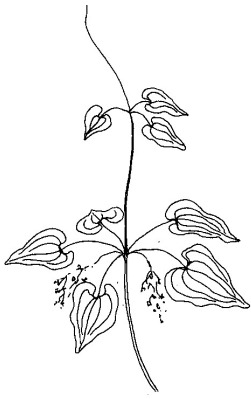


Medicinal Herb Production Guide

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Wild Yam (*Dioscorea villosa* L.)

Introduction

Botanical Information

Wild yam, *dioscorea villosa* L., member of the Dioscoreaceae family, is native to North America with a natural range from New England south and west to Texas and Minnesota. It is a cold-hardy herbaceous perennial found in mixed hardwood forests and grows to an average mature height of nine to fifteen feet. According to Radford *et al.*, “the vines twine upward, from right to left”. The leaves are cordate (heart-shaped) at the base of the plant, with the upper leaves more ovate. The inflorescence arises from the axils of alternate or whorled leaves. Small greenish-yellow flowers, in drooping racemes or spikes, bloom from April to October. The female plants produce winged seed capsules. Wild yam requires moist, well-drained soil and moderate sunlight to flourish. The root is the medicinal part of the plant and is harvested in the fall.

Note: According to Richo Cech, *Growing At-Risk Medicinal Herbs*, another species, *D. quaternata*, is also wild harvested for medicinal purposes. Cech explains that “there is little difference in the medicinal potency of the two species and are considered medicinally interchangeable”.

Bioactive Components

The main bioactive components of wild yam are the saponin, diosgenin, and the alkaloids, dioscorin and dioscorine. These components are believed to have antispasmodic, cholagogue, and diaphoretic effects. Wild yam contains a progesterone precursor used by the pharmaceutical industry to produce progesterone.

Uses and Treatments

In the 18th and 19th centuries, wild yam was used to treat menstrual cramps and problems associated with childbirth. The American Indians used it for birth control. Today, wild yam is used worldwide as an ingredient in many topical creams, in the production of steroid hormones such as cortisone, and for treatment of premenstrual syndrome (PMS). Cech adds, “the efficacy of wild yam for treating PMS, hot flashes, and other symptoms associated with menopause is due to the antispasmodic and tonic effects, not because the herb is a ‘progesterone precursor’.”

Table 1. Modern and traditional uses of wild yam.

<u>Modern Uses</u>	<u>Traditional/Folk Uses</u>
- <i>Lowers blood pressure and cholesterol levels</i>	- <i>Birth control</i>
- <i>Osteoporosis</i>	- <i>Colic</i>
- <i>Steroid production</i>	- <i>Hemorrhoids</i>
- <i>Rheumatoid arthritis</i>	- <i>Menstrual cramps</i>

Cultivation Practices

Site Selection

Wild yam does well in a woods cultivated environment. Since wild yam is indigenous to North Carolina, choosing a site where populations are already present would be ideal. Woodland species that are often growing with wild yam include mayapple and black cohosh. Their presence is a good indication that the site is appropriate for wild yam. 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.

Wild yam prefers partial shade and moist, warm conditions and can grow in different soil types ranging from loam to clay. A forest with mixed hardwoods would be ideal. Richo Cech says that *D. villosa* grows best at the edge of a forest and *D. quaternata* is often found in the deep forest with filtered light. Soil moisture is important throughout the growing season. Cech also recommends a pH range from 5 to 6. Wild yam needs to climb, so when choosing a site, plan for trellises to be constructed.

Planting

Propagation is typically done in the fall through seed or root divisions. To achieve germination of the seed the following spring, Cech recommends sowing them in an outside seedbed in fall or winter, thereby exposing them to a cold period. Shallowly sow wild yam seed in a shaded nursery bed with well-prepared soil (or in buried flats), shallowly sow wild yam seed. Never allow the seeds to dry out during storage or while in the soil. Cover with a thin layer of hardwood leaf mulch.

The following spring, the new seedlings should emerge. According to Cech, seedlings during the first year can easily be separated due to a bulbous rhizome that forms on each plant. Cech recommends transplanting seedlings into pots or leaving them in the seedling bed until planting into permanent shade beds the second year. Spacing recommendations for permanent plantings are 18-24" apart. Keep beds free from weeds, and mulch plants with a hardwood leaf mulch.

Since large quantities of seed are not readily available commercially, rhizome divisions may be the method of propagation necessary to establish a large planting. It will also allow for a faster harvestable plant. Cech recommends digging a mature plant in the fall, cutting the rhizomes into two to four inch pieces. Make sure fibrous roots are attached to the cut rhizome pieces. Cover with one inch of soil and a layer of mulch. In the spring, apply generous amounts of compost or well-aged manure to the beds. Keep beds free from weeds and provide some sort of trellis or support for the vines.

Cech estimates that from seed it takes wild yam at least four years to produce a harvestable root and for the plant to reach reproductive maturity; and from rhizome divisions, two to three years for a harvestable crop.

Insects and Diseases

No serious pest problems have been reported for cultivated wild yam, but this is probably because production is very limited. *Index of Plant Diseases in the United States* lists the following leaf spots that have been known to affect *Dioscorea villosa*: *Cercospora dioscoreae*, *Colletotrichum dioscoreae*, *Didymaria fulva*, and *Phyllostica dioscoreae*. No control methods have been developed.

Harvesting, Cleaning, and Drying

The root is the medicinal part of the plant and is harvested in the fall. Gently dig the plants with a fork or shovel, shaking any dirt from the roots. Over a large mesh screen, carefully wash the roots with a hose, removing any roots that are moldy or discolored. After the wild yam roots have been cleaned, Cech recommends cutting them into pieces before drying. This will speed up the drying process, as wild yam is susceptible to mold during the drying process. Therefore, Cech recommends "drying at 70°F for one day, then increasing the temperature to 110°F for at least two or more days, until they are dehydrated completely. It is important to dry them in a very warm place with adequate ventilation, and to turn them regularly until they are dry enough to 'snap' when broken."

Store dried roots in plastic bags, lightproof sacks, or in poly-sacks. Prolonged storage of dried wild yam root may lessen the medicinal value of this material. Most sources recommend that the root not be stored more than one year from harvest.

Marketing and Economics

Annual Consumption and Dollar Value

In 2001, approximately 52,000 pounds of wild yam were consumed. This amount is about 15% less than consumption in 1997 but about 7% higher than the level of consumption reached in 2000. The dollar value of consumption in 2001 was approximately \$165,000, approximately 29% higher than the level reached in 1997 and 33% higher than the level in 2000.

Supply and Demand

Wild yam is wild harvested throughout its natural range by low-volume collectors. Freshness is a key requirement. Unused supplies must be discarded due to a deterioration of the bioactive constituents. Acceptable bioactive content is generally viewed as diosgenin levels approaching 6%. Current demand slightly exceeds supply for this botanical. This material rarely demonstrates any prolonged supply/demand disturbances due to a lack of differentiation from over 100 plants in the same genus that possess similar medicinal properties. Increased use as hormone replacement therapy (HRT) and further penetration into European markets are vital to the growth prospects for this botanical.

Pricing

Although most of the supply of wild yam is wild harvested, the supply from season to season has been consistent with demand over the past few years. During 2001, the price of this material ranged from \$2.50-\$3.50 per pound of dried root.

Distribution Channels

Wild yam is routinely found in the product mix of many producers and distributors in North and South American markets. General brokers handle most transactions. The bioactive components of this material are very similar to other species within the genus. Therefore, brokers and direct buyers are more concerned with diosgenin levels than the specificity of the species.

Commercial Visibility

Of the top nutraceutical/botanical companies in North America and Europe, 21% offer this material as a stand-alone product and 35% offer this material either as a stand-alone product or as part of a multi-constituent supplement.

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

References

Cech, Richo. 2002. Growing At-Risk Plants. Horizon Herbs. Williams, Oregon. 314 pp.

Fernald, M. L. 1970. Gray's Manual of Botany. D. Van Nostrand Company, New York, NY. 1632 pp.

Fyfe, John Wm. M. D., and John Uri Lloyd. 1905. Dioscorea, A Treatise. Issued by Lloyd Brothers, Cincinnati, Ohio. <http://www.swsbm.com/ManualsOther/Dioscorea-Lloyd.PDF>

Radford, Albert E., Harry E. Ahles, and C. Ritchie Bell. 1968. Manual of the Vascular Flora of the Carolinas. University of North Carolina Press, Chapel Hill, NC. 1183 pp.