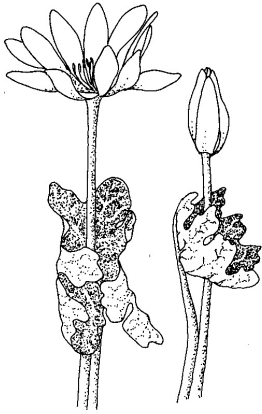


Medicinal Herb Production Guide

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Bloodroot (*Sanguinaria canadensis* L.)

Introduction

Botanical Information

Bloodroot, *Sanguinaria canadensis* L., member of the Papaveraceae family, is an early spring wildflower found in rich woodlands of North America from Nova Scotia to Florida and west to Alabama, Arkansas, Nebraska, and Manitoba. It is native to North America and is a perennial that grows to a mature height of about ten inches. It can grow in full sun but prefers semi-shaded, light-wooded areas with moist, acidic soil. The plant has a single, basal leaf that can be as wide as eight inches. The flower, located on a separate stalk, is white with a yellow center. Bloodroot is one of the first flowers to bloom beginning in late winter and continuing into early spring. The root, known for its reddish-orange color, is typically harvested in autumn, three or more years from seed. It must be stored in a low humidity environment, or it will quickly deteriorate and lose its medicinal value.

Bioactive Components

The main bioactive components of bloodroot are alkaloids, primarily sanguinarine. Others include chelerythrine, berberine, and oxysanguinarine. Sanguinarine is an antiseptic and anti-inflammatory.

Uses and Treatments

Bloodroot was a traditional medicine used by American Indians to treat fever and rheumatism. Modern medicine has found uses for bloodroot as an anti-cancer agent, particularly for the treatment of skin cancer, and as a dissolving agent for skin growths such as warts. It has enjoyed some commercial success in toothpaste and mouthwash as an anti-plaque agent. Although not dangerous in prescribed amounts, an overdose of bloodroot extract can cause vomiting and loss of consciousness. Germany's *Commission E*. has no recommended uses of bloodroot at the current time. Table 1 lists some of the modern and traditional uses of bloodroot. Berberine, an active constituent of bloodroot, is showing promise in fighting brain tumors and many other cancers.

Table 1. Modern and traditional uses of bloodroot.

Modern Uses

- Promote coughing to clear mucus from respiratory tract
- Cancer treatment
- Plaque inhibitor

Traditional/Folk Uses

- Treat fevers and rheumatism
- Produce red, orange, pink dyes
- Treat ulcers, ringworm, skin infections

Cultivation Practices

Site Selection

Since bloodroot is indigenous to North Carolina, choosing a site where populations are already present would be ideal. Bloodroot prefers a rich moist soil that is well drained with high organic matter. Moisture is important throughout the growing season. In its natural habitat, it is usually found in deep shaded or open woodland areas. Bloodroot does well in a woods cultivated, wild-simulated, or artificial shade environment. Select an area with a humus-rich soil and a pH range of 5.5 to 6.5.

If an open field is used for production, shade structures should be erected. Typically, a wood lath structure or polypropylene shade structure is used. For artificial shade, make the structure seven feet tall or higher with two ends open to the prevailing breeze. For forest culture, select a site with good air and water drainage in an area shaded by tall, preferably hardwood trees. Look for a site where other compatible woodland plants grow such as Jack-in-the-pulpit, mayapple, trillium, wild ginger, or a native stand of bloodroot.

Planting

Bloodroot seed is not commercially available, and rootstock is very expensive. With little information available on large-scale production, cultivation has mainly taken place on small, specialty plots. Propagation is typically done through seed or root division. Bloodroot is easily propagated by dividing the rhizomes in spring or in fall. Plants can be started indoors from seed or seed can be directly sown into the ground, but the rhizome divisions allow for a faster harvestable plant.

To plant rhizomes, cut the roots into vertical sections, two inches in length, making sure there is at least one bud attached. There can be up to twelve buds on a rhizome of one bloodroot plant. In a well-prepared three-foot wide bed, plant rhizome pieces deep enough to cover the top of the rhizome with one to two inches of soil (usually around four inches deep). Any fibrous roots connected to the rhizome pieces can remain attached. Stagger plantings six inches apart, making sure the bud is pointed upright when placing the rhizome pieces in the ground. Mulch beds with at least three inches of shredded hardwood mulch or leaf mulch. Add mulch as needed throughout the growing seasons and supply adequate moisture. While bloodroot does not like a soggy soil, irrigation should be provided during dry periods. Plants should be ready to harvest four to six years after planting.

Bloodroot seed matures mid to late spring. Oblong seedpods house the developing seeds, and when ready, the pods open and seeds spring out. If the seeds are not collected, young seedlings will sprout around the mother plant, usually the following spring. To collect bloodroot seed, pouches can be made out of cheesecloth or nylon mesh to cover the young seedpods before they spring open. The pouch is put over the immature pod, and tied loosely around the stalk. When the seedpod opens, the seeds can spring out, but are captured, instead of scattering to the ground.

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With seedbeds prepared, plant the fresh seeds one to two inches apart, approximately one-quarter inch deep. Never allow the fresh seed to dry out. Cover with a two-inch layer of leaf mulch and keep moist. Some germination should occur the following year but many seeds may not emerge until the second spring. Once the plants have developed small rhizomes, transplant into regular planting beds (usually after two years), according to Richo Cech, author of *Growing At-Risk Medicinal Plants*. Harvesting of the root can usually begin six to eight years after seeding. Research is currently being conducted on seed germination studies for bloodroot, and as new information becomes available, this publication will be updated.

Insects and Diseases

Slugs can become a serious pest problem in damp seasons and wet soils. Other animals that forage on bloodroot include deer, groundhogs, and turkey.

Diseases that have attacked bloodroot include Alternaria leaf blight and Botrytis. Other leaf spots listed in *Index of Plant Diseases in the United States* include *Cercospora sanguinariae*, *Cylindrosporium circinans*, *Gloeosporium sanguinariae*, and *Phyllosticta sanguinariae*. As mentioned earlier, if the soil is soggy, it could cause roots to deteriorate, thus allowing potential root diseases to develop. *Pythium paroecandrum* has been known to infect bloodroot roots.

Harvesting, Cleaning, and Drying

Most bloodroot is harvested in the fall, but some is harvested and sold in spring. If harvesting in fall, more than likely the leaves have died back, making it difficult to know where your plants are unless the beds are clearly marked. If hand digging, the use of a spade fork is ideal. For larger scale operations, a ginseng digger or potato digger can be used. Great care should be taken not to damage the roots.

Shake the roots free of dirt and carefully remove only roots that are bloodroot. It is not acceptable to include foreign particles. Protect from the sun and heat; do not allow the roots to dry out. Bloodroot is very susceptible to mold and should be processed as soon as possible. Wash the roots with a pressure hose or garden hose, taking great care to protect the roots from any damage as they are cleaned and as all particles of dirt are removed.

Once the roots are cleaned, dry in a warm place with adequate airflow. If a drying unit is not available, a dehydrator, converted greenhouse, converted room in a barn, or an adequate room in a house are areas that could be used as drying areas. Dry roots at 95⁰F, with high air-flow, for approximately four to seven days. Check roots regularly for mold or deterioration. If roots break without bending, drying time should be sufficient. Make sure the larger roots are dried thoroughly and throughout. Bloodroot will dry down to approximately twenty five percent of its fresh weight. Once the roots are completely dry, store in burlap sacks, cardboard barrels, or cardboard boxes, in a cool, dark, dry location. Protect from rodents and insects. Dried roots can be stored for two years. Potential yield per acre of the dried rootstock is estimated at 2360 lbs.

Marketing and Economics

Annual Consumption and Dollar Value

Consumption of bloodroot is moderate in terms of harvested pounds. Harvested pounds have continued to increase for this material but at a substantially lower rate than from 1997 to 1999. Consumption in 2001 was approximately 135,000 pounds, which was 3.8% higher than consumption in 2000.

Bloodroot trades in a moderate price band, \$12.00 to \$16.00 per pound. The dollar value of this material has increased substantially from 1999 to 2001. A 3.8% increase in pound volume in 2001 was dwarfed by an 88% increase in dollar value in 2001, as compared to 2000.

Supply and Demand

Demand currently exceeds supply for this botanical. From mid-1990 until 2000, a steadily growing demand for this product has been satisfied exclusively by wild harvested material. However, a surge in demand that began in the year 2000 continues to put pressure on naturally occurring populations.

Increasing the use of bloodroot's medicinal attributes is essential to its growth prospects. Unlike many other botanicals, additional demand for this material may come from agriculture. The cattle industry is exploring the use of this product as an ingredient in feedstocks. In 2001, almost all of worldwide harvest came from wild harvested sources.

Demand factors already in place will sustain this botanical in a moderate price band. A German animal feed manufacturer is projecting that it will need between 250,000 and 330,000 pounds of bloodroot a year to meet its production schedule and is soliciting in the states for growers to meet its supply requirements. The quantity of material this company estimates for its production schedule is at least two times greater than the total 2001 bloodroot harvest.

Pricing

Prices for this botanical have traded in a low-to-moderate price band of \$5.00-\$9.00 for a pound of dried root from the mid-1990's up until the year 2000. A sharp increase in demand shifted this material into a higher price band, and it currently trades from \$10.00 to \$16.00 per pound. Depending on where you sell in the supply chain, your return per pound may be significantly less.

Distribution Channels

Blood root is wild harvested in North America by small producers located throughout its natural range, mostly along the Appalachian range. Small pockets of cultivation can be found in India, as well as in some areas of the United States and Canada. Distribution channels for this material are highly structured. Established brokers represent a small number of large customers.

Commercial Visibility

The Commission of European Communities has stipulated that all synthetic antibiotic compounds incorporated into livestock feed as a way to fatten cattle must be removed by the end of 2005. This action was taken in response to scientific evidence that these synthetic antibiotics are transmitted to humans via meat consumption and make humans more resistant to certain drugs. Bloodroot is currently being considered as an alternative ingredient to synthetic antibiotics in cattle feeds. Berberine, an active constituent of bloodroot, is showing promise in fighting brain tumors and many other cancers.

Sanguinarine has been used as an ingredient in toothpaste and mouthwash due to its properties as a plaque inhibitor. The best known of these products was Viadent toothpaste. Viadent stopped using bloodroot in its formula in 2001. Alpha Omega Labs sells a product called "Bloodroot Paste" for the treatment of skin cancer and warts and also has a product called "Alpha Omega III Dentifrice" for the treatment of *gingivitis*. Of the major nutraceutical/botanical companies in North America and Europe, 15% offer bloodroot as a stand-alone product, while 19% supply this material in a product that contains more than one active ingredient.

The majority of bloodroot used for animal or human consumption is sold to European and Asian companies for processing. Additional buyers include companies who use the plant for landscaping, gardening and other ornamental purposes.

Conclusion

North Carolina has the potential to become a major producer of cultivated bloodroot, especially in the western regions of the state. Native populations of bloodroot can still be found in many western and piedmont counties.

Core demand for this product will keep annual growth at about five-to-ten percent over the next three-to-five years. Any increase in supply from existing cultivated sources located in North America and India will be more than offset by diminishing supplies of wild-harvest material. The combination of demand factors emanating from different markets, a lack of large-scale cultivation, diminishing natural populations, a current trading range of \$10.00 to \$16.00 per pound and the possibility of a major demand surge in Europe makes this material an excellent candidate for cultivation.

The nursery industry is already cultivating bloodroot in North Carolina for landscaping and woodland gardens. Bloodroot plants sell in garden centers and specialty shops from \$3.50 to \$10.00 each. As it gains in popularity, bloodroot planting stock will become more in demand and thus create additional market venues.

This Medicinal Herb Production Guide includes excerpts from, Analysis of the economic viability of cultivating selected botanicals in North Carolina. Strategic Reports. 2002.

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