devil's club

(Oplopanax horridus)

An Ethnobotanical Review

by Trevor C. Lantz, Kristina Swerhun, and Nancy J. Turner

Devil's club (Oplopanax horridus (Sm.) Torr. & A. Gray ex. Miq., Araliaceae) is probably the most important spiritual and medicinal plant to most indigenous peoples who live within its range. Different parts of this plant are used by over 38 linguistic groups for over 34 categories of physical ailment, as well as many spiritual applications. Devil's club [syn. Echinopanax horridus (Sm.) Decne. & Planch, Fatsia hordida (Sm.) Benth. & Hook, Panax hordidum Sm.; Riconophyllum hordidum Pall.] is a common deciduous understory shrub occurring in moist, but well drained, forested ecosystems from coastal Alaska southward to central Oregon and eastward to the southwestern Yukon, the Canadian Rockies, northwestern Alberta, Montana, and Idaho. There are also several disjunct populations near northern Lake Superior in Michigan and Ontario. The stems of this shrub are upright to decumbent and can reach heights exceeding 6 meters (~20 feet). The leaves are large (up to 35 cm across (~14 inches)) and maple-shaped.
The stems, petioles, and leaf veins of devil's club are covered with a dense armor of yellowish needle-like spines up to 2 cm (0.5 inches) long, which can cause severe skin irritation. The flowers are small and whitish, borne in terminal pyramidal clusters, and ripen to shiny flattened, bright red berries. Devil's club forms large sprawling clones that expand laterally through the layering of decumbent stems.¹

A member of the family Araliaceae (which also contains the ginsengs), devil's club is related to a number of widely known medicinals including Asian ginseng (Panax ginseng C.A. Meyer), American ginseng (P. quinquefolius L.), eleuthero (Eleutherococcus senticosus Maxim., formerly called Siberian ginseng), and small spikenard (Aralia nudicaulis L., or sarsaparilla). Devil's club is often cited as the most significant plant, both medicinally and spiritually, to the indigenous peoples within its range.² ³ ⁴ The first ethnographic record of devil's club use dates back to 1842, when Eduardo Blaschke, the chief physician for the Russian American Company, reported the use of devil's club ash as a treatment for sores amongst the Tlingit.⁵ Subsequently, devil's club has received widespread documentation for its medicinal, spiritual, and technological uses in ethnographies, ethnobotanies, medical journals, and historical records from within (as well as outside) its geographical range. In a 1982 review, Turner reported more than 30 categories of medicinal, spiritual, and technological uses by peoples of over 25 different indigenous linguistic groups of western North America.⁶ Phytochemical research has revealed that this plant has antifungal, antiviral, antibacterial, and antimycobacterial properties, and these are undoubtedly related to its widespread use in traditional medicine.⁷ ⁸ ⁹ ¹⁰

Recent commercial use of devil's club seems to have developed in response primarily to ethnographic records and the phytochemical research that these have inspired. In most cases the use of devil's club in the herbal and nutraceutical industries parallels traditional uses described in ethnographic and ethnobotanical records. Recently, however, devil's club's botanical relationship to the well-known medicinal ginsengs (Panax ginseng, P. quinquefolius) has been used to increase its commercial appeal. Thus, it is sometimes marketed under the misleading, and now illegal in the United States, common names of "Alaskan ginseng," "wild armored Alaskan ginseng,"¹² and "Pacific ginseng."¹³ Such marketing relies on purported phytochemical similarities between devil's club and Panax spp. Although largely unsubstantiated, presumably such claims are based on the speculation that plants of the family Araliaceae may share similar chemical constituents, a presumption that is not supported by current phytochemical research.

The prospect of increasing demand in the market has the potential to increase the unregulated harvest of devil's club. This is of concern because this shrub is sensitive to over-harvesting.¹⁴ Since devil's club is extremely important culturally, commercialization also raises concerns about the lack of recognition of and compensation for, the intellectual property rights of indigenous peoples from Alaska to British Columbia and Oregon.

The purpose of this paper is to clarify devil's club's medicinal properties by summarizing reported traditional medicinal applications, examining contemporary use by indigenous and non-indigenous peoples, and reviewing recent phytochemical research. Intellectual property rights and cultural and conservation issues associated with the commercialization of this plant are also discussed.

**Ethnobotanical Records of Traditional Use**

A review of published and unpublished ethnographic sources reveals great diversity in the uses of devil's club among many indigenous groups over a wide geographic area. These applications are summarized here in 34 broad categories of medicinal use (Table 1), and eight categories of spiritual use (Table 2). The indigenous peoples who use devil's club include 38 linguistic groups from across northwestern North America (Tables 1-2), representing nine language families.¹⁴ The region defin-
eated by this cultural usage almost directly parallels the geographic distribution of devil's club (Figure 2) and underscores the cultural importance of this plant across its range. In some areas devil's club is used well outside of its geographic range; the few areas where cultural use is not recorded from within the area of its distribution appear to represent gaps in the ethnobotanical documentation and not in actual usage.

Among all of the traditional medicinal uses of devil's club (Table 1), its most widespread is for the treatment of external and internal infections, including tuberculosis. The efficacy of many of the treatments is undoubtedly related to devil's club's significant antibacterial, antitymocobacterial (active against bacteria in the genus *Mycobacterium*), antifungal, and antiviral properties. Devil's club is also commonly used by many cultural groups to treat arthritis, rheumatism, respiratory ailments, and as an emetic and purgative. It is also used as an aid in childbirth (post-partum), for internal hemorrhaging, as an analgesic, to treat stomach and digestive tract ailments, broken bones, fever, dandruff, lice, headaches, and as a treatment for cancer. Several parts of the shrub, including inner bark, inner bark ash, whole stems, roots, berries, and leaves, are used in a variety of ways to effect these treatments. However, the most common type of preparation is as an infusion or decoction of the stem inner bark.

In addition to ethnographic accounts of medicinal uses, there are also numerous sources that describe spiritual applications of devil's club. These include purification and cleansing; protection against supernatural entities, epidemics and evil influences; acquisition of luck; to combat witchcraft; as ceremonial and protective face paint; and in rituals by shamans and others to attain supernatural powers (Table 2). Two of the most widespread spiritual uses are bathing with a devil's club inner bark solution for personal protection and purification, and its use, particularly the spiny or de-spined aerial stems, as an amulet for protection against a variety of external influences (Table 2). External and internal cleansing involving the use of devil's club "was, and is, of paramount importance" to many of the cultural groups throughout devil's club's range. The inner stem bark of devil's club has also often been used in solution to wash down fishing boats, fishnets, and to purify a house after an illness or death, and, as charcoal, to prepare protective face paint for ceremonial dancers (Table 2). John Thomas explained that amongst the Ditidaht, and many other neighboring groups, devil's club is considered sacred and "along with red ochre paint is considered to be a link between the ordinary, or profane world, and the supernatural, or spirit world." Although it is useful for
<table>
<thead>
<tr>
<th>Medicinal Uses</th>
<th>Cultural Linguistic Group (and References)</th>
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</thead>
<tbody>
<tr>
<td><strong>APPETITE STIMULANT</strong> Infusion of inner bark.</td>
<td>Nlaka’pamux (64); Secwepemc (65); Squamish (66)</td>
</tr>
<tr>
<td><strong>ARTHRITIS / RHEUMATISM</strong> Infusion or decoction of inner bark, pounded leaves and sometimes roots, inner bark used in bath/steam bath, inner bark chewed, crushed root used as poultice, and whole stems used to beat rheumatic limbs as counter-irritant.</td>
<td>Alutiiq (67, 68, 69, 70); Carrier (71); Ditidaht (72, 73); Gitxsan (17, 74, 75); Haida (2, 76, 77, 78, 79, 80, 81); Halkomelem (82); Hanaksiala (83); Makah (84); Oweekeno (85); Nuu-chah-nulth (72); S’al’tal’imx (85); Nuxalk (76, 77, 79); Sahaptin (86); Sechelt (72, 87, 88); Sekani (89); Squamish (66, 72); S’al’atl’imx (85, 90); Tlingit (2, 80); Tsimshian (80); Unspecified (91)</td>
</tr>
<tr>
<td><strong>BIRTH CONTROL</strong> Decoction of roots.</td>
<td>Metis (92)</td>
</tr>
<tr>
<td><strong>BLOOD PURIFIER</strong> Decoction of inner bark.</td>
<td>Carrier (73); Nlaka’pamux (64, 93)</td>
</tr>
<tr>
<td><strong>BROKEN BONE</strong> Decoction of inner bark.</td>
<td>Alutiiq (70); Gitxsan (95); Haida (2)</td>
</tr>
<tr>
<td><strong>CANCER</strong> Infusion of inner bark.</td>
<td>Alutiiq (70); Gitxsan (17); Haida (2; 81); Tlingit (2); Tsimshian (80)</td>
</tr>
<tr>
<td><strong>CHILDBIRTH / MENSTRUATION</strong> Inner bark mashed and swallowed, or decoction of inner bark taken as purgative to expel afterbirth, to start post-partum menstrual flow, regulate menstruation, and for cramps.</td>
<td>Alutiiq (94); Carrier (77, 101); Hanaksiala (83); Lushootseed (86); Makah (86); Secwepemc (96); Tlingit (16)</td>
</tr>
<tr>
<td><strong>DIABETES</strong> Infusion of decoction of inner bark and sometimes roots, both alone and in mixtures.</td>
<td>Crec (92); Haida (81); Halkomelem (97); Heiltsuk (27); Metis (92); Nlaka’pamux (64); Nuxalk (98); Sechelt (99); Secwepemc (65); Squamish (66); S’al’atl’imx (85); Straits Salish (97, 100); Tsimshian (23)</td>
</tr>
<tr>
<td><strong>DIPHTHERIA</strong> Infusion of roots applied externally.</td>
<td>Sekani (89)</td>
</tr>
<tr>
<td><strong>EMETIC / PURGATIVE</strong> Decoction or infusion of inner bark prepared in water or seal oil, both alone and in mixtures, roots chewed and the inner bark sometimes swallowed.</td>
<td>Alutiiq (68, 70); Carrier (3, 101); Eyak (3, 102); Gitxsan (79, 95); Haisla (83); Haida (76); Makah (86); Nuxalk (77, 79, 98); Tlingit (3, 16, 103); Tsutsaht (3); Unspecified (104); Wet suwet’en (95)</td>
</tr>
<tr>
<td><strong>FERTILITY</strong> Unspecified.</td>
<td>Unspecified (104)</td>
</tr>
<tr>
<td><strong>FEVER</strong> Decoction of inner bark.</td>
<td>Tanaina (105); Unspecified (104)</td>
</tr>
<tr>
<td><strong>FLU</strong> Infusion of inner bark, alone and in mixtures, and the inner stem bark chewed.</td>
<td>Alutiiq (68, 70); Gitxsan (17); Haida (80, 81); Nlaka’pamux (4, 64); Tanaina (106); Tsimshian (80); Tlingit (16, 80); Wet suwet’en (107)</td>
</tr>
<tr>
<td><strong>GALL STONES</strong> Infusion of inner bark.</td>
<td>Haida (2); Tlingit (2)</td>
</tr>
<tr>
<td><strong>HAEMORRHAGING AND BLOOD DISORDERS</strong> Infusion of inner bark, alone and in mixture, and berries pounded into paste taken internally.</td>
<td>Comox (108); Hanaksiala (83)</td>
</tr>
<tr>
<td><strong>HEART DISEASE</strong> Berries pounded into paste taken internally.</td>
<td>Alustiiq (70); Hanaksiala (83); Wet suwet’en (107)</td>
</tr>
<tr>
<td><strong>INSANITY</strong> Introduced into the system by beating with stems.</td>
<td>Haida (80); Tsimshian (80); Tlingit (80)</td>
</tr>
<tr>
<td><strong>INTERNAL INFECTIONS</strong> Infusion of inner bark.</td>
<td>Haida (80); Tanaina (106); Tsimshian (80); Tlingit (80); Unspecified (91)</td>
</tr>
<tr>
<td><strong>LAXATIVE</strong> Infusion or decoction of inner bark prepared both alone and in mixtures.</td>
<td>Gitxsan (109); Haida (2, 80); Haisla (83); Hanaksiala (83) Heiltsuk (4); Kwakwaka’wakw (110); Nlaka’pamux (93, 64); Nuxalk (77); Tanaina (105); Tlingit (2, 80, 103); Tsimshian (80, 111); Unspecified (91)</td>
</tr>
<tr>
<td><strong>LICE AND DANDRUFF</strong> Pounded berries rubbed on hair and scalp.</td>
<td>Haida (78); Oweekeno (83)</td>
</tr>
<tr>
<td><strong>LYMPH TROUBLE (DROPSY)</strong> Ash of inner bark.</td>
<td>Alutiiq (94)</td>
</tr>
<tr>
<td><strong>MEASLES</strong> Decoction of inner bark.</td>
<td>Halkomelem (72); Tlingit (106)</td>
</tr>
<tr>
<td><strong>PAIN RELIEF, ANALGESIC</strong> Decoction of inner bark, inner stem bark mixed with oil and eaten, dried inner bark laid into tooth cavity, steam bath with inner bark.</td>
<td>Alutiiq (67, 69); Gitxsan (75); Haida (2); Kwakwaka’wakw (110, 112, 113, 114); Nuxalk (98); Oweekeno (83); Tlingit (2); Tsimshian (2)</td>
</tr>
<tr>
<td><strong>PERFUME, BABY TALC</strong> Unspecified.</td>
<td>Makah (86)</td>
</tr>
<tr>
<td><strong>PNEUMONIA</strong> Decoction or infusion of inner bark, and inner bark used in steam baths with a variety of additional plants.</td>
<td>Alutiiq (68); Squamish (66); Tlingit (16)</td>
</tr>
</tbody>
</table>
### Table 1: Summary of Medicinal Uses of Devil's Club (Oplepanax horridus) (cont.)

<table>
<thead>
<tr>
<th>Medicinal Uses</th>
<th>Cultural Linguistic Group (and References)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Respiratory Ailments, Coughs, Colds</strong> Decoctions and infusions prepared from inner stem bark, whole stems and sometimes roots, inner bark also chewed, used in sweat baths, and burned and dampened and worn around the neck.</td>
<td>Alutiiq (67, 70); Eyak (102); Gitxsan (17, 74); Haida (2, 80, 81); Halkomelem (72); Hanaksiala (83); Okanagan (116); Oweekeno (83); Nlaka'pamux (4); Okanagan (115); Sahaptin (86); Secwepemc (65); Squamish (66); Tagish (117); Tanaina (105); Tlingit (2, 80); Tsimshian (80); Unspecified (5, 91, 104); Wet'suwet'en (107)</td>
</tr>
<tr>
<td><strong>Skin Wash</strong> Infusion or decoction of roots used as a general wash for acne, skin disease, dandruff, etc.</td>
<td>Alutiiq (70); Comox (108); Gitxsan (109); Sechelt (72); Sekani (89); Tlingit (16)</td>
</tr>
<tr>
<td><strong>Sores (Swellings, Cuts, Boils, Burns, and External Infections)</strong> Inner bark, or infusion of, used externally as a poultice or wound dressing or rubbed over sore, dried inner bark pulverized with pitch or burnt to ash and mixed with oil or grease (sometimes salmonberries and dog feces) and applied externally, berries pounded into a paste and applied externally, decoction of root applied externally, and slice of bark placed in wound to prevent infection.</td>
<td>Alutiiq (67, 70, 94, 102); Carrier (71); Eyak (68); Gitxsan (17, 74, 109); Haida (2, 3); Hanaksiala (83); Kwakwaka'wakw (113); Makah (84); Nlaka'pamux (93); Nuxalk (98); Sechelt (99); Tanaina (105); Tlingit (2, 3, 6, 16, 103, 118); Tsimshian (80); Unspecified (26, 91); Wet'suwet'en (74)</td>
</tr>
<tr>
<td><strong>Stomach Trouble / Pains, Ulcers</strong> Infusion or decoction of inner bark or paste made from berries taken internally.</td>
<td>Gitxsan (17); Haida (2, 75, 76, 77); Hanaksiala (83); Kwakwaka'wakw (110, 113, 114); Nlaka'pamux (64, 93); Nuxalk (76, 77, 79); Squamish (66); Tanaina (105); Tlingit (2); Unspecified (26, 91)</td>
</tr>
<tr>
<td><strong>Tonic</strong> Infusion or decoction of inner bark or sometimes roots, inner bark chewed, and bark ash infused.</td>
<td>Ditidaht (73); Gitxsan (17, 74); Haida (2, 77); Halkomelem (72); Nlaka'pamux (64, 93); Nisga'a (75); Nuu-chah-nulth (119, 120); Oweekeno (83); Tlingit (2, 16); Sechelt (99); Unspecified (91, 104); Wet'suwet'en (107)</td>
</tr>
<tr>
<td><strong>Unspecified Use, General Sickness</strong> Unspecified.</td>
<td>Alutiiq (67); Carrier (121); Ktunaxa (122); Gitxsan (75); Nlaka'pamux (4); Nuxalk (88); Oweekeno (83); Quileute (123); Sechelt (99); Tlingit (124); Tsimshian (3)</td>
</tr>
<tr>
<td><strong>Venereal Disease</strong> Decoction prepared from inner bark and whole stems both alone and in mixtures with a variety of other plants.</td>
<td>Gitxsan (95); Haida (80); Tlingit (16, 80, 103); Tsimshian (80); Unspecified (91)</td>
</tr>
<tr>
<td><strong>Vision / Blindness</strong> Infusion of inner bark taken internally, inner bark applied externally with pitch, and decoction used as an eyewash to reverse the effects of cataracts.</td>
<td>Haida (80); Hanaksiala (83); Tsimshian (80); Tlingit (80)</td>
</tr>
<tr>
<td><strong>Weight Loss</strong> Infusion of de-spined stems.</td>
<td>Nlaka'pamux (4, 64)</td>
</tr>
</tbody>
</table>
Any pharmacological and therapeutic similarities devil's club shares with ginseng are not well documented, and a number of authors stress that these plants should not be used as if they were the same.

Contemporary Use in the Herb and Dietary Supplement Industry

Many of devil's club's uses in herbal medicine parallel its most commonly documented traditional uses (Table 1). Overall though, the modern commercial applications of devil's club in the North American herbal market are for treating a smaller number of health problems and lack the spiritual practices associated with traditional use. Western herbalists report that the roots of devil's club (and to a lesser extent the inner stem bark) are a strong respiratory stimulant and expectorant and recommend their use for rheumatoid arthritis and other autoimmune conditions, as well as to treat eczema, sores, and a number of internal and external infections. Devil's club is also commonly recommended for the treatment of type II adult onset diabetes, a use of devil's club that is also extensive in indigenous communities. However, since there is considerable risk and uncertainty associated with such therapy, such recommendations should be viewed with caution. In one notable case, devil's club is recommended as a pancreatic tonic that is purported to help lower blood sugar levels by increasing the efficiency of insulin production in the pancreas. In this and other similar cases it is unclear if the reasoning given is based on the clinical evidence, which is equivocal and conflicting. Early clinical research on devil's club, inspired by its widespread use by indigenous peoples for adult diabetes, reported that a white precipitate isolated from extracts of devil's club "root bark" exhibited a hypoglycemic effect in lab hares. Subsequently, in experiments involving two human subjects, Justice presented some additional evidence to support the hypoglycemic activity of devil's club's root and stem bark. However, additional work by Piccoli et al. and Thomassen et al. using extracts from "root bark," and research by MacDermot using a decoction of stems, provide data that do not substantiate the hypoglycemic activity reported previously. Since devil's club is still widely, and increasingly, used as a treatment for late onset type II diabetes and is listed in a recent

Table 2: Summary of Spiritual Uses of Devil's Club (Oplopanax horridus)

<table>
<thead>
<tr>
<th>Spiritual Uses</th>
<th>Cultural Linguistic Group (and References)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>END BAD WEATHER</strong></td>
<td>Unspecified</td>
</tr>
<tr>
<td><strong>LUCK</strong></td>
<td>Wood retained for luck, bark used in bath, and rubbed on body, and fresh bark chewed.</td>
</tr>
<tr>
<td><strong>PAINT</strong></td>
<td>Charcoal, sometimes mixed with bear grease used for face paint used in ceremonies and for protection. Bark also used as medium for paint mixed with berries.</td>
</tr>
<tr>
<td><strong>PERSONAL PURIFICATION</strong></td>
<td>Infusion of inner bark and inner bark used in bath.</td>
</tr>
<tr>
<td><strong>PROTECTION</strong></td>
<td>Bark and stems used as an amulet, charcoal used for protective face paint, bark used in bath for protection, hoop of stem steeped through for protection against supernatural entities, epidemics, evil influences, love charms and shamans' spells, and inner bark sewn into pouche and worn around the neck as an amulet.</td>
</tr>
<tr>
<td><strong>PURIFICATION OF HOUSE</strong></td>
<td>Inner bark burned as a fumigant, placed in pouches, under pillows, or used with other plants to prepare an infusion to purify a house, often following a death.</td>
</tr>
<tr>
<td><strong>SHAMANIC</strong></td>
<td>Infusion of inner bark or roots, and roots chewed.</td>
</tr>
<tr>
<td><strong>WITCHCRAFT</strong></td>
<td>Prophylactic against witchcraft.</td>
</tr>
</tbody>
</table>

Eyak (102); Gitxsan (17, 75); Haïda (83); Hanaksiala (83); Nuxalk (88); Sekani (89); Wet'suwet'en (74, 107)

Ditidaht (73); Haïda (83); Hanaksiala (83); Nuu-chah-nulth (119, 120); Secwepemc (65); Squamish (66); Straits Salish (100)

Eyak (102); Gitxsan (17, 74, 109); Haïda (125, 126, 127); Haïda (83); Hanaksiala (83); Tlingit (3, 118); Tsimshian (4, 83); Wet'suwet'en (74, 107)

Alutiq (70); Ditidaht (73); Eyak (102); Gitxsan (21); Haïda (78); Haïda (83); Hanaksiala (83); Nisga'a (75); Nuu-chah-nulth (119, 120); Nuxalk (79); Sekani (89); Tagish (117); Tlingit (17); Tsimshian (83)

Eyak (102); Gitxsan (17, 75); Haïda (83); Hanaksiala (83); Nuxalk (88); Sekani (89); Wet'suwet'en (74, 107)

Blackfoot (129); Eyak (102); Haïda (83); Hanaksiala (83); Oweekeno (83); Sekani (89); Tlingit (16, 124); Tsimshian (83)

Alutiq (130); Hanaksiala (83); Tlingit (16, 118)
review of antidiabetic plants, additional research and more rigorous clinical trials are required to validate and characterize or to disprove hypoglycemic properties in devil’s club.

Notable commercial applications of devil’s club that depart from traditional use include marketing strategies portraying devil’s club as “Pacific ginseng,” “Alaskan ginseng,” or “wild armored Alaskan ginseng.” In these cases, and on occasion when devil’s club is promoted under its standardized common name, products are marketed on the basis of purported adaptogenic and tonic properties. Suggestions of its use as an alternative to ginseng parallel those of eleutherococcus senticosus Maxim., Araliaceae), formerly called “Siberian ginseng.” Devil’s club is increasingly used as a ginseng substituting in marketed herbal formulas and is considered to have significant potential in U.S. and Asian markets in this role. Although devil’s club is used as a tonic in some traditional medicinal applications (Table 1), its properties as an adaptogen are by no means its most distinct. The belief of some herbalists that devil’s club can be readily substituted for ginseng, with similar effects and benefits, has not been demonstrated empirically. Indeed, devil’s club’s emetic and purgative properties are often what some first-time users highlight when describing their experience with the plant (possibly due to ingestion of relatively high doses). Furthermore, any pharmacological and therapeutic similarities devil’s club shares with ginseng are not well documented, and a number of authors stress that these plants should not be used as if they were the same. Additional applications that are unconnected to traditional indigenous use and appear to have no empirical basis include treatment for hyperthyroidism, for impotence, and as a phytoestrogen.

Another notable divergence between traditional and contemporary commercial applications of devil’s club relates to the plant.
 Phytochemistry and Biological Activity

Phytochemical information on the active constituents of devil's club is somewhat confounded by varying taxonomic treatments of the genus Oplopanax. Most authorities treat Oplopanax as a genus made up of three species: O. elatus Nakai in Russia and Korea;O. japonicus (Nakai) Nakai in Japan; and O. horridus in North America. Throughout this paper we have adopted this treatment and refer to O. horridus in this strict sense when employing the common name devil's club. However, there are other authorities that treat all three as subspecies of O. horridus. Since most research has been conducted on either the Russian or Japanese species (or subspecies) of Oplopanax, with little published descriptive phytochemical work on devil's club, it is unclear if many of the active constituents commonly cited as components of devil's club are actually present in North American devil's club, or only in the Russian and Japanese species. For example, Moore lists nerolidol, torreyol, dodinene, busnesol, dodecenol, cadene, and cerdrol as constituents of devil's club. However, since this research was conducted on Oplopanax elatus [O. horridus ssp. elatus] it is unclear if it is applicable to the North American populations of O. horridus [O. horridus ssp. horridus].

Another group of compounds also commonly cited as constituents of devil's club (O. horridus) are saponins (triterpenoid glycosides). Although a number of triterpenoids have been described from O. elatus and O. japonicus, to date none have been described from North American devil's club. Although it is likely that North American devil's club does contain some of the same compounds as these close relatives, presently the only published report to support this describes glycosidal principles of a possible saponin-like nature. There is also no evidence that devil's club contains a specific group of saponins known as the ginsenosides as is often claimed and used to assert its adaptogenic properties and therapeutic similarity to ginseng. Additionally, none of the saponins described in devil's club relatives O. elatus and O. japonicus are ginsenosides (saponins with dammarane type triterpenoid aglycones). According to Zhuravlev and Kokyada, O. elatus and a larger group of Russian Araliaceae species (including E. senticosus) do not contain ginsenosides, but rather saponins that have aromatic triterpenoid aglycones.

The earliest, and some of the only, published descriptive phytochemical work that has been conducted on the North American devil's club is by Karivone and Morotomi, who described a sesquiterpene (equinopanacene) and a sesquiterpene alcohol (equinopanacol) in O. horridus. In more recent phytochemical investigations on O. horridus, Bloxton et al. reported a number of sterols and four sesquiterpenes, one of which (spatulenol) is novel to the genus. Kobaisy et al. described two novel and three previously described poly-

Like many medicinal plants, devil's club is not currently cultivated in any significant quantity and is almost exclusively wild-harvested.

parts used. Most of the devil's club products currently available commercially, including devil's club teas, tinctures, capsules, and formulas that contain devil's club, contain "root bark" as the main ingredient. "Root bark" is also one of the most common plant parts sold as a crude drug. Unlike the traditional use of devil's club, which primarily involves inner bark of the aerial stems (Table 1), the commercial use of devil's club "root bark" seems to be driven by perceived superior potency of roots. Like the marketing of devil's club under alternate common names that equate it with ginseng, the sale of devil's club "root bark" appears also to be an attempt to highlight devil's club's relationship to ginseng, since the root of the latter is used medicinally. Any therapeutic advantage of the roots over the stem bark, like the marketing of devil's club as a ginseng substitute, appears largely unsubstantiated by research, much of which has been conducted using stem inner bark. Furthermore, the commercial harvesting of devil's club roots in preference to stems has some important conservation implications. Devil's club is a shallow rooting, long-lived, clonal shrub that expands vegetatively through the layering of horizontal, or decumbent stems, and rarely by seedling. Like many medicinal plants, devil's club is not currently cultivated in any significant quantity and is almost exclusively wild-harvested.
enes, one of which (oploandiol) has recently been synthesized.18 These acetylenes all display significant antimycobacterial and antifungal activity49 and most are active against common bacteria such as *Staphylococcus aureus*, *Bacillus subtilis*, *Pseudomonas aeruginosa*, *Escherichia coli*, and *Candida albicans*. These compounds are also active against *Mycobacterium tuberculosis* and *Mycobacterium avium*, both of which can cause significant clinical tuberculosis, particularly virulent in immuno-compromised hosts, AIDS patients being especially vulnerable. Notably, these pathogens are also responsible for the epidemic
status of tuberculosis in Canada’s indigenous population. Since many strains of *M. tuberculosis* and *M. avium* are also resistant to the most commonly used antmycobacterial drugs, there is considerable interest in the potential of devil’s club in tuberculosis therapy. Extracts of devil’s club inner bark also partially inhibit a respiratory syncytial virus.

In other research, immunologist George Luciuk has claimed that devil’s club has anti-microbial effects on upper and lower respiratory tract infections. In related investigations on the Russian species, Me et al. reported that essential oils derived from *O. elatus* show antifungal activity against five pathogenic species: *Microsporum gypseum*, *M. lanosum*, *Trichophyton gypseum*, *T. purpureum*, and *Epidermophyton floccosum*. Aihua et al. also report that *O. elatus* shows anti-mycotic action against a number of common pathogenic fungi. Additionally, a sesquiterpene, a sesquiterpene alcohol, and a sesquiterpene ketone have been isolated from *O. japonicus*; a derivative of the latter is used in Japan in commercial preparations to treat coughs and colds.

**Cultural Concerns and Intellectual Property Rights**

In 1992, signatories to the United Nations Convention on Biological Diversity (Biodiversity Convention) formally recognized the intellectual property rights of the Earth’s indigenous and traditional peoples in Articles 1 and 8j by calling for fair and equitable sharing of any benefits resulting from the sustainable use of biodiversity and traditional and local knowledge. As of September 2003, 187 countries were party to the convention. In the case of devil’s club and many other culturally important plants, it is clear that commercial medicinal applications and research interest in pharmaceutical applications are based directly on traditional knowledge and use drawn mainly from the ethnobotanical record. Consequently there is a clear conflict between current commercialization efforts and articles 1 and 8j of the Convention.

Since Canada is a signatory to the Biodiversity Convention, it is legally and morally bound to uphold all 40 articles. However, despite the obvious conflict between the commercialization of devil’s club in the absence of compensation, and Articles 1 and 8j of the Biodiversity Convention, there are no effective legal means to ensure that the compensation called for in the Convention is provided or negotiated. The concept of copyright and patent protection fundamental to Western intellectual property rights law is designed to protect corporations and individual entrepreneurs and, thus far, has been inadequate to address intellectual property rights that relate to knowledge held in common by one or several cultural groups. In the case of many traditionally used medicinal plants for which detailed ethnobotanical information has been recorded and published, protection of intellectual property rights is particularly problematic. Under current law, traditional knowledge that has been published in the ethnographic literature is considered within the public domain, and consequently as information that is ineligible for conventional intellectual property rights protection. Concern about the lack of protection for knowledge that is now a part of the public domain is described in more detail in the Report of the Royal Commission for Aboriginal Peoples.

Since the United States and four other nations have not ratified the Convention on Biological Diversity, it is also unlikely that the principles expressed in articles 1 and 8j will be used successfully to protect intellectual property rights of indigenous peoples in the U.S. Additional difficu
The summary of traditional uses of devil's club recorded in the ethnobotanical record that is presented here (Figure 2; Tables 1-2) makes the origins of this knowledge unequivocal. Thus, despite the failure of current legal mechanisms to compensate the original users of this plant, current practice is clearly at odds with the ethical framework embodied in the Biodiversity Convention and numerous other international agreements. Are governments where devil's club is harvested and sold commercially ethically and/or legally obligated to ensure that consultation and compensation regarding commercialization is undertaken? Moreover, what are the ethical obligations of harvesters, wholesalers, users, practitioners, journalists, and researchers involved in the commercial use of devil's club and other medicines whose commercial applications are rooted in traditional knowledge?

The bulk of devil's club use in the herbal industry parallels its commonly described traditional uses. However, in many instances it is unlikely that the commercialization of these uses would be considered culturally appropriate. Without consultation it is doubtful that commercial exploitation of a plant of such enormous medicinal and spiritual importance to indigenous peoples would be supported by its original users. Like many culturally important medicinal plants, devil's club is thought by many Indigenous Peoples to lose its healing efficacy if its use is publicized too widely. One of the most striking examples of potentially inappropriate commercialization of devil's club is the web-based sale of ready-made devil's club 'spirit paint.' Given the spiritual importance and sacredness of devil's club and red ochre paint, its sale would likely be seen by many indigenous people as an inappropriate imitation of indigenous knowledge.

Conclusions

Devil's club, a highly significant species for indigenous peoples of western North America, is currently being harvested and marketed as a ginseng-like herbal medicine. Although it is related to ginseng, there is little conclusive research to demonstrate that it has ginseng's adaptogenic and immune-enhancing properties. There is however, extensive phytochemical evidence that supports devil's club's widespread use to treat internal and external infections, in particular its potential to control Mycobacterium spp. It is also commonly reported that devil's club has hypoglycemic properties and as such, it is used by indigenous and non-indigenous peoples alike to treat type II late onset diabetes. However, its efficacy as a treatment for this condition has not been clinically demonstrated. Furthermore, commercial development of devil's club has not been in keeping with the United Nations Convention on Biodiversity and a number of additional international agreements. To date, little or no consultation has been undertaken with the indigenous peoples from whom knowledge of devil's club's properties has been derived, and no provisions have been made for compensation or benefit sharing with the original users of devil's club. Additionally, indigenous peoples and others have raised concerns that commercial harvesting of devil's club, especially the roots, will compromise its ability to persist in some localities within its range. Before the commercial harvest and marketing of devil's club is expanded any further, it is imperative that researchers and promoters work in consultation with the indigenous users of this culturally significant shrub to determine (1) appropriate (e.g., ethical) harvesting methods and applications, (2) active pharmacological compounds, and (3) modes of production that are sustainable and that conform to the
requirements of the Biodiversity Convention and other international protocols. Until these steps have been accomplished, the commercialization of devil’s club is at best problematic.

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There is extensive phytochemical evidence that supports devil’s club’s widespread use to treat internal and external infections.

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Devil’s club Oplepanax horridus. Photo ©2004 Trevor Lantz.
Describes various medicinal uses and historical significance of Devil's Club (Oplopanax horridus). Includes information on its cultivation and potential for traditional and modern medicinal practices. Also mentions the name of the plant in different languages and its traditional uses. The text concludes with a list of references for further reading.


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