

Elderberry's Place in Your Forever Green Farm Plan

*A profitable way to help grow our lands more green
while keeping our waters more blue.*

Midwest Elderberry Cooperative
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Green Lands Blue Waters
2019 Conference



Great Biological Diversity East of the Rockies

Sambucus nigra canadensis, Sambucus canadensis, Sambucus ???

adaptable, under researched botanical variation

Elderberry: Botany, Horticulture, Potential

Denis Charlebois, Patrick L. Byers, Chad E. Finn, Andrew L. Thomas, page 3.

The elderberry or elder (*Sambucus* ssp.) in production or growing wild in the northern hemisphere, may have the widest range of applications of all small fruits. Members of the genus *Sambucus* have a multitude of uses including: river bank stabilization and windbreaks (Paquet and Jutras 1996); wildlife food and refuge; ornamental, crafts and games; versatile human food source, and multi-purpose medicinal (Vallès et al. 2004).



Why Native Elderberry?

- ❖ **Black - Sambucus canadensis: east of the Rockies - avoid the red**
- ❖ **Many environmental benefits: e.g. 60+ native pollinators**
- ❖ **Relatively inexpensive to install and maintain**
 - ◆ c.1000 acres planted in USA - over 1/3 in Missouri
 - ◆ Flexibly adapts to, different cultivars for, many soil/climate combinations
 - ◆ Managed by mowing, bush-hogging, flailing, hand pruning
- ❖ **Research needed: cultivar + soil differences = what nutrient variations?**
- ❖ **Established and growing market demand: #1 commercial value berry in Missouri**
- ❖ **Tastes better than the European elderberry (S. nigra)**
 - ◆ Sweeter than straight cranberry or tart cherry - about half the BRIX of grapes
 - ◆ Sweet neutral, nutrient dense - 7 antioxidants, vitamins, minerals
- ❖ **Strong interest by a dozen national brands - certified organic ingredients**
- ❖ **Limited, undercapitalized crop handling and processing**
- ❖ **MEC organizational structure friendly to strategic supply chain alliances**

Elderberry Advantages

- ❖ Traditional health benefits
- ❖ Supported by research
- ❖ Sweet-neutral berry flavor
- ❖ Elderberry product sales up 85% over 2018
- ❖ Cultural memories
 - ◆ Healing herb
 - ◆ Monty Python
 - ◆ Pioneer farming uses
 - ◆ Arsenic & Old Lace



The First International Symposium on Elderberry



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

University of Missouri in Columbia, MO June 9-14, 2013
ISHS Acta Horticulturae 1061, published January 12, 2015

Although a great deal of research – especially clinical studies – remains to be done, those who researched the potential health benefits of elderberry repeatedly summarized their research as supporting elderberry’s traditional use as a densely nutritional herb that has imparted a number of observed health benefits to its consumers. These results indicated the strong antiviral and anti-inflammatory properties that elderberry’s flavonoid antioxidants (anthocyanins, rutin, quercetin, etc.) have demonstrated in lab tests. Different research reports supported the use of black elderberry flowers and fruit for both prophylactic (take in advance to help prevent a condition) and in treatment of symptoms from the flu or other malady... (<https://midwest-elderberry.coop/health-nutrition/intl-symposium.html>)

- ❖ Elderberry & Brain Health
- ❖ Elderberry Horticulture
- ❖ Elderberry & Human Health
- ❖ Marketing & Industry
- ❖ Overview & Botany

Raw Native Elderberries Safe to Eat?

- ❖ A multi-year project ending in 2018 by University of Missouri researchers discovered that ripe native (*Sambucus canadensis*) black elderberries and their seeds do not have any meaningful level of glycosides or proto-cyanides that can make one sick. [Note: Ripe native (*S. canadensis*) berries often appear more reddish in color than the European (*nigra*) berries, which is probably due to the additional anthocyanins found in the North American condenses cultivars. Native berries are also quite a bit smaller.]
- ❖ While recent research at the university of Missouri (looking to be published) indicates that fresh/frozen, ripe elderberries do not have significant levels of glycosides, some few people seem to be strongly affected by consuming raw elderberries or elderberry juice, where it upsets their digestive system. Why they have a lower tolerance for elderberry is not clearly understood. Fresh and raw frozen berries that are fermented or heated so that the entire volume reaches 180° F, or more have not been associated with any health related incidents to our knowledge.



MIDWEST
ELDERBERRY
COOPERATIVE

- ❖ A MN 308(b) berry grower cooperative
- ❖ Founded September 11, 2012
- ❖ 21 members networked w/100 growers
- ❖ Concentrated in Midwest
- ❖ Now coast-to-coast
- ❖ Most small w/value added products
- ❖ Option for commercial scale and participation in MEC's profits/losses
- ❖ Open cooperative seeking new members

Growing to make a positive impact on the health of people by supplying the highest quality native North American elder flower and berry ingredients using environmentally and socially sustainable practices.

Project 22-50: 2025 goal of 2,250 acres of cultivated native elderberry - that's 10,000,000+ lb. harvested and sold w/ \$10,000,000 investment

Europe has an estimated 30,000 farmed acres & wild collection.

As Found in Nature

- ❖ Open/semi-open areas at forest edges
- ❖ Seedlings compete poorly with more aggressive species, weeds, but mature canes can outcompete buckthorn.
- ❖ Extensive shallow root system, rapid annual growth from 5-10 ft., supports 60+ native pollinators, wildlife habitat
- ❖ Thrives best in full sun or partial shade
 - ◆ Along streams and seasonal waterways
 - ◆ Openings in wooded canopy
 - ◆ Disturbed sites
 - ◆ Along roadsides, pathways



Imitating Natural Habitat

- ❖ Primary focus on its environmental benefits
- ❖ Borders, windbreaks, islands or contours
- ❖ Marginal soils - rocky, sandy (but needs mulch)
- ❖ Soil retention - erosion & run-off control
- ❖ On berms in low wet areas, along ponds
- ❖ Sucks up nitrogen and converts it to biomass
- ❖ Cut down every 1-3 years to renew ~ cultivar
- ❖ Organic pest & disease control requires rows or blocks to be 3-4 ft. wide - open sun, air, access



Planning Approaches

CLC - Continuous Living Cover Farming

❖ Permaculture Template

- ◆ Substitute plants with desired crop potential
- ◆ Silvopasture

❖ Interstitium Model > getting to 10% of farm area: marginal + cultivated lands

- ◆ “The interstitium is a contiguous fluid-filled space existing between a structural barrier, such as a cell wall or the skin, and internal structures, such as organs, including muscles and the circulatory system. The fluid in this space is called interstitial fluid, comprises water and solutes, and drains into the lymph system. The interstitial compartment is composed of connective and supporting tissues within the body – called the extracellular matrix – that are situated outside the blood and lymphatic vessels and the parenchyma of organs.”
- ◆ “The interstitial fluid is a reservoir and transportation system for nutrients and solutes distributing among organs, cells, and capillaries, for signaling molecules communicating between cells, and for antigens and cytokines participating in immune regulation.” (<https://en.wikipedia.org/wiki/Interstitium>, retrieved 10/28/2019)

Interstitium Interpreted

- ❖ “Such [‘honeycomb-like’] structural components exist both for the general interstitium of the body, and within individual organs, such as the heart and kidney.”
- ❖ CLC of varying native plant populations both within and between primary crop plots, farms
- ❖ Masses of annuals and perennials provide reservoirs and rivers of living soil and biome.
- ❖ Microbes, insects, birds & critters - some undesirable, but also potential for natural control
- ❖ Elderberry an ideal intermediary perennial crop



Commercial Production

- ❖ Primary/secondary berry and/or flower crop
- ❖ Sustainable - native to North America
- ❖ Flexible strategies ~ to size of planting
- ❖ Easy to start small and to plant - hardwood cuttings
- ❖ Potential high crop value/acre: \$4,000-30,000
- ❖ Challenges to commercialization
 - ◆ Certified organic cuttings and crops
 - ◆ Harvest, storage and distribution logistics
 - ◆ Crop handling equipment availability/design
 - ◆ Equipment required ~ scope and size



Elder Crop Challenges

- ❖ Elder spread vigorously by roots - up to 8ft. away
- ❖ Hand-harvest of a mostly uneven ripening berry
- ❖ Small window of time to harvest: most uses or buyers require a destemmed, frozen berry
- ❖ Multiple early stage destemming machines
- ❖ Takes from 2-4 years to establish a field - 1-2 yr. issues with weeds
- ❖ Soil requires organic matter: compost & mulch - blackberries
- ❖ Large blocks of rows mean more plant health problems from pests & some diseases but always CLC with mixed low grasses kept mowed
 - ◆ Japanese beetles, SWD, borers, mites
 - ◆ Sedge intermediary rust, some powdery mildew
 - ◆ Neem oil spray very helpful



Developing Market

- ❖ Direct to consumers: u-pick, frozen packs
- ❖ On-farm value added products
- ❖ Flower/berry products/ingredients to craft food & beverage makers, herbalists, breweries, wineries
- ❖ Sales of berry/flower crop to grower cooperative
- ❖ National distribution: River Hills Harvest brand
- ❖ Global ingredient competition, quality standards
- ❖ “...wild elderberry have the lowest quantities of these bioactive compounds...” *Bioactive properties of Sambucus nigra L. as a functional ingredient for food and pharmaceutical industry*, Karolina Młynarczyk, Dorota Walkowiak-Tomczak *Poznan University of Life Sciences, Institute of Food Technology of Plant Origin, ul. Wojska Polskiego 31, 60-624 Poznan, Poland*
[Point #14: <https://midwest-elderberry.coop/health-nutrition/functional-ingredient.html>]

River Hills Harvest ElderBerry Products



Research Opportunities

- ❖ Unexplored trait/genetic diversity - cultivars
 - ◆ Determinate, indeterminate
 - ◆ Vast differences in flower size/bouquet
 - ◆ Bear fruit on a primal cane or not?
- ❖ Cultivars ~ nutrient diversity, soil preferences
- ❖ Even berry ripening, cyme retention, release
- ❖ Genetic editing
- ❖ Ingredient design & process development
- ❖ Measure impact on environment



The Zen of Elderberry

Find its place in your life, on your land.