

# Goldenseal

## *Hydrastis canadensis* L.

### Introduction

Goldenseal (*Hydrastis canadensis* L.) also known as yellow root, yellow puccoon, ground raspberry, yellow paint, wild turmeric and yellow eye, is an herbaceous perennial in the Ranunculaceae (buttercup) family with high medicinal values. It was once common in shady woods and the edges of woodland on rich moist soil in the western peninsula of Ontario, eastern United States from Vermont to Minnesota and south to Georgia, Alabama and Arkansas. Due to its popularity, native goldenseal populations have been seriously depleted and it has recently been classified as an endangered species. This may make collecting from the wild illegal in some States/Provinces. It will make the export of whole root and other identifiable parts illegal without a permit. (See pages 3 and 4 for details). To meet the increasing demand, the field cultivation of goldenseal, which started at the beginning of the century, will now become the major source. The cultural requirements of goldenseal are very similar to those of ginseng, as it will not grow in an open field.



Goldenseal, with a distinct odour and bitter taste, is an herbaceous perennial with an erect hairy stem about 50 cm (18") high with three to four yellowish scales at the base of each stem. It has knotted, tortuous, sub-cylindrical rhizomes, up to 1 cm (3/8") in diameter and 15 cm (6") long, which grow horizontally or obliquely and roots that are yellow-brown outside and bright yellow internally, 1-6 cm (.5-2.5") long and 4-15 mm (.16-6") thick. The rough-hairy plants have 1-3 palmately lobed leaves up to 25 cm (10") in diameter at maturity with 5-7 serrate lobes. A single flower, greenish-white, without petals, 7.5 mm (1/3") wide, appears in late spring to early summer and lasts 3-7 days. This is followed in late summer by a globular, fleshy, bright red berry, resembling a large raspberry. A mature fruit typically contains 10-30 black, hard, shiny, roundish seeds about 3 mm (1/8") long. The stems and leaves will start to desiccate soon after the berry ripens. Winter buds, generally two in number, form near the base of each stem for next season's growth. The rhizomes will also produce new plants a short distance from the mother plant, eventually forming a dense mat of plants. When planted at a 20 cm x 20 cm (8" x 8") spacing this matting should take 3-4 years. It is then ready to harvest.

### Cultivation

Since the cultivation techniques are similar to ginseng, many sections on page 9-134, in the "Ginseng Production Guide for Commercial Growers" 2003 edition, are strongly recommended for use as reference. This publication is available as a download at

[http://www.agf.gov.bc.ca/speccrop/ginseng/ginseng\\_production\\_guide.htm](http://www.agf.gov.bc.ca/speccrop/ginseng/ginseng_production_guide.htm)

This guide covers topics such as site selection, site preparation, nutritional requirements, water availability and water quality, water management and irrigation systems, garden planning, seeding procedures, mulching, garden maintenance, pesticide safety (though none are registered for goldenseal at this time), pest management, physiological disorders, harvesting and post harvest handling. There are also items in the appendix such as dryer design and operation as well as cold storage information that may be useful to the cultivation and post handling of goldenseal.

# Goldenseal FACTSHEET



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## Soil preparation and fertility

Goldenseal needs a rich, well-drained sandy loam soil for best results. Like ginseng, it does not do well in clay soils. From the literature reviewed and limited experience; it needs and can handle more moisture than ginseng. Beds 1.8 m (6') on centre should be formed sufficiently high and rounded on the top to shed excess rain and improve drainage. The soil should have a pH of 5.5-6.5, with a very light fertilizer applied each spring according to a soil test (Cautions: high fertilizing is liable to cause disease; do not use acid phosphate). It appears that its pH range is more critical than ginseng and too high or low will quickly affect growth. It is reported that additions of excess nitrogen and phosphate reduced growth and may also affect the root alkaloid content. There are no actual recommendations at this time.

It is not recommended that you plant goldenseal on the same site immediately after a crop of goldenseal, not because it may not work but rather it is not good farming practice. It is used in the US to follow ginseng as a rotational crop, especially in a woods grown situation and seems to have none of the same disease intolerances of ginseng.

## Shade

The plants need to be grown in the shade with good ventilation provided by artificial shade (75-80%) or under a natural forest canopy for optimum growth. Shading structures can be the same as for ginseng so we refer you to the Ginseng Production Guide for Commercial Growers for details (see page 1). Goldenseal can also be "woods grown" as ginseng is. For information on this, the book "Green Gold" by Dr. Scott Persons which covers all the aspects of woods grown ginseng might be useful. Publications are also available from N. Carolina and Kentucky available on <http://infobasket.gov.bc.ca>

## Mulch and Irrigation

Mulches are necessary for the successful cultivation of goldenseal, to conserve the soil moisture, protect from the winter injury (soil temperature) and to reduce weed growth. The mulch layer should be 5-10 cm (2-4") deep with straw most likely being the standard product here in BC. Other types of mulch such as hardwood bark or sawdust may be used but sources here are a limiting factor. Mulch may need to be replenished every 1-2 years and as with ginseng, if you can see any soil through the mulch, you do not have enough. There is some indication that slightly more mulch may be required than for ginseng, as it may not be as winter hardy. Goldenseal does not require a lot of water (but more than ginseng does) during the growing season; however the growth will

be seriously checked by untimely droughts. Irrigation at critical times is essential so installing it permanently as ginseng growers do, is necessary, especially where precipitation is limited. On the other hand, soil saturation may enhance root rot diseases. Some method to eliminate standing water is essential.

## Propagation

Goldenseal is propagated by seed (28,000/lb), crown divisions, root sections or rhizome cuttings from 3-4 year old plants. If starting goldenseal from root cuttings, dig out the whole plant when the top dies back after frost, underdeveloped smaller roots from rhizomes or fibrous rootlets can also be planted. On average, about five plants can be divided from each rhizome of a 4-year old plant. These would be approximately 2-3 cm long (about 1"). The best results come from rhizome pieces with some roots attached (trim these roots to approximately 2-3 cm (1") in length). Plant these about 2 cm deep (3/4") and 20 cm (8") apart on the bed. When using roots, break them off the plant or rhizome and plant them in September or October. When planting crowns or divisions, tops may not appear until the second summer after planting. Seeds may be planted in the early spring after stratification, or they can also be planted directly into the beds in the fall at 1-1.5 cm (.5-.75") deep, 20 cm (8") apart within rows 20 cm (8") apart. Seed grown plants are ready to harvest in five to six years, about two years longer than rhizome cuttings. Plants grown from divisions or root cuttings may be harvested in three to four years. Stratify seeds by placing the whole berry or cleaned seed in damp sand. Place this in the ground for 30 days for fall planting or remove in early spring and seed.

## Growth

Most first-year seedlings only develop cotyledons. One true leaf is produced the second year; two leaves plus a flower develop in the third, a relatively slow process. If a division of rhizomes or a root cutting is planted, one stalk usually develops in the first season and during the summer one or more new buds will start from other parts of the rhizome. Two to four stalks will appear in the second season. An old plant in the wild may have up to twenty stalks with a very irregular mass of roots. Goldenseal has a relatively short growing season, with more than 95% of the above-ground biomass produced within the first month of the growing season, very similar to ginseng.

## Seed Collection

To collect seed, harvest the berries when fully ripe but before they start to dry up. After picking, separate the seeds from the pulp. This can be done right away

mechanically, but soaking them in water for a few days will help to break down the tissue. They can also be fermented in bags as ginseng can be, to help break down the pulp around the seeds. Seeds should never be allowed to dry internally and need to be stratified in moist sand (1:5 v/v) at least 30 days at approximately 5°C before germination will occur in the spring. There may be opportunity to grow seeds as plugs in a greenhouse but if this is possible, it is not in any literature at this time.

### Harvest

The roots may be dug at any time in the autumn after the tops have died down. Remove leaves, stems, and mulch before digging. Leaves may be harvested and dried, if sold, right after seed is ripe as they desiccate soon after this naturally. The chemical content is less than the root but there may be a market for them. (Check with a buyer). Dig roots carefully, keeping the many fibrous roots intact. Some of the roots with buds can be saved fresh for replanting. The rhizome is thoroughly washed and dried slowly in a forced-air drier using a range of 25-28°C. The drying process will take 5-7 days and the root will become a dark yellow-brown colour with a 10-15% moisture content. An average yield is between 1100-2000 kg of dry roots per ha (or 900-1800 lb/ac). Goldenseal roots should have a distinctive sweet/licorice odour and a bitter taste. Goldenseal as a dried product is quite stable and can remain in storage for a number of years. **Do not** eat fresh goldenseal roots as they can be quite toxic (see later in text). Goldenseal is listed as poisonous in some literature and this is possibly why. It is also recommended, in most information, that it not be taken internally as a dried product for more than a week at a time.

### Diseases and Pests

The most important disease of goldenseal is *Botrytis* blight. All parts of the plant are affected including the rootstocks. Stems rotting off at the base, near the soil surface and blighting of leaves are the most common symptoms. *Botrytis* may cause seedling death as a damping-off organism and can, later, destroy blossoms and seed heads as well. Other diseases such as Fusarium wilt, root gall, and typical damping-off organisms will also affect this crop. There are no reports that *Phytophthora cactorum*, which causes ginseng root rot, will affect goldenseal. Slugs, earthworms and moles are also found in goldenseal beds. In some growing regions, the presence of root knot nematodes will be a concern. Weeding is done by hand as there are no chemicals registered.

### Medicinal Value

(Note: inclusions in this publication or this section do not constitute or imply a recommendation).

Goldenseal is used to treat a wide variety of disorders. Its pharmacological properties are attributed to the alkaloid Hydrastine (2-4%) and berberine (2-3%). The name is derived from Greek meaning "water-acting" after its effect on the secretion of mucous membranes.

Hydrastine exerts a minor influence on circulation, muscle tone, and contractions in the uterus and other smooth muscle areas. It was reported that the goldenseal extracts seem to lower blood sugar levels, relieve stress and anxiety. Goldenseal is entered in the United States and British pharmacopoeias as a treatment for uterine mucosa inflammation. Other biochemical components of goldenseal include albumin, biotin, calcium, canadine chlorine, choline, collagenic acid, fats, inositol, iron, lignin, manganese, volatile and essential oils, phosphorus, potassium, resin, starch, sugar, B complex, and vitamins A, C, and E.

### Toxicity

The major component of goldenseal, hydrastine, is toxic. Eating fresh plant material may ulcerate and inflame the mucous membrane of the mouth. Large quantities of hydrastine will over stimulate the nervous system and may produce convulsions, respiratory failure, or overproduction of white blood cells. Goldenseal must **not be used during pregnancy** since it may cause miscarriage. Long-term use of dried product may weaken the bacterial flora of the colon. Goldenseal has been called 'one of the most wonderful remedies', however, this claim has not been accepted by all, and the plant is considered unsafe for internal consumption by many experts. Other references suggest that goldenseal should not be taken internally for more than one week at a time.

### Export Permits

All recognizable plant parts other than seeds, are required by international law, to be accompanied by a 'CITES export permit' when exported from Canada. These certificates are available from the Canadian Wildlife Service as listed below. There may also be import regulations that have to be met, to comply with the country of import, such as phytosanitary certificate, or free from certain pests. At this time you or the importer would have to contact the country of destination for details.

CITES permits to export from Canada can be obtained from:

<http://www.cites.org>

Phone: 819 997-1840

Fax: 819 953-6283

## Sources

(Note: Inclusion of a company on this list does not constitute an endorsement of the product offered, or that the company is currently active).

Tom Karlen, Nature Supply, 2801 Rib Mountain Drive, Wasau, WI 54401, USA Tel: 715 845-2151.

Leray Ballard, Natures Cathedral, RR 1, Box 120, Blairstown, IA 52209, USA Tel: 319 454-6959

Russell Styles, 2137 E. Hastings St., Vancouver, BC V5L 1V2 Tel: 604 254-4765

Gardens of the Blue Ridge, PO Box 10, Pineola, NC 28662, USA Tel: 704 733-2417

Gary Schewedock, White Crane Trading Co., 447-10 Ave. NY 10001, USA Tel: 212 736-1467

Brickman's Botanical Gardens, RR 1, Sebringville, ON N0K 1X0 Fax: 519 393-5239

Richters, Goodwood ON L0C 1A0 Tel: 905 640-6677

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## Websites:

<http://infobasket.gov.bc.ca>

[http://www.agf.gov.bc.ca/speccrop/ginseng/ginseng\\_production\\_guide.htm](http://www.agf.gov.bc.ca/speccrop/ginseng/ginseng_production_guide.htm)

<http://www.egregore.com/herbs/goldenseal.html>

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