

The Natural Farmer

Cultivation and Marketing of Woodland Medicinal Plants - Spring 2002 Special Supplement on AgroForestry

by Zoë Gardner

Goldenseal, ginseng, and black cohosh are all herbaceous perennial plants native to the hardwood forests of eastern North America. All three plants are currently quite popular as herbal remedies, but are not being cultivated on a wide scale. Instead the plants are being harvested from the wild at an unsustainable rate and are becoming threatened or endangered. Creating a sustainable cultivated supply of these plants will help to relieve stress on wild populations and at the same time provide an alternative crop to woodlot owners. For these reasons, there has been increased interest in the past few years in cultivating woodland plants.

Site Selection

The major difference between cultivating woodland plants and cultivating traditional farm crops is that woodland plants need to be grown in the shade. Shade can either be created, by setting up a shade cloth or lath covered structure, or can be utilized where already existing, such as the shade in a natural woodland. The cost of purchasing and maintaining shade cloth is prohibitively expensive for many growers, and may at times be economically unfeasible. Cultivating plants in an existing woodlot is a more practical and economically viable alternative.

Site selection is probably the most important factor in the success of woodland herb cultivation. The healthiest plants will grow in areas that are most similar to the plants native habitat. The first indication as to a good site is the type of vegetation currently in a site. Ideally, your planting area will contain a mix of mature hardwood trees such as sugar maple, white ash, beech, black cherry, and red maple. A few softwood trees mixed with hardwoods is alright, but a pure softwood stand is undesirable as the evergreen nature of the trees will prevent light from reaching the forest floor in early spring when the plants need light for growth.

Good understory companion plants to look for are spring flowering herbaceous plants such as trillium, mayapple, bloodroot, wild ginger, Solomon's seal, baneberry, and wild geraniums. Ideally, there will be some companion plants, but the area should not be overgrown.

Optimum levels of shade for each plant are currently being determined. In general, black cohosh only requires light shade (30 %) while goldenseal does best in medium to full shade, and ginseng requires full shade (70-80 %).

The soil should be rich and moist with lots of organic matter and a pH near neutral (6.5) to slightly acidic (5.2). Lime may be added to reduce the acidity of a low pH soil. Good air flow, and water drainage are important. All three plants are harvested for their roots, and the potential for root rot is something to keep in mind during site selection. Installing beds on a hillside will provide drainage and prevent root rot. For black cohosh and goldenseal the best growth occurs in tilled raised beds, for any area that is going to be tilled, a gentle slope is ideal. For ginseng, the soil will not need to be tilled, and a steep hillside can be used.

Planting a trial plot of plants in a site that is being considered is a good way to both become familiar with the woodland plants and to see if a specific site will be suitable for a particular plant.

Marketing

I believe that marketing is an important topic to consider before deciding to cultivate any plant. With any crop that you are considering growing, it is important to do some background research. With medicinal plants in particular, you'll want to have a basic understanding of the medicinal uses of the plant, who is most likely to use the plant, and what types of companies make products with the plant.

Potential customers for your crops can be local herb businesses, national companies, or bulk herb distributors. When growing and processing your herbs, you must keep in mind the fact that the highest prices will be paid for high quality organically produced herbs. Larger growers will provide competition with the amount of herbs they can grow and offer to large companies at a low price; they cater to the large manufacturers. But they can never compete with the level of quality that a small grower can provide. The best niche for the small grower is in the production of high quality plant material for small local herb companies who will appreciate the quality.

Goldenseal, ginseng, and black cohosh should all have fairly open markets, assuming that companies will be looking for sustainably grown plants, and current trends suggest that many will. Ginseng roots are said to be incredibly easy to sell, and licensed ginseng dealers, who can be found in states such as New York, Ohio, West Virginia and Wisconsin, are ready markets for your roots. Ginseng dealers may also be interested in goldenseal and black cohosh roots.

Site Preparation

Once you have your site selected, and have figured out several possible markets for your plants, you can go ahead and prepare your site for planting. Planting is best done in the fall, so that roots will have time to settle in to their new habitat during winter and will be ready to sprout in the spring. If necessary, spring planting will also work.

It is helpful to have a couple of people working on site preparation. The first step in site preparation is clearing away fallen trees and branches. A chainsaw will come in handy for cutting larger pieces of wood, and for cutting large vines. Killing large vines is important because the vines will eventually strangle the trees that provide the shade for your crops.

For black cohosh and goldenseal, you'll need to till the soil. Plants grown in tilled soil are much larger and produce a higher yield than plants in un-tilled soil. You will need a heavy duty tiller to prepare the soil. A 14 horsepower tiller seems to be the appropriate strength for a tiller. You'll want to make two passes with the tiller to get the soil loose and well mixed. Beds should be tilled somewhat wider than your planned bed, so there will be enough soil to create a raised bed.

Woodland tilling can be very dangerous. In the woods, there are tree roots to contend with, which can make the tiller jump unexpectedly. Common sense safety precautions are to wear steel toed boots, and have someone watching in case of an emergency.

After the beds are tilled, you'll want to remove any large roots churned up by the tiller, and raise the beds to several inches tall. A standard hoe is the best tool for this job, a steel rake is helpful to smooth the beds out in preparation for planting.

Once your soil is tilled and your beds are raised, you'll be ready to plant.

Goldenseal

In spite of the fact that very little scientific research has been done on the plant, goldenseal is one of the top selling herbs in health food stores, pharmacies, and discount stores in the U.S., used primarily as an "herbal antibiotic," frequently in combination with echinacea. The medicinal properties of goldenseal are attributed to a group of compounds called alkaloids. If you sell your product to a large manufacturer, they will likely test for a minimum content of alkaloids.

Goldenseal (*Hydrastis canadensis*) is an herbaceous perennial that emerges from the ground mid-March to early May. Almost immediately after emergence, a rather inconspicuous single green and white flower appears, which turns into a raspberry-like red fruit in late June to early July. The mature plant is 6 to 14 inches tall with two or more stems that typically have two leaves each. The leaves are 3 to 12 inches across with 5 to 7 lobes. The plant may die down slowly after the fruit matures, or remain green until frost. Goldenseal spreads naturally by underground rhizomes and an extensive fibrous root system, and also reproduces by seed.

The ideal level of shade for goldenseal has not yet been determined. In the southern Appalachian foothills, I saw goldenseal growing in a lawn at the edge of some woodlands and in the deep shade of cool woods, so given the right environmental conditions, goldenseal can be adaptable to a relatively wide range of habitats. Depending on the slope of your site, goldenseal can probably withstand as little as 40 percent shade, although 60 to 70 percent is probably best. Lower levels of shade will be alright for a north or east facing slope, while more shade will be necessary for a west or south-west facing slope. Goldenseal is hardy in USDA hardiness zones four to eight.

The easiest way to propagate goldenseal is by rhizome (root) division. The rhizome should be cut into pieces a half inch in length, if possible, a live bud should be included in each piece. The fibrous rootlets should be left in tact, although if some of the rootlets fall off, initial studies suggest that the rootlets can be replanted and plants will slowly regenerate from them.

The planting area for goldenseal should be tilled, and the beds raised. Root pieces are best planted at a depth of one to two inches with the buds facing up, at a spacing of six to eight inches between plants. Beds should be mulched with saw dust, pine bark, or chopped leaves. Several inches of mulch can be added in the winter to protect the plants. The mulch will need to be raked off in early spring to allow plants to come up.

Propagation by seed is advantageous for minimizing costs and reducing the possibility of importing plant diseases, but can be difficult and produce unpredictable results. Seed germination can vary between 0 and 90 percent, studies trying to produce better germination have not been consistent.

So far, the best results have been obtained by picking the seeds just as they ripen and turn red, mashing the seeds to loosen the pulp, and fermenting the seeds and pulp in water in order to overcome chemical germination inhibitors. Once the mixture has been allowed to ferment, the seeds are strained out and rinsed in a sieve until the water runs clear. The seed is then mixed with clean sand and put in a stratification box (easily made from a coffee can with pieces of strong mesh and screening secured on each end). The stratification box should be buried in a well drained area, exposed to natural rain, and left until the following spring. Burying the seed allows the plants to overcome their natural dormancy. The following spring, the seeds can be planted in nursery beds or flats, covered lightly with soil. Seedlings can take up to a year to germinate, so patience will be necessary.

Slugs are the primary problem with raising goldenseal and can devastate young plantings. The common remedies for slug control are all worth trying, including beer traps, diatomaceous earth, or a mix of lime and wood ash. If the slugs become intolerable, removing any mulch will likely help to reduce slug populations.

As goldenseal has become a more widely cultivated plant, an increasing number of diseases have been noticed. The diseases are fungal, and are similar to the diseases seen in ginseng populations. The best control seems to be adequate air and water flow and good sanitation. Fertilization, assumed beneficial for most crops, does not seem to be beneficial for goldenseal, and may even increase the incidence of disease in a crop.

Roots grown from division will be ready in three to five years, while those grown from seed will be ready in six to seven years. Goldenseal roots should be dug in the fall after the tops have died down. Woodland plots are probably best dug with a digging fork, the roots should have remained shallow and be easy to dig. The fibrous rootlets should be left intact. Large, healthy roots should be set aside as planting stock.

The remaining roots should be laid out on a mesh screen (an old screen door, or a frame with heavy gauge mesh) and sprayed with a hose until clean. If roots are not well cleaned, they will not pass the quality tests used by many buyers.

Roots should be dried on screens in a protected, well ventilated area out of direct sunlight. The drying area should not be more than 100 degrees, otherwise the outside of the roots will dry before the inside and the crop will be destroyed. Drying will take about two weeks.

In some years, there may be a market for goldenseal leaves, which are a less expensive and perhaps more sustainable alternative to goldenseal roots. If you do find a market for the leaves, they should be harvested in late summer when the foliage is still green.

American Ginseng

Ginseng has been a sought-after medicinal plant for over 300 hundred years, and Asia is by far the largest consumer of American ginseng, with Hong Kong purchasing approximately 80 percent of the ginseng produced in the U.S.. The Latin name, *Panax* comes from the word *Panacea* and ginseng has certainly been seen as a cure-all medicinal plant. In Asia, the root is used as a general tonic, an aphrodisiac, and something of a fountain of youth. In the U.S. ginseng is used to boost energy and mental awareness.

American ginseng (*Panax quiquefolius*) is a rather inconspicuous plant of the forest floor, growing to about 20 inches high. The first year, ginseng will have three tiny leaves, and look something like a wild strawberry, in following years, the plants will produce one or more prongs, each with five leaflets. Older plants produce more leaves, up to about five per plant. In early summer, plants send up a cluster of greenish white flowers that in July or August ripen into a cluster of bright red berries. Ginseng will not tolerate as much sun as goldenseal, and grows naturally on north or east facing slopes in well shaded areas in zones three through eight.

There are four different ways that ginseng can be grown, shade grown, woods cultivated, wild simulated, and wild. Shade grown plants are grown in a field under shade cloth. Woods cultivated plants are grown in cultivated beds in the woods. Wild simulated plants are grown in un-cultivated woodland areas. Wild plants are those occurring naturally in the wild. The different methods of cultivation greatly influence the external appearance of the roots. Roots produced under shade cloth or in cultivated beds are much fatter and smoother than wild simulated or wild roots.

The Asian market places the highest value on wild and wild simulated crops, believing that wild roots are much more medicinally potent than cultivated roots. The prices for the typical roots grown in the four different fashions vary widely. Shade grown roots currently sell for \$10 to 12 per pound, woods cultivated roots are \$80 to 100 per pound, and wild simulated roots are \$150 to 250 per pound. Wild simulated roots take a comparatively long time to mature, but also require the least input.

Site selection is particularly important for wild simulated ginseng. Appropriate companion plants are trillium, ferns, mayapple, bloodroot, and spikenard. Several recent studies analyzing soils in natural stands of ginseng have found that a soil high in calcium (4,000 lbs per acre) and low in pH (5.0) produces the healthiest stands of ginseng. Soils with a low pH usually have much lower levels of calcium, finding or creating a low pH, high calcium soil will be helpful in establishing a successful planting of ginseng. To increase the amount of calcium in a site, gypsum (calcium sulphate) is the best amendment. Other forms of calcium, such as lime (calcium carbonate) will increase the pH, which is undesirable.

Planting wild simulated ginseng is very easy. Planting is best done in the fall with stratified seed. To plant, rake away the top layer of leaves in the planting area, loosen the top inch or two of soil, scatter seeds at a rate of four seeds per square foot. Rake seeds into the soil, and cover with the natural leaf layer. The roots will be ready for digging in about 10 years, but may be left in the ground longer. Ginseng roots increase in value with age, so leaving the roots in the ground for a longer period of time is not at all a problem.

Black Cohosh

Of the three plants, black cohosh is the most adaptable and easiest to grow. The roots of black cohosh are used medicinally in the treatment of menopause, and black cohosh is one of the primary ingredients in herbal menopause formulas. Unlike ginseng and goldenseal, commercial collection of black cohosh has only been occurring for the past 10 years or so, although the increase in demand for natural remedies for menopause has forced a lot of collection in recent years.

The leaf stalks of black cohosh (*Cimicifuga racemosa*) emerge in mid-spring and grow to about two feet in height, the rather elegant flower stalks begin to appear in mid-May and by mid-June reach heights up to eight feet. Stalks are full of tiny white flowers that in late summer turn into rattle-like seed capsules. Several varieties of black cohosh are sold at garden centers as ornamentals.

Black cohosh will tolerate a wide range of habitats. In warm climates, shade is necessary, but in northern regions black cohosh will grow in full sun, if enough water is available. Black cohosh is hardy from zones three to seven. In a woodland setting, black cohosh should be adaptable to any slope direction.

Root cuttings are the most reliable way to propagate black cohosh. Mature roots can be divided into three to five pieces, each piece should have at least one live bud. Propagation by seed is possible but difficult because, like ginseng and goldenseal, the seeds need to be stratified to germinate. The best germination results come from fresh seeds. The seeds need to be stratified first in a warm damp environment, then in a cold environment. To do this, fresh seeds can either be seeded in a nursery bed in the fall and left to germinate the following spring, or sown in a flat and left in an unheated greenhouse from the fall to the following spring.

Plants grow rather large, and should be planted one to two feet apart at a depth of two inches in tilled raised beds. Weed control should be done early in the season, since plants will get big quickly. Beds should be mulched with sawdust, pine bark mulch, or chopped leaves.

Plants grown from cuttings should be ready for harvest in 3 to 5 years, and plants grown from seed should be ready in 6 to 7 years.

Harvesting black cohosh is essentially the same as for goldenseal. Roots are dug with a digging fork and sprayed clean on mesh screening. The roots of black cohosh are relatively gnarly and may need to be cut before cleaning. Roots should be dried in a protected, well ventilated area out of direct sun. The temperature should not be over 100 degrees, drying will take approximately 5 to 10 days.

Conclusion

Cultivating woodland herbs can be both enjoyable and profitable for the grower who has an appropriate planting site and is willing to invest the time necessary to become familiar with woodland cultivation. In addition to satisfaction and possible profit, cultivating woodland plants will help to preserve the natural diversity of wild populations of plants that could otherwise be collected to the point of disappearing.

You should now have the basic information that you need to start cultivating woodland medicinal plants. A good deal more information is available on the internet, in books, and in other publications. A brief list of resources is given below, for a larger list of resources contact the author at the e-mail or postal address given below. United Plant Savers (see contact information below) publishes an extensive list of companies that provide live roots and seeds for the woodland herbs.

Suggested on-line resources:

United Plant Savers – P.O. Box 98, East Barre, VT 05649 - www.plantsavers.org
National Center for the Preservation of Medicinal Herbs – 33560 Beech Grove Rd, Rutland, OH 45775 - www.ncpmh.org

Suggested reading:

Sturdivant, Lee and Tim Blakely. 1999. Medicinal Herbs in the Garden, Field, and Marketplace. San Juan Naturals. Friday Harbor, WA. ISBN 0-9621635-7-0.
Gladstar, Rosemary and Pamela Hirsch. 2000. Planting the Future; Saving our Medicinal Herbs. Healing Arts Press. Rochester, VT. ISBN 0-89281-894-8.

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