

Growing American Ginseng in its Native Woodland Habitat¹

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ABSTRACT: American ginseng, *Panax quinquefolium*, is one of the world's most valued herbs; and growing ginseng in its native woodland habitat is an undertaking that a patient person willing to take a calculated risk can find quite profitable. Because he is able to produce a very high grade of root (sometimes worth over \$350 per dried pound), a woods grower can operate successfully using limited capital, little equipment, and on a small scale.

This presentation provides a broad introduction to ginseng and ginseng farming in the woods, including: the plant's life cycle, range, and regulation; cultivation techniques; past, present, and future markets; potential problems; and resources.

Introduction

Each fall since the late eighteenth century, thousands of foragers, trappers, and other outdoors men have searched the hardwood forests of eastern North America for American ginseng. They call this prized woodland herb, "green gold;" but, there is more gold to be made by growing ginseng than by hunting it wild.

The great majority of the ginseng produced in North America is cultivated in open fields under artificial shade in large scale, capital intensive, highly mechanized farming operations, often under corporate ownership. However, as rapidly expanding artificial-shade plantings threaten the profitability of that method of ginseng farming, there is increased potential for, and interest in, woods growing.

To be successful, the artificial shade grower must make a large initial investment in mechanized equipment and in shade materials and construction. Further, he needs to plant a minimum of half an acre each year to make the operation economically feasible.

Most folks, including myself, do not have the cleared land, or the time, or the money to risk in this type of venture. The alternative is to grow ginseng in its native woodland environment. Woods growing requires only a small initial capital investment, it utilizes uncleared land that would probably otherwise be idle, it does not destroy the forest, and it can be undertaken profitably on a small scale.

Moreover, the ginseng produced in the woods differs from the field-grown product and does not directly compete with it in the marketplace. Woods growing is

probably now practiced by more people (though on much less acreage) than artificial-shade cultivation.

Ginseng grows slowly and is subject to diseases, pests, and poachers, but in six years and with little capital investment (other than the value of his own persevering labor) a successful ginseng farmer can raise \$30,000 worth of green gold on only half an acre of woodland.

The Ginseng Plant

Panax quinquefolium is a rather ordinary-looking little herb, about twenty inches high, which grows inconspicuously on the shaded forest floor in well-drained soils throughout the hardwood forest of eastern North America. It is a deciduous perennial that produces a new leaf top each year, while the root continues its slow growth from season to season. A ginseng seed, when it sprouts between late April and early June, sends up a small stem supporting three tiny leaves. Within four or five weeks of sprouting, the leaves are fully developed and the seedling is two to five inches tall. During its first season of growth, the plant looks a great deal like a wild strawberry plant. A small skinny root develops over the summer months. After the first frost of fall, the foliage turns a rich yellow-ocher and soon dies off—but the root, which has developed a solitary bud below the ground at its top, survives the winter, freezing as the ground freezes. It is from the bud that the stem and leaves will unfurl and grow the following Spring.

In its second year, the plant will grow to five or more inches and usually produces two prongs branching from the central stem. Each prong holds three to five leaflets. Under good growing conditions, the number

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of prongs increases with age. In later years, ginseng can have as many as five prongs radiating from the top of the stem, with each prong having five leaflets. From the center of the whorl of prongs and leaflets, a delicate cluster of greenish white blossoms arises in early summer, usually on plants that are at least three years old. By July or August, the blossoms are followed by as few as two or three, or (on older plants) by as many as 70 green berries about the size of large sweet peas. As they ripen, these kidney-shaped berries develop a beautiful bright crimson color. Each ripe berry contains from one to three slightly wrinkled, hard, flat, whitish seeds about the size of small wax beans. These seeds do not germinate and sprout for 18 to 20 months after they fall from the plant in August or September.

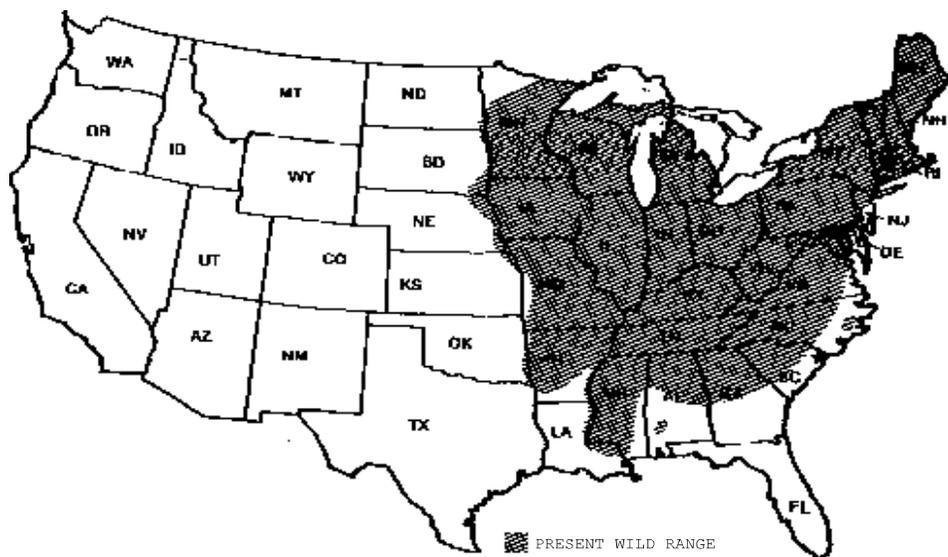
First-year roots are usually 1/8 to 1/4 inch in diameter, while roots four to five years of age may thicken to an inch or more in diameter and often exceed four inches in length. The rate of root growth is much faster under cultivation. Roots often double or triple their size during each of the first few growing seasons, but once the plant begins fruiting heavily its growth rate

slows until only about a 20 percent increase in root weight is attained each year.

When the foliage dies in the fall, the base of the stem breaks off leaving a scar at the top of the root. The next year's bud will have developed on the opposite side of that scar. This yearly scarring produces a root "neck," which bears a series of alternating and ascending marks that tell the age of the ginseng. Twenty-year-old plants are common, and some venerable survivors of over ninety ears have been documented.

Range

Ginseng occurs naturally as part of the forest flora under hardwood timber throughout the eastern half of North America, from southern Canada to central Alabama and from the east coast to just west of the Mississippi River. (See Figure 1.) Its southern range is limited because some exposure to cold is required over the winter months to stimulate seeds and roots to break dormancy and sprout in the spring.



GINSENG IN THE U.S.

Figure 1--Ginseng's present wild range in the United States, as determined by the Department of the Interior's International Convention Advisory Commission and published by the World Wildlife Fund. Although there are occasional reports of wild ginseng growing west of the Mississippi—wild 'sang (as diggers and growers have traditionally referred to ginseng) was found in the Texas panhandle recently—its western spread is probably limited by the generally drier climate and the lack of hardwood shade trees.

Within its natural range, ginseng can be—and certainly is being—cultivated successfully on sites with good

soil, shade, and drainage. Indeed, it has been grown

commercially in eastern North America since the turn of the century.

In addition, *Panax quinquefolium* is being cultivated very successfully in British Columbia, Canada, and experimentally in Germany, Switzerland, Italy, Israel, France, and Belgium. Even in the southern hemisphere—in Australia, New Zealand, and Chile—enterprising individuals are growing American ginseng on a trial basis. And American ginseng gardens are now being planted in mainland China at the rate of 1,000 acres each year.

Regulation

CITES, The Convention on International Trade in Endangered Species of Wild Fauna and Flora, identifies *Panax quinquefolium* as one of many plant and animal species that need the protection of an international trade agreement. More than 115 countries are party to the Convention. CITES monitors, controls, and restricts, as necessary, trading in the identifies species to prevent adverse impacts on their populations and to insure the continued existence of those species in their natural habitat.

In the U.S., in accordance with CITES, each state is required to monitor all ginseng hunted wild or cultivated for export within its borders. Compliance with state regulations is generally simple for the hunter or grower, but anyone who trades in ginseng is usually required to keep records and fill out other paperwork.

A Brief History of the Ginseng Trade

The value of the ginseng plant lies buried in the slow-growing, tuberous rootstock. The root of American ginseng is closely resembles the root of the Asian species, *Panax ginseng* (now extremely rare in the wild), which the Chinese have valued for thousands of years as the most potent of medicinal herbs, a regenerative tonic with broad and subtle efficacy. The Chinese hunted their own species nearly to extinction hundreds of years ago and then began looking elsewhere for new sources of the prized root. They first bought Asian ginseng from the Koreans; and then, in the early 18th century, ginseng was discovered near Montreal, Canada, and soon afterwards throughout the American colonies.

After the revolutionary war, the China trade involving ginseng became a linchpin of America's early economy. The new nation was not in a position to trade in more traditional goods such as rum and

molasses, but was able to successfully enter the international market by shipping furs and ginseng to China. In the early 1900's, North Americans learned to cultivate ginseng successfully and ship their crop to the Orient along with wild ginseng.

Today, the final consumer of 85 percent of American ginseng is the Oriental of Chinese extraction living in the Pacific basin—Hong Kong, Japan, Taiwan, Malaysia, Singapore, Indonesia, the Philippines, etc. (The mainland Chinese now primarily buy the lowest grades of ginseng; but China represents a huge future market for the woods grower, if per capita income continues to rise.) Western usage of ginseng is growing at a high rate, but it is still relatively insignificant.

Except for interruptions during times of war and trade embargoes, the ginseng trade with China had been continuous for about 275 years. The price paid per dried pound of wild root has risen from 7 cents in 1717 to 370 dollars in 1997.

The major ginseng exporters have networks of agent-buyers located in the ginseng growing regions of North America who will quote the ginseng farmer a price. Buy bids can be obtained by mail on the basis of a sample, but once a grower establishes himself as a producer of quality roots, buyers will aggressively solicit a sale, often coming to his farm in the early fall to grade and offer a bid on his newly harvested roots as they are drying. (Because the value of our dollar has dramatically increased recently relative to nearly all the southeast Asian countries, bids in 1998 are almost certainly going to be lower than in 1997, but they are likely to represent similar value to the buyer.)

Grading and pricing are somewhat subjective, based in large part on the root's resemblance to the ideal wild Asian root. Generally, the slower the growth, the greater the resemblance to the revered Asian root and the higher the price. Tilling of the soil and fertilization greatly speed development, while competition with weeds and trees for water and soil nutrients slows growth. Hence, cultivation techniques markedly influence the price paid per pound.

Cultivation Methods

Farming ginseng means utilizing or replicating its native forest environment, and there are three basic ways of doing this. You can (1) construct artificial shade over cleared land, cultivating intensively under a wood-lath or polypropylene-cloth shade structure (not covered in any detail herein); (2) rake aside the leaf litter and cast seeds on the forest floor, simulating the wild growing conditions with a minimum disturbance to the natural forest ecology; or (3) prepare tilled beds in the woods under natural forest shade, striking a balance between (1) and (2). Planting is usually done in September or October.

Wild-Simulated Method

The *wild-simulated* method is the easiest, the least expensive, but also the slowest. Seeds are planted thinly but carefully (with minimal disturbance to the forest floor) and left to grow naturally so that extremely desirable roots, indistinguishable from truly wild roots,

are harvested. Wild-simulated growing requires only a modest investment in seed and labor (see Table I below). Since there is little care and maintenance, most of the labor is in the digging, which is not done until profit is nearly assured. Planting can be undertaken profitably on a small or large scale. One man can reasonably plant an acre or more each year without mechanized equipment—even steep hillsides can be utilized.

A good wild-simulated planting site will have a high shade canopy provided by hardwoods, at least some slope for drainage, and rich woods dirt with high organic matter content. Avoid low-lying, wet areas and look for wild ginseng or other forest floor plants like trillium, ferns, Mayapples (*Podophyllum peltatum*) and bloodroot (*Sanquinaria canadensis*), which are often found with wild 'sang.

Some clearing of the planting site underneath the trees may be necessary before planting, if the undergrowth and young saplings make it difficult to rake the leaves

Table I
Projected Nine-Year Budget For One-half Acre
Of Wild-Simulated Ginseng

<u>Seed*</u>	10 pounds at \$75/lb		\$750.00
<u>Labor</u>	Site preparation and planting: 125 hours x \$10/hr.	\$1,250.00	
	Bi--weekly inspection and trouble shooting: 200 hours x \$10/hr	\$2,000.00	
	Digging roots: 500 hours x \$10/hr.	\$5,000.00	
			\$8,250.00
<u>Materials and Equipment</u>			
	Rakes and shovels or spading forks (assume some tools already on hand)	\$50.00	
	Backpack sprayer (\$125), fungicides, and rodenticides for troubleshooting	\$200.00	
			\$250.00
<u>Drying</u>	Addition of insulation and drying racks to existing room or shed	\$400.00	
	Energy cost to heat (50¢/lb. Of dried root)	\$40.00	
			\$440.00
TOTAL COST			\$9,690.00
EXPECTED YIELD:	80 pounds of dried roots		
GROSS PROFIT:	80 lbs. X \$300/lb.		\$24,000.00
NET PROFIT AT END OF NINE YEARS			\$14,310.00

*The per pound price of seed varies with quality and quantity, and from year to year with supply and demand. The best seed comes from disease-free gardens of fifth-year and older plants. There are roughly 7,000 seeds in a pound. Eventually, a successful grower will produce his own seed.

up. Then in early Autumn, just before the leaf fall, stratified seeds are planted. If the area is small, each seed can be inserted into the soil individually. For larger scale wild-simulated planting, the leaves are raked aside and the soil surface is loosened an inch or so deep with a heavy-tined take, leaving some areas untouched to eventually serve as walk-ways. Seeds are scattered thinly (about four per square foot), raked in, mulched by returning the original leaf litter, and left to grow naturally.

required to farm in the woods (see Table II below)—that is, cutting down small trees, removing stumps, rocks, and large roots, so that the area can be tilled and beds made, in addition to the usual farming chores associated with bed preparation, care, maintenance, and harvest.

The woodlot must contain mostly mature hardwood trees, have humus-rich soil, and at least a little slope to the north or east for drainage and coolness on hot late-

Table II
Projected Six-Year Budget For One-Half Acre of Wood-Cultivated Ginseng

<u>Seed</u>	24 pounds at \$65/lb		\$1,560.00
<u>Labor</u>	Site preparation and planting: 300 hours x \$10/hr.	\$3,000.00	
	Care and Maintenance: 1,000 x \$10/hr.	\$10,000.00	
	Harvesting seeds and roots; 650 hours x \$10/hr	\$6,500.00	
			\$19,500.00
<u>Materials and Equipment</u>			
	Chemicals: Primarily fungicides but also herbicides, insecticides, rodenticides, fertilizer, gas and oil	\$1,000.00	
	Rear-tined tiller for bed preparation	\$1,000.00	
	Backpack sprayers: 2 x \$125	\$250.00	
	Garden seeder \$75.00		
			\$2,350.00
<u>Drying</u>	Addition of insulation and drying racks to existing room or shed	\$600.00	
	Energy cost to heat (50¢/lb. Of dried root)	\$150.00	
			\$750.00
TOTAL COST			\$24,135.00
EXPECTED YIELD:	300 pounds of dried roots		
GROSS PROFIT:	300 lbs. X \$100/lb.		\$30,000.00
NET PROFIT AT END OF NINE YEARS			\$5,865.00

The quantity of harvest is highly dependent on the suitability of the particular planting site. Best yields are usually obtained where a little wild ginseng already grows or used to grow. Less than ideal sites may produce very little.

Woods-Cultivated Method

Woods cultivation, preparing tilled beds under the forest canopy, is the other method of growing under natural forest shade. A planting site where wild ginseng grows or could grow vigorously is not required (though that is certainly desirable) and again there is no need to risk a large up-front investment in shade materials and construction. The major cost is the labor

Summer afternoons. With careful use of a tractor, fairly large-scale woodlot farming is possible. A very small-scale operation—such as planting one tenth of a wooded acre each year—is also worthwhile and widely practiced. Only a garden tiller, back-pack sprayer, ax, perhaps a chainsaw, rake, and shovel are needed.

Although root quality varies somewhat as a function of the woodlot's fertility, woods-cultivated roots are almost always graded higher, bringing a much better per pound price than artificial shade-grown roots. Thus, the woods-cultivated grower is not in direct

competition with the large-scale, high-tech artificial-shade grower.

Comparison of Growing Methods

Table III, below, compares the most critical economic aspects of both methods of woods-growing with the artificial-shade method. Costs, yields, and profits vary greatly among ginseng farmers. The figures in Table III are for small, half-acre ginseng gardens and are medians, based on my own experience and reports from many other growers. The costs include equipment, but not land, and do not reflect the economics of scale that a multi-acre farm can achieve. The figures are conservative—much higher yields and profits are sometimes achieved—but they assume no serious setbacks.

Given the potential profits presented in Table III, it is perhaps surprising that woods-grown ginseng is not flooding the market. Diseases are less virulent in the woods and predation by rodents, birds, insects, and other forest animals is manageable. The major factor limiting the farming of ginseng in its native forest habitat is poaching.

Wherever wild ginseng grows, ginseng diggers (a few bad apples among them) search for it; and, when an unscrupulous digger discovers a woodland planting, the grower can lose the crop he has nurtured and cared for over many years. Poaching is common. The losses from poaching can be large, both financially and emotionally, and many growers quit. Many potential

growers choose not to take the risk. Successful forest plantings have been established outside ginseng's wild

Table III
Comparison of Three Growing Methods - Costs

Method	Time to Harvest	Seeds Planted per 1/2 Acre	Total Labor per 1/2 Acre	Total Costs per 1/2 Acre
Artificial Shade	3 to 4 yrs	50 lbs	1,500 hrs	\$33,500
Woods Cultivated	6 to 8 yrs.	24 lbs.	1,950 hrs	\$24,135
Wild Simulated	6 to 12 yrs.	10 lbs.	825 hrs	\$ 9,690

Comparison of Three Growing Methods - Profits

Method	Root Yield per 1/2 Acre	Root Price per Pound	Gross Income per 1/2 Acre	Net Profit per 1/2 Acre
Artificial Shade	1,125 lbs.	\$ 12/lb	\$13,500	\$(20,000)
Woods Cultivated	300 lbs	\$100/lb	\$30,000	\$ 5,865
Wild Simulated	80 lbs	\$300/lb.	\$24,000	\$14,310

While the price of shade-grown roots and low quality woods-cultivated roots has gone down dramatically in recent years, the price of high-quality cultivated and wild (and wild-simulated) roots has gone up. Moreover, because strenuous physical labor and a longer time frame are required to grow woods-cultivated ginseng, it is likely that the number of wooded acres in production will increase slowly from its present small, though widely distributed, base. As wild ginseng becomes increasingly scarce, demand for woods-cultivated (and, of course, wild simulated) should increase to help fill that high-priced sector of the market. In short, the long-term market outlook, which a new woods grower must consider, looks good—excellent if the southeast Asian economies rebound.

range where poaching is minimal; but, so far, this acreage is small.

Woods-growers are understandably secretive about their operations, and there is no documentation of the extent of woodland plantings. Buyers usually cannot distinguish wild-simulated roots from truly wild roots so they are mixed together as wild in the record keeping; furthermore, buyers are not required to distinguish woods-cultivated from artificial-shade-grown roots so their sales records are similarly mixed together.

In order to get the best estimate possible of how much woods-grown ginseng is being produced in the United

The Extent of Woodland Plantings

States, I surveyed knowledgeable people (see acknowledgments) in all twenty states that have a ginseng certification program. (Where there is no certification program, information is not freely given; but there is no reason to suspect the existence of extensive ginseng farming there.) In several states, I was able to survey two or more informed sources, and I averaged their responses. I explained to each the purpose of the survey and began by stating the following definitions: A woods-grower is an individual who presently has at least one-tenth of an acre of ginseng planted under natural forest shade; a planting is considered woods-cultivated if the ground has been tilled before planting; and a planting is considered wild-simulated if no deep tilling has been done before planting (the top inch or so of soil may be loosened and the seeds worked in)

I then asked for their best estimates of four numbers: the number of woods-cultivated ginseng growers in the state and the number of acres they presently have in production; and the number of wild-simulated growers in the state and the number of acres in production. The survey results are presented in Table IV below. The most striking information evident from Table IV is that, while there are an estimated 814 woods-cultivated growers and 3,334 wild-simulated growers, together

they are farming about 1,400 total acres of ginseng in the woods—an average of only one-third of an acre per ginseng farmer. Clearly, woods-growing as practiced in the U.S. throughout ginseng’s wild range is predominantly a small-scale enterprise.

Based on the estimates of acres planted presented in Table IV, it is possible to speculate on the number of pounds of ginseng being produced in the woods each year. If woods-cultivated growers are harvesting an average of 600 pounds of dried roots per acre after an average of six years of growth, then the maximum poundage (assuming, with *great* optimism, no failures) of woods-cultivated root that might be produced each year would be 49,100 pounds (491 acres X 600 pounds divided by 6 years). Even this maximum would represent only about three percent of the roughly 1.5 million pounds of cultivated roots being exported each year from the United States.

Similarly, if wild-simulated growers are harvesting an average of 160 pounds of dried roots per acre after an average of nine years of growth, the maximum poundage (assuming again, no failures) of wild-simulated roots that might be produced each year would be about 16,000 pounds (905 acres / 9 x 160). This represents roughly eleven percent of the

Table IV
Estimated Woods-grown Ginseng Farming by State

State	Woods Cultivated		Wild Simulated	
	Growers	Acres	Growers	Acres
Alabama	0	0	5	10
Arkansas	3	10	10	2
Georgia	25	55	25	20
Illinois	55	50	30	15
Indiana	10	10	10	10
Iowa	100	15	600	100
Kentucky	45	35	90	40
Maryland	4	28	12	10
Michigan	4	1	6	1
Minnesota	8	20	20	25
Missouri	20	15	25	11
New York	50	10	200	50
North Carolina	75	32	300	80
Ohio	50	10	500	100
Pennsylvania	10	30	150	30
Tennessee	175	60	600	150
Vermont	0	0	1	1
Virginia	120	40	200	30
West Virginia	20	10	50	20
Wisconsin	40	60	500	200
Total of All States	814	491	3,334	905

approximately 150,000 pounds of wild roots being exported from the U.S. each year. Several buyers have told me that they believe wild-simulated roots make up a small but increasing percentage of the wild roots they are now buying.

Clearly woods-grown 'sang constitutes only a small portion of the total ginseng produced in the United States each year, which is almost certainly why the demand for top quality roots remains high.

Potential Problems

The economics of ginseng farming are certainly attractive (see Tables I, II and III), but it is definitely a high-risk, high-reward proposition. No documentation exists, but the failure rate for beginning growers must be fairly high. There are a number of potential problems that nature may inflict on the grower in addition to the human problems of poor management and poaching.

Rodents

All manner of furry creatures will roam through your ginseng beds...usually without doing more than nuisance damage. However, mice and voles are a serious problem for some growers. The mice often use mole tunnels to travel into a ginseng bed and eat roots. (The moles themselves are only after worms and grubs, not ginseng.)

One successful Kentucky grower I know, surrounds the entire perimeter of his large planting area with a rodent barrier of aluminum flashing 18 inches high and buried 12 inches below the soil surface. Some growers put out rodenticides all year round. A few set out rodent traps—especially for the moles to prevent their underground highway construction. One fellow keeps a stable of slightly underfed cats.

Slugs and Insects

In different parts of the country, different insects and gastropods occasionally do significant damage to ginseng, although serious insect problems are uncommon in the woods. Aphids, leafhoppers, lygus bugs, jumping plant lice, tree crickets, cutworms, slugs, and snails have all been reported as pests. Of these, slugs are most frequently a problem. They will munch the leaves during wet, cool weather, sometimes completely destroying young plants; and, in late fall or early Spring, slugs have been known to hunt under the mulch for seeds planted at or near the soil surface.

All these pests can be controlled with appropriate pesticides, but it is important to first identify whatever is causing damage—and be tolerant of a few holes in the leaves here and there—before taking any protective action. You can upset the balance of nature by killing off beneficial predatory insects, or you could even kill those insects that feed heavily on the fungi that cause ginseng diseases.

Diseases

When a wild plant is domesticated and cultivated in a monoculture (only with members of its own kind), often there is an increase in its susceptibility to disease. Wild 'sang diggers rarely find diseased plants, and wild simulated gardens suffer much less from blights and rots than do woods-cultivated gardens, which in turn have far fewer problems than do plantings under artificial shade.

The two most common and troubling diseases you may encounter are blight—usually caused by *Alternaria panax* fungus—and root rot—most commonly caused by *Phytophthora cactorum*.

With ginseng diseases, an ounce of prevention is worth a pound of cure. Healthy plants growing in good soil in a forest where there is good drainage and adequate air circulation will resist most disease infestations. Preventive spraying for Alternaria Blight with a Maneb-based fungicide is common practice among woods-cultivated growers who plant densely. Quickly removing all diseased plants from your farm is good practice regardless of your growing method.

Weeds

A few forest weeds are part of ginseng's natural environment, and a number of growers are convinced that weeding disturbs the natural balance, brings pathogens to the surface, and markedly increases the incidence of disease. No controlled studies have been undertaken to test this hypothesis, but I think it is correct. However, that does not mean weeding is necessarily bad. Thick weed populations are not part of ginseng's natural forest environment and can choke out the ginseng; moreover, thick weeds may increase the likelihood of disease by reducing air circulation and by competing for soil nutrients and sunlight.

A few weeds, then, may be desirable and certainly do not require elimination, while weeding a thick stand of undesirables is appropriate. Some organic growers interplant bloodroot and/or goldenseal with their

ginseng because these two forest herbs are thought to inhibit spread of fungal diseases. One 'sang farmer I know allows the weeds to grow well above his green gold and then whacks them off with a weed eater. Although not as effective as uprooting, this procedure certainly improves air circulation and prevents the trespassers from going to seed. Herbicides are sometimes used where weed growth is particularly invasive.

Cultivation

Irrigation and Fertilization

Irrigation and fertilization are used cautiously, because either can significantly enhance the rate of growth and thereby create roots less similar in appearance to the ideal wild root. It is extremely rare that irrigation is needed for survival on well-mulched woodland sites; and ginseng has evolved to grow in competition with trees and other woodland herbs, so only very moderate levels of nutrition are required. Recent preliminary research (See Beyfuss, R. and Corbin, J.) does suggest that high levels of calcium (2,000 pounds per acre and up) are associated with especially vigorous wild ginseng populations and perhaps with healthier plants as well. Adding gypsum to calcium-poor sites will *probably* prove beneficial.

Harvesting

Forest gardens usually have to be dug by hand with a sturdy shovel or spading fork. You then wash the dirt off the roots, but do not wash thoroughly because the dirt in the horizontal rings serves to help differentiate woods-grown from shade-grown.

Small to medium-scale harvests can be handled by letting the roots drain in the shade and then drying them in a well-ventilated room with a temperature of at least 70 degrees and not more than 100 degrees. Spread the roots apart so that they are not touching on screen- or lattice-bottomed trays to maximize air circulation all around them. Large roots may require as long as six weeks to dry. Kiln drying is now used by large-scale artificial-shade growers.

Picking and Stratifying Your Seeds

The first harvest from your ginseng garden will not be roots but seeds, or rather berries. These are picked in the early fall as they ripen bright crimson on third-year and older plants. A fifth-year plant will produce

anywhere from 15 to 75 seeds—usually two seeds to a berry.

You would expect, therefore, to be able to harvest a great quantity of seeds from a relatively small number of plants. This is true under artificial shade, but in the woods all kinds of critters—mice, grouse, squirrels, chipmunks, deer, turkeys, even porcupines—regard the ginseng berry as a forest delicacy, and you will have to compete hard to get your share. An acre of ginseng under artificial shade often produces more than 200 pounds of seed each year, but you would do well to harvest 20 pounds of seed from an acre of mature wild-simulated plants.

The berries do not all ripen at once and as soon as one turns red it will likely be nibbled up, unless you beat the critters to it. (The seeds of green berries are usually not viable.) Thus, to harvest any quantity, you will have to pick the berries as soon as they ripen and this means repeated picking trips, which are often not cost effective.

After harvesting the berries, the usual procedure is to de-pulp them and mix them with fine, clean sand for storage inside a stratification box, which is buried in the ground for a year. The box has screen on both top and bottom to allow rain water to percolate down and through the sand and seeds, keeping them moist but not wet. The next fall, the box is dug up, the sand and seed mixture is spread out on a screen surface, the sand washed away through the screen, and the year-old seed then planted.

Permanent Seed-producing Beds

Because harvesting seeds from woods gardens is extremely time consuming and often not terribly rewarding, one of the first things a woods-grower may want to do is lay out a small fenced-in or otherwise protected area—a few thousand square feet in size—strictly for seed production. These seed-producing beds are usually well tilled and planted with on-, two-, or three-year-old roots spaced at least nine inches apart each way so that they can be grown for many years and produce large berry crops. (The permanent beds may be planted initially with seeds, rather than roots, but using roots is more efficient, allows selectivity of planting stock, and saves one, two, or three years time.) Of course, you can buy seeds for planting each year, but that adds expense.

If the beds are well-tended and healthy, the grower

can, in a short time, expect to harvest at least 30 seeds per plant. A few thousand mature plants can thus provide the seed needed for each year's new planting.

I have set up permanent seed-producing beds under artificial shade in my back yard. This not only reduces critter predation of the berries but also adds security from human poachers, who may be sorely tempted by beds of large, lush plants growing in the woods. Of course, a shade structure in the back yard does not contribute to the aesthetics of your landscape and it is expensive. I also have many permanent seed-producing beds in the woods that fortunately have not been poached, and they yield very well also.

The Future Market for Woods-grown Roots

Wild roots are being heavily hunted and dug because their value has continued to rise during recent years. They are becoming harder to find, and their price (and the price of wild-simulated roots) should resist any downward pull caused by oversupply of shade-grown ginseng. Top-grade (wild-looking) woods-cultivated roots usually bring about half the price paid for wild roots (if indeed they can't pass for wild). They will probably continue to do so. Low-grade woods-cultivated roots usually bring the same price as the best artificial-shade roots and will probably continue to do so—but that price has dropped dramatically. Not surprisingly, woods-cultivated growers are learning to concentrate on quality, not quantity, by avoiding heavy fertilization and other tactics that significantly increase the rate of root growth.

The historically low prices being paid now for artificial-shade-grown roots could well continue. Until this year, increasing acreage had been planted under artificial shade in each of the previous three years. The future for the small-scale grower is in the forest where the farming is slow and often hard, but the supply of ginseng produced is still far from meeting the demand.

Resources

When I began growing 'sang some 20 years ago, it was extremely difficult for anyone interested in getting started in ginseng to find information on the down-to-dirt details of its cultivation. Now, some literature is available (see References below); and many state departments of agriculture have become aware of its potential as a small-scale cash crop and have developed free pamphlets on ginseng farming. Growers associations have been formed in New York, Illinois, Wisconsin, and Maine. Also, the last chapter of my

book on growing ginseng, *American Ginseng: GREEN GOLD*, lists established buyers and suppliers and includes a lengthy bibliography. The book is available from the author, W. Scott Persons (a grower since 1979, and supplier of seed and seedling planting stock). Tuckasegee Valley Ginseng, Box 236, Tuckasegee, NC 28783.

Conclusion

In conclusion, growing ginseng under natural forest shade is an undertaking that a prudent, patient person who likes to grow things can find interesting and profitable even on a small scale. Understand, however, that it is labor intensive and incurs the usual risks associated with farming any crop, with that risk enhanced by the extended length of time to harvest.

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