Growing American ginseng in Your Woods

Presented by Jarett Cook
Outline

• History
• Ecology
• Production
• Pest Management
• Processing
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• Pest Management
• Processing
Historical Use

• 4,000 years of traditional Chinese Medicine

• *Panax ginseng*
  – Panacea = cure all
  – *jen-shen* = “man root”

• Strengthen body & mind

• Prolong life

• Became nearly extinct
Discovery

• Known by Europeans in 1200s
• Mentioned by Marco Polo
• Traded by Dutch merchants
• Described by Jesuit missionaries in China
• Discovered American ginseng in 1709
  – Gathered by Mohawks
  – Reported by Father Joseph Francois Lafitau
Early Harvesting

- Company of the Indies exported by 1720
- Began in Quebec around Montreal
- Traded alongside furs
- Harvested by Indians and Europeans
- Discovered in New England in 1750
- Followed westward settlement
- Daniel Boone lost 30,000 lbs in 1780s
Over Harvesting

• Annual harvest of 381,000 lbs 1821 - 1899
• Wild populations significantly decline
• Exports decline in 1890s
• Regulations imposed
  – Harvest seasons
Early Cultivation

- Began in late 1880s
  - Transplants
  - Artificial shade
  - Seeding
- Growers associations in 1902
- Farmers’ bulletins and journals published
  - *Special Crops* and *Ginseng Journal*
- Insurance policies
- USDA began promoting in 1898
Promotions

$20,000,000 WORTH OF GINSENG

"Can be marketed annually in China," writes U.S. Consul Johnson from Amoy, China. Entire Chinese population, 400,000,000, uses it for medicinal properties. Big demand for small supply. Be a Ginseng grower! Easily grown. Profits so immense that true statements seem falsehoods. One acre of 4-year old Ginseng is worth $40,000—this is a conservative statement. Hardy anywhere in the U.S. and Canada. We sell cultivated roots and stratified seed. $10 to $80 worth properly cared for will yield a small fortune. Send 4c for 55-page Book on enormous, easily-earned profit in Ginseng and copy of magazine, "The Ginseng Garden."

CHINESE-AMERICAN GINSENG COMPANY
DEPT. 42 SCRANTON, PA.

Grow Medicinal Plants
Fortunes In Small Gardens

There's Big Money in Growing Medicinal Plants—Ginseng, Golden Seal, Snake-root, Belladonna—all pay well. A Money Making Home Industry. Hardy everywhere in the United States and Canada. Easy to cultivate in City or Country. Very small space, little time required. Staple as wheat. Wild supply failing, and prices advancing. We sell reliable plants and seeds, and our patrons have expert advice free. Send two 2 cent stamps for postage for our complete booklet and current issue of "Ginseng Garden," the leading magazine; circulation 10,000, 25 cents per year. It tells all about medicinal plants and herbs and how you can make your back-yard pay big dividends. It's an opportunity—don't miss it. Write to-day.

CHINESE AMERICAN GINSENG COMPANY,
Originators of Ginseng Culture in America.
675 Lacka St., Elmhurst, Pa., (Suburb of Scranton.)
Cultivation Expands

• Started in New York State
  – by George Stanton

• Moved westward
  – Pennsylvania, Ohio, Kentucky, Indiana, Minnesota, and Michigan

• Started in Wisconsin in 1904
  – Fromm brothers near Wausau
  – Marathon County, 95% of modern cultivation
Markets

• 21,000 tons of root from 1821-1983
• Hong Kong imports 80% of U.S. roots
• China is largest consumer
• Over 40 grades
  – Age, shape, texture, color and taste
CITES

• Convention in Threatened and Endangered Species

• Listed as threatened in 1975
  – Limited harvest season & age
  – Certification of exports
  – Enforced through state laws
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Panax quinquefolius

• Perennial, herbaceous and long-lived
• Regrows from root
• Annual stem
• Compound leaves
  – Ovate & serrated
  – Form “prongs”
• Flower spike
Ginseng's Life Cycle

- Seeds
- Sprout
- 1st year Seedling
- Berries
- Four-Pronged (Mature plant)
- Flower Spike
- Buds
- Three-Pronged (at least 3 years old)
- Two-Pronged (at least 2 years old)
Seed Production

- Flowers in May
- Ripen in August
- 1-3 seeds in berries
- Stratify 18-22 months
- Germinate in April
Prong Development

- 1 year seedlings
  - Trifoliate, 2-3”
- 2 year plants
  - Single prong, 4-7”
- 3 - 6 year plants
  - Two prongs
- 7 - 9 year plants
  - Three prongs
- 10 to 11 year plants
  - Four prongs, 20-24”
Aging Roots
Distribution

• Native to eastern North America
  – Ontario & Quebec
  – New England
  – Appalachia
  – Ozarks
  – Upper Midwest

• Cultivated
  – British Columbia
  – Washington
  – Korea
  – China
Preferred Conditions

- Hardwood forest
- North to east slopes
- 5-20% grade
- 75% shade or more
- Cool and moist
Preferred Soils

• Loamy to sandy loam
• High organic matter
• Well drained
• 4.5-7 pH
• 4000 lbs/acre calcium
• 95 lbs/acre phosphorus
Overstory Indicators

- Sugar maple, *Acer saccharum*
- Basswood, *Tilia americana*
- Black walnut, *Juglans nigra*
- Red Elm, *Ulmus americana*
- Red oak, *Quercus rubra*
Understory Indicators

- Maidenhair fern, *Adiantum pedatum*
- False Solomon’s seal, *Smilacina racemoso*
- Rattlesnake fern, *Botrychium virginianum*
- May apple, *Podophyllum peltatum*
- White baneberry, *Actaea pachypoda*
- Hepatica, *Hepatica acutiloba*
- Blue cohosh, *Caulophyllum thalictroides*
Understory Indicators

- Jack-in-pulpit, *Arisaema triphyllum*
- Christmas fern, *Polystichum acrostichoides*
- Goldenseal, *Hydrastis canadensis*
- Blood root, *Sanguinaria canadensis*
- Leeks, *Allium tricoccum*
- Trillium, *Trillium spp.*
- Wild ginger, *Asarum canadense*
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Field Cultivated

- Artificial shade
- Field soils
- Straw mulch
- Raised beds
- 3-4 year rotations
- 100 lbs/acre of seed
- 2,500 lbs/acre of root
Woods Cultivated

- Natural shade
- Forest soils
- Leaf mulch
- Raised beds
- 6-9 year rotations
- 48 lbs/acre of seed
- 600 lbs/acre of root
Wild Simulated

- Natural shade
- Forest soils
- Leaf mulch
- No Tillage
- 9-12 year rotations
- 20 lbs/acre of seed
- 160 lbs/acre of root
Woods vs. Field Grown

- Rotation length
- Pest issues
- Labor and cost
- Root yield
- Root quality
Seed

- Must be stratified!
- Plant in the fall
  - 1/2 -1” deep
  - Hand plant
  - Broadcast
  - Machine planter
- 6,500 seeds/ lb.
- $80 - $140/ lb.
Fertilizer

• Test soil every 2-3 years
• Need 1,000 lbs/acre Ca
  – Add 50 lbs/1,000 sq. ft
  – Limestone for pH < 4.5
  – Gypsum for pH > 4.5
• Need 95 lbs/acre P
Planting Beds

• Mix organic matter and/or fertilizers
  – 4 - 6’ wide
  – 6 - 9” tall

• Plant seeds
  – 6 - 9” rows
  – 1’ apart
  – Broadcast

• Mulch 1 - 3”
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[Image of ginseng plant and flowers]
Alternaria blight

- Caused by *Alternaria panax*
- Bull’s eye leaf spots
  - Water soaked
  - ½” diameter
  - Turn tan and papery
- Kills foliage
- Mature plants survive
Managing Alternaria

• Thin stands for circulation
  – 1 to 2 plants/ sq. ft
• Remove infected plants
• Fungicides
  – boscalid
  – mancozeb
  – chlorothalonil
Botrytis blight

- Caused by *Botrytis cinerea*
  - Water soaked lesions
  - Black sclerotia
- Late in season
- Defoliation
- Not fatal
Powdery mildew

• Cause by *Erysiphe spp.*
  – Leaves covered in white mycelium
  – Turn a reddish purple

• Late in season

• Defoliation

• Not fatal
Damping-off Disease

• Complex of fungi
  – *Pythium* spp.,
  – *Fusarium* spp.
  – *Rhizoctonia solani*
  – *Phytophthora cactorum*

• Pre-emergence decay of seeds and seedlings

• Post-emergence rotting of stems and roots
Damping-off Symptoms

- Pale green wilting leaves
- Turning purplish to brown
- Interveinal chlorosis
- 1 or 2 year plants
- Cool damp soils
Managing Damping-off

• Select sites with good soil drainage
• Buy healthy non-infected seed
• Sterilize seed with 10 % bleach
• Ridomil® fungicide
  – Pre planting soil fumigation
  – Post planting treatments
Root Rots

- *Phytophthora cactorum*
- *Cylindrocarpon destructans*
- *Rhizoctonia solani*
- *Fusarium* species.
- *Slerotinia sclerotium*
Root Rot Symptoms

• Water soaked leaves
  – Discoloration and wilting

• Discolored vascular bundles
  – Stem and root

• Deteriorated roots
  – Dig and inspect
**Phytophthora cactorum**

- Causes root rot and leaf blight
- Wilted foliage
  - Turns yellow or red
- Pale brown roots
  - Smooth exterior
  - Soft rubbery texture
- Causes replant disease
Cylindrocarpon destructans

- Moves from root tips upward
- Rots the top portion of the main root
- Develop at any age
- Rot destroyed before foliar dieback
Rusty Root Rot

- Caused by
  - *Rhizoctonia solani*
  - Possibly other fungi
- Orange to reddish infection
- Rot is dry and firm
- Washes away easily
Fusarium and Sclerotina

- *Fusarium spp.* infect root, stem and crown
  - Discolored vascular bundles
  - Foliar wilt
- *Sclerotinia sclerotium* infect roots
  - Black sclerotia
  - White mycelium
Managing Root Rots

• Site selection
• Remove infected plants
• Bleach equipment
• Frequent monitoring
Diagnostic Clinics

• ISU Plant and Insect Diagnostic Clinic
  – (515) 294-0581, sickplant@iastate.edu

• U of W Plant Disease Diagnostic Clinic
  – (608) 262-2863, bdh@plantpath.wisc.edu

• U of I Plant Clinic
  – (217) 244-3254 satterle@illinois.edu
Sun Scalding

• Sun exposure
  – Sudden
  – Excess
• Tolerance
  – Younger plants
  – Early in season
• Visible after damaged
Herbivory

- Deer and rabbits browse leaves
- Birds and mice eat seeds
- Control
  - Hunting
  - Trapping
  - Fencing
Slugs

• Nocturnal defoliation
• Remove habitat
• Slug pellets
  – Deadline®
  – Sluggo®
  – Escar-go®
Poaching

• Don’t advertise
  – Harvest ripe berries
• Limit access
• Visit frequently
• Report poaching
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Harvesting

- Loosen soil 8 -12” around root
- Dig by hand with spade or “sang” hoe
- Keep fine root hairs attached
- Follow regulations
Washing

- Rinse don’t soak
- Brush don’t scrub
- Leave “skin” on
- Don’t remove all the soil
Drying

- Slowly dry
- Stable humidity
- Air circulation
- Below 100° F
- Space roots apart
- Remove rotten roots
Drying

• Roots will shrink
• Lose 1/3 green weight
• Should break crisply
• Keep roots intact
Producing Seed

- Harvest ripe berries
- Depulp seed
- Stratify in sand
  - Root cellar
  - Burry in boxes
Production Guides

• **ISU Forestry Extension Series F400, F401, F402 & F403**


