

The Missouri Elderberry Development Program



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Outline

- Why elderberry?
- The early years: 1997-2004
- Picking up momentum: 2004-2010
- Fast growth: 2010-Present
- The future
- Challenges along the way

Why Elderberry?

- Snapshot – 1997
 - No known commercial elderberry production in Missouri
 - Elderberry products – strictly cottage industry based on wild harvested fruit or concentrate from elsewhere
- Snapshot – 2016
 - Estimated 400 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

Why Elderberry?

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



Why Elderberry?

S. canadensis



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



S. caerulea



S. nigra

Why Elderberry?

- Elderberry advantages
 - Plant with a long and interesting history in association with humans
 - Plant with healthful qualities
 - Several parts of the plant are marketable
 - Native plant
 - The plant fit well with our interests



Why Elderberry?

- Elderberry challenges
 - Processing berry, with a potentially low return
 - We didn't know how to grow the plant on a commercial scale in Missouri
 - We didn't have cultivars well suited for Missouri
 - Fruit is often considered an ingredient or additive
 - Plant has toxic properties in certain parts
 - Production practices include hand labor



The Early Years: 1997-2004

- Highlights
 - Missouri meets John Brewer - 1997
 - Missouri Elderberry Development Project established
 - Terry Durham joins the elderberry team
 - First farmer workshop – 2001
 - Research underway!



The Early Years: 1997-2004

- John Brewer is the owner of Wyldewood Cellars of Mulvane, KS
- Early promoter of elderberry products in the Midwest
- Margaret Milliken helped develop adapted cultivars



John Brewer and Margaret Milliken

The Early Years: 1997-2004

- The Missouri Elderberry Development Project
 - Conceived in 1997 to help develop elderberry industry in Missouri
 - Partnership among farmers, researchers, and extension specialists
 - Recognized the importance of building an industry by supporting farmers with a farmer-driven research program

The Early Years: 1997-2004



- Justification for elderberry research and outreach in Missouri:
 - Native, adapted plant
 - Growing market for fruit, juice and flowers
 - Commercial cultivars were developed elsewhere – New York and Canada; native midwestern germplasm is underutilized
 - Little known concerning elderberry culture or pest management

The Early Years: 1997-2004

- The Missouri Elderberry Development Project (1997-present)
 - The project has several components:
 - **Development of improved cultivars**
 - Cultural studies
 - Pest management studies
 - Antioxidant content studies and genetic relationship studies
 - Economics and marketing
 - Support in the amount of \$225,000 from several funding sources 2004-present
 - The project cooperates with several programs that are investigating elderberry and human health

The Early Years: 1997-2004

- Collaborators

- University of Missouri
 - Patrick Byers, Andrew Thomas, Michele Warmund, Mike Gold
 - MU Center for Agroforestry
 - Several MU labs
- Missouri State University
 - John Avery, Martin Kaps
- Lincoln University
 - Sanjun Gu, Jaime Pinero, Hwei-Ying Johnson
- USDA-ARS
 - Chad Finn, Bob Martin
 - Penelope Perkins-Veazie, (NCSU)
- **John Brewer and Margaret Milliken, Wyldewood Cellars**
- **Terry Durham, Eridu Farm**
- **Additional elderberry farmers**



Patrick



Andrew

The Early Years: 1997-2004

- Terry Durham
 - Organic farmer near Columbia, MO
 - Interest in elderberry, interested in a challenge
 - Leader in the development of the elderberry industry
 - Strong collaborator from the beginning



Terry Durham

The Early Years: 1997-2004

- Farmers Workshops
 - First farmer workshop in 2001 – 4 attendees
 - Interest gradually grew
 - Annual workshops held since 2001



The Early Years: 1997-2004

- What can we do with elderberries?
 - Juice products
 - Jelly, jam
 - Wine, spirits
 - Health supplements
 - Flower products
 - Ingredient
 - Food colorant
 - Health boost
 - Other plant parts?



The Early Years: 1997-2004

- European or black elderberry – *Sambucus nigra*
 - Most of the worldwide market is this type
 - Easily obtainable supplies of black elderberry concentrate available
 - From the beginning – Missouri worked to differentiate American elderberry from black elderberry



Picking Up Momentum: 2004-2010

- Highlights:
 - We meet people of like mind!
 - Research projects to address producer concerns
 - Research underway to highlight health benefits of elderberry consumption
 - Riverhills Harvest founded – 2008
 - Missouri elderberry products available!
 - Elderberry Market Research report published - 2009
 - Elderberry Festivals and workshops
 - We join forces with Dr. Oz and Martha Stewart

Picking Up Momentum: 2004-2010

- We meet people of like mind!



Elderberry meetings in Canada and Maine

Picking Up Momentum: 2004-2010

- Research projects to address farmer concerns
 - Development of cultivars adapted to production in the Midwest
 - Development of pruning techniques to improve efficiency
 - Development of fertility management practices
 - Pest management studies
 - Antioxidant and DNA studies

Picking Up Momentum: 2004-2010

- Development of improved cultivars
 - Collection and evaluation of germplasm and cultivars
 - Replicated evaluation of superior germplasm
 - Release of improved cultivars
- The elderberry collection to date – we have investigated 76 germplasm accessions
- We have released 3 elderberry cultivars adapted to production in the Midwest.

Picking Up Momentum: 2004-2010

- New cultivar
'Wyldewood' (2010)
 - Adapted to Midwest
 - Productive
 - Late season
 - Large cymes
 - Good quality fruit
 - Fruit does not shatter
 - Favorable juice parameters



Picking Up Momentum: 2004-2010

- New cultivar 'Bob Gordon' (2011)
 - Adapted to Midwest
 - Productive
 - Mid season
 - Medium cymes
 - Good quality fruit
 - Fruit does not shatter
 - Less attractive to birds
 - Favorable juice parameters



Picking Up Momentum: 2004-2010

- New cultivar 'Marge' (2014)
 - European elderberry
 - Adapted to Midwest
 - Significantly later in budbreak and earlier in full bloom
 - Significantly less damaged by mites – virtually untouched
 - Significantly larger berry weight
 - Significantly lower juice pH
 - Significantly higher total yield and # cymes
 - Exhibits desirable biochemical properties



Picking Up Momentum: 2004-2010

- Potential future cultivar releases
 - ‘Ozark’
 - High yielding
 - Interesting biochemical profile
- Other cultivars
 - ‘Ranch’



Picking Up Momentum: 2004-2010

- **Efficiency studies - annual pruning to the ground**
 - All shoots arise from crown or root system
 - Shoots are typically unbranched and produce a single large cyme at the tip; cyme production at a uniform height
 - concentrated harvest over 2-3 weeks







Picking Up Momentum: 2004-2010

- Elemental content of leaf foliar samples
- Nitrogen fertilization



Elderberry foliar samples

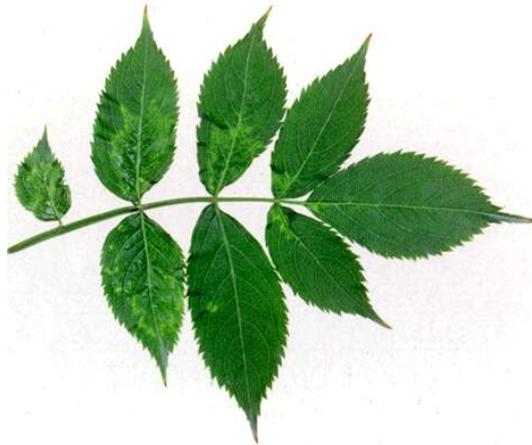
Picking Up Momentum: 2004-2010

- Leaf Elemental Study (2006)
 - We suggest foliar collection times following spring growth flush for N, P, K, Fe, Zn, and Mn
 - We suggest foliar collection times at fruit ripening for Ca, Mg, and B
 - In addition, we suggest that growers sample leaves from new shoots originating at the crown, as this tissue type had elemental content that was either higher or not statistically different from leaves produced on shoots arising from woody stems.

Picking Up Momentum: 2004-2010

- Pest management studies
 - Eriophyid mite (Michele Warmund)
 - Japanese beetle (Jaime Pinero)
 - Rust and other diseases (Michele Warmund)
 - Virus issues (Bob Martin)

Virus symptoms
on elderberry



Eriophyid mites on elderberry

Picking Up Momentum: 2004-2010



- Elderberry antioxidant studies
 - Juice studies
 - Antioxidants in plant parts
 - Others looking at a range of human ailments and elderberry
- DNA analysis of elderberry species, cultivars, and wild selections

Picking Up Momentum: 2004-2010

- Research underway to highlight health benefits of elderberry consumption
 - Several labs at MU and elsewhere investigating the effects of elderberry on several human ailments
 - Important marketing and promotional tool

Picking Up Momentum: 2004-2010

- Riverhills Harvest founded – 2008



The screenshot shows the homepage of the River Hills Harvest website. At the top center is the logo, which features a stylized blue river winding through green hills, with the words "RIVER HILLS" above and "HARVEST" below in blue, bold, sans-serif capital letters. Below the logo is a horizontal navigation bar with several buttons: "Home Page", "Visit Our Online Store", "Contact Us", "Education and Support", "Destemmer", "Planting Instructions", "Custom Installations", "Subscribe to Newsletter", and "Visit us on FaceBook". Below the navigation bar is a large white box with a blue border. Inside this box, the heading "Welcome to River Hills Harvest" is centered. Below the heading is a paragraph of text: "Welcome to our River Hills Harvest website, Your online source for Elderberry information, growing requirements, plant and rootstock needs, and the source to get RHH CoOp brand of American made and produced elderberry products. Tell us how we can help you. [send an email](#)". Below the text is a red button with white text that says "Subscribe To Our Newsletter". Below the button is a Facebook social sharing widget showing "Like" and "Share" buttons, followed by the text "Brian Bolle, Sue Baird and 569 others like this." Below the widget is a small profile picture of a woman. At the bottom of the white box is the URL www.FaceBook.com/RiverHillsHarvest and the source information "Source: <http://www.riverhillsharvest.com/>".

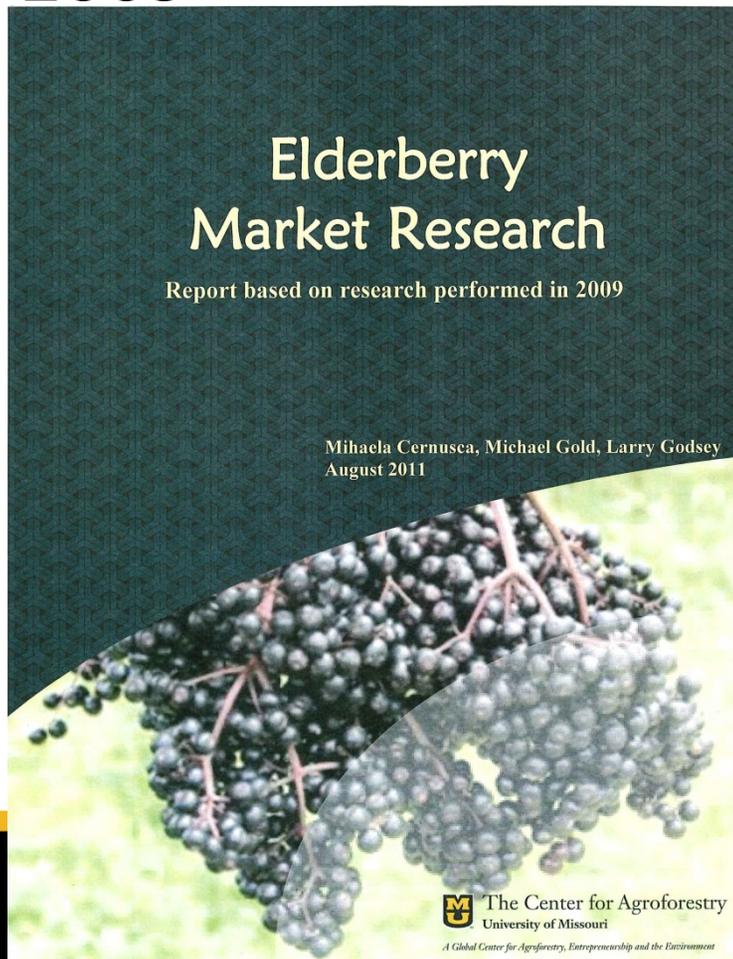
Picking Up Momentum: 2004-2010

- Missouri elderberry products available!
 - Lots of market testing and surveys



Picking Up Momentum: 2004-2010

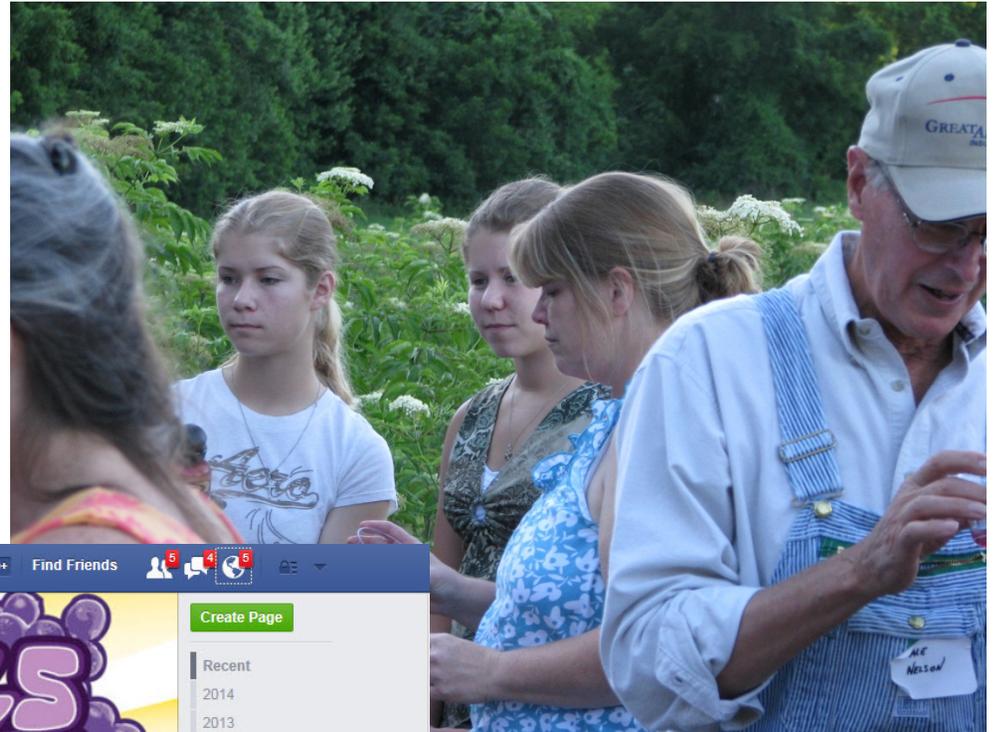
- Elderberry Market Research report published - 2009



- Economics and marketing
[http://
www.centerforagroforestry.o
rg/profit/
elderberrymarketreport.pdf](http://www.centerforagroforestry.org/profit/elderberrymarketreport.pdf)
- Report demonstrated a large potential market for Missouri-grown elderberries and elderberry products

Picking Up Momentum: 2004-2010

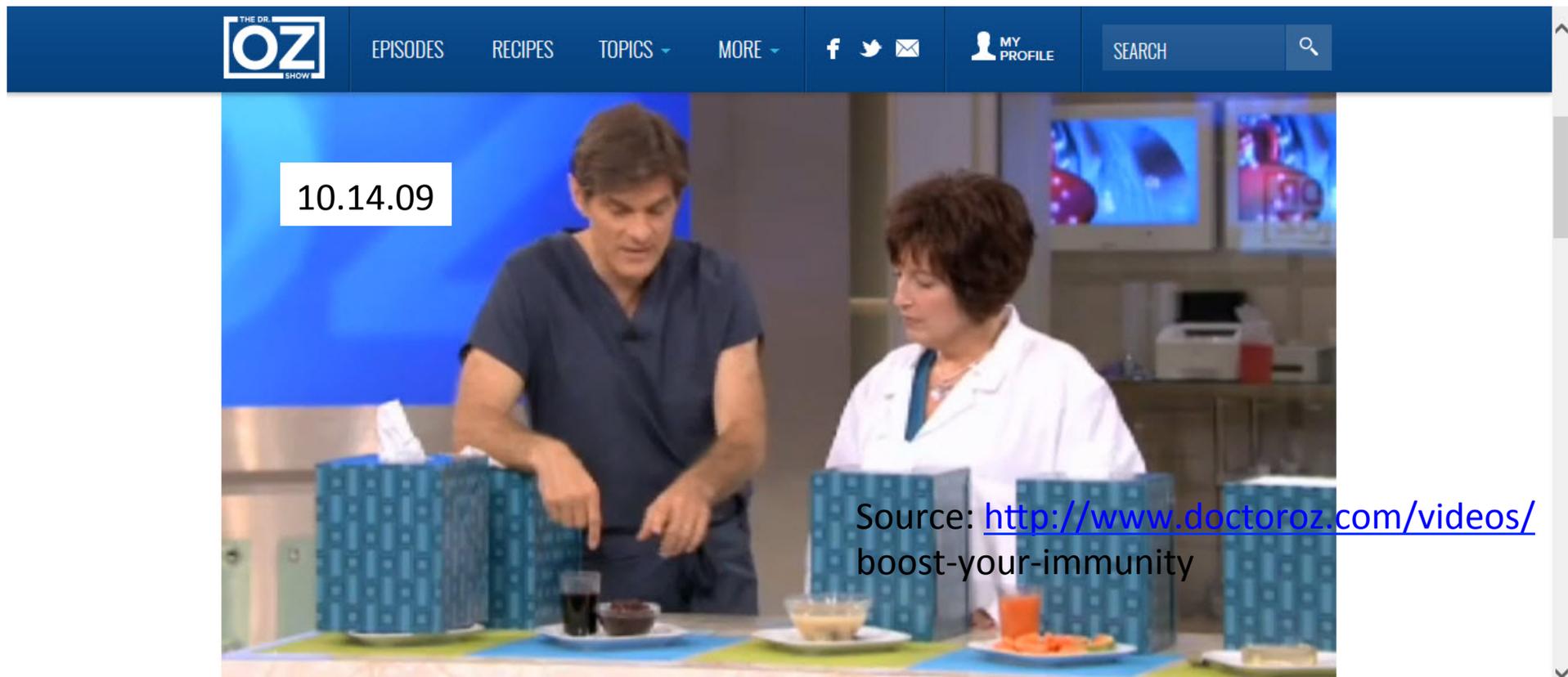
- Elderberry Festivals and workshops
 - Educate potential farmers
 - Educate the public



Source: http://riverhillselderberryfestival.com/General_Information.html

Picking Up Momentum: 2004-2010

- We join forces with Dr. Oz and Martha Stewart



Fast Growth: 2010-Present

- Highlights
 - The media discovers Missouri elderberries
 - Research continues and expands
 - Elderberry growers workshops
 - The International Elderberry Symposium
 - We need more growers!
 - We tackle challenges!
 - Building the elderberry market
 - Diversification of elderberry products
 - Diversification of elderberry markets

Fast Growth: 2010-Present

- The media discovers Missouri elderberries



Source: <http://www.columbiatribune.com/>

Elderberries, anyone? U.S. eyes 'nutraceutical' effect

By Alan Scher Zagier, Associated Press

Updated 6/27/2012 3:30 PM

Comment Recommend 3 Tweet 31 +1 6

HARTSBURG, Mo. – Missouri farmer Terry Durham is among those willing to bet the next hot food crop will be a berry now more commonly found in roadside ditches than supermarket shelves.



Folk healers have long used elderberries to concoct herbal remedies, but the federal government is now investing millions of dollars in studying their potential medicinal benefits. At the same time, the berries are enjoying increased popularity among gourmands ready to pay top dollar for locally grown produce.

Those factors have created interest among farmers and

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superfruit

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October 24, 2010 12:00 am • BY GEORGINA GUSTIN ggustin@post-dispatch.com > 314-340-6195

Hartsburg, MO. • First it was the ruby red, Middle Eastern pomegranate. Then came Brazilian açaí, followed by the Himalayan goji berry.



Fast Growth: 2010-Present

- Research continues and expands
 - Spotted wing drosophila
 - Health studies



Fast Growth: 2010-Present

- Elderberry growers workshops
 - Introduce farmers to the possibilities of elderberry production
 - Help growers build expertise
 - Help grow the supply of Missouri elderberries
 - Address current and future issues



Fast Growth: 2010-Present



By Patrick L. Byers, Andrew L. Thomas, Mihaela M. Cernusca, Larry D. Godsey and Michael A. Gold; University of Missouri.

The American elderberry (*Sambucus canadensis*, also known as *Sambucus nigra* subsp. *canadensis*) is native to much of eastern and midwestern North America. The plant is a medium to large multiple-stemmed shrub, bush or small tree (Fig. 1). Elderberry



Figure 1: The American Elderberry plant

is commonly found growing in a range of habitats throughout Missouri, but it prefers moist, well-drained, sunny sites and is often found along roadside ditches and streams. Elderberry is a beautiful plant with showy flat cymes of white flowers in June followed by bright purple to black berries in late summer (Figures 2 and 3). Ornamental forms are important landscape plants, and elderberry has been grown for generations as a backyard fruit. Based on identified market size and demand, opportunities exist to increase both the production and processing of elderberry across the value chain. At present, usage of both fruit and flowers for wine, juice, jelly, colorant and dietary supplement



Figure 2: The blossoms of the American elderberry

products is on the rise. European elderberry (*Sambucus nigra*) is grown as a commercial fruit crop in Europe and elsewhere. The American elderberry, however, appears to be a better candidate for commercial production in Missouri. This guide outlines production practices and market information for American elderberry based on research and growers' experiences in Missouri.



Figure 3: The fruit of the American elderberry



- Growing and Marketing Elderberries in Missouri
<http://extension.missouri.edu/explorepdf/agguides/agroforestry/af1017.pdf>
- Video:
<http://www.youtube.com/watch?v=ebYtzcnbVoE>
- Over 60,000 visits to the web version in the past year

Fast Growth: 2010-Present

- 2013 First International Elderberry Symposium
 - June 9-14, 2013 in Columbia, MO
 - International Society for Horticultural Science
 - Scientists and farmers from 13 countries
 - 205 attendees: Scientists, Processors, Farmers
 - Highlighted the Missouri elderberry research and industry development
 - We learned from specialists from around the world!!!

The First International Symposium on Elderberry



June 9-14, 2013 | Stoney Creek Inn | Columbia, Missouri, USA

Fast Growth: 2010-Present



Fast Growth: 2010-Present

- We need more growers!
 - Annual elderberry growers workshop
 - Federal/state Cost share/support programs
 - Discuss elderberry production at every opportunity!



Fast Growth: 2010-Present

- We need elderberry planting stock!

[Botany Shop Garden Center](#)

710 Minnesota Ave. Joplin, MO 64801
In business since 1973
Container grown and guaranteed to be disease free.

[POLKARASPBERRY.COM](#) [CONTACT](#) [BOTANYSHOP.COM](#)

Elderberry plants

Our elderberry plants come from hardwood and softwood above ground cuttings only. We never do bare-root cuttings with the idea that the soil on the bare-root plants can spread soil-borne organisms and disease. Before we stick elderberry cuttings to root in our clean, sterile, new Oasis root cubes we soak them in a dip of *Zerotol*. This is a hydrogen dioxide solution to kill and control horticulture diseases. This kills spores of algae, bacteria and fungi. We also add *Zerotol* to our misting solution to further minimize disease in our propagation beds.

When you plant our elderberry plants try to keep them at least 100ft. away from other elderberry plantings for disease control. I think, *and hope*, the *Zerotol* has controlled the eriophid mites which are a common pest of elderberries. Note: The way my fingers are puckered up I don't think bores, insects or mites could survive in our *Zerotol* mist system.

[Growing and Marketing Elderberries in Missouri](#) -----This is a large Adobe Acrobat file with many pictures and it takes a while to download.

We grow 5 sizes of elderberry plants:

[CLICK TO ENLARGE](#)



Small Wedge Oasis	78/tray
Peat Pots	32/tray
Oasis Cubes	50/tray

Peat Pots and Oasis Cubes are the same price.

[PLANTING INSTRUCTIONS](#)

Source: <http://www.botanyshop.com/>



Source: <http://www.risingcreeknursery.com/>

Fast Growth: 2010-Present

Entrepreneurism at work!



Fast Growth: 2010-Present

- Building the elderberry market
 - Several processors

Featured Items

- **Bottle of Pure Elderberry Juice** - avail. in 1, 4, or 12 pks

Each 1 oz. dose contains powerful amounts of antioxidants, vitamins A, C, B-6, thiamin, riboflavin, niacin, folate, calcium, iron, magnesium, phosphorus, potassium, and copper. Elderberries are known for boosting the immune support system and...
Price: \$16.97
[Options](#)
- **T.E.D. - Terry's elderberry destemmer**

\$7,000.00
[Add To Cart](#)
- **Bottle of Pure Elderberry Juice** - avail. in 1, 4, or 12 pks

\$16.97
[Options](#)
- **Elderberry Jelly** - available in single, 4 pack, or case of 12

\$5.95
[Options](#)
- **Elderberry Throat Coat & Herbal Cordial** (single, 4 or 12 pks)

[Options](#)
- **Elderberry Cuttings** - 100 or 1000 bulk discount lots available


[Shopping Cart \(0\)](#)

Source: <http://shop.riverhillsharvest.com/>

Source: <http://www.sanosprings.com/>

Sano Springs
Healthy Juices & Juice Blends

Contains 100% elderberry juice made with Missouri grown elderberries

Welcome to Sano Springs!

- > Home
- > Products
- > Nutrition Information
- > About Us
- > The Farm
- > History
- > Photo Gallery
- > Links



Fast Growth: 2010-Present

- Diversification of elderberry products
 - Juices, concentrate, tincture
 - Juice blends with other juices or honey
 - Jelly
 - Wine
 - Ice cream
 - Beer



The Future

- Research needed
- Missouri elderberry products go nationwide
- Interest in new elderberry products
- Future markets for elderberries

The Future

- Research needed
 - Continued development of adapted cultivars
 - Production for flowers
 - Pest management
 - Propagation and standardization of nursery stock
 - Descriptors for elderberry
 - Harvest parameters



The Future

- Missouri elderberry products go nationwide
 - Distribution in at least 7 states
- Interest in new elderberry products
 - Flower based products
 - Phytochemicals from non-fruit plant parts
 - Dream big!!!!
- Future markets for elderberries
 - Increased use of elderberry as an ingredient
 - Opportunities for local products as well as nationally available products

The Future



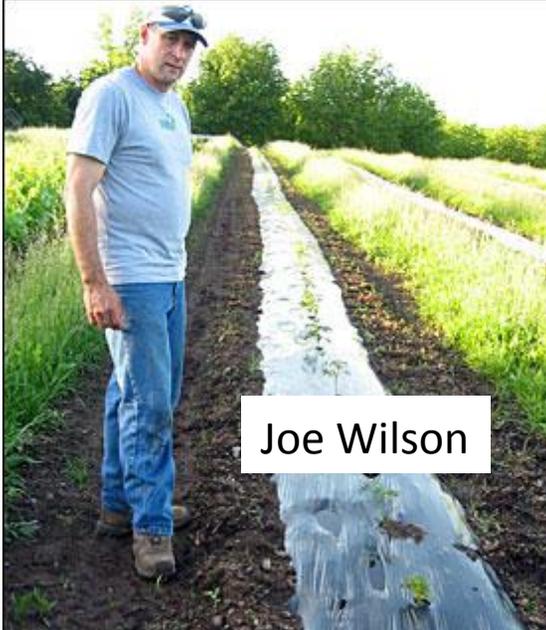
Source: <http://minnesota-elderberry.coop/>

Elderberries are of interest nationwide

Elderberry products for local sales



The Future



Joe Wilson



Earnie Bohner



Phyllis Hannan



Devon Bennett



John Bunge

Challenges

- Funding to conduct necessary production and marketing research for alternative crops
- Nursery production of consistent planting stock
 - Standardization of cultivars
 - Proper production practices
 - Virus testing
- Production challenges
- Product development challenges
- Maintaining a consistent product
 - Harvest parameters
 - Standardized cultivars
- Regulatory challenges
- Lots of work to be done to promote elderberry!

Lessons Learned

- It's all about relationships
- Sometimes good things take time
- A new industry needs champions!
- Cooperation is critical to build a sustainable industry
- Differentiate the product
- The only constant is change
- Address challenges head on, but consult with experts

Any Questions?



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Fast Growth: 2010-Present

- Midwest Elderberry Association formed

Source: <http://www.elderberrygrowers.org/>

