Wilaat Hooxhl Nisga̲'ahl [Galdoo'o] [Ýans]:
Gik'uuhl-gi, Guuń-sa g̲anhl Angoog̲am̓
Using Plants the Nisga̲'a Way: Past, Present and Future Use

By

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Wa'ums – devil's club – *Oplopanax horridus* (Sm.) Miq.

Family: Araliaceae (Ginseng family)

Oplopanax horridus is widely distributed along the Northwest Coast and interior on moist sites, especially on well-drained seeps, throughout Nisga'a traditional territory, from the lowlands to the subalpine.

Food Use

No information was reported or recorded for the Nisga'a use of **wa'ums** for food. The Tlingit of Alaska and the Oweekeno people, whose traditional territory is near Rivers Inlet on the southern coast of BC, ate the spring buds and young stems (Greene 1896; Compton 1993, pg. 85).

Medicinal Use

Wa'ums continues to be highly regarded for medicinal purposes by many Nisga'a across the generations. Every collaborator with whom this plant was discussed knew of at least one medicinal use and many others, young and old, knew its name and that it was an important plant, even if they didn't know the specifics of its use.

One collaborator recalled rules for harvesting **wa'ums** which show how important the plant was to the Nisga'a, as well as the spiritual attitude necessary when harvesting the powerful medicine.

> *You gather four at a time ... but if you take only one, you cut it in four. That's the way we do it ... if you take one you chop it in four. It's got those knots on it where the branches are coming out ... that's where you chop. Just like your limbs ...When you drink this* [medicine prepared from **wa'ums**] *you drink it for four days ... and if you don't feel that good, when another four days is over ... you start it for another four days if you don't feel better* (Sigidimnak' K'igapks – Alice Azak 2007).

Two people mentioned the importance of focusing your mind and body on getting well and not telling others that you were having treatment with **wa'ums** in order for the medicine to work well.

Nineteen people recalled various uses for **wa'ums**, alone or mixed with other medicines. Thirteen people recalled that the stems were used for medicine, first by scraping off the spines. Six people said you could use either the roots or stems. Jeff Benson (2008) recalled that his Grandmother, Agnes Benson, taught him that only the roots should be used, unless you could find a stem without spines, but if you have to harvest in the summer, the root alone should be used.

Eleven people commented that **wa'ums** is meant to be harvested only after the leaves have fallen off in fall and winter. Sigidimnak' Ẃii Ts'iksna'aks (Pauline Grandison 2008) said "it could be picked when the leaves were off and could be picked [throughout the winter] until the leaves opened up again."

Three people said that it was important to wait until the plant had finished flowering before harvesting. One said the medicine is stronger, one said that the smell could overpower you and knock you out, and one said the medicine would be bitter if you picked it when it was flowering. Two people were told that the berries were poisonous.

Generally people said that they preferred to harvest **wa'ums** stems that were tall and straight, about an inch or two in diameter, but said that these were hard to find. One person said it was good to look for an orphaned or lone plant called **neek'im wa'ums** and that he preferred orphans facing north (Sim'oogit Hayḿaas – Chester Moore 2008). Straight big stems were preferred because they make better medicine and are easier to collect and clean (Sigidimnak' K'igapks 2009).

For both external and internal use, preparation was generally described as boiling, despined stems or simmering the roots or shoots in water alone or with other medicinal plants. Parts used were either steeped or boiled until they turned a suitable colour. The suitability of colour was a personal preference. One person said that he prepared the medicine by simmering the roots for 16 hours. Two people said that the roots or stems can be dried, ground or chopped (Sim'oogit Ni'isjoohl – Horace Stevens 2007; Sim'oogit Gadim Galdoo'o – Charles Alexander 2008). One person described how "the old people used to put stems in a cloth and bang it to make the medicine stronger, then they put it in water (Sim'oogit Ni'isjoohl – Horace Stevens 2007).

Abdominal Disorders: Two people said that a decoction made from devil's club stems and/or roots was used as an emetic to clean out the system.

Arthritis/Rheumatism: Six people said that **wa'ums** was used to treat arthritis. Four of them said that they personally use the medicine for arthritis today; two prepared it for other people as well. Whether or not it was mixed with other medicinal plants depended upon personal preference and whether the appropriate ingredients were available. One person said that:

> *A mixture of* ***wa'ums, tiim laxlax'u*** [Labrador tea – *Rhododendron groenlandicum*], *mint leaves* [*Mentha arvensis*] *and cloves* [the exotic spice, *Syzygium aromaticum*, sold in grocery stores] *was taken as a drink to treat arthritis* (Sim'oogidim Sigidimnak' – Lavinia Clayton 2008).

Sim'oogidim Sigidimnak' said that in the modern day she only mixes it with **tiim laxlax'u** for arthritis. The inclusion of the exotic cloves in this treatment for arthritis means that this particular concoction was made only after first contact. Just when cloves became available in the Nass Valley needs to be pursued. It is likely that its inclusion in the medicine began in the late 19th century or sometime in the last 100 years, when this spice was more widely available.

Cancer: Three collaborators said that **wa'ums** is used for treating cancer. They could not say with certainty if it was used in the past for this illness or if this was just a modernday use. One person said that he had personally used it to treat his prostate cancer and two people said they make the cancer medicine now for others. Both said that they preferred to mix it with with **ts'ak'a aam** (licorice fern – *Polypodium glycyrrhiza*) or **haxwdakw** (Pacific yew – *Taxus brevifolia*) but that it could be used alone too.

Chest Conditions: One person said that **wa'ums** was good for asthma**.**

Eye Disorders: One person said that taking **wa'ums** was good for your eyesight, especially important when hunting.

Miscellaneous Use: Sigidimnak' K'yaks Sgiihl Anluuhlkw Psday (Deanna Nyce) recalled the following for treating her hyperactive thyroid:

> *"Harry and I came home from university for a visit. Always on our agenda was to stop by and visit Granny and Ye'e Gosnell. During the course of our sharing our family news with her, I told her about*

> *my hyperthyroid issue. She went to the fridge and brought me a drink of* ***wa'ums****. I remember it having a refreshing sweet taste. I was grateful. When we returned to Vancouver and a subsequent visit to the doctor I was removed from the thyroid medication as I no longer needed it."* (pers. comm. 2011).

One person said that he had heard of someone treating a liver disorder with **wa'ums.** Two people said that it was used as a deodorant to neutralize the human scent when hunting and fishing. One person said that it was used as an aphrodisiac.

Skin Disorders: One person said that a concoction with **alda** (*Abies* sp.) or a decoction of **wa'ums** alone was added to a bath to cure and soothe external sores on the body.

Tonic: Five people said that **wa'ums** was used for a general tonic to keep you healthy or to pick you up when you're feeling run down. Two people said today it is used by sports teams when they want to be strong before an important game. One of them said that people take devil's club in capsules, made locally or available in health food stores.

Unspecified Illness: Thirteen people said generally that **wa'ums** was used to treat all kinds of disorders and that "it was good for almost everything." Sigidimnak' Axdii Ksiiskw (Grace Nelson) described its use as follows:

> *When I first got married in 1938, I learned that the devil's club was very valuable for the lives of all, for medicinal purposes. My mother-in-law prepared it for any kind of pain in the body, although we do not know how to do this, we witnessed it being prepared but had no idea this was important. There were very few who knew how to cook the devil's club"* (2008).

Wa'ums was and continues to be widely used for a variety of medical conditions by First Nations throughout the province (Turner and Efrat 1982; Emmons 1991; Compton 1993; Pojar and MacKinnon 1994; Nisga'a Tribal Conncil 1995, Vol. IV, pg. 88; Boston et al. 1996; Lantz 2001; Turner 2004a; Gottesfeld 1992; Johnson-Gottesfeld 1994; and others).

Spiritual/Ceremonial Use

Two people said that in the past people bathed in **wa'ums** before hunting or fishing because it brought good luck. Sim'oogit Gadim Galdoo'o described in detail how it was used in preparation for hunting.

> *We use it for when we go hunting, for a bath....**sisatkw** we call it. You know my grandfather doesn't sleep with my grandmother when he goes hunting. He sleeps alone and in the morning he takes the **ts' iks*** [false hellebore – *Veratrum viride*] *that he dries in winter and he takes the **wa'ums** ...you scrape the bark off it and he builds a fire, takes a bath, way out there somewhere in the bush* [with the **ts'iks** roots] *where no one is going to see him. When he finishes he puts **wa'ums** stems on top of the fire, when it starts to steam, that's when he breaks it and he wishes over it and it always comes true ... you break it open in your mouth. It's the most powerful ... it's called **sisatkw** ... to make you lucky* (2008).

Today, **wa'ums** continues to be widely used for spiritual purposes by many Nisg̲a'a – fourteen people described such use, using the stems with spines removed. Six people said that they put the stems around the house for good luck and eight people said they put stems around the corners of each room in their homes to keep bad spirits away. Sigidimnak̲' W̓iit'ax̲ An'un (Belinda Robinson) described a slight variation:

> *... the stems with the spines on, we put them on the stove until it's really hot, then we take the smoking stem around the house to get rid of bad spirits* (2008**).**

Sigidimnak̲' Hagwilook̲'am saxwhl giis (Irene Seguin) described several recent uses of **wa'ums** for spiritual purposes. She made bracelets from small pieces of the hollow stems to give as gifts at the Stone Moving Feast for her brother Malgak̲skw (Peter Squires). She and her sister ceremonially washed their gillnetter boat "Nishga Girl" with a decoction of **wa'ums** before they donated it to a museum.

Technological Use

One person recalled that his father would soak **wa'ums** stems in water for about a week, then wash his fishing nets with the water to neutralize the human scent. One person said that **wa'ums** was used to take bad smells from places or things. For example, it can be used to remove the smell of smoke damage after a house fire. Two people said that they burn **wa'ums** stems on their wood stoves to make the house smell nice.

There were no recollections of technological use in the Nisga'a literature and only one use for technological purposes by other northwestern nations. The Tlingit burned the whole devil's club plant, and used the ashes mixed with water to make a black dye (Osgood 1937, pg. 118). Other nations to the south used the spiny stems to spear octopus and carve fishing lures (Turner and Efrat 1982; Turner 2001a).

Oplopanax horridus has been the focus of many research trials in recent times, prompted primarily by its importance to indigenous cultures for generations (McCutcheon et al. 1992; Lantz et al. 2004a). Research results suggest that the inner bark of devil's club has properties that inhibit the growth of certain bacteria and fungi that cause a variety of illnesses (e.g., tuberculosis and fungal pneumonia; McCutcheon et al. 1994, 1997; Kobaisy et al. 1997). More recent studies suggest that devil's club may have an effect in preventing the further growth of several types of human cancer cells as well as benefits as a tonic and for the treatment of arthritis and rheumatism (Tai et al. 2006; Li et al. 2010; Tai et al. 2010). Dr. Tai's research with respect to the effectiveness of devil's club in the treatment of adult-onset diabetes is not strong to date (Tai, pers. comm. 2011), however other trials suggest that devil's club is hypoglycemic (lowers blood sugar) and so would be potentially useful in the control of diabetes (Small and Catling 1999).

Ts'ak'a tyaýtkw, or **ts'ak'a ts'inhlik'**[26] – beaked hazelnut – *Corylus cornuta* Marsh.
Family Betulaceae (Birch family)

Nisg̲a'a word meaning: literally 'dish of thunder' or 'dish of squirrel'

Corylus cornuta is scattered throughout Nisg̲a'a traditional territory at low to middle elevations on moist to mesic sites. Two collaborators living in Gingolx said that this species was not found in their area.

Food Use

Four people recalled that hazelnuts were eaten. One person described coming home from school and eating the nuts if they could get them before the squirrels. For this reason, they were sometimes referred to as **ts'ak'a ts'inhlik** (denoting nuts for squirrel)

[26] from Sigidimnak̲' Ẃii Ts'iksna'ak̲s (Pauline Grandison).

4.6.1.3. *Oplopanax horridus* (devil's club)

Devil's club is found on all the territories in the study region, but is evidently most dominant in the ICH on Gitxsan traditional territory (36%) and in the CWH on Tsimshian territory (28%) (Figure 4.5, Table 4.3). Results also show that collections were almost equally distributed in the ICH and CWH (43%) (Table 4.4). Devil's club is found in all biogeoclimatic zones, with its province-wide modal abundance in the ICH and its next most abundant representation in the CWH (Klinkenberg 2012). It is considered an indicator species of wet to very wet conditions in the CWH (Klinka et al. 1989) and it is diagnostic of nutrient-rich, wet sites in all treed biogeoclimatic zones south of the boreal region (Banner et al. 1993).

It might be expected that the data would show that there is more devil's club on Haida territory because their traditional territory is almost exclusively CWH (96%) (Table 4.2). However, there are more collections of this species on Tsimshian territory (Table 4.3), probably reflecting better access and more complete sampling on the mainland that constitutes the CWH zone on Tsimshian territory, compared to the islands of Haida Gwaii and southern Alaska.

Devil's club was and still is used for medicinal and spiritual purposes by all the nations included in this study, and people prepared the stems and/or roots in similar ways for medicinal use (Smith 1929; Emmons 1991; Johnson 2006; Turner 2004; Turner and Thompson 2004). In fact, it is widely used by more than 38 linguistic groups across northwestern North America for over 34 different purposes (Lantz et al. 2004). All Nisga'a collaborators were familiar with the name and with many uses for this species. Many people use it today as medicine for specific illnesses, as a general tonic and for spiritual purposes (Chapter 2; Nisga'a Tribal Council 1995, Vol. IV). General medicinal uses are summarized in Chapter 4 and in Lantz et al. (2004). There is limited information on its use for food or technological purposes. The Tlingit ate the early spring shoots for food and burned the whole plant as material for dye (Greene 1896; Osgood 1937) and the stems were used for fish lures and octopus sticks by the Haida and the Nitinaht of Vancouver Island (Turner et al. 1983; Turner 1998; 2004).

The Nisga'a, Gitxsan and Tsimshian have cognate words for devil's club: **wa'ums** (in Nisga'a), **wa'umst** (in Gitxsan), and **wooms** (in Tsimshian). The Haida have the same word in all dialects: **ts'iihlanjaaw** (or variants). The word **ts'iihl** translates to "gambling stick" in Haida (Turner 2004). It is unclear if these sticks would have been used in playing the game or if they were used as lucky charms when gambling or both (Turner 2004).

The Tlingit have two words for devil's club (**s'axt'** and **áchta**) which may be regional variations of the same word. Similarly, the Tahltan have two words (**khos chö** and **xwvs choo**) which are also likely regional variations of the same word. This word translates to "big spine" (or thorn), a general term in Athapaskan languages, also sometimes applied to wild rose (Turner pers. comm. 2012).

Despite the similarity in use, the Haida, Tlingit and Tahltan clearly have developed their own terms for devil's club. The fact that this species exists on all their territories but that the names are different could indicate that its use was fully engrained in each culture independent of their contact with each other, and that each nation had their own term for what was considered a powerful and important plant. However, since medicinal preparation and uses are so similar, it is likely that the many uses for this plant were frequently discussed and refined during trade or other types of cultural exchange.

4.6.1.4. *Shepherdia canadensis* (soapberry)

Soapberry is primarily an interior species (Figure 4.6), most abundant in the BWBS (41%) and the ICH (29%), with the proportions collected in the SBS, SWB, ESSF, BAFA and MH ranging from 1% to 9% (Table 4.4). The fact that no collections have been made in the CWH suggests that the desirable fruit of this species would not have been locally available to coastal communities. However, the data are not consistent with those reported in E-Flora BC, which shows it as present in all biogeoclimatic zones with greatest abundance in the SBS followed by BWBS > ESSF > ICH. This difference may be due to the fact that the modal distribution reported in E-Flora is based on its provincewide distribution, rather than the distribution for the study area alone. Alternatively, in the study area, there may have less sampling in the SBS, BWBS and ESSF zones.

Soapberries are widely used by First Peoples in British Columbia and adjacent US states to the south (Washington, Oregon and Montana) for food and medicinal purposes

Chapter 5

Prospects for Sustainability of *Oplopanax horridus* (Wa'ums), an Important Ethnobotanical Resource in the Nass Valley

> *And the girl asked: "Who are you who is so good to us?"*
> *The young man replied: "I have been sent by my father who is the Chief of* ***Wa'ums*** *... he heard the crying of the old lady and sent me to teach you the way of* ***wa'ums*** *... which you find all over this country ... it is really a valuable plant and has many uses which will bring good fortune to all that use it ... as well as good health ...* (Charles Ryan 1929).

> *This is the most used plant of our nation* (Sim'oogit Hleek – Dr. Joesph Gosnell August 2008).

> *There are certain ones you are supposed to look for and they have to be straight and the longer the better. You are supposed to thank the creator before you get it ... get down and talk to the plant before you take it and* [say] *what you're going to use it for* (Sigidimnak' Hagwilook'am saxwhl giis – Irene Seguin 2008).

> *A guy, years ago, it was in the early 1900's, I guess ... a guy went into a bush on the island and he found one huge* ***wa'ums****, about a foot across. Yeah, the old man knew about it and he didn't want to leave it and he only had a knife and he sat there all day cutting it with a knife. He didn't leave it and he was really lucky after that because* ***wa'ums*** *brings you luck* (Sim'oogit Ni'is Naganuus – Steven Doolan 2008).

5.1 Introduction

Oplopanax horridus (Sm.) Miq. (devil's club)[1] has long been an important plant to First Nations people in northwestern North America wherever it is found (Smith 1929; Smith et al. 1973; People of 'Ksan 1980; Turner 1982, 2004; Gottesfeld and Anderson 1988; Gottesfeld 1992, 1994; Johnson 2000; Lantz 2001; Moerman 2002, 2009; Lantz et al. 2004). It was, and continues to be, used for medicinal and spiritual purposes. More than 34 broad categories of medicinal use and eight categories of spiritual use of devil's club have been distinguished from across 38 linguistic groups of northwestern North America (Turner 1982; Lantz 2001; Lantz et al. 2004).

Devil's club is found throughout northwestern North America from coastal Alaska southward to central Oregon and eastward to the Yukon, northeastern British Columbia, northwestern Alberta, Montana, and Idaho (Hitchcock and Cronquist 1961; Viereck and Little 1972; Voss 1985; Lantz et al. 2004). There are also several disjunct populations near Lake Superior in Michigan and Ontario (Hitchcock and Cronquist 1961; Viereck and Little 1972; Voss 1985; Lantz et al. 2004). It is a shade tolerant understory shrub associated with very moist, nitrogen-rich sites in semi-open mature and old-growth forests, on water-receiving floodplains, in well aerated seepages, along stream edges, water-collecting sites and even occasionally on water-shedding sites if soils are calcareous[2] (Klinka et al. 1989; Beaudry et al. 1999; Lantz et al. 2004). Young foliage is often damaged by late frosts but plants regenerate quite well; they are fully hardy in winter (Leśnej et al. 2006). Devil's club stems are upright to decumbent and can reach heights up to 6 metres (Roorbach 1999; Lantz 2001; Lantz et al. 2004). The leaves are large (up to 35 cm across) 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 long. The flowers are small and whitish, in terminal pyramidal clusters, and ripen to shiny, flattened, bright red berries. Devil's club forms large sprawling clones that expand laterally through the rooting of decumbent stems, which tend to develop when tall plants

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[1] Synonomy: *Echinopanax horridus* (Sm.) Decne. & Planch. ex Harms, *Fatsia horrida* (Sm.) Benth. & Hook. f. ex W.H. Brewer & S. Watson. Synonomies from E-Flora BC. Available at: http://linnet.geog.ubc.ca/Atlas/Atlas.aspx?sciname=Oplopanax%20horridus. Viewed on Nov. 7th 2011. A complete botanical description and distribution of this deciduous shrub can be found on E-Flora.

[2] Calcareous soils are alkaline soils with a high pH, generally formed from the weathering of sedimentary rock with a high calcium carbonate content.

topple and put the stem in contact with the soil. The growth behaviour of devil's club is such that it likely achieves a maximum height of 4-6 metres, after which stems collapse and become recumbent and may or may not retain the root stalks as the recumbent stems sprout adventitious roots to initiate what appear to be new individuals (Lantz 2001).

5.1.1. Traditional Use of *Oplopanax horridus* in the Northwest

Northwestern coastal nations have ancient oral histories with respect to the use and power of devil's club and how it first came to be known as a potent plant with a variety of uses (Ryan 1929). It has a wide variety of medicinal purposes (Table 5.1). The first written record of its use for medicinal purposes in the Northwest is from 1842. The records of Eduardo Blaschke, chief physician for the Russian American Company, described the use of devil's club ashes mixed with the resin of conifer trees as a treatment for sores (Blaschke 1842, pg. 74). In 1888, Emmons described the Tlingit use of devil's club for treating wounds, infections and sprains (Table 5.1) (Emmons 1991).

The medicine is generally made from the inner bark, although some people prefer to use the roots alone or a combination of bark and roots. The medicine prepared is used both in external and internal medicinal preparations. For external use, the inner bark and/or roots is made into poultices and applied directly to an ailing or injured area of the body. For internal use, a drink is made by simmering the bark and/or roots. Table 5.1 lists some medicinal uses for devil's club by First Peoples in northwestern BC and neighbouring Alaska.

Spiritually, devil's club was used in purification rituals before hunting and fishing to bring good luck and to mask the human odour, and (in ceremonial rituals) to ward off evil. First Nations also developed technological uses for parts of the plant. The woody stems were cut into segments and used to make fishing lures; whole stems were made into spears, and the berries, bark shavings and charcoal were used for dye and as pigment for facepaint (Turner et al. 1982, 1983; Gottesfeld 1992; Compton 1993; Moerman 2002). There are few references to its use for food but early spring buds were boiled and eaten by some people (Compton 1993).

Table 5.1. Examples of medicinal uses for *Oplopanax horridus* by peoples living in northwestern British Columbia and adjacent Alaska.

		Cough,	Purg.,			Preg.,		Derm.,			Arth.,		
Nation	Chest	colds	Emetic	Gen.	Ulcer	birth	cancer	cuts	Absc.	Tonic	Rheu.	Diab.	STD
Nisga'a	√	√	√	√		√	√	√	√	√	√		
Carrier				$\surd_{6}$		$\surd_{10}$					$\surd_{6}$		
N. Carrier			$\surd_{10}$	$\surd_{10}$									
S. Carrier						$\surd_{10}$							
Gitxsan	$\surd_{10}$	$\surd_{4}$	$\surd_{4}$	$\surd_{10}$	$\surd_{10}$		$\surd_{4}$	$\surd_{4}$		$\surd_{4}$	$\surd_{10}$	$\surd_{4}$	$\surd_{10}$
Tlingit	$\surd_{2}$		$\surd_{2}$	$\surd_{2}$				$\surd_{2,6}$	$\surd_{2}$		$\surd_{6}$		$\surd_{2}$
Wit'suwit'in	$\surd_{4}$		$\surd_{4}$				$\surd_{4}$	$\surd_{4}$		$\surd_{4}$	$\surd_{4}$	$\surd_{4}$	
Haida			$\surd_{8}$	$\surd_{6,8}$	$\surd_{6}$		$\surd_{6}$	$\surd_{12}$	$\surd_{8}$		$\surd_{,6,,12}$		$\surd_{8}$
Tahltan				$\surd_{1}$									
Tsimshian	$\surd_{8}$	$\surd_{8}$	$\surd_{3}$	$\surd_{8}$			$\surd_{8}$				$\surd_{4}$		$\surd_{8}$
Gitga'at	$\surd_{13}$	$\surd_{13}$	$\surd_{13}$	$\surd_{13}$				$\surd_{9}$		$\surd_{13}$	$\surd_{13}$	$\surd_{13}$	
Tainina	$\surd_{7}$	$\surd_{7}$	$\surd_{7}$	$\surd_{7}$					$\surd_{7}$	$\surd_{7}$			
Aleut								$\surd_{11}$*			$\surd_{11}$*		

References: 1 = Emmons$_{1}$1911, 2 = Emmons 1991, 3 = Garfield and Wingert 1966; 4 = Gottesfeld 1994; 5 = Hebda et al. 1997; 6 = Justice 1966; 7 = Kari 1995; 8 = McGregor 1981; 9 = Port Simpson Curricular Committee 1973; 10 = Smith 1929, 1997; 11 = Smith et al. 1973; 12 = Turner 2004; 13 = Turner and Thompson 2006. *= external applications

Key to abbreviations: Purg. = purgative; Gen. = general; Preg. = pregnancy; Derm. = dermatological Absc = abscess; Arth.,Rheu. = arthritis and rheumatism; Diab. = diabetes; STD = sexually transmitted disease.

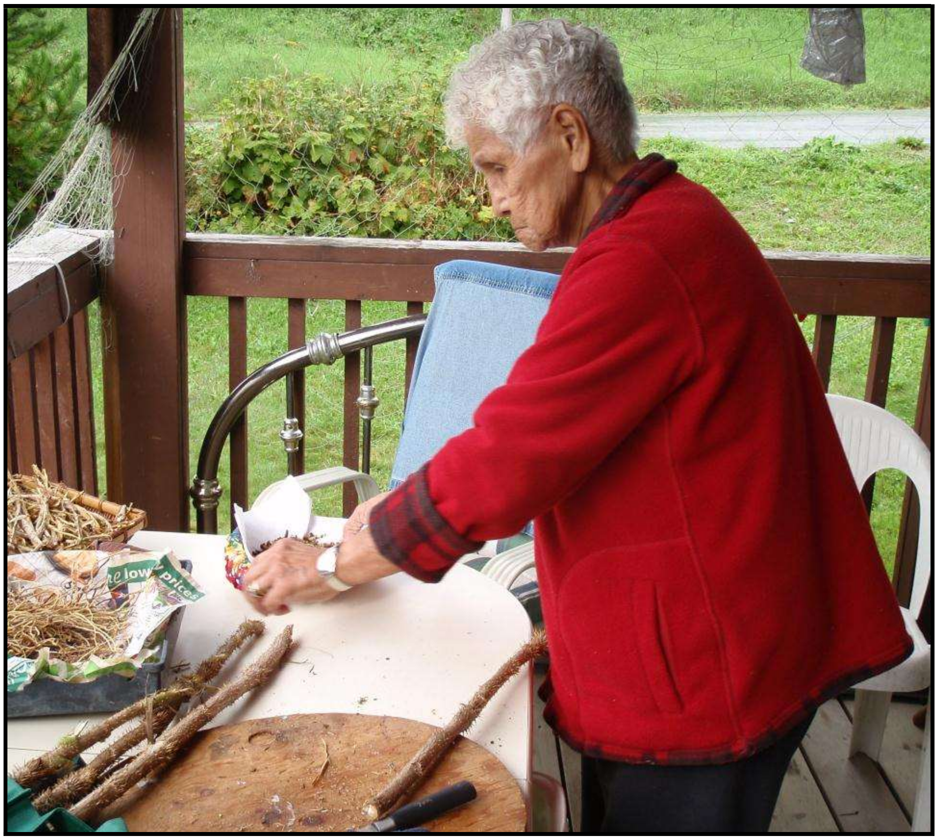

Figure 5.1. K'igapks preparing the inner bark of **wa'ums** for medicinal use.

5.1.2. Nisga'a Use of *Oplopanax horridus* (Wa'ums)

Wa'ums, as devil's club is called in Nisga'a, is highly regarded by most Nisga'a and is used for a variety of medicinal, spiritual and cleansing purposes. In 23 interviews, all collaborators recalled the name for this plant, could easily identify it and knew of some medicinal and/or spiritual use for the stems or roots of the plant. Some prepare medicine for themselves or for others from the stems or roots (Figure 4.1) (Sigidimnak' K'igapks – Alice Azak 2007, 2008; Benson 2008; Sigidimnak' Hlgu Wilksithlgum Maaksgum Hlbin – Emma Nyce 2009). Many young people as well could identify **wa'ums**, knew its Nisga'a name and believed that it was a powerful plant (Calder 2008; Myrle Grandison pers. comm. 2008; Mansell Griffin pers. comm. 2008; Lena Azak pers. comm. 2009). People of all ages continue to hold the plant in high regard, although not all were necessarily aware of specific uses or methods of preparation. The medicinal and spiritual uses for **wa'ums** are detailed in Chapter 2.

Some collaborators stated that tall, straight devil's club stems are preferred because they make the best medicine. There was a general consensus that in the fall, when leaves are turning brown and the flowers are gone, is the best time to begin harvesting **wa'ums** (Sigidimnak̲' Ẃii Ts'iksna'ak̲s – Pauline Grandison 2008; Sigidimnak̲' Hlgu Wilksithlgum Maaksgum Hlbin – Emma Nyce 2008; Sigidimnak̲' K'igapks – Alice Azak 2008; Sigidimnak̲' Alisgum X̲sgaak – Diane Smith 2008). One person said that if you are going to harvest it at other times, you should be sure to use the roots (Benson 2008). Stalks can be harvested throughout the winter, so long as the stems are upright and not frozen or under snow (Sigidimnak̲' Ẃii Ts'iksna'ak̲s – Pauline Grandison 2008).

As recounted in Chapter 2, the Nisg̲a'a prepare a decoction or infusion of the inner bark and/or roots of **wa'ums** alone or mixed with other medicinal plants to make medicine for a variety of ailments (Benson 2008; Sigidimnak̲' K'igapks – Alice Azak 2008; Sim'oogit Gadim G̲aldoo'o – Charles Alexander 2008). They also use a decoction of bark and/or roots of **wa'ums** to wash the body in preparation for hunting and fishing to cover the human scent (Sim'oogit Gadim G̲aldoo'o 2008; Sim'oogit Hleek̲ – Joseph Gosnell 2008), and for a variety of other spiritual purposes such as bringing good luck and protecting against evil (Sim'oogit Gadim G̲aldoo'o 2008; Sigidimnak̲' Hagwilook̲'am saxwhl giis – Irene Seguin 2008; Sigidimnak̲' K'igapks 2007, 2008). In addition, the outer bark and/or whole stems (with thorns attached) are put in the corners of dwellings, around windows and near doors to drive out bad sprits and bring good luck to the home. Bark is also burned on the tops of wood stoves so that the powerful odour will bring forth feelings of peace and harmony to the dwelling and its inhabitants (Sigidimnak̲' Hagwilook̲'am saxwhl giis 2008).

For millennia, **wa'ums** has been harvested at many locations throughout Nisg̲a'a territory. Many individuals, families and **wilps** (houses) had treasured collection areas, typically in mature and old-growth forests, where year after year they went to harvest stems of devil's club. Over the last 50 years however, there has been active commercial logging in the Nass Valley, disrupting many of the old **wa'ums** collection sites. While some feel that there is "lots of **wa'ums** around if you know where to look ... especially in the valley bottoms" (Sim'oogit Hleek̲ – Dr. Joesph Gosnell 2008), others have expressed concern that there is no longer as much available, and that logging is permanently destroying optimum devil's club habitat and inhibiting the regrowth of healthy stems (Anonymous 2008-2009[*]; Benson 2008).

[*] Personal communication during incidental discussion; some of the people who expressed this concern wish to remain anonymous.

5.1.3. *Western Research Trials of* Oplopanax horridus *(Devil's Club)*

Prompted primarily by its importance to indigenous cultures for thousands of years, devil's club has become the focus of research in recent times (McCutcheon et al. 1993; Lantz 2001; Lantz et al. 2004).

According to Lantz et al. (2004), research on the phytochemical basis for the active ingredients of devil's club is confused somewhat by the fact that three distinct taxa are recognized and accepted by the World Checklist of Selected Plant Families (WCSP[3]) as belonging to genus *Oplopanax*[4]. However, other authorities treat these three species as subspecies of *O. horridus*. This variation in nomenclature, coupled with the use of the common name "devil's club" for all three species or subspecies, can lead to confusion when interpreting research results related to the medicinal potential of North American devil's club. Although comparisons of medicinal effectiveness of these three species don't seem to have been made, it would be important to understand which species or subspecies of devil's club is involved in any given study. Unless otherwise noted in this chapter, research results refer to the species found in North America, *Oplopanax horridus* (Sm.) Miq.

The active ingredients contained in the inner bark of devil's club have been found to inhibit the growth of certain bacteria and fungi that cause a variety of illnesses, e.g., tuberculosis and fungal pneumonia (McCutcheon et al. 1994, 1997; Kobaisy et al. 1997). More recent studies suggest that devil's club may have an effect in preventing the further growth of several types of human cancer cells, and has benefits as a tonic and for the treatment of arthritis and rheumatism (Tai et al. 2006; Xiao-Li et al. 2010; Tai et al. 2010). Dr. Tai is also conducting research with respect to the effectiveness of devil's club in the treatment of adult-onset diabetes but said that results to date are not conclusive (Joseph Tai pers. comm. 2011). However, research suggests that devil's club is a hypoglycemic (lowers blood sugar) and so could potentially be useful in the control of diabetes (Small and Catling 1999).

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[3] WCSP is an international collaborative programme that provides the latest peer-reviewed and published opinions on the accepted scientific names and synonyms of selected plant families. It allows one to search for all the scientific names of a particular plant, or the areas of the world in which it grows (distribution). Available at: http://apps.kew.org/ See also: http://www.theplantlist.org/browse/A/Araliaceae/Oplopanax/

[4] These include *Oplopanax elatus* (Nakai) Nakai (of Russia and Korea), *O. japonicus* (Nakai) (in Japan) and *O. horridus* (in North America).

used to interpolate the number of years after logging required for devil's club to reach some preferred size thresholds (in this study, 2.5 cm in basal diameter). All regression analysis was conducted using SAS procedure REG (SAS Institute 2004).

Visual inspection of scattergrams plotting plant size against clearcut age revealed the possibility for some sharp thresholds or categorical differences in the size of devil's club in stands of different ages. Although sampling was not designed to test for thresholds in devil's club performance among stand age classes, analysis of variance (ANOVA) was used to better define the existence and location of any categorical differences. Separate ANOVA runs were conducted for stand means of each of the above attributes to evaluate variation among:

- those stand ages for which more than one cutblock was sampled (and treating both old-growth sites as approximately equal in age);
- four stand age classes, with individual sites grouped by decadal intervals, as ages <10 years, 10-19 years, 20-40 years, and old growth (>250 years old);
- three clearcut age classes, with individual sites grouped by decadal intervals as <10 years, 10-19 years, and 20-40 years; and
- two clearcut age classes, <10 years and >10 years since logging.

These broad age classes were required, rather than testing among individual stand ages using ANOVA, in order to have at least two replicate stands in each age class. In these analyses, SAS procedure GLM was used for the ANOVA because the same number of stands was not sampled for all stand ages. When ANOVA results revealed a significant effect ($p<0.05$), a Tukey post-hoc multiple comparison test (an option in SAS procedure GLM; SAS Institute 2004) was conducted to identify significant differences among stand ages and/or stand age classes.

The analyses revealed high variability in stem sizes among and within the sites sampled. Therefore, the sources of this variation were further evaluated for the stems growing in clearcuts. Factors tested in one-way ANOVAs included simplified site moisture regime (mesic vs. hygric), shading (shaded or open), aspect (S vs. other directions or flat conditions), evidence of fire (present or absent), and the presence or absence of 27 individual indicator plant species (Klinka et al. 1989). That is, separate one-way ANOVA runs were used to test the variation of devil's club stem diameter (for example) growing on mesic sites compared to hygric sites, in the shade or in the open, and so on.

5.5. Results

5.5.1. *Overview*

Generally, it was not difficult to find devil's club growing in stands of all ages. Living stems were especially prevalent on sites with no evidence of fire (96% of stems sampled)[7], with northerly aspects (74% of stems sampled), on moist or mesic sites (87% of stems sampled), and in nearly equal numbers on sites with and without shade from other vegetation (54% and 46 % of stems sampled, respectively). Dead devil's club stems were observed on a number of sites. Living stems on all sites were either not disturbed during logging or had resprouted from damaged stems since logging. Such survival is to be expected, provided logging practices (e.g., slash burning) don't affect the health of the forest floor to the extent that regrowth and clonal expansion of devil's club stems is inhibited (Lantz 2001).

Stem diameter, length and bark area were all significantly correlated, with diameter a good indicator of the estimated amount of bark available (Table 5.3). Table 5.4 presents the mean stem diameter, stem height and estimated bark area of devil's club for each of the sites (16 sites ranging in age from 3 to 37 years since logging and two old-growth stands with nominal ages of 295 or 296 years). The largest stems with the most material with which to make medicine came from a stand 11 years old (Gitwinksihlkw 12). The means and standard errors of diameter, length, and estimated bark area for these stems overlapped with those found in the old-growth stands near Gingolx. The smallest stems were from a stand that had been logged 3 years earlier (Kitsault 17).

Table 5.3. Correlation of individual stem attributes (n=180).

Stem Attribute	Diameter	Length	Bark area
Diameter	r=1	r=0.765, p<0.0001	r=0.933, p<0.0001
Length		r=1	r=0.899, p<0.0001
Bark area			r=1

[7] i.e. only 4% of the stems sampled showed evidence of fire.

Table 5.4. Mean and standard error results for devil's club stem diameter, height and usable bark area for individual stands ordered by age.

Location ID	Stand age	Stems measured	Mean diameter	Standard error	Mean height	Standard error	Mean bark area	Standard error
	(yrs)	(number)	(cm)	(cm)	(cm)	(cm)	(cm^2)	(cm^2)
Kitsault 15	3	10	1.68	0.07	41.7	6.5	180	31
Kitsault 16	3	10	1.30	0.08	24.1	3.1	82	16
Kitsault 17	3	10	1.18	0.12	21.7	4.3	77	25
Ksedin 5	5	11	1.25	0.23	31.8	9.5	236	71
Kwinhak 2	5	10	1.49	0.14	51.2	6.1	204	38
Gitwink 11	11	10	2.57	0.20	121.1	4.1	780	65
Gitwink 12	11	10	3.29	0.27	135.9	5.7	1136	121
Gitwink 13	11	10	2.57	0.17	131.7	4.3	854	68
Gitwink 14	11	10	2.33	0.19	119.6	10.0	728	112
Beaupre 8	14	10	1.46	0.15	81.9	9.6	330	68
Beaupre 7	16	10	1.69	0.20	78.1	10.0	372	92
Ksedin 3	17	10	2.38	0.41	84.1	12.6	612	201
Kwinhak 4	17	10	1.54	0.20	85.6	9.8	371	82
Ksedin 1	18	10	1.35	0.10	41.5	4.2	145	20
Beaupre 6	20	10	1.43	0.11	59.0	4.1	219	34
Beaupre 9	37	10	1.71	0.15	42.5	5.6	196	40
Gingolx	295	10	2.67	0.29	88.9	10.7	639	105
Gingolx 2	296	9	2.30	0.19	64.6	2.5	471	48

5.5.2. *Regression Results*

When considering the average growth of devil's club at each site sampled (n=18), linear regression of mean stem attributes showed no significant relationship to stand age (p=0.1631 for stem diameter, p=0.8423 for stem length, p=0.5196 for bark area) or to $\log_{10}$ of stand age (p=0.0830 for stem diameter, p=0.3262 for stem length, p=0.2489 for bark area).When all individual stem measurements were treated as independent observations (n=180), a significant (p=0.0019) though very weak relationship (R^2=0.06) was detected for stem diameter as a function of stand age. More significant relationships emerged when stem size was regressed against the log of stand age: p=0.0001 (R^2=0.08) for stem diameter (Figure 5.3), p=0.0001 (R^2=0.08) for stem length, and p=0.0010 (R^2=0.06) for bark area.

Although the trends exhibited by these three variables suggest that stem size increases with stand age to a certain extent, the regression relationships explain only 6% to 8% of the variance observed. Further analysis of the data was therefore carried out in order to portray thresholds observed upon visual inspection of the data shown in Figure 5.3. For example, it appears that stands less than 10 years old rarely support devil's club with stem diameters greater than 1.8 cm, stem lengths greater than 60 cm, or estimated bark area per stem greater than 300 cm^2.

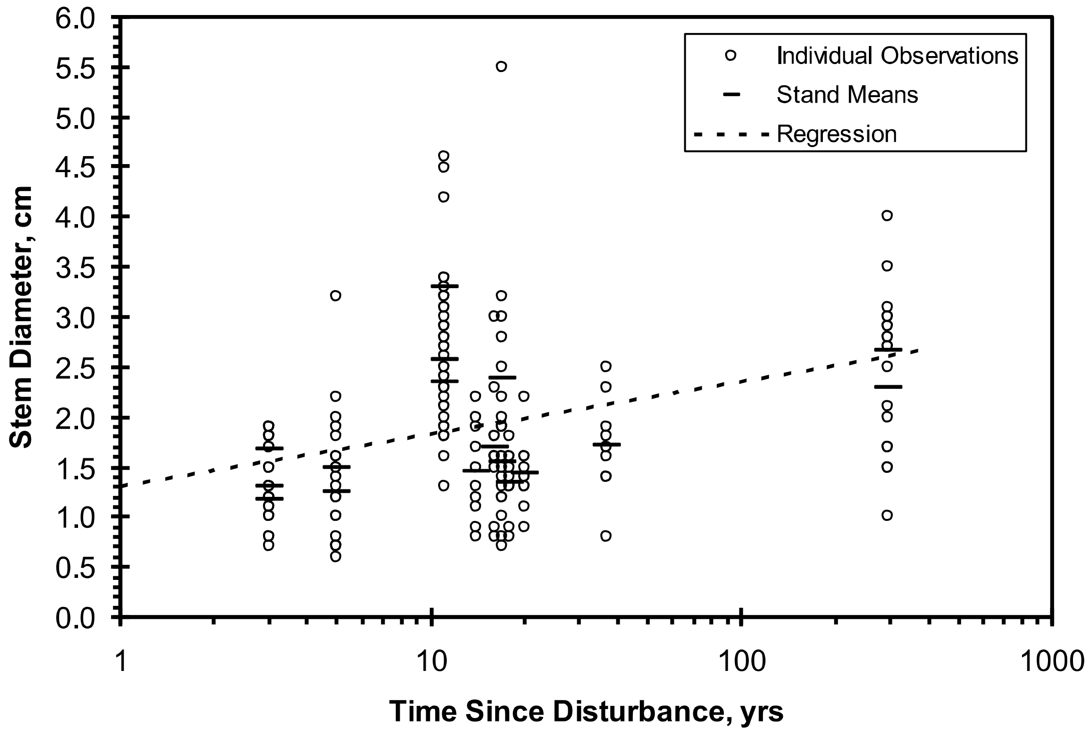

Figure 5.3. Relationship of individual devil's club stem diameters to time since disturbance, showing means for each site sampled, and the regression line derived for individual stem diameters: diameter = $1.29862 + 0.53186 \log_{10}(\text{stand age})$.

5.4.3. *Analysis of Variance (ANOVA) Results for Stem Diameter*

Assessment of stem diameter differences using ANOVA and Tukey multiple comparison tests revealed some significant relationships among the five stand ages for which replicate cutblocks were available ($F= 7.89$, $p=0.0070$). But those differences (results not shown) were not consistently related to increasing stand age: devil's club in the 11-year old clearcuts had, on average, the largest mean stem diameter which were not significantly different from those of devil's club in the old growth, but were significantly different from the 3- and 5-year old sites.

When data from all the cutblocks sampled were combined into four decadal age classes, significant differences among stand age classes also emerged ($F=3.45$, $p=0.0459$). Due to the high variability within the four age classes (Figure 5.4), or perhaps the unequal number of stands within age classes, Tukey tests were unable to identify which means were significantly greater or less than others.

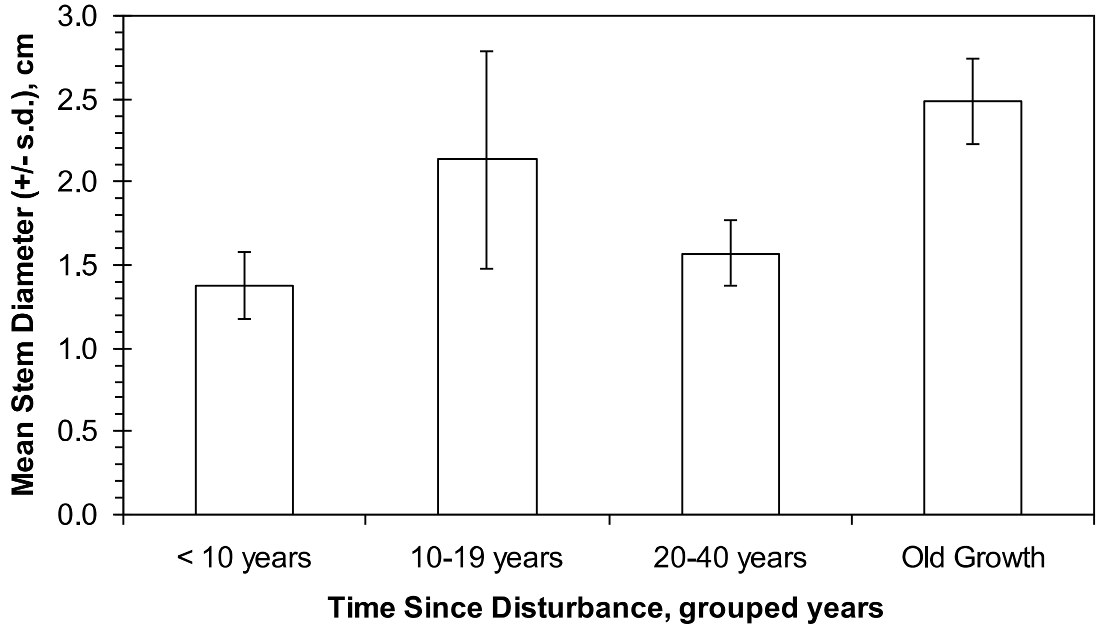

Figure 5.4. Mean devil's stem diameters in multiple stands grouped into four age classes; error bars are standard deviations among stand means.

Evaluating only the younger (<40 year old) stands – i.e., those that had been logged – in three age classes generated similar results for stem diameter: ANOVA F=3.53, p=0.0597. However, stem length differences were significant (F=10.72, p=0.0018), with stems in the 10-19 year age class averaging 98 cm in length, compared to 51 cm in the 20-40 year age class and 34 cm for those less than 10 years old. These differences were accentuated when testing for stand age effects around the 10-year threshold after disturbance, i.e., testing for significant differences between plants growing on clearcut sites <10 years old and >10 years old. ANOVA results for stem diameter demonstrated significantly larger stems in the older stands (where they averaged 2.1 cm) compared to the younger stands (averaging 1.4 cm; F=6.56, p=0.0209 Figure 5.5.). Even more pronounced results were found for stem length (averaging 87 cm compared to 34 cm; F=12.08, p=0.0025) and for bark area (averaging 528 cm^2 compared to 139 cm^2; F=8.25, p=0.0110).

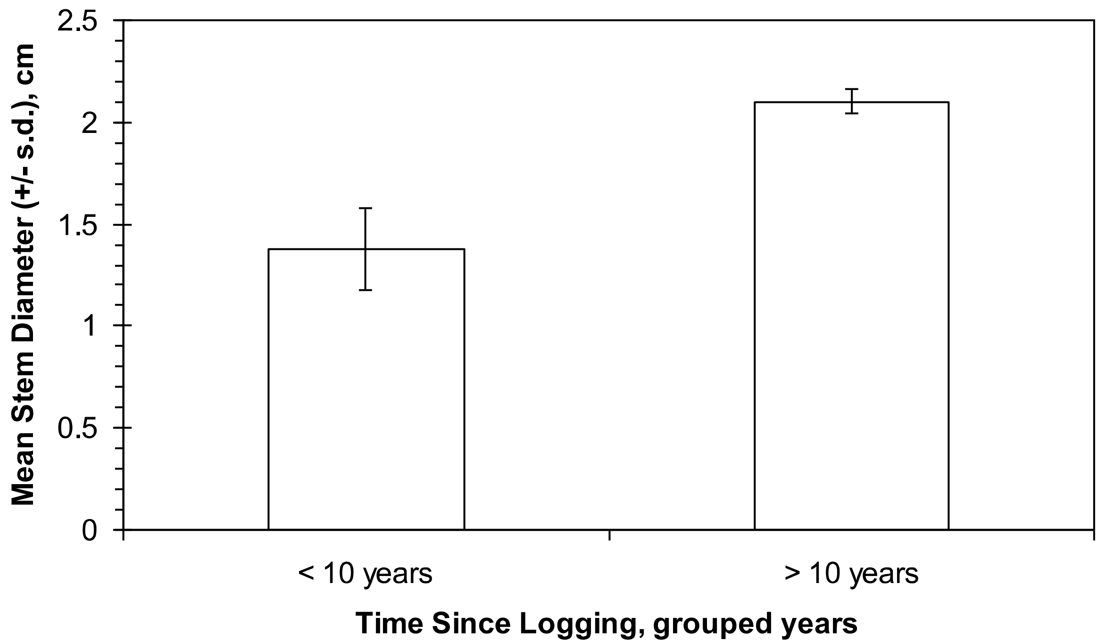

Figure 5.5. Mean devil's stem diameters in stands grouped into two age classes, namely clearcuts less than or greater than 10 years old since logging; error bars are standard deviations among stand means. ANOVA indicates that the means are significantly different at the 95% confidence level.

5.5.4. *ANOVA Results for Site and Species Association Factors*

Given the widespread variability in plant size revealed in the above analyses (especially in the cutblocks 10 to 40 years old), it appears that stand age alone is not the defining factor for determining the size of devil's club stems. One-way ANOVA to examine the relationship between stem diameter and stand age classes did not reveal a more consistent relationship than did regression analysis, although there seems to be some sort of threshold between 5 and 11 years of age. To further understand the variability observed in stem sizes, individual one-way ANOVAs were run to evaluate individual site factors that might contribute to differences in devil's club growth. Microsite factors such as evidence of fire, soil moisture regime, shading, aspect and the presence of various plant species were evaluated for their effect on stem diameter. For this analysis, only stems from the logged sites were evaluated (n=161) because the goal of this part of the study was to evaluate factors contributing to devil's club recovery after clearcut logging.

5.5.4.1. *Site Factors*

Analysis of the data with respect to the recovery of devil's club after logging showed that stems on slash-burned sites were significantly smaller than stems on unburned sites (F=11.15, p=0.0011). There were also significant effects when comparing open/shaded sites (F=6.36, p=0.0127) and gross site moisture regime (F=12.86, p=0.0004). Figure 5.6 shows the mean stem size was significantly greater when stems were growing in the open and on slightly drier sites.

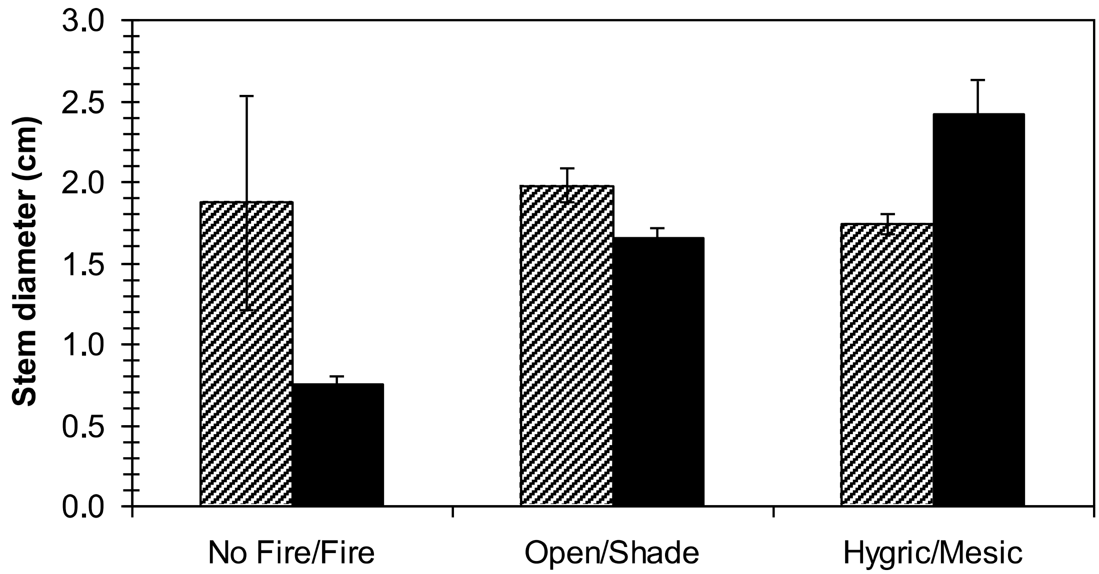

Figure 5.6. Significant differences ($p<0.05$) for devil's club stem diameters under contrasting (gray vs. black bars) microsite conditions. Error bars are standard errors of individual stem measurements.

5.5.4.2. *Species Association*

The presence or absence of particular plant species can be useful in predicting where larger devil's club stems are found. Table 5.5 lists 27 different indicator species and how frequently they were found growing in association with devil's club in clearcuts of all ages. Highlighted data show that there were eleven species for which their presence or absence was associated with significant (ANOVA, $p<0.05$) differences in the size of devil's club stems (Table 5.5).

The presence of a particular species growing in association with devil's club stems did not always signal superior diameters for the devil's club stems. Figure 5.7 shows that of the 10 species with significant relationships to devil's club stem size, only five were associated with an increase in devil's club stem diameters. These include two conifers, *Abies amabilis* (Pacific silver fir) and *Thuja plicata* (western hemlock), one shrub, *Rubus spectabilis,* (salmonberry),

Table 5.5. Mean and standard error for devil's club stem diameters associated with the presence or absence of plant species (or genera) observed growing in association with devil's club in all clearcut age classes.

Species	**Common name**	**Present**			**Absent**			**ANOVA results**	
		n	Mean	S.E.	n	Mean	S.E.	F	p
Abies amabilis	Pacific silver fir	10	2.55	0.16	168	1.86	0.07	6.46	0.0119
Athyrium filix-femina	lady fern	64	1.85	0.09	114	1.92	0.09	0.33	0.5644
Cornus canadensis	bunchberry	62	1.85	0.10	116	1.92	0.08	0.26	0.6114
Corylus cornuta	beaked hazelnut	10	1.54	0.20	168	1.92	0.07	1.87	0.1734
Epilobium angustifolium	fireweed	94	1.71	0.08	84	2.10	0.11	10.08	0.0018
Equisetum sp.	horsetail	30	1.49	0.08	148	1.98	0.08	8.59	0.0038
Geum macrophyllum	large-leaved avens	19	2.62	0.22	159	1.81	0.07	16.59	<.0001
Gymnocarpium dryopteris	oak fern	21	1.47	0.15	157	1.95	0.07	6.26	0.0133
leafy mosses	leafy moss	10	1.69	0.20	168	1.91	0.07	0.62	0.4316
Linnaea borealis	twinflower	10	1.71	0.15	168	1.91	0.07	0.51	0.4777
Lysichiton americanus	skunk cabbage	50	1.71	0.11	128	1.97	0.08	3.38	0.0678
Menziesia ferruginea	false azalea	41	1.68	0.13	137	1.96	0.08	3.64	0.0581
Poa glauca	glaucus bluegrass	19	2.62	0.22	159	1.81	0.07	16.59	<.0001
Populus tremuloides	trembling aspen	4	2.58	0.41	174	1.88	0.07	2.63	0.1063
Ribes sp.	currants	20	1.70	0.12	158	1.92	0.07	1.20	0.2748
Rubus idaeus	red raspberry	10	1.71	0.15	150	1.84	0.07	0.22	0.6426
Rubus parviflorus	thimbleberry	61	1.98	0.12	117	1.85	0.08	0.95	0.3317
Rubus spectabilis	salmonberry	29	2.59	0.13	149	1.76	0.07	26.68	<.0001
Salix sp.	willows	21	1.59	0.14	157	1.94	0.07	3.21	0.0747
Sambucus racemosa	elderberry	16	1.41	0.10	162	1.94	0.07	5.85	0.0166
Streptopus lanceolatus	rosy twisted stalk	1	1.90	-	177	1.90	0.07	0.00	0.9963
Thuja plicata	western red cedar	27	2.51	0.22	151	1.79	0.07	18.54	<.0001
Tsuga heterophylla	western hemlock	82	1.93	0.09	96	1.86	0.09	0.28	0.5943
Tsuga mertensiana	mountain hemlock	1	1.60	-	177	1.90	0.07	0.36	0.5487
Vaccinium membranaceum	black huckleberry	71	1.92	0.11	107	1.88	0.08	0.11	0.7361
Vaccinium ovalifolium	oval-leaved blueberry	71	1.92	0.11	107	1.88	0.08	0.11	0.7361
Veratrum viride	false hellebore	20	1.39	0.07	158	1.96	0.07	8.32	0.0044

one herbaceous species, *Geum macrophyllum* (large-leaved avens) and one grass, *Poa glauca* (glaucous bluegrass). In contrast, smaller than average devil's club diameters were associated with the presence of the shrub *Sambucus racemosa* (elderberry) and the herbaceous plants *Epilobium angustifolium* (fireweed), *Equisetum* spp. (horsetail), *Gymnocarpium dryopteris* (oak fern) and *Veratrum viride* (false hellebore).

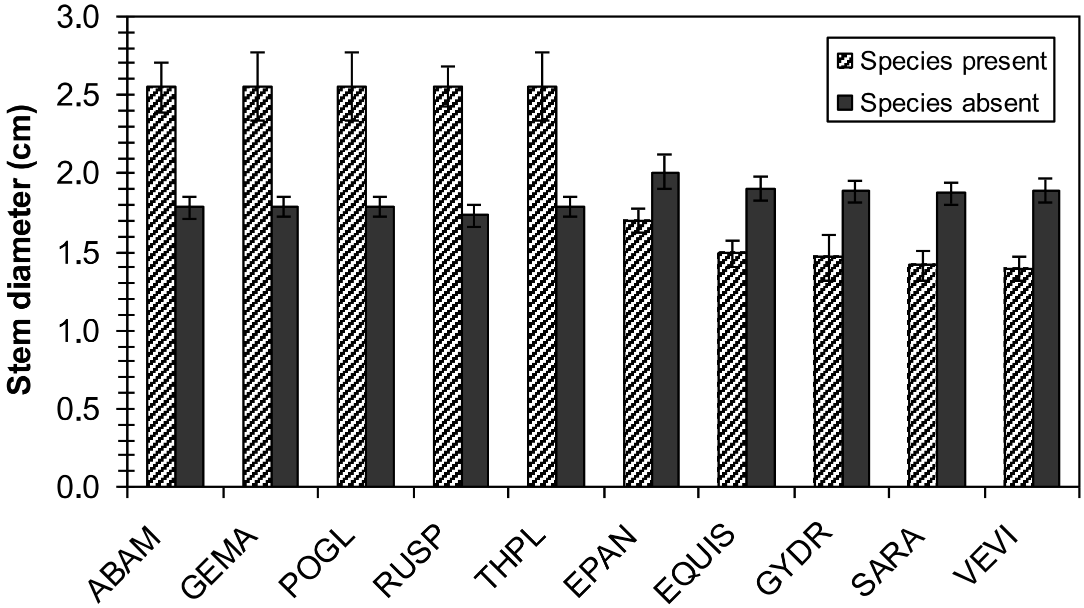

Figure 5.7. Significant results for analysis of variance comparing mean stem diameter in the presence/absence of individual plant species. Error bars are standard errors of individual stem measurements. Plant species codes are as follows: ABAM=*Abies amabilis*, GEMA=*Geum macrophyllum*, POGL=*Poa glauca*, RUSP=*Rubus spectabilis*, THPL=*Thuja plicata*, EPAN=*Epilobium angustifolium*, EQUIS=*Equisetum* spp., GYDR=*Gymnocarpium dryopteris*, SARA=*Sambucus racemosa*, VEVI=*Veratrum viride*.

5.6 Discussion

Nisga'a collaborators who use devil's club stems, for medicinal or other purposes, prefer to harvest them from undisturbed, old-growth forests. It is reasonable to expect that old-growth forests would have the largest stems of this slow-growing, shade-tolerant species, and that older clearcuts would support larger stems than more recent clearcuts. However, results suggest that, although time since logging is a factor in understanding the average size of devil's club after disturbance, other factors are also important. In particular, it is difficult to find large stems in the first 10 years after clearcut logging. The extent of stem damage from logging or fire, microsite factors (e.g., site moisture and nutrient availability, the presence of protective slash) also affect the persistence and recovery of healthy stems (Figure 5.6). These results are consistent with the literature which describes devil's club as a shade tolerant species that is sensitive to fire and grows well on moist sites (Alaback 1980; Klinka et al. 1989; Howard 1993, Burton 1998; Roorbach 1999).

The significant relationships determined between devil's club plant size (as indicated by stem diameter, stem length and bark area) and the logarithm of stand age supports the notion that stem size increases with stand age, though in a curvilinear manner. Field observations and subsequent analysis reveal that stand age alone does not predict plant size, as many of the largest stems were found in 11 year old stands (Table 5.3). In fact, relatively little of the variance (6% to 8%) in plant size was explained by stand age. There is a tendency for stems to increase in size with time since disturbance, but this relationship is not a linear one, as the rate of evident size increase in the first decade after logging does not continue indefinitely. Clearly other factors contribute to the persistence and recovery of devil's club after disturbance because the largest stems are not always found in the oldest clearcuts. Under the right conditions, devil's club stems in northwestern BC have been found that measure 6 cm in diameter (data in Burton 1998). Collaborators also report the incidental occurrence of plants of similar or greater sizes (Sim'oogit Ni'is Naganus – Steven Doolan 2007; Sigidimnak' Alisgum Xsgaak – Diane Smith 2008).

Stem diameters were found to be significantly smaller on sites where slash burning had occurred than on sites where there was no burning. Devil's club is sensitive to fire (Fischer and Bradley 1987; Hamilton 2006) and is reported to be absent from burned sites for decades after catastrophic fire (Howard 1993). Its cover declines after slash burns of low to moderate severity (Hamilton 2006). This response to fire could reflect the fact that devil's club, common on moist sites where fires are infrequent, is adapted to a long fire return interval (Banner et al 1993; Wong et al. 2003; Keeley et al. 2011). Shortening that interval through slash burning could affect the ability of devil's club populations to persist on the landscape. Given the long natural fire return interval of ecosystems that support the growth of devil's club, its sensitivity to damage by fire, and the criteria for its establishment and persistence, broadcast burning is not a recommended treatment after logging where maintenance of devil's club is desired. Likewise, burn piles (consisting of logging slash, tree tops, and damaged wood) should not be placed on or near existing stands of devil's club.

Devil's club is a shade tolerant species (Klinka et al. 1989; Burton 1998; Beaudry et al. 1999), and it can survive and persist in a forest understory. It can tolerate a wide range of light conditions from open to very low (Lantz 2001) but dominance by devil's club in a plant community may be favoured in shade (Roorbach 1999). Devil's club populations sampled by Burton (1998) showed higher plant biomass at light levels up to about 50% of full sunlight; biomass was no greater at higher light levels and was often less. Results presented here further substantiate these findings: devil's club was found in a wide range of open and shaded conditions, with some plants growing in open areas showing signs of stress (smaller leaves, leaves sometimes curled and edges browned). Nevertheless, significantly larger stems were documented under open conditions versus shaded conditions (Figure 5.8), where sunlight is blocked by shade from other living vegetation including juvenile conifer trees, shrubs, and herbaceous plants. Some of the largest stems ($F=16.75$, $p<0.0001$) were found growing in and among "dead shade," (i.e., shade cast by logging slash or wood waste) which does not compete with devil's club and may even limit competition from other vegetation. Given that devil's club can persist under a variety of light conditions, it is possible that the stems growing in close proximity to vigorous growth of other plants were in competition for moisture and nutrients and so were smaller. In contrast, devil's club stems growing in the shade of slash or logs were bigger because they can become dominant in shade and so were not competing for resources to the same extent (Roorbach 1999).

Formal determination of relative soil moisture regime (as described by Banner et al. 1993) at each sampling site was not conducted as part of this study. Nonetheless, observations of the habitat associated with individual stems often included observations on moistness of the soil and slope position. Analysis of those relationships revealed that stems were larger on sites that were slightly drier than those stems on very wet sites. Assuming that the very wet sites were sites that were not well drained, these observations are consistent with the perceived preference of devil's club for well drained, water-receiving sites (Klinka et al. 1989; Beaudry et al. 1999).

Devil's club stems were significantly larger when found growing in association with some species, and significantly smaller when growing in association with other species. Both *Rubus spectablis* (salmonberry) and *Veratrum viride* (false hellebore) are noted to be common associates of devil's club (Klinka et al. 1989), and can indicate sites suitable for devil's club even if it is not currently visible there. With the exception of *Poa glauca*, all of the species observed to be growing with devil's club (Table 5.5) are commonly associated with nitrogen-rich soils and fresh to wet soils (Klinka et al. 1989). It is possible that the smaller devil's club stems found in association with *Sambucus racemosa* (elderberry) and *Veratrum viride* (false hellebore), *Epilobium angustifolium* (fireweed) and *Gymnocarpium dryopteris* (oakfern) (Figure 5.7) reflect more intense competition from those species.

5.7. Conclusion

The need for this study was prompted by the fact that the Nisga'a consider devil's club to be one of their most important medicinal plants. Concern was expressed by some that devil's club is no longer so abundant in the Nass Valley, and that the large stems believed to make the best medicine are not as easy to find now due to clearcut logging. Based on the high regard the Nisga'a have for this medicinal and spiritual plant and the perception that it is being lost from the landscape, this pilot study was undertaken to address their concerns.

The results of this study reveal several important points related to the persistence and/or recovery of devil's club after logging:

- Devil's club can persist after logging, and there is a general tendency for stem numbers and size to increase as time passes;
- Unless they escape damage during logging, large devil's club stems can rarely be found in cutblocks less than 10 years old;
- Increase in size is only partially explained by time since logging, with stands as young as 11 years old producing stems equivalent in size to those in old-growth forests;
- Stems growing on sites that weren't burned after logging are significantly larger than stems growing on burned sites;
- "Dead shade" from slash and logs seems to be beneficial to the survival and growth of devil's club, as are somewhat well drained (but still moist) soils;
- Devil's club can recover after logging, provided that logging is carried out in a way that does not severely disturb existing devil's club populations.

Although devil's club can indeed persist and recover after clearcut logging, this does not mean that other components of old-growth ecology can recover as well. Some forest harvesting is a necessary part of our regional economy, but these results should not be considered an endorsement of old-growth logging or clearcutting. If we adopt a model of sustainable forest management that works toward the long-term conservation of all forest values (Adamowicz and Burton 2003), including the continued health of valuable medicinal plants such as devil's club, then the protection and facilitated recovery of non-timber forest products need to be considered before deciding where, when, and how to harvest trees.

In order to conserve devil's club populations it is recommended that:

- healthy populations of devil's club should be protected during clearcut logging, either in green tree retention patches or machine-free zones (Beese and Bryant 1999; Rosenvald and Lõhmus 2008);
- when clearcut logging, scattered slash should be left in devil's club patches to provide protective shade for recovering plants;
- burn piles and slash burning should not be located in devil's club patches;
- large-scale harvesting of devil's club stems (if any) should be dispersed and monitored to determine sustainable rates of harvesting and recovery;
- a comprehensive ecosystem-based research trial should be undertaken to evaluate the demography, cover, biomass, and stem growth of devil's club over a period of several years (related to soil type, soil moisture, soil nutrients, plant community, slope position, aspect and site history) after logging.

When considering the harvesting of devil's club amidst the inspiration of ancient trees, old-growth forests offer both practical and spiritual values that cannot be replaced in a short period of time. In an old-growth forest, there are large devil's club stems easily accessible on paths that have long been used for sustainable gathering. We cannot overlook the cultural and spiritual value of harvesting devil's club and other traditionally used plants at locations that are familiar and have long been used for such purposes.

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Chapter 6

Nisga'a Plant Use: Past, Present and Future

> *When my grandfather was still alive too, and my mom and dad too, they would sit there by the table at lunch time. And they were all telling stories, lunchtime, suppertime, all meal times. They say that while you are eating, you're just like a sponge, you take in the story while you're eating. It will stay with you and you'll never forget it. It's like a tape recorder up there* (Sigidimnak' Alisgum Xsgaak – Diane Smith 2008).

> *Today we learn most things from books and we write everything down. But in the old days, right when we were very young, we learned by watching and listening and helping however we could* (Sigidimnak' K'igapks – Alice Azak 2012).

6.1 Introduction

The title of this dissertation, "**Wilaat Hooxhl Nisga'ahl [Galdo'o] [Ýans]: Gik'uuhl-gi, Guuń-sa ganhl Angoogam̓**" ("Using Plants the Nisga'a Way"), implies that the Nisga'a use of plants has always been, and will continue to be, an important part of Nisga'a lives. As reflected in the title, it was therefore the goal of this work to document traditional plant use, and in doing so, provide some insights as to how the cultural context of Nisga'a plant use has changed and how it will continue to do so.

Throughout this research, collaborators repeatedly recalled how their parents or grandparents would preserve fruit, carve canoes, tools and other implements, make medicine or use plants for spiritual purposes. They themselves did not have the same opportunity to immerse themselves so fully in those activities: they were children, teenagers and young adults during a period in history when the lives of indigenous people were rapidly changing. Most of the collaborators were sent away to residential schools at an age when, in their cultural tradition, they would have been consolidating information on traditional ways. In addition, rapid technological changes, advances in medicine, improved access to modern goods and services, and dependence on a monetary economy meant they were not so interested or able to learn the old ways. Nonetheless, the value of this knowledge is recognized, and the Nisga'a still retain aspects of their traditional culture with respect to plants while incorporating new ways to harvest, prepare and use them. For example, many Nisga'a jar or freeze fruit for their personal use and for traditional use at feasts. However, they not only collect berries from the wild, but grow cultivated varieties in their gardens or buy them from local growers or supermarkets. Similarly, some people harvest cedar bark for making baskets, or weaving headbands for regalia, but the cedar bark products (e.g., hats, bands, mats, baskets) are prepared for modern cultural events such as graduation ceremonies, or for sale as artistic creations. Some artists make their living from carving.

That the interest in plants and their many uses will continue into the future is evident from the renewed interest in Nisga'a cultural traditions on the part of younger people. At the university level, many people are taking classes in ethnobotany, Nisga'a language classes or general First Nations studies. In ethnobotany courses, students learn to identify plants and learn more about traditional plant use and knowledge in the Nass Valley and elsewhere. The classes are usually a combination of learning in a setting that blends traditional oral learning with book-based or web-based learning. Elders share their knowledge with students who also learn through lectures and university textbooks. This type of learning prepares them for a future where they become secure in their cultural identity, while providing an opportunity to acquire a post-secondary education that encourages them to expand upon what they learn.

Similarly, elders in the community routinely go into elementary school classrooms and preschools to teach the language, which inevitably includes discussion about plant use and plant names. The presence of elders sharing such knowledge in a modern classroom or pre-school setting helps young people understand and appreciate traditional knowledge in a context that also includes the knowledge and skills needed in the world ahead.

Based on the information and analysis reported in the preceding chapters, the purpose of this chapter is to summarize the importance of plants to the Nisga'a in the past and today, and then to extrapolate these trends to speculate on potential Nisga'a plant use in the future.

6.2 Nisga'a Plant Use in the Past

6.2.1. *General observations*

Chapter 2 provides a comprehensive description of traditional plant use for food, medicinal, spiritual and technological purposes. Work on this project has shown that the Nisga'a have a long history of plant use that has been passed down for generations (Nisga'a Tribal Council 1995, Vols. I-IV). The fact that plants were a vital part of traditional life is reflected in the fact that all collaborators remembered something about how plants were used in the past, despite the fact that many of them no longer participate in any kind of traditional harvesting or preparation. Although all collaborators today rely primarily on buying fruits and vegetables at regional supermarkets located over 100 km from their homes, they remember the uses, preparation and names for many of the traditional food plants on their territory. Similarly, although they primarily use western medicine to treat their illnesses, they recall their parents or grandparents preparing plants like **wa'ums** (devil's club), **ts'iks** (false hellebore), or **ho'oks** (amabilis fir) for medicine, and the use of **wa'ums** and **ts'iks** for bringing luck into the home. Such recollections are perhaps to be expected in an oral culture in which people have a long historic connection to their land. Their recollections are remarkable though, considering the impact of western culture on their traditional way of life as they were growing up, and are a testimony not only to their long history of relationships with plants and their territory but to the strength of their culture.

Over the course of this project, 146 plant species were discussed with 21 collaborators (Appendix C). Trees, shrubs and herbaceous plants were predominantly discussed at the botanical species level. Because information related to grasses and grass-like plants, lichens, bryophytes, fungi and seaweeds was not as readily recalled or shared, these five lifeforms were usually discussed in a general sense, with a few types discussed more specifically. Through the collective memories of the collaborators and a review of available written material, uses for 110 species have been documented, with several species serving multiple roles in traditional Nisga'a culture (Table 6.1, Chapter 2).

Table 6.1. Summary of Nisga'a plant uses by growth form and biological category

Growth Form	Food	Medicinal	Spiritual	Technological	Total*
Trees	8	13	2	17	18
Shrubs	30	14	4	22	48
Flowering herbs	19	15	6	7	45
Ferns	2	1	0	3	6
Fern allies	2	2	0	4	6
Grasses/grasslike species	0	0	0	3	3
Mosses/Liverworts	0	2	0	4	6
Lichens	1	0	0	7	10
Fungi	2	3	0	1	6
Seaweeds	4	2	0	2	5
Horticultural spp.	4	0	0	0	4
Total	72	52	12	70	110

*Number of species having one or more reported uses.

Table 6.1 shows that shrubs were the dominant growth form recalled for food use. This high number is likely because the use of shrubs for food includes many berry species and the use of these berries was readily recalled because many of them continue to be harvested today. Trees, shrubs and forbs were all used for medicine in almost equal proportions.

Of the 21 collaborators (11 female and 10 male), women recalled more plant uses in all categories than men (Table 6-2). This trend may simply reflect the fact that, around the world, women have typically been the gatherers while men were the hunters (Ember 1978; Turner 2003; Waguespack 2005) and so the female collaborators were more knowledgeable about plants. However it may be that they were more comfortable discussing plants with me, another woman. Also, throughout their adult life, many of the female collaborators were the dominant caregivers and homemakers and would have had more time to practice and teach traditional ways, while men were more engaged in the western monetary economy and away from home more frequently.