University of Kentucky
College of Agriculture, Food and Environment
Cooperative Extension Service

Center for Crop Diversification Crop Profile

Ginseng

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Introduction

Ginseng is a perennial herb that has been used for medicinal purposes in China and other Asian countries for centuries. American ginseng (*Panax quinquefolius*) is native to the rich hardwood forests of Canada and the eastern half of the United States, including Kentucky. Today Kentucky leads the nation in wild ginseng production. While wild American ginseng is not yet considered endangered, it is protected by federal and state laws. Because ginseng regulations are subject to change, the State Ginseng Coordinator in the Kentucky Department of Agriculture (KDA) should be contacted for the latest laws and restrictions. Additionally, laws will vary from state to state; the information in this profile is pertinent to Kentucky only.

Marketing

The market for ginseng is well-established; however, the harvest and sale of all ginseng is strictly regulated in Kentucky. Ginseng harvested in the state can only be sold through dealers licensed by the Commonwealth of Kentucky. A list of dealers can be obtained from the KDA.

Kentucky is one of 19 states with an approved wild ginseng export program. Ginseng harvested in Kentucky cannot be transported out-of-state in any manner unless it is accompanied by an export certificate obtained from the KDA. Ginseng for international trade must also be accompanied by a phytosanitary certificate from the USDA and a CITES (Convention on International Trade in Endangered Species) export certificate obtained from the U.S. Fish and Wildlife Service. These regulations are in place to protect the limited stock of wild ginseng growing in the forests, and to help eliminate the theft problems that can occur with this valuable and very slow-growing plant.

Market Outlook

Ginseng prices rise and fall based on the strength of the Pacific Rim economy, because 85 percent of the ginseng harvested in the United States is exported to Hong Kong; most of that is bound for China. A strong Chinese economy helped support wild ginseng prices in the U.S. through 2014. Changes in China contributed to weaker prices reported in 2015.

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Wild roots have a distinctive appearance and are in the greatest demand by Asian markets. There is a long history of ginseng use in traditional Chinese medicine, and there is a great cultural and mystical connotation to wild ginseng among Chinese consumers. Cultivated ginseng roots have a different appearance from those growing wild in the forest; they are also thought to be less potent and are, therefore, of less value.

The market for cultivated ginseng is in value-added pharmaceutical products. Most, if not all, of manufactured ginseng herbal products are made using cultivated ginseng. Prices for cultivated ginseng have declined due to an increase in supply from producers in Canada, as well as from the production of American ginseng in China. Wisconsin produces about 95 percent of cultivated ginseng in the U.S., with about 180 farms selling ginseng in 2015, according to the Ginseng Board of Wisconsin. "Wisconsin Ginseng" is trademark protected and marketed through the Ginseng & Herb Co-op.

Wild-simulated and woods-grown ginseng roots most closely approximate those of wild ginseng. Because of this, they bring a better price than cultivated roots, although not as high as wild roots. Good quality roots grown in woodland sites can bring up to 50 percent of the price of wild-harvested roots. Wild-simulated ginseng can be sold into the export market, but roots must be accompanied by the appropriate certification papers.

Production considerations

Production methods

Kentucky State Law recognizes four production methods for ginseng: wild, wild-simulated, woods-grown, and cultivated. While wild ginseng grows with little or no human involvement, the other three methods are technically different cultivation systems that necessitate human involvement in some way. Cultivation is a way to meet the market demand without endangering or reducing current native wild populations.

Wild ginseng grows naturally in the forest. Ginseng thrives in deeply shaded woodlands where the soil is moist, well-drained, and high in organic matter. Plants require 70 percent to 80 percent shade and are often found growing under such deeply rooted hardwoods as oak, hickory, beech, and walnut. Other wild plants generally found in or near ginseng patches include trillium, Solomon's seal, rattlesnake fern, spleenwort, Jack-in-the-pulpit, cohosh, and wild ginger. These plants, which require similar growing conditions, can indicate that ginseng is growing nearby. Cultivated ginseng plants must be provided with growing conditions similar to those present in wild sites.

Wild-Simulated ginseng is grown in untilled soil in a favorable forest location. This method requires minimal human intervention. Little site preparation is required other than raking away the leaf litter down to the topsoil. Seeds can be pushed into the soil individually or raked into the top 1 inch of soil. The leaf litter is then raked back over the planting. Once planted, no further labor is required until harvest, at which time plants are hand-dug.

Woods-grown (also referred to as woods-cultivated) ginseng is produced 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. Seeds are either broadcast or planted in rows. Maintenance can include hand weeding, the continued removal of competing understory plants, thinning seedlings, and pesticide applications.

Cultivated (also referred to as field-cultivated) ginseng is grown in well-tilled raised beds in an open area. Artificial shade is provided by wooden lath houses or black polypropylene shade cloth. This method requires an intensive level of management. Leaves, rotted sawdust, or woodland soil may be added to the beds. Seeds or

roots are planted in furrows and mulch is added immediately after planting. Maintenance consists of weeding, adding more mulch, fertilizing, and applying pesticides.

Seeds and transplants
Starting plants from seed is the cheapest and most common way to establish the planting initially. Plantings can also be started by purchasing 1-year-old roots. While this method is more expensive than starting from seeds, the plants will produce seed one year earlier. Kentucky state law does not allow for the purchase of Kentucky roots or seed for planting; when purchasing planting material from out-of-state sources, it is advisable to determine if the state of origin has any applicable restrictions.

Seed harvest normally starts by the third or fourth year. Producers will need to decide whether to harvest seed for planting or to remove flower buds to allow larger root development.

Pest management
Some insect pests to anticipate are jumping plant lice, tree crickets, and aphids. Alternaria blight and Phytophthora root and crown rot are the main disease concerns. Fungicides are routinely applied to ginseng cultivated under artificial shade. Deer and wild turkeys can be problems in some locations. Rodents (such as voles and mice) can do a great deal of damage, especially in wooded sites. Weed control, generally by hand, will be necessary in some plantings. Despite these potential problems, human theft remains the major concern of ginseng producers and harvesters.

Harvest
The harvest season for ginseng in Kentucky begins September 1 and ends December 1; ginseng may only be dug during this period, even on the harvester's own private land. Fresh or "green" ginseng roots may be sold to dealers starting September 1; dry ginseng may be sold to dealers from September 15 to March 31. These dates could change in any given year, so it is advisable to check with the KDA for verification.

Per Kentucky State Law, all ginseng roots, regardless of production method, must be a minimum of 5 years old (plants have three or four prongs) before they can be harvested. Prongs are the shoots or branches from the main stalk that bear compound leaves comprised of three to five leaflets. Keep in mind, however, that the market generally demands roots that are much older than this 5-year minimum.

Wild
Wild roots are hand dug and must be at least 5 years old (three or four prongs) before they can be harvested. Never harvest from plants with unripe (green) berries. Kentucky state regulations require that seeds adhering to plants dug during the season must be removed and planted within 50 feet of the collection site. The ripe, bright red berries should be planted ¾ to 1 inch deep using only a finger as a tool. Good ginseng stewardship also entails not harvesting all mature plants, but leaving some for the future.

Harvesting on federally owned management areas is not allowed, with the exception of the Daniel Boone National Forest (DBNF), where in the past ginseng could be dug for personal use only. Ginseng harvesters in the DBNF have been required to first pay a fee and obtain a permit from the Forest Supervisor's office in Winchester, KY, or from one of the district offices. However, due to declining ginseng populations, harvesting permits for the DBNF were suspended in 2016. Harvesting on state property, including state parks, is not permitted. Digging on private property does not require a permit; however, permission should be obtained from the landowner.

Wild ginseng harvesters are required to sign a "Ginseng Purchase Form" at the time they sell their roots to a state-licensed dealer. The harvester must also be able to provide information regarding the date and location of harvest.

Wild-simulated, Woods-grown, and Cultivated

As with wild ginseng, plants produced in any other manner must also be at least 5 years old (three or four prongs) before the roots can be harvested. While roots cultivated under artificial shade could be harvested when they are 5 years old, ginseng roots in woodland sites (wild-simulated and woods-grown) may require six or more seasons of growth. Harvesting from raised beds can be done by hand, with a potato fork, or with a mechanical digger. Wild-simulated roots are usually dug with a modified hoe or trowel.

Yields and Storage

Cultivated roots can be expected to yield at least 1,500 to 2,000 pounds dry weight per acre with 100 to 250 dry roots to a pound. Wild-simulated roots may yield closer to 100 to 600 pounds per acre and contain 200 to 350 dry roots per pound. Once harvested, roots are washed and then dried slowly, either in the open or in drying rooms with forced hot air. Roots can be stored in a dry, rodent-proof area until sold to a licensed dealer.

Labor requirements

Labor requirements for ginseng production vary considerably depending on the intensity of cultivation and the production year. Intensively produced woods-grown ginseng in Kentucky may require as much as 3,000 hours per acre for land preparation and planting, an average of 600 hours maintenance per acre during production years, and 3,500 hours per acre for harvest and drying operations. On the other hand, the same size woods planting that has been cultivated less intensively can require 3,600 hours total, over a period of six to eight years. An acre of wild-simulated ginseng can require 1,500 hours total over six to eight years.

Economic considerations

Commercial ginseng production requires a significant capital commitment, especially in the producer's time and startup costs. Generalized budgets are difficult to establish due to variations in production methods. Lower investment and production costs can be expected for wild and wild-simulated ginseng, for which the major expenses are the cost of seed and labor required for planting and harvest. Intensively cultivated ginseng under artificial shade requires the highest startup expense, as much as $40,000 to $60,000 per acre, based on data from Wisconsin.

Ginseng values depend on production method, root appearance, and quality. Prices growers receive for ginseng roots (particularly wild-harvested) can vary tremendously from season to season. Wild ginseng prices paid by registered Kentucky dealers fluctuated, from less than $350 to more than $600 per pound, between 2005 and 2015. Next in value to wild ginseng is wild-simulated, followed by woods-grown ginseng. These latter two production methods produce roots that more closely resemble wild roots and have sold in the range of $85 to $125 or more per pound.

Cultivated ginseng roots do not closely resemble wild ginseng, and are far less valuable per pound. Wisconsin shade-grown production was estimated to require a breakeven price of $20 to $22 per pound in the early 2010s, according to University of Wisconsin estimates.

Ginseng cost and return estimates for ½ acre were adapted in 2011 for Kentucky based on information presented by a North Carolina

producer at the 1998 Specialty Forest Products/ Forest Farming Conference. The estimates assumed ginseng prices still obtainable in 2015. The net profit below represents the difference between total costs, including labor, and sale of mature roots. As seen below, it may take six to eight years until harvest for woods-grown and six to 12 years for wild-simulated. Positive profits are realized upon harvest and could contribute toward positive net returns in well-managed agroforestry systems.

Method	Yrs to harvest	Total costs	Net profit
Woods-grown	6 to 8	$24,135	$5,865
Wild-simulated	6 to 12	$9,690	$14,310

Selected Resources

Kentucky

- American Ginseng Program (Kentucky Department of Agriculture) http://www.kyagr.com/marketing/ginseng.html
- Ginseng Webinar (UK Center for Crop Diversification, 2016) http://www.uky.edu/ccd/training/webinars/ginseng
- Commercial Production of Ginseng and Goldenseal (Purdue University) http://www.hort.purdue.edu/newcrop/NewCropsNews/94-4-1/ginseng.html
- Cultivating Ginseng in Kentucky, ID-60 (University of Kentucky, 1996) *May be available from your county Extension office*
- Forest Farming: Medicinal Plants (University of Kentucky, 2009) http://www.ca.uky.edu/agc/pubs/for/for117/for117.pdf
- Good Stewardship Harvesting of Wild American Ginseng (*includes information on harvesting ginseng in the State of Kentucky*) (American Herbal Products Association, U.S. Fish and Wildlife Service, and United Plant Savers, 2006) http://www.ahpa.org/portals/0/pdfs/Kentucky.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

- Daniel Boone National Forest: Forest Products Page (US Forest Service) http://www.fs.usda.gov/detail/dbnf/passes-permits/?cid=fsbdev3_032584
- Selected Internet Resources for Herb Marketing (University of Kentucky, 2011) http://www.uky.edu/hort/sites/www.uky.edu.hort/files/documents/herbmarketing.pdf
- Woods Production of Ginseng and Goldenseal (University of Kentucky, 2003) http://www.uky.edu/hort/sites/www.uky.edu.hort/files/documents/medicinalplants.pdf

Other sources

- Alternate Field Crops Manual: Ginseng (University of Wisconsin and University of Minnesota, 2000) http://www.hort.purdue.edu/newcrop/afcm/ginseng.html
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) http://www.cites.org/
- Economics and Marketing of Ginseng (US Forest Service, 1999) http://nac.unl.edu/documents/agroforestrynotes/an15ff04.pdf
- American Ginseng Production in Woodlots (US Forest Service, 1999) http://nac.unl.edu/documents/agroforestrynotes/an14ff03.pdf
- Ginseng: A Production Guide for North

Carolina (North Carolina State University, 1997) http://www.ces.ncsu.edu/depts/hort/hil/pdf/ag-323.pdf

- Ginseng, Goldenseal, and Other Native Roots (ATTRA, 2004) https://attra.ncat.org/attra-pub/summaries/summary.php?pub=40
- Good Stewardship Harvesting of Wild American Ginseng (*includes requirements to export wild ginseng*) (American Herbal Products Association, U.S. Fish and Wildlife Service, and United Plant Savers, 2006) http://www.fws.gov/international/permits/by-species/american-ginseng.html
- Growing American Ginseng in its Native Woodland Habitat, by W. Scott Persons, in Proceedings from the 1998 Specialty Forest Products/Forest Farming Conference http://www.nfs.unl.edu/documents/SpecialtyForest/Persons.pdf
- Growing American Ginseng in Forestlands (Virginia Tech, 2011) http://pubs.ext.vt.edu/354/354-313/354-313.html
- Growing American Ginseng in Ohio: An Introduction (Ohio State University, 2004) http://ohioline.osu.edu/factsheet/F-56
- Growing American Ginseng in Ohio: Selecting a Site (Ohio State University, 2004) http://ohioline.osu.edu/for-fact/pdf/0058.pdf
- Growing American Ginseng in Ohio: Site Preparation and Planting Using the Wild-Simulated Approach (Ohio State University, 2004) http://ohioline.osu.edu/for-fact/pdf/0057.pdf
- Producing and Marketing Wild Simulated Ginseng in Forest and Agroforestry Systems (Virginia Tech, 2009) https://pubs.ext.vt.edu/354/354-312/354-312.html
- U.S. Fish and Wildlife Service International Affairs – American Ginseng http://www.fws.gov/international/plants/american-ginseng.html

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Reviewed by Shawn Wright, UK Horticulture Specialist
Photos: Anna Lucio, KDA (ginseng plants, pg. 1, and ginseng roots, pg. 5); Terry Jones, UK (woods-grown ginseng planting, pg. 4)
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For additional information, contact your local County Extension agent