UNIVERSITY OF KENTUCKY College of Agriculture, Food and Environment

COOPERATIVE EXTENSION SERVICE
UNIVERSITY OF KENTUCKY COLLEGE OF AGRICULTURE, FOOD AND ENVIRONMENT
Center for Crop Diversification Crop Profile

Goldenseal

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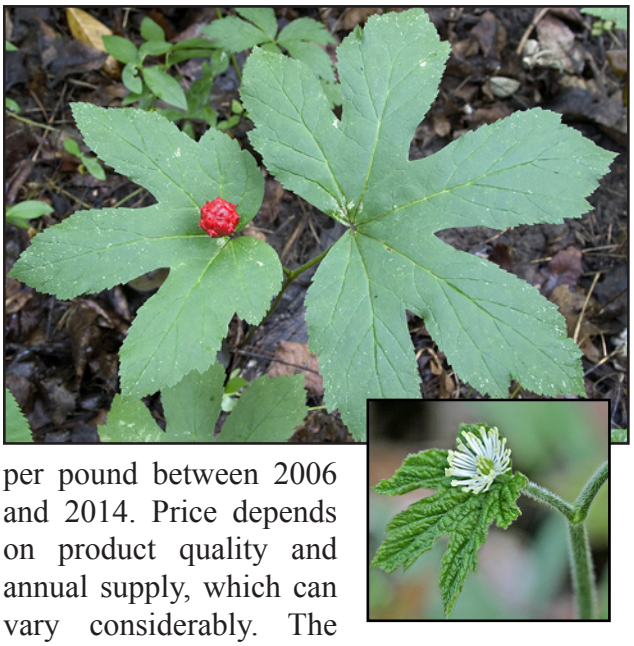
Introduction

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, declined to $15 to $25 per pound through 2005, and ranged from $5 to $20 per pound between 2006 and 2014. Price depends on product quality and annual supply, which can vary considerably. The American Herbal Products Association reported total tonnage of wild and cultivated goldenseal from 34 to 44 dried tons between 2006 and 2010[1]. 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. Kentucky growers could also explore various alternative marketing

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opportunities, such as health and natural food stores where goldenseal is sold as a tea, as well as in powder and capsule form. 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.

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 be used as mulch. 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, and cohosh.

Propagation

Goldenseal plantings may be started from seed, root pieces, 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) or artificially (refrigeration 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.

Apply 1 to 2 inches of 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 pieces 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 before moving them to a permanent site.

Propagation of goldenseal from rhizome pieces with a well-developed bud is the most reliable method of production. 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.

Production methods

WILD goldenseal grows naturally, without human influence, in patches with 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. Once goldenseal is planted, the leaf litter is raked back into place. No further 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, understory growth, and undesirable trees. Well-rotted organic matter may be added to the beds. 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. Leaves, rotted sawdust, or woodland soil may be added to the beds. 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, adding more mulch, and fertilizing.

Pest management

Under natural conditions, especially in small isolated plots, diseases and insects do not pose a serious threat. Disease problems, such as Botrytis blight, Rhizoctonia root rot, and root knot nematode, are usually more of a problem under artificial shade structures. Deer, which will feed on ginseng, generally leave goldenseal alone. Rodents, such as field mice and voles, can do a great deal of damage, particularly in wooded sites. Moles and slugs can also be a threat. Weeds are generally not a serious problem in mulched plantings; however, occasional hand weeding may be necessary in some sites. Human theft will be one of the major concerns of the goldenseal grower.

Harvest and storage

Goldenseal roots can be harvested after 3 to 5 years. Roots are dug after the tops have died down in the fall. 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 while still green and then dried. Harvesting tops will reduce root growth and should therefore be delayed as long as possible.

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, cultivated requires less labor to harvest. Growers need to use the method that is easiest for them to manage and protect from theft. Growing goldenseal from seed requires slightly more labor hours than growing from transplants.

Economic considerations

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

The major production costs 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 in 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 $10 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 a price can be realized that is well above most annual average prices. 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.

[1] Zimmermann, M.D. and S.J. Dentali. *AHPA's Tonnage Survey of Select North American Wild-Harvested Plants, 2006–2010.* https://www.thieme-connect.com/products/ejournals/abstract/10.1055/s-0032-1307520

Selected 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
- Medicinal Herb Seed and Root Sources for Planting in Kentucky (University of Kentucky, 2001) http://www.ca.uky.edu/agc/pubs/ho/ho73/ho73.htm
- Selected Internet Resources for Herb Marketing (University of Kentucky, 2013) http://www.uky.edu/ag/ccd/herbmarketing.pdf
- Woods Production of Ginseng and Goldenseal (Robinson Station, University of Kentucky, 2003) http://www.uky.edu/ag/ccd/medicinalplants.pdf
- Commercial Goldenseal Cultivation (North Carolina State University, 2000) http://www.ces.ncsu.edu/depts/hort/hil/hil-131.html
- Forest Production of Goldenseal (USDA Forest Service, 1999) http://nac.unl.edu/documents/agroforestrynotes/an16ff05-1.pdf
- Ginseng, Goldenseal, and Other Native Roots (ATTRA, 2004) http://attra.ncat.org/attra-pub/ginsgold.html
- Goldenseal Plant Guide (USDA NRCS, 2001) http://plants.usda.gov/plantguide/pdf/pg_hyca.pdf
- Goldenseal (Pennsylvania State University, 2006) http://pubs.cas.psu.edu/freepubs/pdfs/uh175.pdf
- Goldenseal (Appalachian Center for Ethnobotanical Studies, 2012) http://www.frostburg.edu/fsu/assets/File/ACES/Hydrastis canadensis for ACES website.pdf
- Organic Goldenseal Production Enterprise Budget (Washington State University, 2001) http://smallfarms.wsu.edu/crops/medicinalherbs/organicGoldenseal.html

Reviewed by Shawn Wright, UK Extension Specialist (Revised 2016)
Photos by Lew Diehl, Bugwood.org **April 2016**