

DEVIL'S CLUB

Oplopanax horridus (Sm) Miq
Araliaceae

Common Names in English:

Devil's club
Alaskan ginseng
Wild armored ginseng
Pacific ginseng

Other taxonomic names in literature:

Fatsia horrida (Smith) Benth and Hook
Echinopanax horrida (Smith) Decne. & Planch
Oplopanax horridus (Sm) Miq (also written as horridum or horrida)
Panax horridum J.E. Smith
First Nations names for devil's club have not been included but can be found in Turner (1982).

Description of Plant

Devil's club is a perennial, deciduous shrub or treelet that grows from 1 to 4.5 metres. It has large spiny 7 –9 lobed maple leaf shaped leaves on a densely spined stem. The leaves are dark green and can be more than 40cm in length (not including the leaf stem). The leaf veins are spined on both surfaces of the leaf. The stems are either erect or sprawling and are a greyish brown colour. The upright stems become decumbent or sprawling. Over the years as the plants grow taller they tend to start to sprawl along the ground at the base. These decumbent, or horizontal, stems lose their spines, and become covered in moss and earth eventually becoming buried. These layered stems will put down roots and send up new upright stems.

In late spring a pyramidal shaped spray of whitish flowers about 20cm or so in length is produced by some, but not all, of the upright stems. The berries ripen in mid summer and are bright red, elliptical or round and slightly flattened.

It grows in what can sometimes be thick, seemingly impenetrable thickets, or can sometimes grow interspersed with other plants especially ferns. These thickets often appear to be clonal.



Oplopanax horridus leaves and stems

Devil's club grows in shaded wet areas or damp drainages and on the edges of streams in coniferous old growth or second growth forest. It may also be found growing under alder or maples on the edges of waterways and riparian areas.

Range

Devil's club is distributed from south central Alaska south along the Pacific Coast and the western slope of the Cascade Range to southern Oregon and east to southwestern Yukon Territory, Idaho, and western Montana. Disjunct populations occur on several islands of northern Lake Superior, including Isle Royale and Passage Island, Michigan, and Porphyry and Slate islands, Ontario. Some authorities extend its distribution to eastern Asia. However Voss recognized the Asian plants as a distinct species, *Oplopanax elatus* (Nakai) Nakai¹.

Common Misidentification Errors

It is uncommon to misidentify devil's club due to its unique identifying features. The leaves are maple shaped and from a distance could be mistaken for maples or for thimble berries, however a closer look will reveal the sharp spines which neither of these other plants have. It occasionally grows with Stink currant (*Ribes bracteosum*), which has a similar shaped leaves, but no spines on leaves or stems.

➤ *Part of the plant used medicinally*

Bark	Birket-Smith, K. 1938
Leaves, roots and berries	Compton, B.D. 1993
Inner bark	Emmons, G.T. 1991
Inner bark, stem, root	Fortuine, R. MD. 1988
Inner bark	Gottesfeld, L. 1994
Inner bark	Gottesfeld-Johnson, L. 1992
Inner bark of stem, root, berries	Graham, F. 1985
Inner bark of stem, root	Gunther, E. 1973
Inner bark	Hebda et al. 1996
Inner bark, root	Justice, J. MD. 1966
Inner bark	McGregor, M. 1981
Inner bark, bark, root	Smith, H.I. 1929
Stem	Steedman, E.V. 1930
Inner bark, root, stem, berries	Turner, N.J. 1973, 1979, 1983, 1990
Stem bark, roots	Moore, M. 1993
Inner bark (few refs to roots)	Moerman 1998
Inner bark	Ray, V.F. 1932
Inner bark	Lantz 2001
Inner bark	Howe 2003
Inner bark	McCutcheon 1997
Inner bark, berries	Thommasen 1990

The upright stems and the horizontal or decumbent stems are the parts of the plant that are usually used medicinally. The flowering stems are described as being too oily for use².

Most of the uses refer to either the upright or decumbent stem but in some instances the ethnobotanical literature refers to the root being used. However this may well result from confusion arising from the way in which the plant grows. The decumbent stems are often covered by moss and leaves and this leads to them being mistakenly thought of as roots. The true roots are quite small and harvesting them will damage the plant unnecessarily. The stems have the same medicinal uses as the roots.

➤ *Harvest Times*

There are references in the literature to the plant being harvested throughout the year.

According to Lantz³ there is significant variation in the time of year that different First Nations people perceive the plant to be most powerful. Possibly the action required would dictate when it should be picked.

McCutcheon *et al.*⁴ harvested the plant when it was in flower for their “Anti-mycobacterial screening of British Columbian medicinal plants”.

Graham⁵ has recorded that the plant harvested in autumn or winter may contain toxic amounts of the active ingredients however no specifics are given as the nature of this toxicity and the active ingredients were not identified nor were constituents of the plant known at the time Graham recorded this.

No research has been done to compare chemical constituents of different parts of the plant, or to compare how the chemical constituents differ at different times of year⁶.

➤ *Harvest Area*

Devil’s club grows in wet areas and on stream and riverbanks. These areas are very sensitive to disturbance of the soil, which can have a negative affect on water quality and fish habitat.

Great care must be taken not to damage these fragile ecosystems.

The quality of the water will affect the soil in the riparian area and stream or river flood plain. Ensure that there are no contaminants in the water coming from upstream, such as industrial pollutants and run off from mine sites.

Ensure that the harvest area is not otherwise contaminated with heavy metals, industrial pollutants, pesticides or herbicides, or run off from roads or mines.

The harvest area should not be within the fall out area for industrial pollutants as the plants can absorb pollutants through their leaves even if the pollutants are not found in significant amounts in the soil⁷.

Check with landowner that harvest area has not been sprayed with herbicide or pesticides. If the history of the harvest site or any adjacent waterway is not known a soil sample should be tested for the above pollutants. Harvesting should not take place within 50metres of main roads⁸.

➤ *Harvesting Methods*

The plant should be identified using “Good Practices for Plant Identification for the Herbal Industry”⁹. If there is any doubt about the identity of the plant seek an experienced person to confirm identity.

Harvest the upright stems above the lowest leaf or above a lower branch of the stem¹⁰. The total quantity of plant in the harvest area should be assessed.

Preliminary data by McKenzie shows that no more than 2% of the patch should be harvested¹¹.

However he goes on to say that this is probably too low. Vance et al.¹² recommend a harvest rate of 20% which is probably too high. An eight-foot stem will be ten to twelve years old in many areas¹³.

Given this relatively slow growth rate the impact of harvesting 20% of the stand each year could have a significantly negative impact. Vance et al. also recommend harvesting the roots and decumbent stems but this was found to be unsustainable by McKenzie and reported as unacceptable practice by Lantz¹⁴.

Do not harvest flowering stems as these are described as being too oily for use¹⁵.

Do not harvest decumbent stems or roots, as this is not commercially sustainable¹⁶.

Sharp cutters should be used to harvest the stems.

Organic certification would not be obtainable for mechanically harvested plants, as it would not meet the standards set for wild harvested medicinal species¹⁷.

The following practices should be avoided as they will cause deterioration of quality. DO NOT: leave the plant piled up for any period of time prior to drying, bruise the plant during harvesting, or harvest on a hot day.

Do not delay transporting plant to drying facility.

Harvested plant material should be collected in clean containers and contact with the ground should be avoided. Harvesting containers or tarps must be cleaned between harvest batches.

In order to ensure that the harvesting is not negatively impacting the stands you are collecting from you must monitor and record the sustainability of your harvesting operations on an on-going basis.

- always make sure there are enough mature plants left after harvesting to maintain habitats that other wildlife depend on;
- avoid damage to neighbouring species, especially rare or threatened species;
- take particular care with species that have symbiotic relationships or otherwise depend on each other;
- avoid harvesting operations that lead to erosion or damage to sensitive habitat, and
- take and keep samples of each batch harvested¹⁸.

Harvester must have clean hands and be free of any disease that is transmittable through food.

Tools must be cleaned between harvest batches.

➤ *Regeneration*

Devil's club reproduces vegetatively by layering. Seed germination is poor.

Traditionally when the plant is harvested pieces of the stem are stuck back in the mud to root¹⁹.

However this method is not suitable for commercial wildcrafting as regeneration using this method is not reliably successful²⁰.

Preliminary data from regeneration studies on devil's club show that harvesting decumbent stems and roots is not sustainable, with regeneration being almost non-existent. Trials also showed that harvest of stems at ground level has a slower regeneration rate than harvesting the stems above the lowest leaf or lower branch. Generally regeneration rates are slow, and three years post-harvest the test sites had not returned to pre-harvest levels. Most of the regeneration occurs on cut stems and very little natural regeneration comes as new shoots from the ground. New shoots from the ground and from replanted stems showed less vigour than new shoots from the stems²¹.

More research is needed to assess sustainable harvest rates for devil's club^{22, 23}.

Regeneration and sustainable harvest rates will be site specific so management plans and permanent sample plots must be set up if possible to monitor and assess sustainability and harvest impact.

➤ *Harvest Records*

The harvester must keep records of each harvest batch which should include identification of the plant, name of plant in Latin, common name, harvest date, harvest location (using map reference or indicated on a map), part harvested, quantity harvested, sustainable harvest rate for area (if known), harvest rate for this harvest, quality of material collected, unusual weather during the growing season that might influence plant constituents, delays in getting the plant to drying stage which would affect quality. Each harvest batch must be given a batch code that will correspond with the record for the harvest batch and with the batch sample and this code will follow the batch through drying, processing and storage or to

Records should be kept for two years. CHSNC²⁴ is in the process of developing templates for GAP records that can be used for wildcrafting. The “Good Practices for Plant Identification for the Herbal Industry”²⁵ can be used to document plant identity.

➤ *Preparation for Drying*

The part used medicinally and the part required for manufacture of natural health products is the green inner bark of the upright stems.

The green inner bark is processed as follows:

1) Remove the spines from the outer bark.

The spines are removed by scraping them with a sharp knife. Care must be taken when removing the spines that they do not break off in the processors hands. Discard the spines carefully so that they will not become embedded in feet or hands of other people or animals.

2) Remove the brown outer bark.

The brown outer bark is paper-thin and it is removed by carefully scraping it away from the green inner bark. Care must be taken not to remove the inner bark at the same time as the outer bark. Discard the outer bark.

3) Peel the green inner bark from the woody core of the stem and discard the inner woody core.

The plant should be processed while still fresh. It becomes more difficult to separate the layers of bark from each other when the plant is dried prior to processing.

Tools must be cleaned between harvest batches.



Green inner bark peeled from the white inner core

➤ *Drying*

The inner bark should be spread out on racks and dried between 30°C to 45°C out of direct light, in a drying shed. A good airflow around the drying racks is essential. Drying outside, or with no heat will tend to result in loss of volatile oils and loss of colour of the inner bark. Avoid high heat. High heat during drying will cause loss of essential oils in the inner bark.

Drying racks should be labeled individually with the name of the drying herb and the code applied at harvesting. Any problems associated with drying must be recorded with the corresponding batch records.

Drying, processing and storage facilities should provide protection of the plant-material against pests, rodents, insects, birds, and pets and other domestic animals²⁶.

Racks must be cleaned between harvest batches.

➤ *Extraction Techniques*

[Infusion and Decoction and oil maceration](#) are all used.

Decoction and Infusion: Traditionally the plant was extracted by decoction or infusion. There are also references to the fresh plant being chewed for a short period of time in an acute situation, or used fresh in a topical application. Any long term use of the plant traditionally involved extraction using heat and water²⁷.

[Tincture](#): Traditionally the plant was not extracted in alcohol and there is no evidence to support safety or efficacy of its use in tincture form²⁸. Justice cautions against using with alcohol²⁹. Extracting devil's club in alcohol would raise the following concerns³⁰:

1. alcohol extracts lipid soluble constituents from the plant that would not be extracted by decoction,
2. alcoholic extractions do not use heat and would contain constituents normally lost in heating such as volatile oils, and,
3. changes to constituents that normally occur with the application of heat would not occur.

[Encapsulation](#): There is no evidence to support safety or efficacy of ingesting dried herb in capsule form.

Oil: the inner bark can be extracted in oil to make a medicinal ointment.

➤ *Storage*

The inner bark must be stored in dry conditions out of direct light. Store in new polypropylene sacks. Each harvest batch and storage bag or container must be labeled appropriately with the name of the plant, quantity, and the code applied at harvesting. Details of any problems that occurred during storage (eg. Loss of heat, overheating, insect infestation in building etc.) must be recorded with the corresponding batch records.

Drying, processing and storage facilities should provide protection of the plant-material against pests, rodents, insects, birds, and pets and other domestic animals³¹. The storage area should be heated to avoid damp and mould, but not at high temperatures as degradation of the product will occur.

➤ *Toxicity or Health and Safety Cautions for Harvesters*

The spines will cause painful inflammation if they become embedded in the skin. Take care not to get the spines in hands or fingers when harvesting and processing. Dispose of the spines carefully to avoid them becoming embedded in the skin of either animals or people.

➤ *Identification of Commercial Product*

The medicinal product should be green in colour and aromatic. It should not contain the white inner core of the stem. Some brown outer bark might be present.

Odour: reminiscent of celery.

Taste: biting and pungent.

➤ *Official Monographs*

There are no official monographs for devil's club.

➤ *Organic certification*

The Canadian regulations covering wild crops are outlined in [Organic Production Systems General Principles and Management Standards](#) (CGSB 2006)

The Soil Association (organic certifying body in the UK) certifies organic products in Europe and has standards for Wild Harvesting. These standards are recognized in the EU. The full Wild Harvesting Standards can be ordered from the Soil Association³².

Canadian, European and US standards address endangered species, harvesting areas, requirements for sustainable harvest management plans, personnel training, batch tracking, samples and record keeping.

➤ *Land Access for Harvesting*

Private Land: Written permission to harvest must be obtained from the landowner.

Crown Land: No permission or license is required however harvesting must be carried out within provincial Ministry guidelines. In BC such harvesting is subject to the Forest and Range Act.³³

First Nations Reserve Land: Permission must be obtained from the Band with details of exactly what you wish to harvest. For many First Nations harvesting of medicinal plants is a spiritual practice with strict rules about how the harvest is carried out. Knowledge of and respect for these practices should be a part of any request for permission to harvest. Devil's club is a plant of particular spiritual significance and importance for First Nations people.

National or Provincial Parks: It is illegal to harvest in National or Provincial Parks.

➤ *Points of Concern*

The harvest of devil's club for the herbal and nutraceutical markets has increased dramatically in recent years. In 1997 it is estimated that in excess of 2 000 kg of bark was harvested in British Columbia³⁴. Its relationship to ginseng (*Panax spp.* also Araliaceae) is fuelling the increasing demand and it is sometimes even being erroneously used interchangeably with ginseng. Its medicinal action is quite different.

In addition to increased demand the harvesting techniques being used are unsustainable and cause significant damage to sensitive riparian areas.

Loss of habitat is also of concern for devil's club because it does not tolerate clear-cut logging practices and is eliminated from areas once the tree cover and riparian areas are destroyed.

The lack of necessary information re: wild harvesting and number of concerns about the harvest of devil's club is discussed by Lantz³⁵: "Escalating commercial interest and over harvesting of devil's club, a lack of information about its ecology and basic life history, and its cultural significance to First Nations people make devil's club a plant that touches on many aspects of medicinal plant commercialisation". All knowledge of medicinal uses of the devil's club comes from First Nations People. Any commercial use of that knowledge to support claims of safety and efficacy must be accompanied by details of benefit sharing as per the Convention on Biological Diversity.

¹ Howard, Janet L. 1993. *Oplopanax horridus*. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available at: <http://www.fs.fed.us/database/feis/plants/shrub/oplhor/all.html>

² Lantz, T.C.. *The Population Ecology and Ethnobotany of Devil's Club (Oplopanax horridus (Sm) Torr. & A. Gray ex Miq.; Araliaceae)*. MSc Thesis, Botany Department, University of Victoria, B.C. 2001.

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- ⁶ Howe, A. *What does the herbalist need to know about devil's club (Oplopanax horridus) before incorporating this plant into the materia medica? A review of the traditional and scientific literature, commercial claims and ethical considerations* [master's thesis]. University of Wales, U.K. 2003.
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- ¹¹ McKenzie, Evan. Medicinal Plant Research in the Harrop-Procter Community Forest – Report. 2004.
- ¹² Vance, N., Melissa Borsting, David Pilz Special Forest Products - Species Information Guide for the Pacific Northwest. USDA Forest Service. Pacific Northwest Research Station. <http://www.fs.fed.us/pnw/pubs/gtr513/gtr513b.pdf>
- ¹³ A. Howe. Personal observation, east coast of Vancouver Island, B.C.
- ¹⁴ Lantz, T.C. *The Population Ecology and Ethnobotany of Devil's Club (Oplopanax horridus (Sm) Torr. & A. Gray ex Miq.; Araliaceae)*. MSc Thesis, Botany Department, University of Victoria, B.C. 2001.
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- ³⁴ Wills, R.M., Lipsey, R.G. *An Economic Strategy to Develop Non-Timber Forest Products and Services in British Columbia*. Forest Renewal BC Project No. PA97538-ORE [online]. Available at:<URL: www.sfu.ca/~rlipsey/FRBC.PDF >. 1999.

APPENDIX 2

³⁵ Lantz T. *Examining the Role of Co-operatives in the Ethical Commercialisation of Medicinal Plants: Plant Conservation, Intellectual Property Rights, Ethics and Devil's Club (Oplopanax horridus)*. BC Institute for Co-operative Studies Occasional Papers. ISSN 1497 729X. 2001.

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