)

Except in an inversion, air temperature decreases with height. (Darker tones indicate cooler air.)

A temperature inversion sets in when cool air is trapped under warm layer. The normal temperature gradient is reversed in the inversion layer.
“Why won’t my plants set fruit?”

- Age.
- Winter injury.
- Late spring frost.
- Cold or rainy weather during bloom.
- Inadequate pollination.
- Lack of cross-pollination in species that are not “self-fruitful.”
- Poor plant nutrition or management.
- Disease.
More site consideration…

- Adequate sun?
- Adequate space?
- Good air circulation?
- Access to water?
- Diseases & insects?
- Wildlife & weeds?
### Fruit/rootstock

<table>
<thead>
<tr>
<th>Fruit/rootstock</th>
<th>Spacing (ft)</th>
<th>Bearing age (years)</th>
<th>Potential yield at maturity (lb./plant)</th>
<th>Harvest period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strawberry</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>1–2</td>
</tr>
<tr>
<td>Raspberry</td>
<td>2</td>
<td>8</td>
<td>2</td>
<td>2–5</td>
</tr>
<tr>
<td>Gooseberry</td>
<td>4</td>
<td>10</td>
<td>2–4</td>
<td>6–8</td>
</tr>
<tr>
<td>Blueberry</td>
<td>4.5</td>
<td>10</td>
<td>3–6</td>
<td>3–10</td>
</tr>
<tr>
<td>Blackberry</td>
<td>2</td>
<td>10</td>
<td>2</td>
<td>2–3</td>
</tr>
<tr>
<td>Grapes-American type</td>
<td>8</td>
<td>9</td>
<td>3</td>
<td>20</td>
</tr>
<tr>
<td>Apple/M.9</td>
<td>7</td>
<td>13</td>
<td>3–5</td>
<td>60</td>
</tr>
<tr>
<td>Apple/MM.106</td>
<td>18</td>
<td>24</td>
<td>5</td>
<td>300</td>
</tr>
</tbody>
</table>

*Start small*
*A little can go a long way*
Grow a cover crop

Options include:
• Buckwheat
• Annual Ryegrass
• Winter Rye
• Oats
• Winter Wheat
• Bird seed (millet)

For more info search for cover crops on www.gardening.cornell.edu
The most important years for a productive home fruit garden are the years before planting.

Plan

Prepare

Produce
Berries: Keys to Success

• Avoid sites where strawberries, brambles or tomato-family crops were recently grown
• Choose disease-resistant, hardy cultivars
• Do an excellent job of weed control during the establishment year
• Supply adequate water
• Cover plants with mulch during the winter months
• Start new plantings with virus-indexed plants purchased from a reliable nursery
Strawberry
*Fragaria x ananassa* Duch.

June-bearing

Day-neutral

Everbearing
Choosing June-bearing Cultivars

<table>
<thead>
<tr>
<th>variety</th>
<th>season</th>
<th>flavor</th>
<th>leaf diseases</th>
<th>root diseases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earliglow</td>
<td>early</td>
<td>1</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Cavendish</td>
<td>early mid</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Jewel</td>
<td>late mid</td>
<td>1</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Allstar</td>
<td>late</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

1= excellent    2= good    3= not so good
Planning & Preparing year

Evaluate your site and soil
- history of soil-borne diseases
- well-drained soil, ideally sandy loam
- good air drainage
- access to a suitable water supply
- preferably sunny
- complete soil test

Prepare the soil
- adjust pH as needed (~ 6.2)
- adjust nutrients as needed
- eliminate perennial weeds
- increase organic matter

Match plants to your site
- disease resistant cultivars
Planting year

Winter  Early Spring

- purchase plants
- plant
- adequate water

Winter injury

trim
Planting systems

Matted row system

Ribbon row system
## Planting year

<table>
<thead>
<tr>
<th>Winter</th>
<th>Early Spring</th>
<th>Spring</th>
<th>Summer</th>
<th>Early Fall</th>
<th>Late Fall</th>
</tr>
</thead>
<tbody>
<tr>
<td>purchase plants</td>
<td>plant</td>
<td>fertilize</td>
<td>fertilize</td>
<td>straw mulch</td>
<td></td>
</tr>
</tbody>
</table>

- **WEED**  
- WEED  
- weed  
- weed

- remove flowers as desired
- maintain narrow rows

1-2 inches of water each week, either by rainfall or irrigation

### Monthly Details

- 10-10-10 fertilizer
- 6 wks after planting:  
  - ~ **1/3 ounce** per foot
- early September:  
  - ~ **1/3 ounce** per foot
Winter Survival

• Cover strawberry plants with mulch in fall to prevent injury from winter low temperatures. Use clean wheat, oats or rye straw and avoid mulches that might contain weed seeds, such as hay. Apply mulch when nighttime temperatures approach 20°F, covering the plants 2 -4 inches deep (about Thanksgiving in many places). Synthetic rowcovers may be an alternative in warmer areas but for many they do not offer as much protection as straw. Continual snow cover is as good as straw.
Renovating Strawberries

• Mow or clip to height of ~3”
• Till between rows & narrow row width
• Rake soil to cover crowns ~1”
• Fertilize

After planting year
10-10-10 fertilizer
at renovation:
~ 1/2 ounce per foot
early September:
~ 1/4 ounce per foot
Fungal Diseases

Botrytis fruit rot / gray mold

leather rot
Insect pest
Tarnished Plant Bug
Insect pests

bud weevil

spittlebugs
Mollusk pest
slugs
Keys to Success

- Avoid sites where brambles, strawberries or tomato-family crops were recently grown
- Choose disease-resistant, hardy cultivars
- Trellis plant for easier management and harvest
- Prune annual and for some twice-a-year
- Start new plantings with virus–indexed plants purchased from a reliable nursery
Choosing Raspberry Cultivars

Summer-fruiting
summer-bearing

Fall-fruiting
fall-bearing, everbearing

red    yellow    black    purple
red    yellow

spent Floricanes
Primocanes

Primocanes

Floricanes
new Primocanes

Spring-Planting Year
Fall-Year 2

Fall-Year 2
(not mowed)

Summer-Year 2

chilling

chilling

no chilling

Spring-Planting Year
Fall-Planting Year
Choosing Raspberry Cultivars

<table>
<thead>
<tr>
<th>Summer-fruiting</th>
<th>Fall-fruiting</th>
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<tbody>
<tr>
<td>summer-bearing</td>
<td>fall-bearing, everbearing</td>
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</table>

**Red:**
- Prelude
- Reveille
- Killarney
- Canby
- Titan
- Encore

**Yellow:**
- Amber
- Kiwigold
- Fallgold
- Goldie

**Black:**
- Allen
- Bristol
- Alleghany
- Jewel

**Purple:**
- Brandywine
- Royalty

**Red:**
- Heritage
- Autumn Bliss

**Yellow:**
- Kiwigold
- Fallgold
- Goldie
Planning & Preparing year

Evaluate your site and soil
- sun sun sun
- avoid wild brambles areas (diseases)
- well-drained soil, ideally sandy loam
- good air drainage
- adequate water but no water accumulation
- complete soil test

Prepare the soil
- adjust pH as needed (~ 5.5 to 6.5)
- adjust nutrients as needed
- eliminate perennial weeds
- increase organic matter

Match plants to your site
- hardy, disease resistant cultivars
Planting year
summer-bearing

Winter

purchase
plant material

dormant suckers or transplants
one vs. two year old red & yellow raspberries

tip-layering
black & purple raspberries

tissue culture
Trellising
summer-bearing floricane-fruiting

- Reduces winter cane breakage
- Keeps berries off the ground
- Makes harvesting easier
- Reduced interference among canes
Pruning & Trellising

summer-bearing
RED raspberries

3-4 canes per linear foot of row
Pruning & Trellising

summer-bearing
BLACK & PURPLE raspberries

2-3 canes per hill
Planting year
fall-bearing

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<th>Early Spring</th>
<th>Spring</th>
<th>Summer</th>
<th>Fall</th>
</tr>
</thead>
<tbody>
<tr>
<td>purchase plant material</td>
<td>plant</td>
<td>fertilize</td>
<td>weed</td>
<td>harvest</td>
</tr>
<tr>
<td></td>
<td></td>
<td>weed</td>
<td>trellis</td>
<td>mow</td>
</tr>
</tbody>
</table>

Irrigate as needed (avoid wetting foliage)
Trellising
fall-bearing

Buried plastic pipe holds removal able post
Ounce of prevention

- Be choosy with site
- Promote healthy soil
- Plant disease resistant cultivars
- Start with healthy plant material
- Adequate space, water & nutrients
- Timely and proper pruning
- Cleaned up debris
- Maintain a complex ecosystem
- Properly time control measures

www.fruit.cornell.edu
Berry Diagnostic Tool
Insect pests

raspberry cane borer (cane girdlers)

Japanese beetle

spider mites (technically not an insect)
Growing Blueberries at Home
Blueberries: Keys to Success

• Soil must be acidic
  pH < 5.0
• Supply adequate water
• Mulch to control weeds & conserve moisture
• Prune to keep 1-2 canes per year up to 8 years olds.
• Harvest early or protect fruit from birds.
Choosing cultivars
Blueberries

• Northblue
• Northcountry
• Northland
  Zone 3

• Blueray
• Berkeley
• Bluecrop
• Jersey
• Elliot
  Zone 4

• Duke
• Herbert
• Darrow
• Spartan
• Bluejay
pollination
Planning & Preparing year

Evaluate your site and soil
- a growing season of at least 140 days
- well-drained soil, ideally sandy peat
- access to a suitable water supply
- preferably sunny
- complete soil test

Prepare the soil
- adjust pH to < 5 (sulfur takes time)
- adjust nutrients as needed
- eliminate perennial weeds
- increase organic matter

Match plants to your site
- hardy cultivars
**Planting year**

<table>
<thead>
<tr>
<th>Winter</th>
<th>Early Spring</th>
<th>Summer</th>
<th>Fall</th>
</tr>
</thead>
<tbody>
<tr>
<td>purchase plants</td>
<td>plant &amp; prune</td>
<td>weed &amp; mow alleys</td>
<td>weed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>remove flowers mulch</td>
<td></td>
</tr>
</tbody>
</table>

Adequate water throughout season

- 2-3 year-old plants
- 4 ft
- 10 ft

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Pruning Basics

- Prune in early spring
- Do not “hedge” prune, remove canes from point of origin
- Start with removing diseased, broken or dead branches
- Keep ~2 new canes per year up to 8 years
- Remove old, large canes > 1 in
- With neglected bushes, remove up to 20%
Pruning

Before

After
Ounce of prevention

- Be choosy with site
- Promote healthy soil
- Plant disease resistant cultivars
- Start with healthy plant material
- Adequate space, water & nutrients
- Timely and proper pruning
- Cleaned up debris
- Maintain a complex ecosystem
- Properly time control measures

www.fruit.cornell.edu
Berry Diagnostic Tool
Diseases and Insect Pests

• There are a few minor diseases to be aware of
• Luckily, blueberries have NO significant insect pests!
But birds are significant pests

The family cat may help out