

# Evaluation of Elder as a Florida Crop in with a Focus on Non-Conventional Growing

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## INTRODUCTION

American Elder, *Sambucus nigra* ssp. *canadensis* also known as elderberry and elderflower, is a perennial plant that produces clusters of small creamy flowers in late spring, which become dark purple berries by the end of the summer. It can vary in size from bush to small tree, though for cultivation purposes it is kept on the smaller for ease of harvest and plant health. Unusual as a crop, as both the flowers and berries can be harvested, and either sold fresh or processed. Flowers are used to make syrups, cordials, sodas, and fritters, with their most famous usage in St. Germain, a liquor. Elderberries are sold dried and fresh, as well as being processed into syrups, jams, and supplements; They are of greater interest to growers, recently becoming a focus of the healthy food community, as a potential superfruit due to high anthocyanin content. Health benefits include: aiding with respiratory ailments, colds, cardiovascular diseases, diabetes and obesity, with positive effects on the immune system, antiviral and antibacterial activity, and protection against UV radiation<sup>8</sup>

Of increased interest to Floridian growers, with rising demand (COVID), greater sustainability, and huanglongbing (HLB) continuing to effect citrus production

## ELDER IN FLORIDA

- Wild native *S. nigra* throughout Florida (formerly *S. simpsonii*) indicative that can and will thrive as commercial crop with additional aid by growers
- preferred method of propagation is clonally through hardwood cuttings thanks to dormancy barriers in seed, and seedling variation
- increased vigor with cross pollination, and while capable of self pollination, documentation of reduced seed set, suggesting inbreeding depression.
- does not require grafting
- hardier than most other floridian fruit
- fruit production in 2 years min.

### Hurdles

- european elder yields of 11-51 lbs per plant,
- American cultivars yields at 4-5 lbs per plant
- >90% of US elderberry products are derived from European imports<sup>10</sup>
- European Elder (*Sambucus nigra* ssp. *nigra*) is unable to easily fruit in Florida due to chilling hours, any cultivars using genes or germplasm will be likely be unfit for floridian growers
- most cultivars are designed for Midwest, similar difficulties in Floridian heat
- hand harvested: cymes ripen at different rates
- processing issues: remove seed from stem to reduce glycosides
- must have facilities to process elder, market for fresh berries is limited

## HYPOTHESIS

Elder's unique properties make it an excellent plant for Floridian growers to expand into, especially given the growing market for elderberries as a superfruit. In addition to conventional growing, elder also shows a great deal of potential for growth on marginal land and intercropping

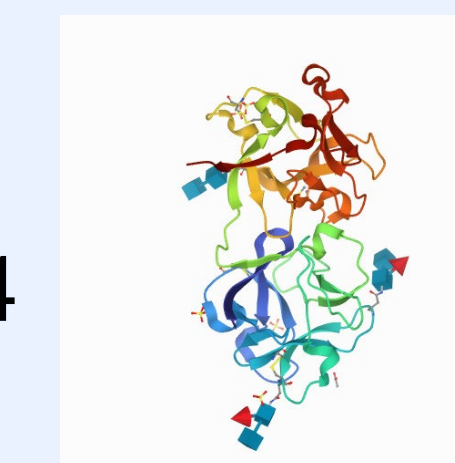
## MARGINAL LANDS

- Marginal Land: unused and often unsuited for conventional ag
- Riparian Barrier:
  - prolific roots
  - reduced erosion and runoff
  - nutrient scavenging
- Proclivity as native floridian species
- avoidance of mechanical harvesting
- infected (HLB) citrus orchards?

## INTERCROPPING POTENTIAL

### Elder Toxicity and Natural Insecticidal properties

- elder was historically planted near dairies to discourage insects
- glycosides and alkaloids, both toxic, discourage insects
- protein lectins in elder:
  - Sambucus nigra agglutinin I and II (SNA-I and SNA-II).
- induced apoptosis in some insects
- lectins known toxicity to: Lepidoptera, Coleoptera, and Hemiptera<sup>5,6</sup>
- SNA-I proven against<sup>7</sup>:
  - *Acyrtosiphon pisum* (pea aphid)
  - *Myzus nicotianae* (tobacco aphids) reduced survival.<sup>4</sup>
- repellent/guard intercrop
  - push/pull



### Agroforestry/Intercropping

- successional development
- alley intercropping, boundary intercropping, shelterbelts
- too bushy for conventional agroforestry
  - lacks canopy
  - cannot be used as scaffold

### Intercropping with commercial crops

- best for reducing runoff, erosion, and specific pests
- proper niche partitioning
  - determine LER
  - allelopathy?
- data suggests tobacco as good candidate
- Elder need nitrogen for yield, so, Fabaceae
- Should not be intercropped with plants that share similar pests, such as *Drosophila*
- Do Not use in pastoral or forage situations

## CONCLUSIONS

### Major findings summary

elder has a great deal of promise in various utilizations throughout Florida. In particular, it would be well suited for intercropping, growth on marginal lands, and organic farming. These are all promising by way of offering more sustainable methods for growers, helping reduce eutrophication of Floridian water by decreasing fertilizer and reducing runoff.

### Next steps

#### Research

- trials on elder yield and hurdles in florida
- intercropping trials with tobacco, peanut, others.
- IPM using elder

#### Breeding

- adaption to the warmer climate, with increase diseases/pests
- ensure chemical contents:
  - fruits: high rates of anthocyanins in berries, low glycosides, alkaloids
  - rest of plant: high rates of lectins, glycosides and alkaloids to discourage insects
- mixed success with hybrids, introgress former *S. simpsonii*
- marker-assisted breeding with ISSRs<sup>4</sup>
- flower harvest

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