

Lithospermum ruderale and Relatives

Following is a preliminary and brief report on the *Lithospermum* genus. I welcome correspondence or additional information on this genus.

Lithospermum is a genus with 59 species found growing across north temperate regions. The genus name is Latin for stone seed.

Some of the common names for *Lithospermum ruderale* are Lemonweed, Stoneseed, Western Gromwell and Columbia Puccoon.

Lithospermum ruderale's range is from Washington to northern California to Montana and Colorado and adjacent Canada. Philip A. Munz in *A California Flora* reports its habitats and range as: dry slopes and plains 4500-6000 ft.; Sagebrush Scrub, Northern Juniper woodland.; Placer Co. to Modoc Co.; to B.C. Rocky Mts. *Flora of the Pacific Northwest* says: it is "common in open, fairly dry places up to mid elevation in mountains, chiefly East Cascades".

Years ago, I knew *Lithospermum ruderale* as a wildflower. Then I read in an ethnobotany book that the Shoshone women used it for birth control (a contraceptive tea which could the woman sterile if taken for too many months in a row) and made a mental note that it likely has some medicinal applications. As it turns out this account was the inspiration for the invention of the first oral contraceptive. I first started getting orders for *Lithospermum ruderale* root about 4 years ago.

Its main application at that point was to treat hyperthyroid conditions (overactive thyroid). It has been more recently used to slow down cancer spread where stimulated by hormones. Caution: Contraindicated in cases of hypo-thyroidism (under-active thyroid). Thus it appears that this species influences human hormone function, and reduces hormone secretion.

There may well be a growing market for this species. Being in the Boraginaceae family, pyrrolizidine alkaloids may be present in the root, but if the types of alkaloids or quantity is excessive, there are now a number of processing techniques to take out the undesirable constituents.

As a result of all these developments, I have been paying close attention to western gromwell's presence and abundance in the plant communities I visit. Every

year I visit and tromp around in many hundreds of plant communities and do drive-by examinations of thousands more. Over half of them are in eastern Washington and into Montana.

I can report that *Lithospermum ruderale* is a common component of plant communities in the 12" to 30" rainfall areas. It is found in ponderosa pine forests, bunchgrass steppe and shrub steppe. It needs deep well-drained soil and is quite drought hardy. It grows in full sun or partial shade, but if the shade gets too dense it dies out.

Some plants get old and large and then senesce and decay. Others get overtaken by rot at an earlier age. I can tell at a glance how large the root will be by the number and size of the stems. The more stems the larger the root. I have also learned how to distinguish old, senescent roots by noting those with wide crowns and sparse stems.

While the plants are found in many plant communities, they usually occur as widely spaced individuals, which means that on many sites there are not many large individuals per acre. Thus for sustainable wildcrafting, only a very small % of the root mass per acre should be harvested at any one time and maybe only once every 3 to 5 years. Due to its slow growth and dispersed pattern of growing it lends itself to overharvesting. If diggers took all the big ones they could find on a site, it would take many years to re-grow that amount of root again.

At this time, there is little demand for the roots and probably mostly filled by ethical wildcrafters like myself. However if demand ever got really big, then unsustainable harvesting would probably happen on localized sites. This would remain localized however, even over many decades just because of the sheer extent of its plant community types in the intermountain Northwest. It would probably be impossible to turn it into an endangered plant.

In the interests of safeguarding even localized populations it would make sense to bring this species into cultivation if the herb trade in it continues to grow. If it performs anything like its Chinese and European relatives in my garden, then it will grow much faster under cultivation than in the wild.

I would also recommend that people with appropriate ecosystems do direct seeding on their land or plant out seedlings or tubelings. They can thus be grown as a semi-wild crop, similar to "wild-grown" ginseng, which fetches a higher price than cultivated ginseng.

Lithospermum ruderale

The root is surprizingly brittle and breaks easily so the digger has to take extra care. Digging roots with a shovel would require sizable excavations. I use long, steel digging bars to extract roots without digging a hole. A method which causes much less soil disturbance.

Native Americans use the root as a red dye. It was mixed with warm deer fat to make a paint. The root when first broken open appears a light yellow color. Within 5 minutes of exposure to air the root starts to turn red and gets increasingly darker as it dries. The fresh root tincture turns bright red.

Over the years I have dug hundreds of roots spread over many locations. A notable characteristic of *Lithospermum ruderale* in the wild is that most plants develop a rotted-out center. This looks to me like a deliberate policy! The rot starts to develop relatively early in life, probably about age 5 to 10. The rot slowly develops and almost all medium sized roots will have hollow centers. Large roots will have large rot cavities which eventually, after a long life, finally reduce the plant to a shell and it dies.

The plants live for a long time with this rot. They do not succumb quickly. I have also noticed that a significant number of these rooted out centers host colonies of little ants, and when the root is disturbed they boil out and attack the disturber (me). There are a number of other plants that have developed hollow portions of their anatomy to house ants, which then protect the plant in exchange for the housing. A nice symbiotic relationship, which in this case also involves a rot fungus species. Ants are important and beneficial elements in many terrestrial ecosystems of the interior Pacific Northwest. Ant numbers are down because of human ecosystem impacts. Perhaps there are less ants around these days to colonize as many of these hollow roots as they used to.

At any rate, all these theories aside. It is a notable fact that preparing *Lithospermum* roots for processing is a very time consuming job, since the roots have to be split lengthwise a number of times and the inner, corrugated, rotted surface, scraped thoroughly.

Northwest ethnobotany books show that *Lithospermum ruderale* had multiple uses.

The leaves are medicinal.

The roots are medicinal.

The roots are a dye.

The seeds are used for beads.

The roots are edible. I must confess, the roots don't look like anything edible to me.

Élan Botanicals of Sedona, Arizona uses *L. ruderale* in their hyperthyroid formula tincture, as well as selling the single ingredient tincture.

Nancy Turner in *Ethnobotany of the Okanagan/Colville Indians* reports that they used *Lithospermum ruderale* to stop internal haemorrhaging by drinking an infusion of the roots.

Lithospermum ruderale was used for skin afflictions and to aid intestinal and urinary tract. Shoshone Indians used it as a contraceptive.

The bony seeds are white or gray with a smooth, shiny finish and were used as beads.

Indian Foods and Fibers of Arid North America reports that the Pima ate the leaves of at least one *Lithospermum* species, but doesn't say which specie.

Some Other Lithospermum Species

Lithospermum use in China

The most well-known medicinal *Lithospermum* is *L. erythrorhizon* from China, called Zi Cao. Its roots turn purple when dried.

Deni Bown reports that the Chinese use *L. erythrorhizon* to lower fevers and clear toxins. It stimulates the liver, heart and circulation. It is contraceptive and has anti-cancer effects. It is used in skin care creams. It is dried for decoctions. Tops are gathered when flowering. Roots are dug in autumn.

Li Shih-Chen in *Chinese Medicinal Plants* reports that the root is said to act on the blood, to be derivative to the skin and all of the passages of the body, especially the intestinal canal and urinary tract. It is also prescribed in skin affections and especially in eruptive fevers, being supposed to bring out eruption and to neutralize the poison.

Daniel P. Reid in *Chinese Herbal Medicine* reports that: The Chinese consider it a "sweet and cold" herb with affinity for the heart and liver. It is antipyretic and "cools" the blood. It is used as an antidote to body toxins induced by heat excess. Dosage is 5-8 grams. It is also used as an emollient for eczema, abscesses and burns. The oil is effective for diaper rash and is used in preparations for that purpose.

The root when harvested for dye is dug in early spring before the plant has flowered as the time when the purple dye is brightest.

Caution:

Lithospermum is another one of those Boraginaceae family plants that may contain pyrrolizidine alkaloids. In *Edible and Medicinal Plants of the West*, Gregory Tilford warns: "Although this plant has a long history of use as a medicine, it contains potentially toxic alkaloids that may cause internal bleeding, and estrogen-like constituents that interfere with hormonal balances in the female reproductive system.

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