Goldenseal

Cheryl Kaiser and Matt Ernst

Introduction

Goldenseal is an herbaceous perennial woodland plant that is highly valued for its many herbal medicinal uses. The dried roots have been used for the treatment of eye, skin, and digestive disorders. Goldenseal has also been marketed as an immune system stimulant. Leaves and stems have commercial value when harvested while still green. Goldenseal's natural range, which includes Kentucky, is similar to that of ginseng.

Marketing and Market Outlook

Kentucky is a major harvester of wild goldenseal. Unfortunately, a decline in native populations has occurred as demand and harvesting pressure has increased. Like ginseng, goldenseal is listed in Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) agreement. As such, international trade of goldenseal is closely controlled to prevent over-exploitation that could lead to further endangering the species.

Unlike ginseng, the market does not distinguish between wild and cultivated goldenseal. Because roots bring the same price regardless of production method, goldenseal is a good candidate for cultivation. Potential producers of goldenseal should identify current price levels, as goldenseal root prices paid by dealers reportedly peaked around $40 per pound in 2000, before declining to $5 to $20 per pound between 2006 and 2015. Published prices for dry goldenseal root in 2018 fell into the $40-$44 range, and prices for the tops ranged from $2-$12. Price depends on product quality and annual supply, which can vary considerably. Because of fluctuating prices, like other medicinal forest products, potential goldenseal producers should consider production for reasons other than steady profitability. Highly variable prices create marketing risk. Product differentiation, such as seeking organic or other certifications, may help producers realize potential price premiums.

The same state-licensed dealers who purchase ginseng also buy goldenseal, along with a number of other woodland medicinals. In addition, co-ops or herbalists might be interested in purchasing dried or fresh roots. Direct sales to consumers may also be an option; producers must follow all applicable state and federal regulations in the sale of protected plants and herbal products including labelling, processing and marketing. NO medical claims can be made regarding the use of this plant.



Goldenseal

Production Considerations

General

Goldenseal is often grown under the same natural conditions or shade structures as ginseng. In fact, because of the similarity of cultural requirements, goldenseal makes the ideal succession crop for ginseng growers.

Cultivated plants must be provided with growing conditions similar to those present in wild sites. This includes moist, well-drained soil high in organic matter. There have not been enough replicated studies to make definitive fertilizer recommendations; however,

based on a few studies and grower experiences on a high organic matter soil, goldenseal may benefit from a light fertilization of a balanced fertilizer like 5-5-5 when growth begins in the spring. Whole and/or shredded leaves, bark chips, or a bark and sawdust mix may also be used as a mulch, and will help to fertilize the plants as these materials decompose. Goldenseal is more tolerant of light than ginseng and prefers 60% to 75% shade. Plants grow best in a slightly acid soil (6.0 to 7.0) but will die out if the pH level drops below 5.5.

The selected site should have a slight slope, preferably facing north or east. The best wooded sites are those with long-lived, deep-rooted deciduous trees, such as oak, hickory, beech, tulip poplar, sugar maple, and walnut. Wild plants that indicate good goldenseal growing conditions include jack-in-the-pulpit, mayapple, trillium, wild ginger, bloodroot, black cohosh, and to a lesser extent, blue cohosh.

Propagation

Goldenseal plantings may be started from seed, root fragments, rhizome divisions, or 1-year-old seedlings.

Seeds for propagation should be harvested when the berries turn dark red and soften. Goldenseal seed requires a period of cold stratification, which can be met naturally by planting outdoors immediately after collection, or artificially by refrigerating seeds at temperatures of 35º F to 40º F. Seed should be removed from the fruit and never be allowed to dry out. Because germination can be unpredictable, with rates ranging from 10% to 90%, it is best to sow seeds into a prepared seed bed first. Plant seeds approximately ½ inch to ¾ inch deep, and apply 1 to 2 inches of leaf mulch immediately after planting. Later, in the fall after the first or second growing season, the seedlings can be transplanted to a permanent location.

Small root fragments can also be used to start new plants; however, they may remain dormant for a year after planting. Like goldenseal seeds, it is best to plant these smaller roots into a propagation bed for 1-2 years before moving them to a permanent site.

Propagation of goldenseal from rhizome divisions is the most reliable method of production. Divisions should be approximately ½ inch to 1 inch long with a well-developed bud and healthy fibrous roots. Additionally, this method produces a marketable root in less time than propagation from seed or small root fragments. Rhizomes are divided during dormancy in the late summer or early fall and then planted approximately 2 inches deep.

Production Methods

Wild goldenseal grows naturally, without human influence, in clonal patches with many plants sharing an interconnected root system. Because goldenseal is considered a

vulnerable plant with declining populations, harvesting wild populations is not encouraged.

Wild-simulated goldenseal is grown in untilled soil in a favorable forest location. Little site preparation is required other than raking away the leaf litter down to the topsoil, and planting rootlets in individual holes or furrows. Once goldenseal is planted, the leaf litter is raked back into place. Absent of disease or pest issues, minimal labor is required until harvest when plants are hand-dug.

Woods-grown goldenseal is cultivated in tilled beds under the natural shade of hardwood trees. Site preparation includes clearing away rocks, competitive understory growth, and undesirable trees. Well-rotted organic matter may be added to the beds prior to planting. Growing plants in raised beds can be beneficial to root development and yields. Maintenance can include hand weeding, the continued removal of competing understory plants, and thinning seedlings.

Field-Cultivated goldenseal is grown in well-tilled raised beds in an open area under artificial shade. Leaves, rotted sawdust, or woodland soil may be added to the beds to further mimic natural conditions. Artificial shade is provided by wooden lath houses or black polypropylene shade cloth. Rhizomes are planted in furrows and mulch is added immediately after planting. Unlike wild-simulated and woods-grown goldenseal, which generally require no supplemental water, field cultivated plants will need to be irrigated. Additional maintenance consists of weeding, mulching, fertilizing, as well as disease prevention and treatment if necessary.

Pest management

Under natural conditions, especially in small isolated plots, diseases and insects do not pose a serious threat. Diseases, such as Botrytis leaf blight, Rhizoctonia root rot, and root knot nematode, are usually more of a problem under artificial shade structures, but can occur in forest sites where airflow and soil drainage are inadequate, or during periods of excessive precipitation. There are no registered pesticides to control disease, insects or weeds for this crop. Deer, which will vigorously feed on ginseng leaves, generally leave goldenseal alone, but some browsing may occur. Rodents and other pests, such as field mice, moles, voles, and slugs, can do a great deal of damage to roots, leaves, and fruits, especially in wooded sites. Weeds are generally not a serious problem in mulched plantings; however, occasional hand weeding may be necessary in some sites, especially when the soil has been tilled. Human theft will be one of the major concerns of the goldenseal grower. Appropriate measures need to be taken to limit loss through theft. DO NOT advertise that you are growing it.

Harvest and storage

When grown from rhizome divisions, goldenseal roots can be harvested after three to five years, but may require six to eight years' growth when propagated from seed. To ensure a high-quality product, roots are harvested in the fall after the leaves have begun to turn yellow or have died down completely. Harvesting from raised beds can be done by hand, with a potato fork, or with a mechanical digger. Wild-simulated root is usually dug with a potato fork, a modified hoe, or a trowel. Woods-grown and field-cultivated can be harvested with a digging knife by cutting around the rhizome and leaving runner roots to regrow.

Wash, but do not scrub, the roots immediately after digging to remove soil particles and debris. Roots should then be allowed to drain on a screen for an hour or two before beginning the drying process. Dry harvested roots slowly at temperatures between 90º F and 110º F. Provide good air circulation and keep the relative humidity low so that the rhizomes will dry evenly and not mold. Drying will result in root weight reductions of approximately 70%. The roots can then be stored in a cool, dry, rodent-proof area until sold.

If the leaves and stems will be marketed, they should be cut soon after the seeds have ripened while still green and then dried as soon as possible to preserve their color and quality. Harvesting tops will reduce root growth and should therefore be delayed as long as possible, typically after three to four years' growth.

Labor requirements

Labor requirements for goldenseal production vary considerably depending on the intensity of cultivation. While there may be planting labor efficiency in wild-simulated production, woods and field-cultivated systems require less labor to harvest. Growers should use the method that is easiest for them to manage and protect from theft. Growing goldenseal from seed and fibrous root cuttings will require slightly more labor hours than growing from rhizome transplants.

Economic Considerations

Commercial goldenseal production can be profitable in field-cultivated systems under artificial shade, but will require a high capital commitment of time and money. Risks include price fluctuations, theft, and crop failure due to diseases, drought, rodents, and post-harvest contamination. Generalized budgets are difficult to establish due to variations in production methods. Wild-simulated production will require lower investment than intensively cultivated field and woods-grown goldenseal. Kentucky growers are likely to experiment with wild-simulated or woods-grown goldenseal. The

major production costs associated with these methods are the purchase of transplants or seeds, and the labor required for planting and harvest. The time value of money (interest costs) should be considered, especially if a large investment in shade-grown production is under consideration.

Total costs for a 1/10-acre wild-simulated goldenseal production system will approach $3,000 for production from transplants and $2,000 for production from seed. In addition to the cost of seed or transplants, the main costs are the value of labor, (110 to 130 hours estimated to cost $12.50 per hour). Marketed at $20 per pound, this system will generate negative net revenues. At a price of $40 per pound, net revenues could approach as much as $4,000. These figures, based on a 5-year production cycle, indicate that wild-simulated goldenseal has the potential for economic profitability only if realizing a price higher than many annual prices reported through 2019. Producers who are able to obtain a premium price for goldenseal, by marketing premium products or selling directly to consumers, may be able to realize long-term economic profits but there are no guarantees.

References/Resources:

- Commercial Production of Ginseng and Goldenseal (Purdue University New Crops website, article by Len Stoltz, University of Kentucky, 1994) http://www.hort.purdue.edu/newcrop/NewCropsNews/94-4-1/ginseng.html
- Forest Farming: Medicinal Plants (University of Kentucky, 2009) http://www.ca.uky.edu/agc/pubs/for/for117/for117.pdf
- Selected Internet Resources for Herb Marketing (University of Kentucky, 2018) https://www.uky.edu/ccd/sites/www.uky.edu.ccd/files/herbmarketing.pdf
- Goldenseal An Annotated Bibliography (USDA Forest Service, 2005) https://www.srs.fs.usda.gov/pubs/gtr/gtr_srs088.pdf
- Ginseng, Goldenseal, and Other Native Roots (ATTRA, 2004) https://attra.ncat.org/product/ginseng-goldenseal-and-other-native-roots/
- Goldenseal (Penn State University, 2011) https://extension.psu.edu/goldenseal
- Goldenseal Plant Guide (USDA NRCS, 2001) http://plants.usda.gov/plantguide/pdf/pg_hyca.pdf
- Root Report (Virginia Tech, 2015) https://www.rootreport.frec.vt.edu/docs/RootReportFinal8-10-2.pdf
- Dryers for Commercial Herb Growers: A construction guide (North Carolina State University, 2008) https://newcropsorganics.ces.ncsu.edu/wp-content/uploads/2016/11/herb_dryer_leaflet.pdf?fwd=no

Suggested Citation:

Kaiser, C. and M. Ernst. (2020). *Goldenseal*. CCD-CP-54 Lexington, KY: Center for Crop Diversification, University of Kentucky College of Agriculture, Food and Environment. Available: https://ccd.uky.edu/resources/crops/herbs-medicinals/goldenseal

Reviewed by: Shawn Wright, Horticulture Specialist, University of Kentucky & Tanner R. Filyaw, Non-Timber Forest Products Program Manager, Rural Action Sustainable Forestry Program

Photo courtesy of Pixabay.com

Cooperative Extension Service

Agriculture and Natural Resources
Family and Consumer Sciences
4-H Youth Development
Community and Economic Development

MARTIN-GATTON COLLEGE OF AGRICULTURE, FOOD AND ENVIRONMENT

Educational programs of Kentucky Cooperative Extension serve all people regardless of economic or social status and will not discriminate on the basis of race, color, ethnic origin, national origin, creed, religion, political belief, sex, sexual orientation, gender identity, gender expression, pregnancy, marital status, genetic information, age, veteran status, physical or mental disability or reprisal or retaliation for prior civil rights activity. Reasonable accommodation of disability may be available with prior notice. Program information may be made available in languages other than English. University of Kentucky, Kentucky State University, U.S. Department of Agriculture, and Kentucky Counties, Cooperating.

Disabilities accommodated with prior notification.

Lexington, KY 40506