

## Small Fruit in the Home Garden

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## Agenda

- Introduction
- Grapes
- Blueberries
- Strawberries
- Raspberries/Blackberries



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## Small Fruit Production

- Considerations:
  - Bearing age and longevity

Crop	Bearing Age (yrs.)	Longevity (yrs.)
Blueberry	3	20–30
Blackberry	1	5–12
Raspberry	1	5–12
Strawberry	1	3
Gooseberry	3	10–20
Currant	3	10–20
Grape	3	20–30



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## Grapes



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## Grapes

- Advantages
  - Low availability of local table grapes



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## Grapes

- Disadvantages
  - Disease Management
  - Time to Bearing Age
  - Establishment Costs
  - Early Flowering



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## Vine Anatomy



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## Glossary

- Cane – A mature, woody, brown shoot that develops after leaf fall
- Cordon – An extension of the grapevine trunk, oriented horizontally along the fruiting wire
- Curtain – The portion of the canopy that contains the current year's growth
- Fruiting Wood – One year-old wood (cane) that produces the current year's crop

Source: Midwest Grape Production Guide – The Ohio State University Extension

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## Glossary

- Node – The thickened portion of a shoot or cane where the leaf and compound bud are
- Shoot – The green, leafy growth (this year's growth) that may arise from a count bud or elsewhere
- Spur – A cane on the cordon pruned to 1 or 2 nodes for shoot/fruit production in current year (contains the count buds)
- Trunk – The main, upright structure of the vine from which the cordons arise.

Source: Midwest Grape Production Guide – The Ohio State University Extension

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## Vineyard Trellis Systems

- To provide support for the vine
- To position shoot growth for optimum exposure to light
- To position fruit for effective pest control and harvest
- To facilitate vineyard management operations

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## Vineyard Trellis Systems

- Single Curtain Bilateral Cordon
- Geneva Double Curtain (GDC)
- Vertical Shoot Position (VSP)
  - Smart-Dyson
  - Ballerina

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## Single Curtain Bilateral Cordon

- Most common
- Least expensive
- Simple construction
- Suited for low or moderate vigor situations



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## Single Curtain Bilateral Cordon



## Geneva Double Curtain



- More expensive
- Best system for high vigor situations
- Can increase yields by ~50% compared to single curtain
- Not as well-suited for mechanical harvest

## Geneva Double Curtain



## Vertical Shoot Position (VSP)



## Vertical Shoot Position (VSP)

- Well-suited for upright-growing cultivars
- More expensive
- Best suited for low vigor situations
- Can require more intensive canopy management
- Can be altered to Ballerina or Smart-Dyson

## Vertical Shoot Position (VSP)



## Ballerina



## Smart-Dyson



## Planting Year

- Prune top growth to 2-3 buds after planting
- Train 2 shoots along a training wire to the cordon wire.
- Send shoots out along the cordon wire and tip when they reach the desired length.
- If shoots do not reach the cordon wire in the planting year, prune back to 2-3 buds before year 2.

## Canopy Management Goals

- Put vegetative vigor in check
- Improve sun exposure to fruit, foliage, renewal buds
- Increase airflow to reduce disease pressure
- Improve effectiveness of spray applications
- Facilitate harvest and dormant pruning
- Promote ripening and increase fruit quality
- Reduce crop variability
- Balance vine growth

## Grapevine Management Techniques

- Dormant Pruning
  - Identifies the location and number of buds (count buds) to be retained for producing the upcoming season's growth.
- Sucker Removal
  - Shoots that originate at ground level
  - Can retain suckers if winter injury has occurred or for trunk renewal
  - Best done when suckers are <6 inches long

## Grapevine Management Techniques

- Water Sprout Removal
  - Shoots that originate from the trunk
  - Typical sign of excessive vigor
  - May be retained for cordon renewal, although typically not recommended
- Shoot Removal
  - Removing undesirable shoots
    - Basal Shoots (non-count bud shoots)
    - Non-fruiting shoots (count bud shoots)

## Grapevine Management Techniques

- Cluster Thinning
  - Removal of all clusters during establishment years
  - Removal of excessive clusters during fruiting years
    - Prevents overcropping which can lead to:
      - Decreased vigor
      - Increased winter injury
      - Decreased fruit quality
  - Can be done prior to bloom when poor fruit set is expected (not recommended for tight cluster varieties)
  - More commonly done within 2 weeks of berry set



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## Cluster Thinning

- Rules of Thumb
  - Remove all clusters from shoots less than 12" long.
  - Leave one cluster per shoot for shoots 12-24" long.
  - Leave two clusters per shoot for shoots more than 24" long.
  - Remove small or poorly pollinated clusters
  - Remove late emerging clusters that probably will not ripen
- "Green Harvest"
  - Done at veraison
  - Leaving a heavy crop from bloom to veraison can reduce growth of vigorous plants



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## Grapevine Management Techniques

- Shoot Positioning
  - "Combing" increases airflow and sunlight penetration into the canopy
  - Makes dormant pruning much easier
  - Should be done early in the season when shoots are pliable
- Lateral Removal
  - Removing shoots that arise on fruiting canes near the fruiting zone
  - Completed after bloom, prior to veraison



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## Grapevine Management Techniques

- Leaf Removal
  - Should be done after fruit set (same as cluster thinning) and again before veraison
  - Leaf removal later in the season typically results in sunburn of fruit
  - Typically done on the shade side (East side of N-S rows, North side of E-W rows)
  - Some leaf removal on the sun side of rows can be done on particularly dense canopies
  - Goal – Expose fruit to sun, increase air flow to decrease wet periods, increase effectiveness of sprays



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## Grapevine Management Techniques

- Topping
  - Used to decrease shading of top growth on upright growing canopies
  - Typically done just prior to veraison
    - Helps to minimize lateral growth
  - Top to 1 foot above the top wire
- Skirting
  - Similar to topping, but for downward oriented shoots
  - Trim to 1 foot above the ground
- Shoot Hedging
  - Bringing in shoots to within 1.5-2 feet of the canopy
  - Done along with topping and/or skirting



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## Additional Resources

- Sunlight into Wine
  - Book on vineyard trellis systems and canopy mgmt.
- Midwest Small Fruit and Grape Spray Guide
  - <http://ohioline.osu.edu/b919/index.html>
- A Pocket Guide for Grape IPM Scouting in the North Central and Eastern United States
  - <http://www.ipm.msu.edu/GrapePocket.htm>



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## Blueberries

## Blueberries

- Advantages:
  - Hardy, long lived plants
  - Consistent production
  - Fruit is less perishable and may be stored for short periods of time
  - Reduced pest management
  - Early Flowering

## Blueberries

- Disadvantages:
  - Specific soil requirements
  - Bird management
  - Fertility management
  - Substantial initial investment
  - Waiting period before production



## Blueberries

- Introduction
- Site Selection and Site Modification
- Cultivar Selection
- Production Practices



## Introduction

- Challenges facing blueberry growers in our area
  - Marginally suitable soils
    - High pH: 5.5-7.0
    - Low organic matter: <3%
    - High calcium content
    - Poor drainage, impervious soil layers
  - Lack of ideally suited cultivars
  - Climate

## Site Selection

- Full sun is important
- Choose a site that is well drained – air drainage, water drainage
- Locate away from trees, especially walnut trees – at least 60 feet
- Locate near a water source
- Previous use of the site

## Site Selection

- Percolation test is valuable
- Observation of soil profile is valuable



## Site Modification

- Soil pH modification
  - Soil test critical – accurate pH measurement
  - Modifying soil pH
    - Elemental sulfur in advance of planting
    - Iron sulfate in advance of planting
    - 6 months in advance of planting
    - Retest and apply additional sulfur if needed

## Site Modification

- Soil organic matter modification
  - Green manure and cover crops
  - Organic matter additions before planting
  - Peat moss additions at planting
  - Mulches after planting

## Site Modification

- Provisions for soil drainage
  - subsoiling
  - berming
  - surface drainage
  - other approaches
  - disease issues



## Cultivar Selection



## Cultivar Selection

- Ideal cultivar for our area
  - Adapted to mineral soils
  - Productive
  - Large, firm berries
  - Hardy
  - Disease resistant



## Cultivar Selection

### • Recommended cultivars (highbush)

- Early season
  - Duke
  - Nui (T)
- Midseason
  - Berkeley
  - Bluecrop
  - Bluejay
  - Brigitta (T)
  - Legacy (T) (SH)
  - Reka (T)
- Late season
  - Chandler
  - Coville
  - Darrow
  - Jersey
  - Lateblue
  - Nelson (T)



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## Cultivar Selection

### • Cultivars to avoid

- Spartan – sensitive to high pH
- Bluetta – susceptible to stem blight
- Patriot – blooms early



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## Production Practices

### • Consider growth habit

- Upright growth habit
  - Remove older center canes to open up bush
  - Bluecrop, Collins, Lateblue, Elliot, Reka, Duke, Legacy, Nelson
- Spreading growth habit
  - Prune to upright growth
  - Bluejay, Berkeley, Coville, Patriot, Nui, Summit, Toro, Chandler



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## Production Practices

### • Planting

- Nursery stock
  - One year (BR or container)
  - two year (BR or container)
  - three year (BR or container)



1 gallon container plant



1 year, 2 year, and 3 year BR plants

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## Planting

- Spacing
  - Spacing between rows: 10-12 feet
  - Spacing between plants: 3- 4 feet



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## Production Practices

- Water management
  - Irrigation is critical
  - Trickle irrigation widely accepted



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## Production Practices

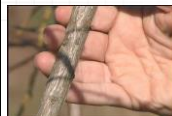
- Fertility management
  - Split N applications common
    - dry timing - blossom, 6 weeks, 12 weeks
    - injected - divide total into weekly applications
    - combination of dry and injected
  - other nutrients - as indicated by foliar test
  - Foliar applications of secondary and micronutrients practiced, especially iron



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## Production Practices

- Understanding the plant – age of canes



Year 4  
and older



Year 2-3



Year 1



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## Production Practices

- Understanding the plant - fruit buds and cane age



Year 5 and older



Year 3-4

Year 1-2



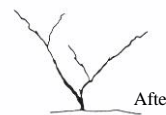
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## Production Practices

- Pruning young blueberry plants -
- Year 1-2
  - Minimal pruning
  - Remove weak twiggy growth
  - Remove damaged or diseased wood
  - Remove flower buds



Before



After



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## Production Practices

- Pruning - Year 3 - 5
  - Minimal pruning
  - Remove weak twiggy growth
  - Remove damaged or diseased wood
  - Allow a small crop in year 3 (0.5-1 pint/bush), gradually increase crop in year 4-5



Before



After



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## Production Practices

- Remove damaged or diseased wood



Anthracnose



Stem Blight



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## Production Practices

- Pruning mature blueberry plants
- Goals:
  - Maximize yield
  - Maximize fruit size and quality
  - Encourage consistent cropping
  - Position the fruiting zone
  - Manage diseases



## Production Practices

- Pruning mature blueberry plants
  - remove 20% of the oldest canes each year (usually 1-2 canes)
  - Remove weak growth at the base of the plant
  - Thin out the interior of the bush
  - Thin flower buds if needed



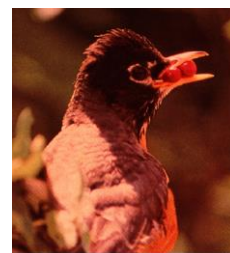
## Production Practices

- Mulching
  - Benefits
    - Moderate soil temperature
    - Moderate soil water
    - Weed control
    - Organic matter
  - Organic mulches used
  - Mixtures of coarse and fine particles
  - Replenish regularly



## Production Practices

- Bird Management
  - Scare tactics
  - Netting



## Production Practices

- Blueberry diseases
  - Stem blight
  - Phomopsis stem canker
  - Anthracnose
  - Phytophthora root rot
  - Other diseases



## Production Practices

- Disease management
  - Plant on raised ridges or berms
  - Prune out diseased tissue – remember sanitation
  - Fungicide programs



## Conclusion

- Growing blueberries in our region is a challenge!
- Select an suitable site
- Proper cultivar selection is critical
- Cultural practices are important
  - Water management
  - Fertility management
  - Soil pH management
  - Mulching



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## Strawberries



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## Strawberry

- June-Bearing
  - Matted Row
  - Annual Plasticulture
- Everbearing
- Day-Neutral



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## Strawberry

- Advantages:
  - Strong Demand for Crop
  - Younger Bearing Age
  - Reduced Pest Management



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## Strawberry

- Disadvantages:
  - Plants and Fruit are susceptible to environmental issues
  - Plantings are short lived
  - Weed management
  - Vertebrate pest management



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## Defining Classifications

- June Bearing strawberries produce one flush of flowers/fruit. Fruit is typically available for 2-3 weeks, ranging from late May-late June.
- Everbearing strawberries actually produce a good sized crop in the spring and a small crop in the fall
- Day-Neutral strawberries can produce flower buds and fruit can be harvested every 6 weeks or so. But, since they do not flower when temps are above 85, they operate much like Everbearing cultivars



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## More on Classifications

- All strawberries should be planted in spring, as soon as soil can be worked
- June Bearing varieties will produce a crop in about 13 months. There are many varieties to choose from. All flowers should be removed in year 1.
- Day-Neutral and Everbearing varieties should have all flowers removed until the 4<sup>th</sup> of July of the planting year. Expect a small crop in the fall of year 1. Look for Ogallala and Ozark Beauty (Everbearing) and Tribute and Tristar (Day-Neutral)



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## More on Classifications

- Homeowners may wish to have both June Bearing and Day-Neutral/Everbearing varieties.
- Keep June Bearing plantings separate from the others for renovation purposes.



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## Site Selection

- Full Sun
- Good surface and internal drainage
- 5% Organic Matter



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## Productivity

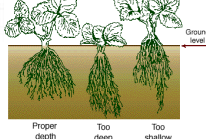
- Expect ~1 Qt./plant (plus it's daughter plants)
- Matted Row systems should provide optimum production for 3 seasons
  - Important to purchase new plants
  - Don't dig up from a friend's patch



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## Planting

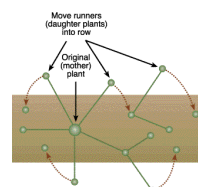
- Traditional bed design
  - Planted on level ground
  - Rows 48 inches apart
  - Plants spaced 30-36" apart
  - Fruiting bed is wide – up to 24 inches



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## Year 1 Maintenance

- Cultivate, Cultivate, Cultivate
  - The first 6 weeks are the most important
  - Good for weed removal and loosening up soil for runners to root easily
- Remove all blossoms
  - End this practice beginning in July for Everbearing and Day-Neutral cultivars
- Train runners into row
- Irrigate (1"/Week)
- Apply mulch in fall after a few days in the 20s



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## Spring Care

- Determine when to remove mulch by monitoring leaf color as days warm up
  - When you begin to see yellowing, rake the mulch into the row middles, but leave a scattered layer on the plants.
  - If a frost is expected, replace the mulch onto the plants.
  - Always protect plants from frost (even when flowering), just remember to remove the mulch during the day.
- Harvest daily when berries begin to ripen



## Renovating the Bed

- After harvest, renovate the bed by following these steps:
  - Remove weeds from row middles
  - Mow old tops off of the plants (set the mower blade to remove foliage without hitting the crown)
  - Rototill each established row to a row of plants
  - Fertilize
  - Irrigate



## Brambles

## Brambles

- Blackberries:
  - Upright Blackberries
  - Semi-Erect Blackberries
  - Primocane Blackberries
- Raspberries:
  - Black Raspberries
  - Primocane Red and Yellow Raspberries
  - Floricane Red Raspberries

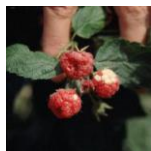
## Brambles

- Advantages:
  - Strong Market Demand
  - Younger Bearing Age
  - Reduced Disease Management



## Brambles

- Disadvantages:
  - Plants and Crops are vulnerable to environmental issues
  - Plantings are short-lived
  - Perishable fruit



## Introduction

- What is a bramble?
- Raspberry vs blackberry
- Primocane vs floricane



## Recommended Primocane Raspberry Cultivars

- Red Primocane Raspberries
  - Caroline
  - Heritage
  - Josephine
  - Polana
  - Autumn Bliss
  - Autumn Britten
- Yellow Primocane Raspberries
  - Anne
  - Kiwigold

## Recommended Floricane Red Raspberry Cultivars

- Prelude
- Lauren
- Revielle
- Nova
- Canby
- Titan
- Harvest: late May to July



## Recommended Floricane Black Raspberry Cultivars

- Bristol, Jewel
  - Harvest:
    - Bristol – 6/9-6/30
    - Jewel – 6/13-6/30
  - Avg berry size: 1.5-2.0 g/berry
  - Yield: 1500-1700 lbs/acre



## Primocane Black Raspberries?



"Explorer" primocane black raspberry

## Recommended Erect Blackberry Cultivars

- Thorny
  - Choctaw
  - Shawnee
  - Chickasaw
  - Kiowa



## Recommended Erect Blackberry Cultivars

- Thornless
  - Arapaho
  - Natchez
  - Ouachita
  - Apache
  - Navaho



## Prime-Jim, Prime-Jan (thorny)

- University of Arkansas: 2004
- Harvest
  - Floricane – late June
  - Primocane – late July
- Avg Berry Size
  - Floricane – 5 g
  - Primocane – 3-10 g
- Yield:
  - floricane yield comparable to Apache
  - primocane yield disappointing in MO



## Recommended Semi-erect Blackberry Cultivars

- Triple Crown
- Chester
- Loch Ness



## Site Selection

- Full sun
- Well drained soil
- pH: 5.5-6.5
- Elevated site
- Previous uses of the site
- Marketing considerations

## Site Preparation

- Eliminate perennial weeds
- Modify soil pH and fertility
  - pH: 5.5-6.5
  - K: 300 lbs/acre
  - P: 50 lbs/acre
- Organic matter addition, cover crops

## Site Preparation

- Berming



## Planting

- Types of nursery stock
  - Conventional rooted suckers
  - Tissue culture plug plants
  - Nursery matured tissue culture plants
  - Root cuttings



## Planting

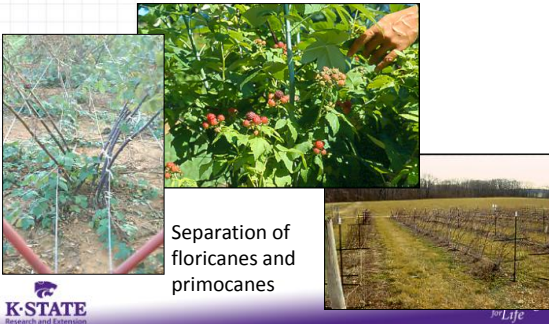
- Row Spacing: 8-12 feet
- Plant spacing: 2-6 feet
- Plant in early spring



## Training and Pruning

- Pruning –
  - Primocane raspberries - dormant removal of canes in early spring (manage for the primocane crop only)
  - Floricane brambles
    - Tip primocanes (blackberries, black raspberries)
    - Remove spent floricanes
    - Dormant season pruning

## Training and Pruning



Separation of floricanes and primocanes

## Bramble Problems



Environmental Damage

Anthracnose

Stink Bug Injury

## Other Problems

- Cold damage to floricanes
- Frost damage to blossoms



## Harvest

- Season:
  - Primocane raspberry: late July – October
  - Floricane brambles: June – late August
- Harvest early in the day
- Harvest frequently – every second day



## Thank You

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