

Golden Seal

Botanical: *Hydrastis Canadensis* (LINN.)

Family: N.O. Ranunculaceae

Synonyms

Yellow Root. Orange Root. Yellow Puccoon. Ground Raspberry. Wild Curcuma. Turmeric Root. Indian Dye. Eye Root. Eye Balm. Indian Paint. Jaundice Root. Warnera.

Part Used

Root.

Habitat

The plant is a native of Canada and the eastern United States, the chief States producing it being Ohio, Kentucky, West Virginia, Indiana, New York and in Canada, Ontario. Most of the commercial supplies are obtained from the Ohio Valley, the chief market being Cincinnati. It is scarce east of the Alleghany Mountains, having become quite rare in New York State, where it has been almost exterminated by collectors. It is found in the rich soil of shady woods and moist places at the edge of wooded lands.

The North American plant Golden Seal produces a drug which is considered of great value in modern medicine. The generic name of the plant, *Hydrastis*, is derived from two Greek words, signifying water and to accomplish, probably given it from its effect on the mucous membrane.

Golden Seal belongs to the Buttercup family, Ranunculaceae, though its leaves and fruit somewhat resemble those of the Raspberry and the *Rubus* genus generally.

Description

It is a small perennial herb, with a horizontal, irregularly knotted, bright yellow root-stock, from 1/4 inch to 3/4 inch thick, giving off slender roots below and marked with scars of the flower-stems of previous years. The flowering stem, which is pushed up early in the spring, is from 6 to 12 inches high, erect, cylindrical, hairy, with downward-pointing hairs, especially above, surrounded at the base with a few short, brown scales. It bears two prominently-veined and wrinkled, dark green, hairy leaves, placed high up, the lower one stalked, the upper stalkless, roundish in outline, but palmately cut into 5 to 7 lobes, the margins irregularly and finely toothed. There is one solitary radical leaf on a long foot-stalk, similar in form to the stem leaves, but larger, when full-grown being about 9 inches across.

The flower, which is produced in April, is solitary, terminal, erect, small, with three small greenish-white sepals, falling away immediately after expansion, no petals and numerous stamens. The fruit is a head of small, fleshy, oblong, crimson berries, tipped

with the persistent styles and containing one or two hard black, shining seeds. It is ripe in July and has much the appearance of a Raspberry (whence the name 'Ground Raspberry'), but is not edible.

Hydrastis Canadensis was first introduced into England by Miller in 1760, under the name of *Warnera*, after Richard Warner of Woodford, and later was grown at Kew, Edinburgh and Dublin. Having no claims to horticultural attractiveness, its cultivation has not been attempted in this country except in botanical gardens - and on a slight experimental scale - nor has it been cultivated on any scale in any other country until quite recently, when owing to its growing scarcity in the woods of Ohio, where it used to be abundant, plantations were started in a few parts of America, but the amount under cultivation there is still very small.

In 1905 the United States Department of Agriculture called attention to the increasing demand for Golden Seal for medicinal purposes in a Bulletin (No. 51). There it is stated that the early settlers learnt of the virtues of Golden Seal from the American Indians, who used the root as a medicine and its yellow juice as a stain for their faces and a dye for their clothing. It was not until about 1850 that the root became an article of commerce, and in 1905 the annual supply of it was estimated at from 200,000 lb. to 300,000 lb., about one-tenth of which was exported, with an ever-increasing demand. Thirty years ago it was plentiful in its wild haunts and sold for 8 cents per lb., but as its supply diminished, not only from overcollection, but from the forests in the central States being cut away, the price rose in proportion and is now almost prohibitive.

Cultivation

Experimental growing of the drug here has not been attended with much success, as it is of somewhat difficult culture.

The best conditions for the cultivation of Golden Seal are said to be a well-drained soil, rich in humus, in a partially shaded situation. Lath blinds (placed overhead on wires and light runners) are used by American cultivators - as with Ginseng - and these are considered to be preferable to the shade of trees, the roots of which interfere with operations. The plant requires from 60 to 75 per cent shade. The root-stocks are divided into small pieces and then planted about 8 inches apart in rows. Seeds are not considered reliable. Fresh plantations are made in autumn, after the plants have died down, or earlier, if they are lifted for a supply of marketable rhizomes. The strong fibrous roots sometimes develop buds which can be used as stock. Plantations thus formed take two or three years to grow to marketable size, the rhizomes deteriorating in their fourth year. According to an American grower, 32 sturdy plants set to each square yard, in three years' growth will produce 2 lb. of dry root. Experiments conducted by the United States Department of Agriculture recommend growing it only two years and marketing. It is stated that the plant may be transplanted at any time of the year with safety.

It has proved difficult to obtain a supply of living roots with which to start plantations in this country. The market is in the hands of American growers, collectors and dealers, and it may be that they are unwilling to spoil their monopoly by aiding other countries to grow their own Golden Seal, but the drug is growing in favour with

medical practitioners, therefore its production on a commercial scale in this country would appear to be desirable, if it could be carried out with success.

The fresh rhizome is juicy and loses much of its weight in drying. When fresh, it has a well-marked, narcotic odour, which is lost in a great measure by age, when it acquires a peculiar sweetish smell, somewhat resembling liquorice root. It has a very bitter, feebly opiate taste, more especially when freshly dried.

The rhizome is irregular and tortuous, much knotted, with a yellowish-brown, thin bark and bright yellow interior, 1/2 inch to 1 1/2 inch long, and from 1/8 to 1/4 inch thick. The upper surface bears short ascending branches, which are usually terminated by cup-like scars, left by the aerial stems of previous years. From the lower surface and sides, numerous thin, wiry, brittle roots are given off, many of them breaking off, leaving small protuberances on the root.

The colour of the rhizome, though yellow in the fresh root, becomes a dark, yellowishbrown by age; that of the rootlets and the interior of the root is yellow and that of the powder still more so.

When dry, the rhizome is hard and breaks with a clean, resinous fracture, the smooth, fractured surface is of a brownish-yellow, or greenish-yellow colour, and exhibits a ring of bright yellow, somewhat distant narrow wood bundles surrounding a large pith.

Constituents

The chief constituents of Hydrastis rhizome are the alkaloids Berberine (3.5 to 4 per cent.), which constitutes the yellow colouring matter of the drug, Hydrastine (2 to 4 per cent.), a peculiar crystallizable substance and a third alkaloid, Canadine; resin, albumin, starch, fatty matter, sugar, lignin and a small quantity of volatile oil, to which its odour is due, are also present. The rhizome is stated to be much richer in alkaloid than the roots.

Hydrastis owes its virtues almost entirely to Hydrastine, the alkaloid Berberine, apart from some effect as a bitter being practically inert. The United States Pharmacopoeia requires Hydrastis to yield not less than 2.5 per cent of Hydrastine.

For many years the alkaloids and the powdered root were the chief forms administered, but now the fluid extract is the form most used. The tincture is also official in both the British and the United States Pharmacopoeias.

Medicinal Action and Uses

The American aborigines valued the root highly as a tonic, stomachic and application for sore eyes and general ulceration, as well as a yellow dye for their clothing and weapons.

It is official in most Pharmacopoeias, several of which refer to its yellowing the saliva when masticated.

The action is tonic, laxative, alterative and detergent. It is a valuable remedy in the disordered conditions of the digestion and has a special action on the mucous membrane, making it of value as a local remedy in various forms of catarrh. In chronic inflammation of the colon and rectum, injections of Hydrastine are often of great service, and it has been used in haemorrhoids with excellent results, the alkaloid Hydrastine having an astringent action. The powder has proved useful as a snuff for nasal catarrh.

It is employed in dyspepsia, gastric catarrh, loss of appetite and liver troubles. As a tonic, it is of extreme value in cases of habitual constipation, given as a powder, combined with any aromatic. It is an efficient remedy for sickness and vomiting.

Preparations

Powdered root, 10 grains. Fluid extract, 1/4 to 1 drachm. Tincture, B.P. and U.S.P., 1/2 to 1 drachm. Solid extract, 5 to 8 grains.

As an infusion, it has great influence in preventing and curing night-sweats. It is sometimes used as a wash for ulcerated mouth.

Externally, it is used as a lotion in treatment of eye affections and as a general cleansing application.

It is said to be a specific to prevent pitting by smallpox.

In large amounts the drug proves very poisonous.

The employment of Hydrastis as a dye by the Indians has led to investigations as to its possible commercial employment in this direction. Durand (*Amer. Journ. Pharm.*, Vol. XXIII) states that 'it imparts to linen a rich and durable light yellow colour, of great brilliancy, which might probably by proper mordants give all the shades of that colour, from the pale yellow to the orange. The lake produced by the bichloride of tin might also prove a useful pigment in oil and water-colour painting.' With indigo, it is said to impart a fine green to wool, silk and cotton.

Substitutes

Owing to the high price of Hydrastis, the quality of the commercial article has steadily deteriorated, and in recent years, about every drug native to the soil which resembles this rhizome, either in fibre or in colour, has been known to be mixed with it. The yellow colour of Hydrastis rhizome, the appearance of a transverse section and the characteristic odour of the drug distinguish it readily from Blood Root, obtained from *Sanguinaria Canadensis*, which is usually of a dark reddish-brown colour, while a transverse section exhibits a more or less pronounced red colour and no evident wood bundles.

None of the substitutes can be reasonably mistaken for the drug in the entire condition.