A QUICK GUIDE TO PRODUCING
NON-TIMBER FOREST PRODUCTS
**INTRODUCTION**

The hardwood forests of the Appalachian region are a rich and diverse resource, providing us with fuel, fiber, food, and medicine. For many woodland owners timber harvesting may not be the primary management goal or it may be several years before that goal can be realized. Non-Timber Forest Products (NTFP’s) may be a good way to add value to your forest understory and provide supplemental income while allowing timber to mature and increase in value. NTFP’s can also be a primary management goal for small properties where timber harvesting is not economically feasible. This publication will highlight the top NTFP opportunities for woodland owners in the region and production strategies to help get you started.

Prices and figures included in this booklet are based on averages from 2007-2012.

**AMERICAN GINSENG | (Panax quinquefolius)**

American ginseng is a perennial understory herb native to eastern North America. While “digging sang” has been a profitable activity in the Appalachian region for over two hundred years, wild harvesting and habitat loss have impacted populations to such a degree that it has become threatened in many parts of its native range. Intentionally growing ginseng using wild-simulated practices can be a more profitable way to bring ginseng to market and reduce harvest pressure on wild populations.

**SITE SELECTION**

Ginseng grows in cool, moist, and densely shaded (80%) woodlands on north to east facing slopes. Ginseng is typically found growing in hardwood stands dominated by tulip poplar and sugar maple trees. Understory plants like maidenhair fern, black cohosh, bloodroot, wild ginger, and spicebush are also indicators of suitable habitat. Sites with an open understory are best to allow for airflow and circulation. Pruning small trees and shrubs is recommended to improve site conditions and airflow if needed.

**PLANTING STOCK**

Ginseng seeds are slow to germinate and require 18 months of stratification before sprouting. When cultivating ginseng only purchase pre-stratified seeds. Plant seeds in the fall during peak leaf drop. Be cautious about buying cheap seed; seed producers who do their jobs right are not likely to sell their seed at low prices. Approximately 1lb. of seed will plant 1,600 sq. ft.

**WILD-SIMULATED PLANTING**

Wild-simulated cultivation mimics natural conditions. To plant, start at the bottom of the slope and rake back the leaf litter in a strip 4-5 ft. wide. Scuff the soil with the rake to loosen the top 1/4” of soil. The broadcast 5-7 seeds per sq. ft. Move uphill and rake leaves down onto the previously seeded area and repeat until the planting site is full. It is recommended to walk over planted seeds to ensure better soil contact.

Deer, turkey, and small rodents like mice, moles, and voles may eat seeds, leaves, and occasionally roots, although human theft is the greatest threat to ginseng crops. Foliage and water-borne disease can also affect plantings. Walk through plantings regularly looking for signs predation, spontaneous mortality, and leaf discoloration.

**Harvesting**

Ginseng roots must be at least 5 years old to legally harvest and sell, but it is recommended to wait at least 7 to 10 years before harvesting to earn top dollar prices. Ginseng’s value is closely linked to appearance. Harvest the roots carefully, making sure not to damage the root body, or break the neck and fibrous roots. After harvesting, roots can be kept fresh or dried before marketing.

**Marketing**

Ginseng has ready-made markets and buyers are licensed by each State. A list of licensed buyers can be obtained by contacting the Ohio Division of Wildlife or your state’s managing agency. Average prices for wild and wild-simulated ginseng are about $500 per pound, but in recent years have gone as high as $800-$1,000 per dry pound.

**Sources of Information and Propagation Material**

Apsley and Carroll. Growing American Ginseng in Ohio; Planting Using the Wild-Simulated Method. Rural Action and Ohio State University Extension


Ohio ginseng regulations. www.dnr.state.oh.us/tabid/18635/default.aspx
Rural Action Sustainable Forestry | Forest Botanicals www.ruralaction.org/forest-botanicals
GOLDENSEAL (Hydrastis canadensis)

Goldenseal is a highly valued medicinal herb that has been collected from the forests of eastern North America for hundreds of years. Also known by the names: yellow root, ground raspberry, and wild turmeric, goldenseal is known for its anti-fungal, antibiotic, and anti-bacterial properties. Overharvesting and habitat loss have caused serious declines in wild populations, which has increased demand for sustainably produced materials.

Goldenseal is an herbaceous perennial that emerges in early spring from a dormant rootstock. The root system consists of a bright yellow horizontal rhizome that is covered with numerous fibrous roots. Juvenile plants have a single leaf and stem, while adult plants develop a forked stem with two leaves. Mature plants produce small, white flowers almost immediately after emerging in spring. After pollination, the flowers produce a green raspberry-like fruit that turns red as it ripens in August.

SITE SELECTION
Goldenseal grows best in a rich, moist, woodland soils with good drainage. Areas with tall, dense canopies of poplar, beech, sugar maple, asp, and mixed oak species are preferable. The presence of companion plants in the understory, such as mayapple, black cohosh, maidenhair fern, jack-in-the-pulpit, wild ginger, trillium, and bloodroot also indicate good habitat.

PLANTING
Goldenseal is commonly propagated from rootlets, but can also be grown from seed. Rootlets are planted in the fall before the first freeze. Woodland sites can be tilled and raised beds formed for more intensive cultivation, or grown less intensively using wild-simulated practices. Both tilled beds and wild-simulated plantings should be mulched with leaf litter for added nutrients and insulation. Rootlets are planted in furrows 2” deep every 6”, and in rows 6-8” apart. Seeds are most viable when they are sown just below the soil surface after ripening on the plant.

MARKETING
Prices for goldenseal roots range from $22-$36 per dry pound, with higher prices paid for sustainably produced material. Roots can be sold in bulk and unprocessed, or can be made into value-added products. In many states, a license is not required to purchase or sell goldenseal. Goldenseal buyers often advertise in local papers during the fall, and most ginseng dealers usually buy goldenseal roots as well.

SHIITAKE MUSHROOMS (Lentinula edodes)

Shiitake mushrooms are native to Japan, but have been widely cultivated in the U.S. since the 1980’s. The market for gourmet mushrooms continues to grow as consumers become more aware of their culinary uses and nutritional benefits.

LOG SELECTION
Healthy, living hardwood logs are harvested in late February for spring inoculation or early October for fall inoculation. The best logs measure 3-8 inches in diameter and are cut to 3.5 foot lengths for easy handling. Oak species are most desirable for shiitake cultivation, but sugar maple, hickory, elm, sycamore, poplar, red maple, and beech have also been used successfully. Denser hardwoods like oak and hickory will continue to fruit longer than softer species. Oak and hickory logs also retain their bark for much longer, which is essential for shiitake to fruit successfully.

Harvest logs carefully to avoid soil contact and damage to the bark. Tom bark can allow other organisms to enter the log and compete with the shiitake for nutrients. Remove damaged sections when cutting to length and discard logs with internal rot.

INCUBATION
Logs can be inoculated with either sawdust spawn or plug spawn. Holes are drilled approximately 1.25” deep every 6”, in rows 3” to 4” apart. The holes are then filled with spawn and sealed with cheese wax to retain moisture and keep out competing organisms. Label each log with the date of inoculation and type of spawn used for your records.

FRUITING
Logs will fruit naturally when conditions are right or can be “forced”. To force fruit, soak logs for 12-36 hours in water, then restack. Be careful not to over soak and drown the mycelia. Mushrooms should begin budding and fruiting 4-7 days later. After force fruiting logs need to rest for 6-8 weeks before being forced again. A forced fruiting rotation allows for regular and predictable harvests for market producers.

Harvesting
Bigger isn’t always better. The best grades of shiitake tend to be small in size and have caps with a slight curl at the edge. Harvest often if you want to earn the best price for your mushrooms. Harvest by cutting the stems near the base with a knife or scissors. Pay attention to post-harvest handling and storage to maintain quality. Mushrooms should be refrigerated in paper bags or waxed cardboard boxes to prevent moisture build-up.

MARKETING
Shiitake mushrooms can be sold fresh or dried. Most consumers prefer fresh mushrooms, but dehydrating can be a good way to preserve unsold harvests. Average market prices range from $8-$12/ fresh pound.

BUYERS FOR FRESH SHIITAKE MUSHROOMS
Restaurants, Bed and Breakfasts, Vacation Resorts, Organic Markets, Supermarkets, and Farmers Markets.

SOURCES OF INFORMATION AND PROPAGATION MATERIAL:
Northwest Mycological Consultants - www.nwmyc.com
Field and Forest Products - www.fieldandforest.net
Kentucky State University Extension - www.co.ca.uky.edu/ces/
Ramps | (*Allium tricoccum*)

The ramp, also known as the wild leek, is another perennial understory herb native to eastern North America. Ramps bulbs are prized for their spring onion taste and strong garlic-like aroma. In early spring, ramps emerge as smooth, broad, lily of the valley like leaves that disappear by mid-summer before producing a flowering stalk with small white flowers.

Traditionally ramps were consumed as the first edible "greens" of the year, providing much needed vitamins and minerals following long winter months without fresh vegetables. Today, annual "ramp festivals" are considered major tourist attractions in central and southern Appalachia. In many areas intensive harvesting has seriously impacted wild populations. Today nearly all of the ramps currently being consumed are harvested from the wild. Growing interest among consumers has increased demand and thus, the need for more producoto consider ramps as a new crop.

**SITE SELECTION**

Ramps grow naturally under a forest canopy of beech, birch, sugar maple, poplar, buckeye, basswood, hickory, and mixed oaks. Wildflowers such as trillium, toothwort, nettle, black cohosh, bloodroot, trout lily, and mayapple can also help density suitable growing sites.

Ramps prefer a well-drained site with rich, moist soils, that are high in organic matter. Soil moisture is one of the most important environmental conditions for the survival and growth of the plant and seedlings. The best sites often occur on north to east facing slopes where moisture is more abundant and available.

**SEED PROPAGATION**

Late August through September is the best time for gathering and sowing ramp seeds. Seeds require a warm moist period followed by a long cold period to break seed dormancy. Lack of adequate warm cold periods can result in slow or poor seed germination. To plant, rake back the leaf litter and broadcast 1/2 seed/sq ft. and cover with leaves. If starting from seed it will take 5-7 years to produce a harvestable bulb.

**PROPAGATION FROM BULBS**

Many growers like planting bulbs as well as saving seeds. Planting bulbs can provide harvestable ramps and seeds within a few short years.

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PAWPAW | (*Asimina triloba*)

The pawpaw is a small to medium sized deciduous tree with uniquely flavored fruit, that resembles a tropical combination of banana, mango and pineapple. Although relatively small in size, pawpaws are the largest native tree fruit in North America. Indigenous groups cultivated pawpaw trees for generations and were believed to be instrumental in helping spread the species north from the southern U.S. through trade and migration.

**FRUIT CHARACTERISTICS**

The pawpaw fruit is very nutritious and the pulp contains high levels of vitamins, minerals, and amino acids. The fruits have a thin skin and contain several large oblong seeds. The skin and seeds are both inedible and can cause digestive upset. The pulp to seed ratio is variable in wild plants, but new cultivars have increased fruit size and yields. The versatility and uniqueness of this species may present a lucrative opportunity for small-scale producers.

**SITE SELECTION**

While naturally found in the forest interior or along the forest edge, for the best fruit production trees should be spaced 20-25 feet apart. Pawpaws are very shade tolerant, but fruit production declines rapidly as shade levels increase. To improve conditions, thin surrounding and overhead vegetation. Trees should be planted on sites rich in organic matter and with adequate moisture and soil drainage. Excessively windy, dry, or areas where cool air accumulates should be avoided.

**PLANTING**

Pawpaw trees are best planted in the spring, but fall planting is also possible. Full sun plantings should be irrigated for the first two years until established. Fruit production typically begins after 5-7 years growth. Grafted varieties may produce fruit after only 3 years.

**HARVEST AND STORAGE**

The flavor of a pawpaw fruit intensifies as it ripens, similar to a banana, resulting in pulp that is excellent for use in cooking or eating fresh. Harvest when fruits are slightly soft to the touch. Skin color change is not a guarantee of ripeness. Tree-ripened fruits have a shelf life of only 3 to 5 days at room temperature, but can be stored from 1 to 3 weeks if refrigerated.

**PRODUCTS AND MARKETING**

Pawpaw fruit yields vary widely from wild stock to specially cultivars. Cultivars tend to have larger fruits, higher yields, and thrive in full sun. Whole fruit sell for $1.00-$2.00/lb, with approximately 3-5 fruits per pound. Pawpaw fruits can be processed into pulp, juices, wines, ice cream, yogurts, baked goods, and more. The skin and seeds should not be eaten. It is also worth noting that a small number of people are allergic to the fruit.

**SOURCES OF INFORMATION AND PROPAGATION MATERIAL**

Kentucky State University - www.pawpaw.ksue.edu
Ohio Pawpaw Growers Association - www.ohiopawpaw.com
Peterson Pawpaw - www.petersonpawpaw.com

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**SOURCES OF INFORMATION AND PROPAGATION MATERIAL**

NCHerb.org - www.nch.uga.edu/depts/herbc/hcnh-133.html
Rural Action Sustainable Forestry | Forest Botanicals
www.ruralaction.org/forest-botanicals/
Ramp Farm Specialties - www.rampfarm.com