



Overview of Elderberry Culture

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Outline

- Introduction
- Choosing a good site for elderberry production
- Choosing elderberry cultivars
- Propagation and planting establishment
- Elderberry cultural practices
- Harvest and postharvest handling

Introduction

- American elderberry (*Sambucus nigra canadensis*)
- European or black elderberry (*S. nigra*)
- Blue elderberry (*S. n. caerulea*)



Introduction

- American elderberry
Sambucus nigra L. ssp.
canadensis (L.) R. Bolli
(or *Sambucus*
canadensis L.)
- Native to much of
North America
- Medium to large shrub
to small tree



Introduction



- Juice products
- Jelly, jam
- Wine, beer, spirits
- Health supplements

- Flower products
- Food colorant
- Other plant parts?

- Elderberry is of growing commercial interest



Elderberry Culture

- Choosing a good site for elderberry
 - Marketing considerations
 - Availability of irrigation water
 - Elevated relative to surrounding land
 - Site specific issues
 - Previous uses of the site
 - Organic production considerations

Elderberry Culture

- Cultivars with origins in New York
 - ‘Adams 1’, ‘Adams 2’ (1926)
 - Selected from the wild by William Adams
 - Fruit clusters and berries described as large
 - ‘Adams 1’ has greenish stems; ‘Adams 2’ has reddish stems
 - Cross pollination required
 - ‘York’ (1964)
 - Originated as a cross of ‘Adams 2’ x ‘Ezyoff’
 - Clusters heavy, berries large
 - Lower soluble solids than ‘Johns’, ‘Scotia’, or ‘Victoria’
 - Ripens after ‘Adams 1’ and ‘Adams 2’
 - Plant large, productive



‘Adams 2’



‘York’



Elderberry Culture

- Cultivars with origins in Kentville, Nova Scotia
 - ‘Johns’ (1954) – parentage unknown
 - ‘Kent’ (1957) – seedling of ‘Adams 1’; earlier than ‘Adams 1’
 - ‘Nova’ (1959) – seedling of ‘Adams 2’; large fruit, ripens early, sweeter than ‘Kent’ and ‘Victoria’
 - ‘Scotia’ (1959) – seedling of ‘Adams 2’; large fruit, ripens early, sweeter than ‘Kent’ and ‘Victoria’
 - ‘Victoria’ (1957) – seedling of ‘Adams 2’; earlier than ‘Adams 2’

Elderberry Culture

- Midwestern cultivars
 - ‘Bob Gordon’ (2011)
 - ‘Wyldeewood’ (2010)
 - ‘Marge’ (2013)



‘Bob Gordon’



‘Wyldeewood’

Elderberry Culture

- European Elderberry cultivars
 - ‘Haschburg’
 - ‘Marge’ (2013)
 - Danish cultivars



‘Haschburg’

Elderberry Culture

- Propagation
 - Root cuttings
 - Sprouted hardwood cuttings
 - Softwood cuttings
 - Tissue culture
 - Seeds
 - **Dormant hardwood cuttings**
 - 1, 2, or 3 node cuttings
 - Rooting hormone?



Collecting elderberry hardwood cuttings





Field nursery production

Bed nursery production





Hardwood cuttings in cell packs

Elderberry Culture

- Establishment - plants
 - Bare root or container plants
 - Berms
 - Spacing
 - 3-4 feet between plants
 - 10-12 feet between rows



Elderberry Culture

- Establishment –
hardwood
cuttings
 - Stick directly in
the soil
 - Success
percentage can
vary



A photograph of a newly established elderberry planting. The plants are arranged in rows, each covered with black plastic mulch. The soil is dark brown and appears to be recently tilled. The plants are small and green, indicating they are in the early stages of growth. The rows are spaced evenly across the field, and the overall appearance is that of a well-maintained agricultural site.

Newly established elderberry planting

Elderberry Culture

- Growth habit
 - Fruits on old wood
 - Produces suckers, which also fruit in many cases



Elderberry Culture

- Pruning
 - Annual removal of all shoots can improve harvest efficiency
 - Larger, fewer flower cymes
 - Concentrated ripening period
 - Implications for eriophyid mite and SWD management?







Elderberry Culture

- Pruning
 - Selective removal of older shoots



Elderberry Culture

- Fertilization
 - Nitrogen
 - 60-100 lb/acre (4x12 spacing)
 - Apply as growth begins
 - Other nutrients?
 - Foliar sampling to monitor nutrition?



Elderberry Culture

- Irrigation
 - Elderberries are not drought tolerant plants
 - Drip or trickle irrigation systems work well – 18mm tube with emitters every 18-24"
 - Water needs: 1.5-2" per week





Elderberry Culture

- Weed management
 - Control perennial weeds before planting
 - Plastic mulch for young plantings
 - Weed barrier fabric for older plantings?
 - Mulching
 - Hand removal
 - Herbicides
 - Labeled herbicides: Casoron, Surflan, Gallery, Snapshot, Aim, Roundup Max, Rely, Reglone, Gramoxone



Elderberry Culture

- Pest management
 - Eriophyid mite

Eriophyid mite





Elderberry Culture

- Pest management – eriophyid mites
 - Two species of mites discovered in MO
 - Overwinter in elderberry buds
 - Cultivar differences in susceptibility?
 - Control measures
 - Removal of woody plant parts?
 - Delayed dormant lime sulfur spray?
 - Oil spray?
 - Timing of sprays?

Elderberry Culture

- Pest management
 - Japanese beetle



Elderberry Culture

- Pest management –
Japanese beetle
 - Insecticide applications
 - Mass trapping

1,120,745 beetles killed in 2012 in 4 traps!



Source: Dr. Jaime Pinero, Lincoln University

Elderberry Culture

- Pest management
 - Spotted Wing Drosophila





Elderberry Culture

- Pest management – Spotted Wing Drosophila
 - SWD is a new elderberry pest for Missouri
 - SWD numbers appear to build in May and June, and reach damaging levels in June-Sept in MO
 - SWD management in elderberry
 - Baited monitoring traps – place in advance of fruit ripening and monitor regularly
 - Use cultural methods (pruning) to concentrate ripening
 - Exclusion?
 - Spray program
 - beginning at first ripe fruit and repeat as necessary
 - at present pyrethroid, spinosyn, and pyrethrum class insecticides are labeled on elderberry for JB, but not for SWD (except for Delegate)



Elderberry Culture

- Pest management – Spotted Wing Drosophila

Class	Trade Name	Active Ingredient	PHI (days)	Days Residual
pyrethroid	Mustang Max (RU)	zeta-cypermethrin	1	7
	Danitol (RU)	fenpropathrin	3	7
	Brigade (RU)	bifenthrin	3	7
spinosyn	Delegate (2ee)	spinetoram	1	7
	Entrust (organic)	spinosad	1	3-5
pyrethrum	Pyganic (organic)	pyrethrum	0	2

Elderberry Culture

- Pest management
 - Insect problems
 - Stem borer
 - Elder borer
 - Sawfly
 - Stink bug, including BMSB
 - Green June bug



Stink Bug



Elder Borer



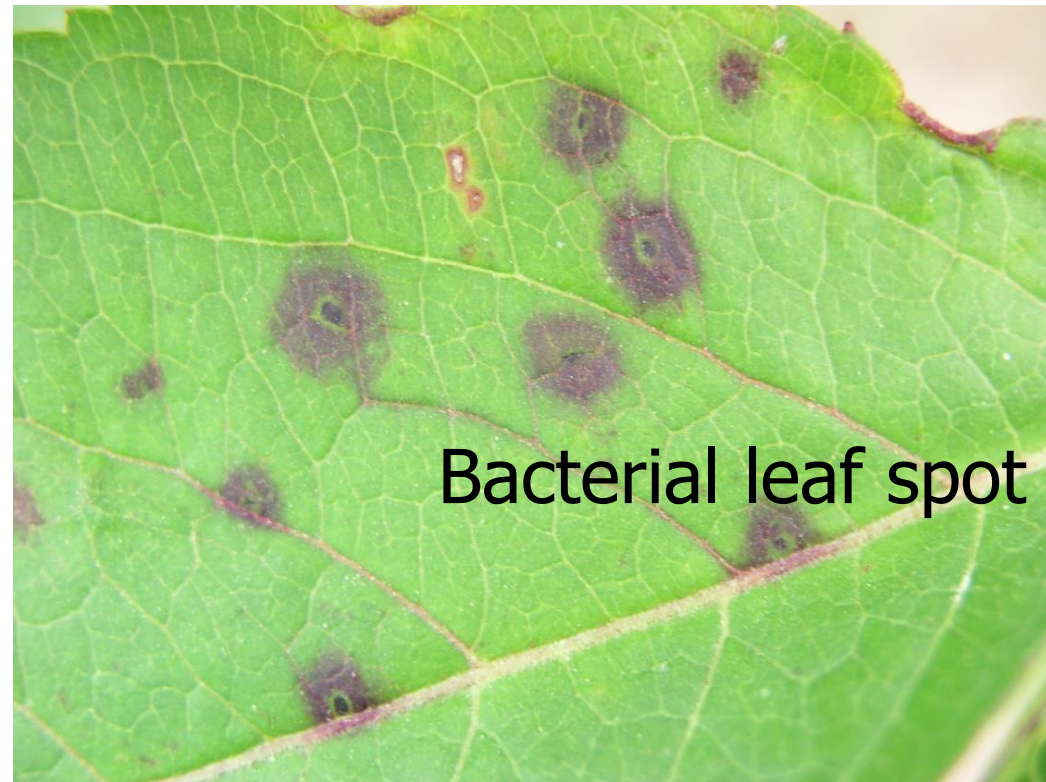
Stem borer



Green June Beetle

Elderberry Culture

- Pest management
 - Bacterial leaf spot (*Pseudomonas*)



Elderberry Culture

- Pest management
 - Elderberry rust



Elderberry Culture

- Other diseases
 - Phoma
 - Fungal leaf spot
 - Viruses



Fungal leaf spot

Elderberry Culture

- Harvest - blossoms
 - June
 - Harvest when all florets are open
 - Florets may be removed by rubbing over a screen
 - Use immediately, freeze fresh blossoms, or dry for future use



Elderberry Culture

- Harvest - fruit
 - July-August
 - Harvest cymes when all berries fully colored
 - Usually 2-3 pickings
 - Mechanization?



Elderberry Culture

- Let's discuss the harvest decision process...



Harvest decision is based on:

- Berry color
- Condition of the crop
- Juice chemistry



Elderberry Culture

- Yields
 - Year 1:
 - MO: 1226 lb/acre
 - IL: 1214 lb/acre
 - Year 2
 - MO: 3338 lb/acre
 - IL: 8677 lb/acre
 - Year 3
 - MO: 5621 lb/acre
 - IL: 8582 lb/acre
 - High yields
 - MO: 11352 lb/acre
 - IL: 13846 lb/acre





Postharvest Handling

- Fruit is destemmed
 - 4-10% of fresh weight is stem
- Storage
 - Fresh destemmed – fruit held at 4°C
 - Frozen destemmed – fruit held at -20°C
 - Storage time – up to 2 years without loss of quality

Elderberry Culture

- Stem removal
 - Can remove berries from stems by freezing





Elderberry Culture

Terry Durham's
Destemmer



McCord Elderberry Farm Harvest



Elderberry Culture

Means of juice characteristics from 2002 elderberry harvest
at two locations:

Site	# Samples	°Brix	pH	TA (ml)
Mt. Vernon	34	11.44	4.72	0.85
Mtn. Grove	26	12.59	4.56	0.92
Combined	60	11.94	4.65	0.88



Elderberry Marketing

- Fresh or frozen fruit
 - On the stem
 - Destemmed
 - Price:
 - On the stem - \$0.50 to \$1.95/lb
- Fresh, frozen or dried blossoms



Riverhills Elderberry Workshop



Join us 13-15 June 2019!

Comments or Questions?

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Development of Missouri's Elderberry Industry

- Snapshot – 1997
 - No known commercial elderberry production in Missouri
 - Elderberry products – strictly cottage industry based on wild harvested fruit or concentrate from elsewhere
- Snapshot – 2017
 - Estimated 300 acres of commercial elderberry in Missouri and surrounding states
 - Conservative estimated value of over \$900,000 annually for the raw fruit alone
 - Diverse products and markets, based on Missouri elderberries

Industry Development

- Growth of the elderberry industry in Missouri is the result of a partnership among innovative farmers and researchers, with a common goal...to build an industry where none was before!

Terry Durham





Challenges to Missouri's Elderberry Industry

- Additional research is urgently needed
 - Cultivar development
 - Cultural management, especially fertility
 - Weed control
 - Pest management, especially eriophyid mites, SWD, rust and BMSB
 - Mechanization
 - Flowers as a crop
 - Perception of cyanide issues
- Additional economic research is needed