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Ginseng, Goldenseal, and Other Native Roots

HORTICULTURE TECHNICAL NOTE

Abstract: *Native U.S. ginseng (and related species), goldenseal, and other medicinal roots are exported or used domestically in products regulated by the 1994 Dietary Supplement Health and Education Act. Most such crops are raised under contract by experienced growers. Some roots are organically raised. Since 2002 U.S. federal law has reserved the commercial term "ginseng" for Panax species.*

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Table of Contents

American ginseng (*Panax quinquefolius*) growing in the Ozark Mountains.
Photo by Katherine Adam

Introduction

America has exported native ginseng to the Orient for almost 300 years. Ginseng shares with several other woodland species of eastern North America (among them goldenseal, black cohosh, and blue cohosh) the distinction of having close relatives in eastern Asia that are recognized as medicinal plants in the Chinese pharmacopoeia.(1) Ginseng of the family Araliaceae, goldenseal and black cohosh of Ranunculaceae, and blue cohosh of Berberidaceae are all commercially traded on world botanicals markets. Other plants in the family Araliaceae—including native sarsaparilla and imported Eleutherococcus ("Siberian ginseng")—have found favor with dietary supplement manufacturers because of their ginseng association. Since 1998, the market for medicinal herbs has declined precipitously, down 12% in 1999, another 15% in 2000, and a further 21% in 2001.(2) According to the latest figures for the 52 weeks ending January 4, 2004,

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NCAT

both dollar and unit sales of ginseng were down approximately 24% in 2003. A larger majority of herbal subcategories, including ginseng, experienced sales declines in 2003, compared with declines in 2002. Black cohosh root was the exception, with sales growing 27.4% in 2002 and 26.2% in 2003.(3)

Until recently, trade in plant species native to North America was almost entirely supplied by wild-gathering. Now, encouraging farm production is part of a concerted effort by conservation groups, as well as government agencies, to preserve remnant wild populations of rare native plants, while accommodating the demand for raw materials by the dietary supplement industry. On August 13, 1999, new U.S. Fish & Wildlife export restrictions on wild and "wild-simulated" ginseng roots went into effect. The purpose of the new regulations is to ensure that ginseng plants are not harvested prematurely (before seed production). State permits to harvest wild ginseng customarily require mature seeds to be left in the hole from which the root is dug.

New growers will not find published production budgets for most native roots, because existing growers consider such information a trade secret. Production budgets for the three common methods of raising ginseng (shade-cloth, woods-grown, and wild-simulated) that were published by Miller (1985) and Hankins (1999) are now out of date. Hankins identified wild-simulated as the best method for American ginseng growers, because of lower production costs and maximum returns.

Raising a trial crop first is very good advice. Medicinal root crops are perennials (rather than annuals like grains) and, once established, typically take three to five years before they are ready to harvest. Propagation from seed, generally not recommended, is complex and time-consuming, requiring specialized facilities such as greenhouses and labs. Harvest requirements often lead American growers to build or modify specialized equipment, and on-farm drying facilities are usually necessary for root crop production. Security is the first concern of ginseng growers, because secluded ginseng patches are often the targets of thieves—especially as the ginseng nears maturity.

The herbal industry has consolidated rapidly in the past five years and moved production out of the U.S. Only a few niches are filled by independent growers.

Ginseng (*Panax* species)

American ginseng (*Panax quinquefolium* L.) is a fleshy-rooted deciduous perennial native to cool and shady hardwood forests of North America, ranging from Quebec south to northern Florida and west to Arkansas. In the past decade ginseng has become increasingly scarce in its native habitat. When prices for wild American ginseng skyrocketed in 1996, secluded stands were quickly overrun by root hunters.

Asia imports both wild-harvested and cultivated American ginseng. In 1997 the U.S. legally exported 527,547 pounds of cultivated ginseng roots and 22,929 pounds of wild roots.(4) In 1998 Wisconsin alone produced almost 2 million pounds, but production in 1999 in that state fell to 1 million pounds (almost all for export), while Canadian production rose to a total of 4,615,000 pounds.(5) Since 1999 U.S. export production has plummeted.

Differences between *Panax quinquefolium* L. and *Panax ginseng* L. (Asian ginseng) are based on consumer perceptions, uses in traditional Chinese medicine (one is classified as "cool," the other as "hot"), and marketing strategies, rather than pharmacological studies using Western methodology. Asian consumers have a distinct preference for wild, rather than cultivated, ginseng—of whatever *Panax* species. U.S. consumers have a decided preference for convenience and do not make distinctions among products based on species, production methods, or origins—as long as the label says "ginseng." Chinese customers get such phytomedicines from traditional healers; Americans buy them in capsules from the shelves of chain stores. The potential size of the American market for *P. quinquifolium* in unprocessed form is unknown, but is probably small. American consumers tend to shop on price alone and prefer easy-to-use capsules and lozenges. It is questionable whether U.S. consumer preferences can be shifted much to favor unprocessed forms of ginseng supplied by local growers.

Since wild forms of ginseng are rare in Asia, wild (or "wild-simulated") *P. quinquefolium* from the U.S. is highly marketable there. Extension Specialty Crops Specialist Andy Hankins (6), who visited China in 1999, found perfect

"hands" of U.S. ginseng being used as expensive gifts; he recommended that U.S. exporters pay more attention to protecting the "hands" from damage in shipment, rather than just shipping them in barrels as a commodity. (A "hand" is a complete, unbroken ginseng root with its branches resembling human body parts.) Hankins developed and published one of the few production budgets for various methods of producing ginseng in the U.S.(6)

In keeping with his 1997 prediction that Chinese production of American ginseng would make China self-sufficient in farm-raised grades by the year 2000 (7), Hankins reported in May 2000 that cultivated American ginseng is now imported via San Francisco from China.(8) Manufacturers of ginseng preparations marketed in the U.S. prefer to use cheaper grades of imported Asian ginseng (P. ginseng), and now American ginseng (*P. quinquifolium*). The cheaper grades of both species are those produced quickly under shadecloth.

Prices for cultivated ginseng depend on how closely the production simulates the growing conditions of wild ginseng.

Hong Kong's becoming part of The People's Republic of China in 1998 has complicated U.S. access to the Chinese market for ginseng. Hankins reports (8) that the main problem is getting paid. There is no recourse if a deal goes sour. Demand in other Asian countries is locally or regionally met. Asian dealers now want only wild or "wild-simulated" U.S. ginseng, easily identified by an experienced botanicals dealer. This product is customarily marketed through private networks. Wild and wild-simulated ginsengs come from natural woods in the Appalachian mountain ranges of the eastern U.S. (parts of Pennsylvania, New York, Kentucky, Tennessee, and West Virginia). A small amount comes from similar terrain in the Missouri and Arkansas Ozarks. Contrary to a common misconception, marketable ginseng is not produced by alley cropping or agroforestry plantation methods, except in very small amounts in the Pacific Northwest for local use. The sustainability of continued or increased wild harvest is questionable. As a result of these market factors, many former commercial ginseng growers in the U.S. and Canada have switched to other medicinal root crops or quit entirely.

The United States monitors all trade in ginseng, whether wild or cultivated, within its borders and for export. All dealers or ginseng growers are required to register with the regulatory agency

in their state. There are also state regulations on collecting ginseng seed from wild stands. The U.S. Fish and Wildlife Service (9) can provide a list of state agencies that regulate ginseng.

Historically, more than 95% of commercial ginseng grown in the U.S. for export to Asia has been cultivated under shadecloth in Marathon County, Wisconsin. Now countries such as Canada, New Zealand, Australia (in Tasmania), Ecuador, and Chile, as well as China, have developed the capacity to compete for local and Pacific Rim markets.

Diseases of ginseng include root rot (early blight) and *Alternaria panax* (ginseng blight). According to Hankins (10), intensively cultivated plants are highly susceptible to ginseng blight. In fact, disease problems associated with shadehouse-grown ginseng are so devastating that using fungicides to save an otherwise organically grown crop near the end of its multi-year cycle is a common industry practice. Wild ginseng plants are rarely affected. The greatest danger for wild-simulated ginseng growers and for caretakers of wild patches is not disease but human theft.

Many companies can supply seed or plants for propagation. It may be best, however, to obtain healthy rootlets and raise one's own seed crop to avoid diseases.(11) State regulations on harvesting seed from wild stands must be observed.

In 2002 the long-running Panax listserve for commercial ginseng growers ceased operations when its moderator retired. See **Web Resources**, below, for currently available information on the Internet. A USDA bulletin on ginseng culture, published in 1928, is now available on the Internet.

Panax relatives

Other species in the same family as ginseng include *Eleutherococcus senticosus* Maxim., an aggressive 9-foot-tall woody shrub native to Siberia (formerly marketed in the U.S. as a dietary supplement and weight-loss remedy); Devil's club (*Oplopanax horridus* Miq.), native to the Pacific Northwest and Alaska; and sarsaparilla (*Aralia* L. *spp.)*, native to North America (particularly the southeastern U.S.). None of these are recognized in the Chinese pharmacopoeia as "-seng." The 2002 U.S. Farm Bill prohibits marketing any non-*Panax* species as "ginseng"; the status of all dietary supplements is under review by the National Organic Program.

Goldenseal

Goldenseal (*Hydrastis canadensis* L.), a member of the buttercup family (Ranunculaceae), has approximately the same native range and environmental requirements as ginseng (moist woodlands of the eastern U.S.). A perennial, goldenseal has an erect hairy stem that grows to about a foot in height, with three or four yellowish scales at the base of the plant. The rhizome (a root-like underground stem), the part used for medicinal purposes, is the principal source of revenue, though the leaves are also gathered and marketed.

Goldenseal is threatened with extinction over much of its natural range (12, 13), and many states have passed regulations to discourage wild collecting. Goldenseal is a major focus of the privately-funded United Plant Savers (UpS) (14), which sponsors botanical sanctuaries and other native plant conservation efforts.

A report on the first comprehensive study of goldenseal cultivation, conducted by a Canadian research team, appeared in 2001.(15) A 1994 study by Dr. Jeanine Davis (16), North Carolina State University Extension, on methods for accelerating production of plants from rootlets rather than seed or root division, gave mixed results. Dr. Davis has also studied goldenseal diseases. Mulch studies on goldenseal have shown better stands and fewer diseases with sawdust, especially composted sawdust, than with straw mulch. Straw mulch promoted slugs, according to studies in both North Carolina and Washington State.(17)

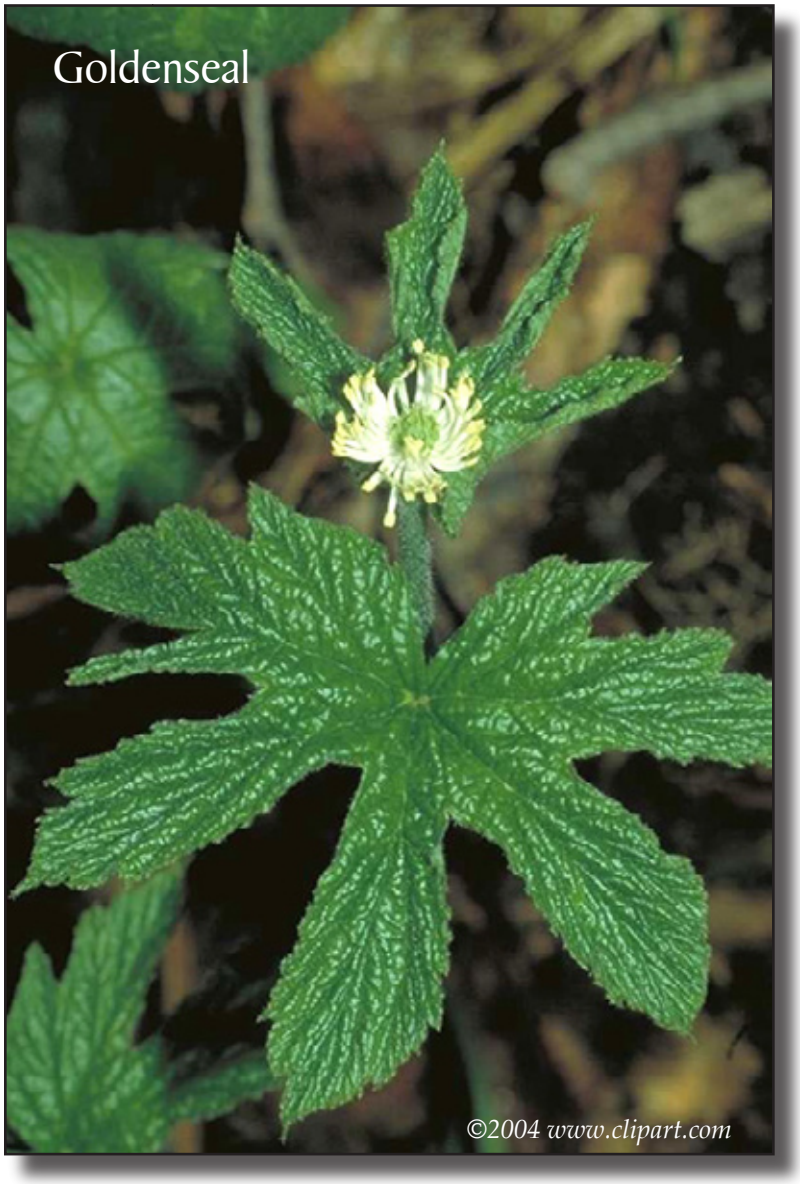
Goldenseal has been marketed as an immune system stimulant. Cheaper substitutes for goldenseal are now on the market. The notion that it masks drug-use tests, while unfounded, has undoubtedly contributed to its marketability.

Much of the information in the USDA bulletin *Goldenseal Under Cultivation,* published in 1949, applies to ginseng as well. This publication has especially useful suggestions on organically acceptable fertility management. See **Further Resources** below.

Although reliable information about the yield

of roots is difficult to find, successful growers of goldenseal (in 1949) reported dry root yields of 2,000 pounds per acre at 5 years from seed. Yields of 1,000 to 2,500 pounds of dried goldenseal root per acre (at 3 to 5 years) have been reported for goldenseal under intensive cultivation.(17) Like ginseng, cultivated goldenseal is subject to increased disease pressures.(18)

Prices for goldenseal fluctuate, depending on supply and demand. Since plants started from seed take about five years to reach harvestable stage, predicting future returns on investment is difficult. Several sources for goldenseal rhizomes are provided below. After initial establishment, goldenseal roots and seeds can be saved for propagating new beds.



Black Cohosh

A medicinal root herb in the same family as goldenseal is black cohosh (*Cimicifuga racemosa* Elliot). Steven Foster describes black cohosh in *Herbal Renaissance* (19) as a Native American remedy used in tincture form for female problems and as an aid in childbirth.

Universities have just begun research on black cohosh as an agricultural enterprise. Purdue University, which earlier pioneered much new-crops research, has closed its New Crops Center, but maintains a medicinal herb "demonstration plot" that includes black cohosh.

The University of Kentucky's New Crop Opportunities Center, headed by R. Terry Jones (20), Department of Horticulture, is currently assessing the potential of a number of Kentucky wildflowers for commercial floral crop production.(21) Black cohosh is included in a study of "native plant and underutilized landscape plant species" at one of its research stations. Jones has published a useful guide to seed and root sources for black cohosh (as well as blue cohosh, ginseng, and goldenseal) for Kentucky growers, www.ca.uky.edu/agc/pubs, as well as other Web resources.

A major horticultural study on black cohosh began in 2001, under the auspices of the Center for Phytonutrient and Phytochemical Studies (a research consortium of the University of Missouri—Columbia and the Missouri Botanical Garden), funded by a substantial grant from the U.S. National Institutes of Health. The name of the study is "Identification and Characterization of Botanicals." Research sites include the Missouri Botanical Gardens, St. Louis; Southwest Research Center, Mt. Vernon; and the Shaw Nature Research, Gray Summit. The initial experiment is to answer questions about when, how much, and under what conditions (including stress) the herb produces certain phytochemicals (the "active principles"). For current information, see the Web site www.phyto-research.org/identification, or contact the Center.(22)

While the University of Kentucky material notes that Black Cohosh seed is very difficult to germinate and must be absolutely fresh (23), and I have found it of intermediate difficulty, Foster considers it easy to propagate and grow…

> ...given a moderately rich, somewhat-moist, shady situation. Propagation is achieved by sowing seeds in a well-prepared seedbed as soon as ripe in autumn for germination the following spring, or by division of the roots in early spring or autumn, after the leaves begin to fade. Plants should be given two-foot spacings. Black Cohosh thrives under cultivation in lightly shaded conditions and is adaptable to relatively poor, acidic, rocky woodland soils. The plant does best, however, in a relatively rich, moist woodland soil. Average weight of the matted roots is four to eight ounces. No information on yields is available, but . . . [might be] about 3,000 pounds per acre.(19)

As with many native perennial seeds, germination rates may be quite low. Seed sources compiled by the University of Kentucky are listed below. Richard A. Miller advises sun-curing the split roots, which are then cut and sifted.(24)

Blue Cohosh

Sales of blue cohosh (*Caulophyllum thalictroides* L. Michx.), another root with traditional medicinal uses, are currently very small, but increasing. Practically no scientific research has been done on this species. Regarding culture, Foster notes:

> Blue cohosh can be propagated by seeds or root division. The seeds can be planted in midsummer as soon as the blueberry-like fruits ripen. Fall division of the root stocks is also a good means of propagation. Plants grown from seed will have to be in the ground for up to five years before the roots can be harvested. (19)

This plant likes a humus-rich soil in deciduous forests with a pH of 4.5 to 7 (acid to neutral). It seems to like at least 75 percent shade, and can be grown in a similar habitat as ginseng and goldenseal. Blue cohosh is not subject to pests and requires a minimum of care.(23)

Unless fresh seed is planted in the fall, seed germination rates may be quite low. Seed sources include Richters, Johnny's, and Horizon Herbs (see below). Miller advises sun-curing the split roots, which are then cut and sifted.(24)

Conclusion

Pioneers of herbal medicines envisioned a health care system with experienced herbal practitioners prescribing holistic courses of treatment. The actuality took a decidedly different turn when medicinal herb producers found themselves competing on the world botanicals market to provide raw materials for mass-marketed products. Inadequate basic research on production (including improved cultivars) hampered new growers.(25) Mark Wheeler of Pacific Botanicals (26) noted in 2000 the accelerated trend toward contract farming, even as new legislation curbed wild harvesting. With uncertain markets, it is now highly doubtful whether even experienced farmers should make medicinal herb crops a significant part of their production.

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Panax-owner@cariboo.bc.ca
RWBrunn@aol.com

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9) U.S. Fish and Wildlife Service
Office of Management Authority
4401 N. Fairfax Drive
Arlington, VA 22703
800-358-2164

10) Anthony Hankins
Virginia Cooperative Extension
Box 9081
Virginia State University
Petersburg, VA 23806
804-524-5962

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14) United Plant Savers (UpS)
P.O. Box 400
East Barre, VT 05649
802-496-7053
802-496-9988 FAX
info@plantsavers.org
www.plantsavers.org

15) Sinclair, Adrianne, and Paul M. Catling. 2001. Cultivating the increasingly popular medicinal plant, goldenseal: Review and update. American Journal of Alternative Agriculture. Fall. p. 131–140.

16) Dr. Jeanine Davis
Mountain Horticultural Crops Research and Extension Center
Fletcher, NC 28732
704-684-3562

17) Davis, Jeanine. 1999. Ginseng listserve, Aug. 10. p. 1.
panax@cariboo.bc.ca; Jeanine_Davis@ ncsu.edu

18) Hankins, Anthony. 1992. Growing and marketing goldenseal. The Business of Herbs. Vol. 10, No. 4. p. 33–34.

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20) R. Terry Jones
New Crops Opportunities Center
Department of Horticulture
University of Kentucky
Robinson Station
130 Robinson Road
Jackson, KY 41339-9081
859-257-9511, ext. 234
tjones@uky.edu

21) University of Kentucky
www.uky.edu/Ag/NewCrops/nccult.html
www.uky.edu/Ag/Horticulture/gardenflowers/chco.htm

22) Missouri Center for Phytonutrient and Phytochemical Studies
M121 Medical Sciences Building
Columbia, MO 65212
info@phyto-research.org
www.phyto-research.org

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No. 1184. 13 p.
www.wvu.edu/~agexten/fldcrps/oldsang. htm

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Sources of propagation materials

For an assessment of customer satisfaction with seed/plant suppliers, see the Web site http://gardenwatchdog.com.

Seed Company (Numbers correspond with the companies that follow)	Seed / Plant				
	Ginseng	Goldenseal	Black Cohosh	Blue Cohosh	Panax Relatives
1	✓	✓			
2	✓	✓			
3	✓		✓		
4	✓	✓	✓	✓	
5			✓	✓	
6	✓	✓	✓	✓	
7		✓	✓	✓	
8	✓	✓			
9		✓	✓		
10	✓	✓			
11	✓	✓	✓	✓	✓
12	✓	✓			
13	✓				
14	✓	✓	✓		
15	✓	✓	✓		
16	✓	✓			
17	✓				
18	✓	✓	✓	✓	✓
19		✓	✓	✓	
20	✓	✓			

1. American Ginseng Gardens
   P.O. Box 168-D
   404 Mtn. Meadow
   Flag Pond, TN 37657
   423-743-3700

2. Barney's Ginseng Patch
   433 Hwy. B
   Montgomery City, MO 63361
   573-564-2575

3. Bill Slagle
   Route 3, Box 186
   Bruceton Mills, WV 26525
   304-379-3596

4. Companion Plants
   7242 North Coolville Ridge Road
   Athens, OH 45701
   740-592-4643
   740-593-3092
   complant@frognet.net
   www.companionplants.com

5. Nancy Crouse
   P.O. Box 141
   Mozelle, KY 41749
   606-374-3374

6. Dabney Herbs
   P.O. Box 22061
   Louisville, KY 40252
   502-893-5198 (ph./FAX)

7. Elixir Farm Botanicals
   General Delivery
   Brixey, MO 65618
   Contact: Shanti
   417-261-2393
   417-261-2355 FAX
   efb@aristotle.net
   www.elixirfarm.com
   Biodynamically certified organic seed of native and Chinese medicinal herbs.

8. Goodwin Creek Gardens
   P.O. Box 83
   Williams, OR 97544

800-846-7359
www.goodwincreekgardens.com

9. Linda Heller
HC-62, Box 841
Confluence, KY 41730
606-672-6444
Call for availability for current year.

10. Holbrook, Charles D.
P.O. Box 561
Brodhead, KY 40409
606-758-8814

11. Horizon Herbs
P.O. Box 69
Williams, OR 97544
541-846-6704
541-846-6233 FAX
herbseed@chatlink.com
www.chatlink.com/~herbseed

Horizon Herbs publications include titles on Mediterranean herbs, echinacea, Chinese herbs, burdock, St. Johnswort, English herbs, and milk thistle. May be purchased separately or as a set. Credit cards accepted.

12. Hsu's Ginseng Enterprises
16819 Co. Hwy. W.
P.O. Box 509
Wausau, WI 54402-0509
800-826-1577
info@hsuginseng.com

13. Jelitto Perennial Seeds
125 Chenoweth Lane
Louisville, KY 40207
502-895-0807
502-895-3934 FAX
www.jelitto.com

14. Johnny's Selected Seeds
Foss Hill Road
Albion, ME 04910
207-437-4301
800-437-4290 FAX
commercial@johnnyseeds.com
www.johnnyseeds.com/

15. Lake's Botanicals
2029 Poindexter Road
Cynthiana, KY 41031
859-234-6884
lakefarm@kyk.net
No catalog; fall delivery only.

16. Pickerell's Ginseng Farm
258 Ennis Mill Road
Hodgenville, KY 42748
270-358-4543

17. Red River Ginseng
220 Neff Road
Hazel Green, KY 41332
606-662-4091
Ginseng@eastky.com

18. Richter's Herbs
357 Hwy. 47
Goodwood, Ontario, Canada
L0C 1A0
905-640-6677, ext. 201
roberts@richters.com
www.richters.com

19. Sandy Mush Herb Nursery
316 Surrett Cove Road
Leicester, NC 28748-5517
828-683-2014
www.sandymushherbs.com
Catalog on-line.

20. Well-Sweep Herb Farm
205 Mt. Bethel Road
Port Murray, NJ 07865
908-852-5300

Electronic resources:

Craker, Lyle E., and Jean Giblette. 2002. Chinese medicinal herbs: Opportunities for domestic production. p. 491–496. *In:* J. Janick and A Whipkey (ed.). Trends in new crops and new uses. ASHS Press, Alexandria, VA.
www.hort.purdue.edu/newcrop/ncnu02/v5–491.html

North Carolina State University Extension factsheets on ginseng and goldenseal
www.ces.ncsu.edu/hil/spcrop-index.html

Growing Ginseng (USDA Farmers Bulletin No. 2201)
www.penpages.psu.edu/penpages_reference/29401/2940169.html

Natural Foods Merchandiser
nfm@newhope.com
www.nfmtradezone.com
Can provide up-to-date marketing statistics for herb crops for $200/yr. access fee.

Richters information on growing herbs
www.richters.com

The Herb Growing and Marketing Network
www.herbnet.com

University of Kentucky Extension factsheet on medicinal herbs
www.ca.uky.edu/agc/pubs

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The electronic version of **Ginseng, Goldenseal and Other Native Roots** is located at:
HTML
http://attra.ncat.org/attra-pub/ginsgold.html
PDF
http://attra.ncat.org/attra-pub/PDF/ginsgold.pdf

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