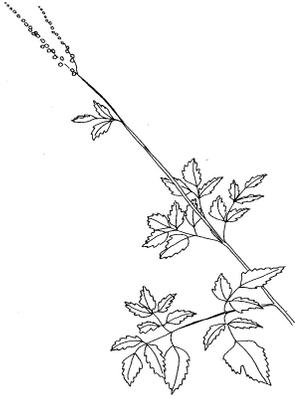


Medicinal Herb Production Guide

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Black Cohosh (*Actea racemosa* L.)

Introduction

Botanical Information

Black cohosh [*Actea racemosa* (L.) formerly *Cimicifuga racemosa* (L.) Nutt], member of the Ranunculaceae family, is a native medicinal plant found in rich woodlands from Maine to Georgia, west to Missouri, Indiana, and Ontario. In North Carolina it can be found at elevations up to 4,000 feet. It is an herbaceous perennial reaching a mature height of well above four feet and can grow at a rate of 18 to 22 inches per month during the growing season. The leaves are large with three pinnately compound divisions and irregularly toothed leaflets. Tall plumes of cream to white flowers, on a wand-like raceme, bloom from May to July, often-towering over six feet. From August to October, seeds develop in capsules and make a rattling sound when they are mature and ready to be harvested.

Of economic importance are the rhizomes and roots. The rhizome is dark brown to black in color; is thick and knobby; and produces large buds on the upper surface. The rhizomes also have fibrous roots attached. When the leaves on the plant start to die back in the fall, the root is harvested, cleaned, and dried.

Bioactive Components

The main bioactive components of black cohosh are the triterpene glycosides, *acetein* and *27-deoxyacteïn*, and the isoflavone *formononetin*. Other components include aromatic acids, tannins, resins, and fatty acids. Black cohosh has been clinically proven to create an "estrogen-like" effect in the user. Research has also shown that it decreases luteinizing hormone secretions, which are a cause of hot flashes in menopausal women.

Uses and Treatments

Native Americans used black cohosh for a variety of medical conditions ranging from gynecological problems to snake bites. Physicians made use of it in the 19th century to treat fever, menstrual cramps, and arthritis. In Europe, black cohosh has been used for over 40 years as a treatment for menstrual pain. In recent years, this material has been used as a treatment alternative to mainstream hormone replacement therapy (HRT). Table 1 summarizes the most common uses of black cohosh in modern and traditional medicine.

Table 1. Modern and traditional uses of black cohosh.

<u>Modern Uses</u>	<u>Traditional/Folk Uses</u>
<ul style="list-style-type: none">- Premenstrual syndrome (PMS)- Hormone replacement therapy	<ul style="list-style-type: none">- Rheumatism- Sore throats and bronchitis- Snake bites

Cultivation Practices

Site Selection

Black cohosh prefers a rich moist soil that is well drained with high organic matter. In its natural habitat, it is usually found in shaded or partially shaded areas. Black cohosh does well in a woods cultivated, wild-simulated, or artificial shade environment. Harvest costs tend to be higher in a woods planted environment compared to field cultivation due to the need for manual labor to bring in the crop.

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 woodland plants grow such as mayapple, trillium, bloodroot, ginseng, or perhaps a native stand of black cohosh.

Black cohosh has been known to tolerate more light and soil variations than ginseng or goldenseal, provided there is adequate moisture available. If cohosh is not grown in ideal forest soils, raised beds are highly recommended, especially for moist or clay soils. Make sure sufficient compost or other organic material is added. Soils with a pH range of 5 to 6 are ideal for growing black cohosh.

Planting

Propagation is typically done through seed or root division. Black cohosh is more 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. Plus, large quantities of seed are not readily available commercially.

To plant rhizomes, cut the roots into vertical sections, two to three inches in length, making sure there is at least one bud attached. There can be up to fifteen buds on a rhizome of one black cohosh plant. Any fibrous roots connected to the rhizome pieces can remain attached. In a well-prepared three-foot wide bed, plant rhizome pieces deep enough to cover the top of the rhizome with two inches of soil (usually four to six inches deep). Stagger plantings

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18-24 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. Plants should be ready to harvest three to five years after planting.

In the fall, the mature seed can be harvested, and then sown in the ground immediately. Collect the seed just as the pod starts to split open. With seedbeds prepared, plant the fresh seeds one and a half to two inches apart, approximately one-quarter inch deep. Cover with a two-inch layer of mulch and keep moist. Some germination may occur the following spring but most seeds will not emerge until the second spring. Keep young seedlings moist and shaded. Transplant into regular planting beds when a second set of true leaves emerges. Harvesting of the root can usually begin four to six years after seeding.

To speed up the germination process, when Richo Cech, author of *Growing At-Risk Medicinal Herbs*, seeds his black cohosh, he exposes them to warm temperature (70°F for two weeks), then cold temperature (40°F for three months). Other researchers are currently conducting seed germination studies for black cohosh and as new information becomes available, this publication will be updated.

Insects and Diseases

Common diseases found on black cohosh consist of leaf spots, including *Alternaria*, and root rots, including *Rhizoctonia*. *Rhizoctonia solani* caused damping off in young emerging seedlings of black cohosh in a 2003 study done by R. D. Reeleder, *Canadian Journal of Plant Pathology*. Two other leaf spots mentioned in *Index of Plant Diseases in the United States* are *Ascochyta actaeae* and *Ectostroma applanatum*.

Common insects that attack black cohosh include cutworms and blister beetles. Other pests that forage on black cohosh include deer, opossum, rabbits, slugs, and snails. On a positive note, butterflies and hummingbirds are quite attracted to the flowers.

Harvesting, Cleaning, and Drying

Most black cohosh is harvested in the fall, primarily because that is when plants are at their peak in weight and bioactive constituents. There are some buyers who will purchase it in the spring as well. The rhizome and roots are the parts harvested. Since it has a dark, thick, and knotty nature, digging is easiest with a spading fork.

Shake the roots free of dirt and carefully remove any roots that are not black cohosh. It is not acceptable to include foreign particles. Protect from the sun and heat; do not allow the roots to dry out. Since fresh roots are susceptible to mold, do not wash roots until ready to process. Mixing the roots with sphagnum moss and storing in meshbags, burlap bags, or boxes in the cooler will help to reduce mold forming. Check often to prevent roots from drying out and stir the roots to avoid additional mold growing and to allow some aeration. When ready for processing, it is recommended to wash black cohosh roots with a pressure water hose. The knotty roots can be quite a challenge to clean. Take great care to not damage the roots as they are cleaned and to remove all particles of dirt.

Once the roots are cleaned, dry the roots in a warm place with adequate airflow. Black cohosh roots are usually dried whole. If a special drying unit is not available, a dehydrator, converted greenhouse, or converted rooms in a barn can be used as drying areas. According to Richo Cech (2002), "Dry for one day with low temperature (70°F) and high air flow. Then, turn up the temperature to 110°F and dry until the roots snap. Make sure the larger roots are dried thoroughly and throughout. Once they are completely dry, store in plastic bags, light-proof sacks or drums, in a cool, dark, and dry location." Keep no longer than one year.

For black cohosh, the dry-down rate is approximately one-third of its fresh weight. Tim Blakley (1999) estimates drying time to be five to ten days (longer if roots are large). Potential yield per acre of the dried rootstock is estimated at 2360 lbs.

Marketing and Economics

Annual Consumption and Dollar Value

In 1998, around 700,000 pounds of dried black cohosh root were consumed. Almost all of this material came from wild harvested sources. In 1999, world consumption dropped to about 183,000 pounds. It rebounded sharply to approximately 420,000 pounds in 2001.

It is estimated that the demand for black cohosh will increase in the next three-to-five years. In 2001, it was estimated that the black cohosh market, in consumption dollars, reached \$2.25 million. Projections of consumption well in excess of 500,000 pounds per year are not uncommon. Prices for this material have been increasing steadily since the autumn of 1999.

Supply and Demand

Supplies of this product come mostly from the harvesting of native populations. Only small quantities of cultivated material have made its way to market. Prices have risen steadily but have not thus far triggered a strong response among growers to cultivate this material. Supplies are becoming unstable. Many of the large, easily harvested wild populations have already been exhausted. Harvesters scouring the countryside have to go further off the beaten trail in search of smaller, more widely scattered sources.

Suppliers of black cohosh are well dispersed throughout the natural range. They are more prevalent in the southeastern region of the range because that is where the largest concentration of sizeable wild populations exists. Demand for cultivated product will increase as naturally occurring populations become fewer in number and more widely dispersed. Just a few decades ago, the vast majority of the black cohosh that was harvested was sent to Europe for processing and consumption. Cultivation efforts are currently underway in the United States and Europe, although in the 2001 harvest season, an estimate of only 10% was generated from cultivated sources.

Customers often require black cohosh with specific levels of triterpene glycosides and isoflavones. With growing health concerns over HRT, many health professionals are looking

to black cohosh and other natural substances as potential treatment options for menopause symptoms. Positive clinical results for black cohosh continue to drive demand.

Pricing

Black cohosh has experienced a significant increase in demand, which has been satisfied by additional wild harvested material coming to market. In 1998, demand tripled from the previous year to almost 756,000 pounds. However, due to the easy access of wild populations, the price increased by only 40 cents per pound from 1997 levels. In 2001, the price per pound of dried root ranged from \$1.75 to \$5.00/lb.

Distribution Channels

As mentioned, renewed interest in this material by pharmaceutical companies has led to larger companies contracting directly with wild-harvest suppliers. Interest in cultivation, particularly organically certified cultivation, has also increased. Still, the majority of this material continues to flow through general brokers. Higher root prices will continue to keep small collectors foraging for natural populations.

Commercial Visibility

Black cohosh was identified as one of the fastest growing herbal products in 1998. It has found its way into a number of commercial products, including the early 20th century product "Change-O-Life" formula and, more recently, "Remifemin". "Remifemin" is a derivative of black cohosh and was introduced as a prescription drug in Germany in the 1950's.

In 1997, GlaxoSmithKline marketed it in this country as "Remifemin Menopause". Of the leading nutraceutical/botanical companies in the United States and Europe, 46% offer black cohosh as a stand-alone product, and 65% offer this material as either a stand-alone product or as part of a multi-constituent supplement.

Conclusion

North Carolina has the potential to become a major producer of cultivated black cohosh, especially in the western regions of the state. Commercial interest in this material has never been greater. Naturally occurring populations will not satisfy the expected increase in demand of 20-30% annually over the next three-to-five years. Lack of significant cultivation creates an opportunity for North Carolina growers to fill the gap in supply as wild populations continue to decline.

Black cohosh has never traded in a very high price range for a sustained period of time, but its current price is starting to move stealthily upward. Cultivated material will become more prevalent in the supply chain as prices increase 10-20% annually over the same period. Overall supply will increase but not at a rate commensurate to demand growth. This factor should keep prices moving upward with moderate momentum.

Black cohosh is also gaining popularity as an ornamental among shade gardeners, nursery container growers, and landscapers. Selections of native species are available as well as varieties with purplish leaves and stems. As a background plant in a shade garden, the gracefulness of this plant, in flower, will hardly go unnoticed. Nursery containers range in price from \$3.95 to \$10.00 per plant.

Since black cohosh can take more than three years to reach a harvestable root size, growers interested in large-scale commercial production should consider planting black cohosh as soon as possible. Once production gets underway, growers can produce their own planting stock, and perhaps offer quantities to other growers.

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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