



# Elderberry

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## Introduction

The American elderberry (*Sambucus nigra* subsp. *canadensis*) is a large shrub or small tree native to Kentucky. Wild stands are found growing from Florida to Quebec and west to the Rocky Mountains. It is closely related to the European elderberry (*Sambucus nigra*), which exhibits very similar morphological characteristics. The small fruit has prominent seeds that are produced in large clusters (corymb). While elderberries are not normally eaten fresh due to their tartness, wild and cultivated elderberries can be processed, either alone or with other fruit.

Significant elderberry research has been conducted by the Center for Agroforestry at the University of Missouri. Kentucky producers considering an elderberry enterprise can review research-based publications about elderberry at the Center for Agroforestry website, <http://www.centerforagroforestry.org/>.

## Marketing and Market Outlook

Most commercially grown elderberries are sold to processors for wines, juices, jellies, jams, syrups and pies. Both the fruit and flowers are used in winemaking. Additionally, there is a growing demand for elderberries in the health tonic industry. Wholesale growers should arrange for a market contract prior to production.

Commercial elderberry production and market development efforts in the United States are currently focused in Missouri and in northern states. As of early 2018, a Missouri farm harvests its own elderberry acreage and sources elderberries from other Midwestern growers to pro-



cess into juice, syrup and other value-added products. Minnesota-based Midwest Elderberry Cooperative coordinates production and sourcing from Minnesota, Iowa, Wisconsin, Illinois, Missouri and Texas. Efforts in Missouri are complemented by production research (variety trials, pest management and other production research, market research and economic analysis) by the University of Missouri and Missouri State University.

## Production Considerations

### *Cultivar selection*

Elderberry varieties differ in earliness, yield, hardiness, plant vigor and disease susceptibility. Berry flavor, as well as cluster and berry size, can also vary between cultivars. Fruit color may be red



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to bluish-black to dark purple. Many of the improved cultivars currently available were developed in New York or Nova Scotia between the 1920s and 1960s. The University of Missouri released two cultivars, 'Bob Gordon' and 'Wyldehood,' in 2010-11. Growers should select only adapted varieties that have the qualities in demand for the intended market.

#### *Site selection, planting and maintenance*

Virus-free bare-rooted plants of horticultural varieties can be purchased commercially. Plants are also easy to propagate from seed, cuttings or suckers, though plants grown from seed may not have the same desirable characteristics as the parent. One-year-old nursery stock plants are transplanted to a well-tilled site in early spring. Plants are somewhat tolerant of wet or poor sites; however, repeated flooding during active growth will reduce productivity. Elderberries are relatively drought intolerant and very sandy soils are not recommended because they support limited growth. The best soils are well drained and moderately acidic (pH 5.5-6.5). Plants have a shallow, fibrous root system that can be damaged if the soil is cultivated too deeply for weed control; mulches, mowing, or landscape fabric for weed exclusion are better control practices. According to production research in Missouri, elderberry can benefit from a light (less than 10 pounds per acre) nitrogen application one to two months after planting. Mature plantings can benefit from annual applications of 60 to 80 pounds of nitrogen per acre and other nutrient applications according to soil tests.

Fruit is borne at the tips of the current year's growth, as well as on older wood. While second-year canes with several lateral branches are generally the most productive, fruit clusters are largest on new vegetative canes arising from the crown. Elderberry plants are partially self-fruitful and will require more than one variety in a planting to ensure cross-pollination. Row spacing for newer Midwest plantings is usually 10-12

feet, with plants spaced 4 feet apart.

Elderberry should be pruned during dormancy to remove dead, damaged and unproductive canes. Pruning is also beneficial for disease and insect management. Canes are removed at ground level, leaving equal numbers of 1-, 2- and 3-year-old canes. Complete renewal of all canes annually or biannually is an alternative method, though it can reduce yield the year that it is performed. Benefits of complete renewal over selective pruning may include larger, later ripening fruit clusters and a more concentrated harvest period with the possibility of greater harvest efficiency.



Elderberry flowers

#### *Pest management*

Relatively few insects and diseases are problematic on elderberries. Potential insect pests include cercropia caterpillars, eriophyid mites, Japanese beetles, elderberry longhorn beetles, cane borers, sawfly larvae, aphids and fall webworms. Spotted wing drosophila is possibly the most serious pest of elderberry fruit. Diseases such as viruses, cankers,

leaf spot, rust and powdery mildew may attack elderberry. Few pesticides are labeled for use on this crop, so growers will likely need to rely on good cultural practices for pest management. Birds can be a serious problem, especially in small plantings near woods. Selections such as 'Bob Gordon,' in which the fruit clusters hang downward, are somewhat less attractive to birds.

#### *Harvest and storage*

Elderberry comes into full production after three to four years. Fruit is hand-harvested in August and September by cutting the cluster from the bush once all berries in a cluster have fully ripened. Because berries produced on different age canes will ripen at different times, fruit is generally harvested weekly over a period of approximately three weeks.

Several methods of destemming harvested fruit exist for smaller producers. Freezing will soften the berries,

allowing for easier removal by stripping, shaking or knocking off the fruit. The harvested fruit is either re-frozen for later processing or thawed for immediate processing. Fresh fruit can be separated from the cluster by knocking against a bucket, rigid harvest container, or by rubbing against a hardware cloth frame. Mechanical destemming machines exist for larger commercial production.

Harvested fruit is very perishable and requires prompt refrigeration and/or freezing to preserve quality. Freezing and/or heating during processing will reduce the cyanogenic glycosides present in the flesh. Concentration is generally low enough that fresh fruit eaten in reasonable quantities will not produce a reaction, though some consumers are more sensitive than others and may experience nausea.

With good growing conditions, an average yield of 3 to 4 tons of fruit per acre can be expected. According to researchers in Missouri, elderberry plants “will likely remain productive for at least five years, but the full productive life of an elderberry planting is not known.”

#### *Labor requirements*

Elderberry production is labor-intensive since the berries must be removed from the cluster after field harvest. Labor needs per 1/5-acre are approximately 20 hours for production and 130 hours for hand harvest and freezing/processing; labor needs could vary significantly depending on harvest method and use of stem separation equipment. Mechanical elderberry harvest is under investigation in some parts of North America. Machine harvest could significantly reduce harvest labor time but would require the equipment to be used over significant elderberry acreage to be financially feasible.

### **Economic Considerations**

Initial investments include land preparation and the purchase of planting material. An additional start-up cost could include the installation of an irrigation system since elderberry is drought intolerant. Producers who do not already have an existing refrigeration system in place will also incur this cost for processing. Those producers who do have existing cooling systems may be able to reduce their fixed production cost by nearly \$1,000 per year, depending on the size and scale of the cooling facility. The potential for retail

elderberry production in Kentucky is most likely for small-scale processing in a certified kitchen or other food preparation facility. Elderberry wine production is also a possibility.

Elderberry yields range from 4,000 to 6,000 pounds per acre. Actual costs of production can wildly vary for a crop like elderberry, where there is limited commercial production experience. Approximate establishment costs for an irrigated small-scale (1/5-acre) elderberry planting in Kentucky (2018) were estimated at \$2,400, assuming a plant purchase price of \$4 per plant for 180 plants. Annual production costs could range from \$500 to \$600 per 1/5-acre, with harvest and marketing costs ranging from \$300 to \$1,500, depending on yields and harvest labor time. Total annual expenses for a full-bearing 1/5-acre, including both variable and fixed, are estimated at \$3,000. This includes an annual amortized cost of about \$700 for refrigeration and/or freezing of elderberries. Presuming gross returns of \$3,920 per full-bearing 1/5-acre, returns to land, capital and management would be approximately \$900 per 1/5-acre. These 2018 estimates presume a realized price of \$3.50 per pound of elderberries. For every \$0.10 change in price, returns per 1/5-acre will increase by approximately \$120.

A crop such as elderberries can also generate non-financial returns to producers and landowners. Elderberries are a native plant possibility for incorporating into agroforestry production and conservation systems. Site-specific considerations for establishing elderberry plantings could include their use as windbreaks and buffers. Landowners may be interested in establishing a small, intensive planting of elderberries for a financially profitable harvest for food purposes while also establishing other plantings for conservation, wildlife habitat or property improvement purposes.

### **Selected Information**

- Growing and Marketing Elderberries in Missouri (University of Missouri, 2012) <https://extension2.missouri.edu/AF1017>
- Elderberry Market Research (University of Missouri, 2011) <http://www.centerforagroforestry.org/profit/elderberryreport.pdf>
- The First International Symposium on Elderberry (University of Missouri, 2013) <http://www.centerforagroforestry.org/profit/ElderberrySymposiumGuide.pdf>

- Economic Budgeting for Agroforestry Practices (University of Missouri, 2010) 1 MB file <http://extension.missouri.edu/explorepdf/agguides/agroforestry/af1006.pdf>
- Fruit Production Guide: Elderberries (Pennsylvania State University) <https://extension.psu.edu/fruit-production-for-the-home-gardener>
- Agroforestry on the Farm: Elderberry (Iowa State University, 2016) <https://www.extension.iastate.edu/smallfarms/agroforestry-farm-elderberry>
- Organic Practices for Elderberry Production (University of Vermont Extension, 2016) <https://www.uvm.edu/sites/default/files/media/elderorganichandoutaug16.pdf>

- Growing Elderberries: A production manual and enterprise viability guide for Vermont and the Northeast (University of Vermont Extension, 2016) <http://www.rosaliewilson.com/wp-content/uploads/2017/01/ElderberryGuideComplete.pdf>

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*Reviewed by John Strang, UK Extension Specialist, and Daniel Becker, UK Extension Associate*  
*Photos courtesy of John Strang*

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