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Inuit plant use in the eastern Subarctic: comparative ethnobotany in Kangiqsualujjuaq, Nunavik and Nain, Nunatsiavut

Alain Cuerrier^{1*#}, Courtenay Clark^{2#}, and Christian H. Norton²

¹ Jardin botanique de Montréal, Institut de recherche en biologie végétale (Université de Montréal), 4101 Sherbrooke Est, Montréal (Québec), Canada, H1X 2B2

² Institut de recherche en biologie végétale (Université de Montréal), 4101 Sherbrooke Est, Montréal (Québec), Canada, H1X 2B2

courtenay.clark@gmail.com
christian.norton@umontreal.ca

Both authors have contributed equally and share first authorship.

* Corresponding author: Dr. Alain Cuerrier, Institut de recherche en biologie végétale, Jardin botanique de Montréal, Université de Montréal, 4101 Sherbrooke Est, Montréal, QC, H1X 2B2, Canada, Phone :+514.872.3182, Fax : +514.343.2288, E-mail : alain.cuerrier@umontreal.ca

Abstract

Plants are important in traditional Inuit life. They are used for food, tea, medicine, etc. Based on semi-structured interviews with 35 informants, we documented and compared plant names and uses in Nain, Nunatsiavut and Kangiqsualujjuaq, Nunavik. Plant names and uses were expected to be similar between communities owing to common boreal-subarctic environments and cultural ties. Both communities reported the same number of taxa, with equivalent proportions of vascular/non-vascular, growth forms, use categories, and medicinal uses. Forty-three species were used in each community, for a total of 78 species from 39 families. Despite a high overlap in species distributions, only 35% of non-vascular and 56% of vascular species were used in both communities. Correspondence was higher at the family level (64% of non-vascular and 75% of vascular families shared). The Ericaceae family was the most-used, followed by Rosaceae. Thirteen of 30 medicinal species were shared between communities. There was a low correspondence regarding the conditions for which the medicinal species were used. Edible taxa were shared the most (52%). Plant uses unique to either Nain or Kangiqsualujjuaq may reveal separate bodies of traditional knowledge, or may reflect an overall loss of ethnobotanical knowledge in the Subarctic due to recent lifestyle changes.

Keywords: Inuit, Inuktitut, Nunavik, Nunatsiavut, traditional knowledge

Introduction

Biocultural diversity is at risk throughout the world (Maffi 2005; Cuerrier and Arnason 2008). Indigenous languages worldwide are declining, and Inuktitut (the language of the Inuit) in the Canadian Subarctic and Arctic is no exception (Norris 2007). The loss or degradation of a culture's language often entails the disappearance of much of that culture's traditional knowledge. This phenomenon has already started to become apparent in the Arctic, most obviously in the navigation and travel skills of younger hunters (Pearce et al. 2011). The health and food security of indigenous peoples worldwide is also being affected by climate change. Global warming is creating rapid environmental changes that are reducing the ability of Inuit to use traditional knowledge to make reliable predictions about the environment (Downing and Cuerrier 2011; Cuerrier et al. 2015). Since many species in the Subarctic and Arctic are already at the margins of their distributions, temperature changes, and the environmental variability they create, are also causing increased stress to the biodiversity of these regions (Hampe and Petit 2005; Walsh 2008). Biological, linguistic, and cultural diversity are all linked, and threat to any one type of diversity also constitutes a threat to the other types. The Inuit thus face the challenge of compounding stresses to their biocultural integrity.

Healthy ecosystems and the biodiversity they harbour are critical to the well-being of human populations, and more directly so for indigenous groups still living more closely with their traditional lands. Inuit of the boreal-arctic transition zones of Nunavik and Nunatsiavut have occupied their territories for at least the last 700 years. Until about the middle of the twentieth century, their diet was based mainly on sea mammals, fish, and caribou (Institut culturel Avataq 2015). Although the use of plants in Inuit culture has received much less attention than hunting and fishing activities in the literature, plants nevertheless played an important role in the traditional Inuit lifestyle, as can be seen from archaeological and paleoethnobotanical studies (Kaplan and Wollett 2000; Woollett 2007; Zutter 2009), ethnographies (Turner 1894; Hawkes 1916), and Inuit oral history (Brice-Bennett 1977).

To date, the most extensive work on Inuit ethnobiology has focused on the western Arctic and Subarctic, with many publications throughout the last century addressing Alaska specifically (Gorman 1896; Anderson 1939; Alexander 1949; Bank 1951*a, b*; Oswalt 1957; Lantis 1959; Young and Hall 1969; Nickerson et al. 1973; Ager and Ager 1980; Fortune 1988; Griffin 2001; CAFF 2006). Some publications have explored ethnobotany in the central Canadian arctic

(Northwest Territories and Nunavut), documenting lists of plant names (Birket-Smith 1976), the Inuit ethnobotany and folk taxonomy in Igloolik (Dritsas 1986) and Baker Lake (Paillet 1973), and medicinal plants (Ootoova et al. 2001; Black et al. 2008). Plant names and uses by Inuit have also been documented in Greenland (Le Mouél 1969; Birket-Smith 1976; de Bonneval and Robert-Lamblin 1979). Smith (1973) and Wilson (1978) summarised Inuit ethnobotany in a pan-Arctic context.

Concerning Inuit ethnobotany in the eastern Arctic early ethnologies by Turner (1894) for the Ungava District (eastern part of present day Nunavik, in northern Quebec), and Hawkes (1916) and Peacock (1947) for Labrador addressed some plant uses. More recent projects have focused on the ethnobotany and folk taxonomies of communities in the Inuit territory of Nunavik (Avataq Cultural Institute 1990, 1991, 1992, 1994; Cuerrier and Avataq Cultural Institute 2004; Cuerrier and Elders of Kangirsujuaq 2005, 2011; Cuerrier and Elders of Umiujaq and Kuujjuarapik 2011; Cuerrier and Elders of Kangiqsualujjuaq 2012*a, b*). However, in the bordering Inuit territory of Nunatsiavut (northern Labrador), very little has been published regarding Inuit ethnobotany (Downing et al. 2013; Oberndorfer et al. 2017).

The frequent grouping of Nunavik and Nunatsiavut in dictionaries is testament to the high mutual intelligibility between speakers from these two regions, stemming from the common morphology and syntax of their speech, and relatively few lexical differences (Dorais 1978). Technically, the two territories speak distinct dialects of Inuktitut, the most noticeable differences being phonological and morphophonological in nature, in addition to having different writing conventions (Dorais 2010). Moreover, different contact histories also exist between the two groups. Moravian missionaries established missions on the coast of Labrador starting in the late eighteenth century, while permanent settlements were not set up on the eastern coast of Ungava Bay until the second half of the twentieth century (Brice-Bennett 1977). This has meant a significantly longer period of European contact and settlement for Labrador Inuit, resulting in a greater influence of European languages and western education system, which is reflected by a significantly smaller number of speakers of the Labrador dialect Inuttut, especially among younger generations (Statistics Canada 2006; Norris 2007). Sharing a language is not the only element of similarity between the two communities.

The two territories have also important liaisons, similar to other geographically close Inuit groups (Collignon 2006), and this would have encouraged cultural exchange. Shared routes

through the Koroc River valley for inter-coastal travel provided a foundation for long-distance social networks, and meetings along the route while travelling at culturally important places (e.g. Ramah metachert outcropping, or good hunting areas) would have facilitated language and knowledge sharing (KRG 2005).

Environmental differences also exist between the two territories; Ungava Bay coast being more northerly and thus somewhat colder. This may have impacted the culture and language of these Inuit groups. Although, there are differences, one needs to admit that the florulae of both places share a large number of plants. Another factor that needs to be taken into account is the migration of Inuit families that may blur a clear comparison.

Based on ethnobotanical interviews, we document plant names and uses from two Inuit communities: Nain in Nunatsiavut, Labrador and Kangirsualujjuaq in Nunavik, Quebec. The amount of information gained through this research is of importance as very little is known about plant use in Nunavik and especially Nunatsiavut. Moreover, the similarity of their floras and lexicons, along with a history of cultural exchange, contrasted with differing socioeconomic histories and ease of access to the more diverse flora of southern Labrador, make these two communities an interesting case study for comparison. Thus, we are anticipating greater results stemming from working with two closely related communities. We examine the diversity of plants named and used in the two communities, highlighting similarities and differences, with a special focus on medicinal uses. A goal of this ethnobotanical research is to provide a means of conserving the invaluable biocultural diversity of Inuit inhabiting the Eastern Canadian Subarctic.

Methods

Study area

This study took place in two communities in northeast Canada. Kangirsualujjuaq (58°41' N, 65°57' W) is the easternmost village of the Inuit territory Nunavik (province of Quebec), located 25 km inland from the east coast of Ungava Bay at the mouth of the George River (Figure 1). Kangirsualujjuaq has a population of 874 (Statistics Canada 2012a). Nain (56°33' N, 61°41' W), Nunatsiavut (province of Newfoundland and Labrador) is 340 km to the south-east (Natural Resources Canada 2012a) of Kangirsualujjuaq, on the coast of the Labrador Sea. Nain is the northernmost community in the Inuit territory Nunatsiavut (Figure 1). Nain has a population of 1,188 (Statistics Canada 2012b). Nain has particularly high precipitation for its low elevation and

consistently cold climate, with an average annual rainfall of 400.4 mm and average annual snowfall of 492.2 cm. Nain is at the border between subarctic and polar climate, with average low in the winter of -23°C and average high in the summer of 16°C , with a daily mean temperature of -3°C (Environment Canada 2012a). Kangiqsualujjuaq has a similar climate, though slightly colder due to its more northerly location (Environment Canada 2012b). Both communities fall within the Canadian Shield plateau physiographic region, with Nain being at the northern edge of sporadic discontinuous (10-50%) permafrost and Kangiqsualujjuaq within extensive discontinuous (50-90%) permafrost (Natural Resources Canada 2012b).

Data collection

Data were collected using semi-structured interviews with local informants (Martin 1996). Both plant specimens (fresh and dried/pressed) and photos were used to guide the discussions. Each interview lasted between 30 minutes to two hours, depending on informants' knowledge and availability, with care taken to avoid informant fatigue. Interviews were conducted in English and Inuktitut in both communities, with the help of local interpreter/translators when needed. Interviews took place between August 6th – 27th, 2004 in Kangiqsualujjuaq and between July 19th – August 12th, 2010 in Nain. Interviews took place in homes, offices, and in the field. Informants were mostly Elders, identified and recruited based on suggestions from our interpreters, community members, and public health workers. Interviews were audio and video recorded, informants consenting. In Kangiqsualujjuaq, ten informants were interviewed (six women, four men, median age 69.5). In Nain, 22 interviews took place with 25 informants (sixteen women, nine men, average age 68, median age 64). Our spelling of Inuktitut terms is based on the standardized Labrador Inuttut writing system as outlined in the dictionary by Andersen et al. (2007).

Approval for this project was granted by the Faculty of Arts and Science Research Ethics Board of the University of Montreal. Territorial research permission was granted in Nain by the Nunatsiavut Government under Land Use permit no. LIL030017PR, and in Kangiqsualujjuaq by the Avataq Cultural Institute for Nunavik. All informants participated under prior informed consent, having been explained the objectives and methodology of the project, and of their right to withdraw from the study at any point.

Plant collection and identification

Plant specimens used in the interviews were collected within several kilometres of each community, except for Kangiqsualujjuaq where collecting also happened near Tasirkallak, a lake north of Kuururjuaq (Koroc River). Voucher specimens have been added to the Marie-Victorin Herbarium (MT) at the Montreal Botanical Garden for reference. Species names follow Blondeau et al. (2011) as well as VASCAN (<http://data.canadensys.net/vascan/search?lang=fr>).

Occasionally, informants described species for which a voucher specimen was unavailable. In these cases the plants were identified using photos, or a best guess was made based on the description and knowledge of species in the area and are marked with a “?” in the analysis. In most instances, plants were collected and brought back to the informant for validation.

Data analyses

Plants that were recognized by informants are only reported here if they were attributed names and/or uses. Plants that were named but not used are not included in analyses. Introduced or cultivated garden plants were also omitted from the analysis.

In order to better represent the Inuit botanical classification system, and to avoid over- or under-representation of the number of species used in each community, some taxa were combined if they had both an Inuktitut name in common and the same uses. As an example, seaweeds, kelps, and algae were combined. Since multiple species, genera, families, or other polyphyletic divisions were often grouped together in Inuktitut for non-vascular taxa, and since the degree to which these taxa were identified between the two communities was unequal, non-vascular taxa were addressed separately from the vascular taxa for some analyses.

Since no extensive ethnobotanical work had previously been documented for Nunatsiavut, our emphasis was to elicit names and uses for the greatest range of taxa possible. If no new names or uses were recorded for a particular species after several interviews, that species was no longer emphasized in subsequent interviews in the interest of discussing other species that had not yet been named or reported. This allowed a greater number of species to be presented to informants over the course of our time-constrained interviews without excluding the more well known species. Since we purposefully did not discuss every species with every informant, the use reports are an underrepresentation for the most commonly used plants. For this reason, measures such as the informant consensus factor (ICF) and fidelity level (FL) were not calculated because

both require information pertaining to the number of times species and uses are cited by individual informants. The statistical program JMP 8 was used to do Pearson's Chi-Square test ($\alpha = 0.05$) to compare species, families, uses, and growth forms between the two communities.

Results

Diversity of taxa and growth forms

Informants identified 78 discrete taxa: 58 in Nain and 59 in Kangiqsualujjuaq (Table 1). Fifty-three of these correspond directly to Linnaean species. The remaining 25 taxa correspond to categories more inclusive than a single species. For the purposes of analysis, the higher taxa were counted as families and the lower taxa as genera and species. Almost three-quarters of the reported families were used in both communities, while only half the species were shared, the remaining half split evenly between the communities (Table 1). Of the vascular plants, 25 families were used, with over 43 genera (multiple genera from the family Poaceae), and over 55 species. There was no significant difference in the number of vascular species, genera, or families used between the communities (Pearson Chi-square = 0.009, $p = 0.9953$). Both communities used 43 vascular species from 22 families, representing 34 genera in Nain and 35 in Kangiqsualujjuaq. Over half the vascular species were used in both communities and over three-quarters of the families were shared.

The family Ericaceae was the most widely used with 11 species, followed by Rosaceae, Pinaceae and Salicaceae with four species each. Asteraceae, Betulaceae, Onagraceae, and Polygonaceae had three species each, followed by Caryophyllaceae, Poaceae, and Orobanchaceae with two species each. A single species was reported for each of the remaining families: eight species that were used in both communities (from families Campanulaceae, Cornaceae, Crassulaceae, Cupressaceae, Cyperaceae, Diapensiaceae, Equisetaceae, and Grossulariaceae), and six that were used uniquely in one community (Nain: Adoxaceae, Boraginaceae, and Caprifoliaceae; Kangiqsualujjuaq: Fabaceae, Myricaceae, and Saxifragaceae).

Twenty-three non-vascular species were used, from 19 genera and 14 families (Table 1). There was no significant difference in the number of non-vascular species, genera, or families used between the communities (Pearson Chi-square = 0.024, $p = 0.9883$). Data show that 35% of species and 64% of families were used in both communities (Table 1). Four taxa of mosses (Phylum Bryophyta) made this the most used 'family', followed by three taxa in each of Class

Phaeophyceae (kelps, brown seaweeds) and Lycopodiaceae, and two taxa from Fucaceae and Parmeliaceae. A single taxon was reported for each of the remaining nine families: Class Chlorophyceae (green algae), Cladoniaceae, Grimmiaceae, Sphagnaceae, and Umbilicariaceae all used in both communities; Basidiomycota, and Chordariaceae uniquely in Nain; and Lycopodaceae, and Laminariaceae uniquely in Kangiqsualujjuaq.

Of the taxa mentioned, the majority were herbaceous growth forms. There was no significant difference between the communities concerning the growth forms of documented plants (Pearson Chi-square = 1.365, $p = 0.8502$). Table 2 reviews the Inuktitut names for plant parts and organs, in addition to vocabulary specifically for berries and medicinal taxa.

Uses

There were eight categories of usage for identified plants: edible, medicinal, tea, combustible, construction, cleaning, games, and other. The greatest number of species was reported for the edible category and the least reported for games (Figure 2). Edible taxa also had the greatest proportion of shared species between the communities. Less than half of the species reported for all other categories were used in both communities. The number of species per usage category was not different between the communities neither for vascular taxa (Pearson Chi-square = 8.354, $p = 0.3024$), non-vascular taxa (Pearson Chi-square not valid), nor for all taxa combined (Pearson Chi-square = 12.328, $p = 0.0903$).

The growth forms varied with usage category. The largest difference among proportion of growth types used was for edible taxa, which were mostly herbs (52%), followed by shrubs (22%) and aquatic taxa (14%). Medicinal species were mostly shrubs (30%), followed by herbs (27%), and trees (13%). Combustible taxa were mostly shrubs (31%), bryophytes and lycopods, (27%) and trees (18%). Construction taxa were represented mostly by trees (26%). Tea species were exclusively herbs (48%), shrubs (38%) and trees (14%).

Edible taxa were mostly eaten raw, some simply chewed, others boiled, and occasionally fermented or steeped to create a homebrew. Berries had the greatest variety of preparations mentioned. Berry preparations included raw, frozen, jam, jelly, sauces, desserts, pies, cakes, pudding, custard, homebrew, fermented, with cod liver oil, and in bread. To make tea (technically tisanes), the leaves, berries, aerial parts, and/or boughs of various species were steeped in hot water (infusions) or boiled (decoctions). The parts of combustible taxa used included bark,

boughs, dried roots, and dry lichens and mosses being used as wicks, fire starters, firewood, for smoking fish and skins, to create emergency smoke signals, and to deter mosquitoes. Taxa in the construction category were used in the construction of various items for housing (cabins, wind shelters, insulation/sealing cracks, mattress/ground cover), transportation (sleds, sled runners, snowshoes, paddles, kayaks), and other objects for hunting, fishing, and clothing (tools, cord/rope, traps and camouflage for traps, lures, floats for fish nets, seal skin drying frames, basket weaving and dye for clothing and fishing nets). Species used for cleaning purposes were generally used for their abrasive qualities as a brush, as well as soap for the body and to clean hides. Games included placing on fingers, popping, play-money, rubbing leaves to get a tingly feeling, flutes, and slingshots. Uses in the other category included seasonal indicators, dog food, Christmas tree, necklace, house decoration, church decoration, garden flower, insect repellent, fertilizer, and house scent. Table 3 summarizes the taxa used in the two communities for more than three usage categories.

Medicinal uses

Medicinal uses were grouped into seven categories based on similarity of ailment/problem, taking into account groups used in Cook (1995) and Black et al. (2008). Treatments were generally administered once, or until the problem improved. Dosage was not generally reported. Table 3 summarizes medicinal taxa used in the two communities for more than a single ailment category.

Thirty species were used from 19 families. The family Ericaceae was used the most with six species, followed by Pinaceae and Salicaceae with three species each, then Onagraceae and Polygonaceae with two species each (Table 3). *Larix laricina* and *Rhodiola rosea* were the most diversely used species, reported for six of the seven medicinal categories, followed by *Juniperus communis*, *Picea mariana*, and *Vaccinium vitis-idaea* used for five categories each (Table 3). Of the medicinal species, the majority were shrubs, followed by herbs, trees, and bryophytes and lycopods. Grass, fungus and aquatic growth forms all had two species, while pteridophytes were not used at all. There was no statistically difference in the proportion of growth forms used between communities.

Figure 3 shows the number of species used in each community for each ailment type; there was no statistical difference between communities. The gastrointestinal/excretory category

was treated with the greatest number of species (14), although only *Juniperus communis* was used in both communities. Thirteen species were used as a bandage, dressing, or poultice, for a total of 15 species when also including species used for other cutaneous problems (five species separately). Thirteen species were used for respiratory problems; oral and other problems had 10 species each; seven species were reported for general health. There was very low correspondence between communities regarding which species were used to treat the same ailments, and likewise which ailments were treated by a certain species. Although 43% of medicinal species were used medicinally in both communities, a species was used for the same ailment category in both communities only 19% of the time.

The gastrointestinal/excretory category had species to treat heartburn, ulcers, stomach aches, diarrhoea, and to calm nervous stomachs. This category also included species used as diuretics, thirst-inducers when ill, treatment for urinary tract infections, and taxa deemed to be poisonous in excess. Species used for respiratory problems addressed coughs, colds, colds with phlegm, flu, tuberculosis (bleeding lungs, spitting blood), asthma, as well as being used as a tonic for better respiration. Species applied topically were used as a poultice, bandage, or dressing to cover boils, burns, cuts, sores, wounds, gunshot wounds, inflammations (to absorb liquid, extract water), as well as dressings for newborn's navels, and as absorbent material for diapers and menstrual pads. Generally, these were applied directly and held in place by a piece of cloth or animal skin. Other species were used as a disinfecting wash for cutaneous infections, dry/itchy skin, eczema, impetigo, and other dermatological problems. Often the plants were pounded to help extract the juices before application, and/or boiled in the case of washes. The oral category included species used to treat thrush, sore throat, and other oral problems, as well as toothaches, cavities, and species that are good for teeth in general, or used as chewing gum. A general health category was also included, which comprised of species said to be cure-alls, or used as a general tonic, for sickness, or to feel better. These were consumed raw or drank as infusions or decoctions. Other medicinal uses that were grouped together included aches, pain relief, earaches, eye infection, blood poisoning, fever, scurvy, and good for the brain.

Discussion

Despite high overlap in species distributions (Blondeau et al. 2011), only slightly more than half the total species were used in both communities. Commonness can be taken into

account to explain this discrepancy, since the presence of a plant in an area does not imply that it is easily accessible. For example, the distribution of *Picea glauca* extends north into the region around Kangiqsualujjuaq, but it is less common than *Picea mariana*. While not reported as used in Kangiqsualujjuaq in this study, Inuit in that community would likely use *Picea glauca* if they encountered it. Post-study, an Inuk in Kangiqsualujjuaq mentioned using *P. glauca* to make tent poles. Despite lower usage overlap at the species level, there was usage convergence at higher taxa. There was greater overlap at the genus level. As an example, *Pedicularis labradorica* was used in Nain and *Pedicularis groenlandica* was used in Kangiqsualujjuaq. At the Family level, 74% were shared between Nain and Kangiqsualujjuaq.

The results from this study suggest the durability of Inuit plant knowledge, as well as likely exchange between different Inuit groups. The fact that the two communities reported the majority of the species found during an archaeological dig in Uivak in Labrador (Zutter 2009) is adding further evidence to other studies showing that traditional knowledge passed down orally can remain robust across many generations (Aporta 2009; Pearce et al. 2011; Oberndorfer et al. 2017). The overlap of names and uses between Nain and Kangiqsualujjuaq, especially informants' awareness of different names or uses for the same species in other communities, supports the existence of a pan-Arctic network of material and cultural exchange, as suggested by Aporta (2009). For example, the medicinal categories with the largest number of reported species were for topical (cutaneous/poultice/bandage) and respiratory treatments, and this is consistent with the most commonly treated ailments reported by Ootoova et al. (2001) for Baffin Island Inuit. Knowledge, and perhaps plant material, was likely shared between members of the two regions during meetings at specific locations, or when groups met during travel along shared routes (KRG 2005; Cuerrier unpubl. data).

The communities used a wide range of species, but there was low specificity for medicinal uses of plants, both within and between communities. A single species was often used for a variety of ailments, and each ailment was treated by a variety of species. Pharmacologically effective plants are expected to have higher informant consensus values (Trotter and Logan 1986), and they would also be expected to be more widely known within and across communities (Moerman and Estabrook 2003). Although specificity for medicinal plants was low at the species level, the families used by the two communities show similarities to other Indigenous groups. Four of the communities' medicinal families, Ericaceae, Rosaceae, Pinaceae, and Salicaceae,

rank in the top ten medicinal Families used by Indigenous groups in North America (Moerman 1996).

In addition to medicinal similarities, the edible plant families identified by the communities showed similarities with other Indigenous groups in North America. Of the 21 vascular plant families reported with edible species, 5 of these were among Moerman's (1996) top ten most used families (Rosaceae, Ericaceae, Grossulariaceae, Pinaceae, and Polygonaceae). Two of the other top ten families, however, are not represented in the boreal-arctic ecotone (Cactaceae, Fagaceae), so their absence in the list of edible taxa of Inuit is not surprising.

Herbaceous plants were the most used growth form. This finding is not surprising given the relative abundance of herbaceous species in the Subarctic/Arctic. However, compared to the number of tree species available, trees were proportionally used more often than herbaceous plants. In this study, each species was classified as a single growth form, but it must be noted that tree and shrub species in Arctic and Subarctic climates have high phenotypic variability (Brandt 2009). So, while *Picea mariana* may reach a height of three metres in a sheltered valley (and thus unmistakably be classified as a 'tree'), it may only reach a height of one metre if growing in an exposed area. Informants were quick to classify obviously upright species as *napâttuit* ('trees'), but while they recognized prostrate specimens as the same species as their upright counterparts, they were less comfortable classifying them as typical *napâttuit*. In higher latitudes of the Arctic, above the tree line where all plant life is more or less prostrate, perhaps height is less of a distinguishing factor than is woodiness (which could make them useful for fuel), as suggested by Paillet (1973).

Terminology could be clarified by spending more time in the communities. There is a need to clarify terminology concerning preparations and parts used medicinally, the meanings and etymology of names, and as well as linking the history of equivalent terms to families originating from different communities. Especially in the case of Nain, families were relocated twice in the last century from previously separate villages (Brice-Bennett 1977). Informants often reported the names that they would use for a plant, as well as what their spouse may call it if they were from a different family or community. Some interviewees felt that they had little to offer because Nain was not the land where they grew up. They started by being shy to the interview process, even though the flora was very similar.

Both communities reported the same number of taxa, with similar distributions of these taxa between vascular or non-vascular taxa, growth forms, general, and medicinal usage. Yet, half of reported taxa were used by only one of the two communities. Even of the shared taxa, their uses were often different, even for the medicinal taxa. Is this a reflection of true differences in plant knowledge and use between the two Inuit groups? If not a reflection of true differences, is this a reflection on knowledge erosion? How did the shift to permanently settled life, with the accompanying influences of non-Inuit culture and language, affect traditional plant knowledge? Knowledge erosion in Indigenous communities is well documented, and further investigation may become more difficult if the trend of knowledge loss is not stopped. The fraction of community members with robust botanical knowledge, who grew up living off the land, has already declined significantly compared to several decades ago. In any case, these data provide a starting point for more in-depth analysis and comparison across Inuit groups, as well as other indigenous groups that occupy similar biogeographical areas. By recording traditional knowledge from a diversity of regions, communities, and families, there is a greater chance of recording a more complete body of knowledge. What might be remembered in one location may have been forgotten in another, although that knowledge may have existed at an earlier time. Leduc et al. (2006) have shown that loss of knowledge has been less severe within the Cree of Eeyou Itschee if one compares plant uses published a hundred years ago to the actual uses. Turner and Turner (2008) have mentioned a number of reasons that may have shaped loss of knowledge. The only factors that seem to be at play for the loss of knowledge is religion shift and residential school. With the community of Nain, another factor has to be computed: the moving of Inuit from Hebron, Nutak or Okak to Nain.

Plant knowledge is still firsthand for the older generations, but a shift to a sedentary lifestyle and modern medicine means that most youth have little knowledge of traditional plants. This is especially difficult to acquire given the language barrier between youth and elders, as is the case in Nain. But even in Kangiqsualujjuaq where Inuktitut is spoken by all generations, botanical terms are lacking, with the exception perhaps of the edible berries and other important plants, such as those used for fuel. Reintegrating these traditions (e.g., by including plants among other more well-known and still used traditional foods) could have positive effects for health as well as Inuit cultural identity (Turner and Turner 2008; Mead et al. 2010; Downing and Cuerrier 2011).

Conserving the diversity of knowledge is an important reason for continued research done in a participatory fashion. In other communities across the Arctic, more rare species may have been used wherever they occurred, but this knowledge may have been lost in a few populations or communities. Furthermore, given the variety of uses reported for the same species both within and between the two communities, the uses mentioned by people in other communities may also be different. Knowing that a species is used does not entail these uses are similar. A better understanding of which plants are named and used by the Inuit groups across the Arctic, Subarctic, and boreal zones can inform research regarding plant distribution (both present and historical), add new and interesting perspective to northern ecology, and contribute to culture, language, and biodiversity conservation – increasingly important initiatives in the current context of climate change and globalization.

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Draft

Table 1. Total and shared vascular and non-vascular taxa in Nain and Kangiqsualujjuaq. Unique taxa were taxa that were reported in only one of the two communities. There was no statistical difference between communities for vascular taxa (Pearson Chi-square = 0.009, $p = 0.9953$), non-vascular taxa (Pearson Chi-square = 0.024, $p = 0.9883$), or all taxa combined (Pearson Chi-square = 0.027, $p = 0.9864$).

	Shared	Nain total	Unique to Nain	Kangiqsualujjuaq total	Unique to Kangiqsualujjuaq	Total
Vascular						
Species	31	43	12	43	12	55
Genera	26	34	8	35	9	43
Families	19	22	3	22	3	25
Non-Vascular						
Species	8	15	7	16	8	23
Genera	9	13	4	15	6	19
Families	9	11	2	12	3	14

Table 2. Inuktitut vocabulary for plant anatomy, berries, and medicinal taxa in Kangiqsualujjuaq and Nain.

General Vocabulary		
Plant part/organ	Kangiqsualujjuaq	Nain
plant	<i>pirurtuq</i>	<i>piguttuk</i>
flower	<i>pirutsiaq</i>	<i>piguttuk</i>
silk/cotton	<i>qakurtalik,</i> <i>aqlasisiutik, nuvuraq</i>	<i>suputik</i>
catkin	<i>qimminguaq,</i> <i>qimminguaqujait,</i> <i>urpiitpaurngangit,</i> <i>mirqulik, miqqulik</i>	<i>piguttuk, uppialuk ?</i>
cone, strobiles	<i>qimminguaq</i>	<i>paungak, napâttupaungnga,</i> <i>napattuk paungngak</i>
berry	<i>paurngaq</i>	<i>paungak, paungngak,</i> <i>paungait, paungatuinnak</i>
berry - ripe	<i>aunig</i>	<i>aunik</i>
gall	<i>pingaluk, atsitumuat,</i> <i>pattaujaq, pingiup</i> <i>unguunanga,</i> <i>unguunaaluk,</i> <i>akirug, paurngaq</i>	<i>pullak, piuluKutik, paungak</i>
bud	<i>manguq, nuvugak, paungakuluit, kangasotik ?</i> <i>paurngaq</i>	
distal part, still growing	<i>nutaijurtuq,</i> <i>nuvugaq, nuvuqaq</i>	
leaf, leaves	<i>uqaujaq, uqaujait, mapattak, sappatak, uKaujak</i> <i>uqaujavalat,</i> <i>uquajatuinnait</i>	
leaves - old, yellow	<i>pinik</i>	
needles, needle-bearing branches	<i>qisirtauti, qisirtautik,</i>	<i>Kisittotik</i>

	<i>akiruaq</i>	
bark	<i>amiruaq</i>	<i>amigak</i>
resin/gum (hard)	<i>kutsuk, kutsutuinnaq</i>	<i>kutsuk, kutsok</i>
resin/sap (runny)	<i>qulliaq, qurliak</i>	<i>Kulliak</i>
branch/branches	<i>urpik, akiruaq, palliq</i> (old)	<i>uppigak, akiguk</i>
stem/trunk	<i>naparutaq</i>	<i>nappajuk, napâttuk</i>
trunk (base of tree)	<i>palliq (old)</i>	<i>miminnak</i>
stump		<i>kipakuk</i>
wood	<i>umaak, umaaq, qijuq</i>	<i>pannak (dry), Kausinnik (wet, live)</i>
wood - rotten	<i>puvaq, puvaujaq, puvaujak</i>	
roots	<i>amaak, amaa, airaq, mangua, nuvugak</i>	<i>amak, ammak</i>

Vocabulary for Medicinal Taxa

Family	Genus species	Kangiqsualujjaq	Nain
Cornaceae	<i>Cornus canadensis</i> L.	<i>aupaalutuk</i>	<i>sigalak/sigalâk, imukkuluk, kimminaujak</i>
Cupressaceae	<i>Juniperus communis</i> L.	<i>qisirtutaujaq</i>	<i>kigutanginnaujak, kigutanginnak Kisiktutaujak, ummaujak</i>
Ericaceae	<i>Arctous alpine</i> (L.) Nied.	<i>kallak, kallait</i>	<i>kallak</i>
Ericaceae	<i>Empetrum nigrum</i> L.	<i>paurngaq, paurngait</i>	<i>paungak, paungngak, paungatuinnak</i>
Ericaceae	<i>Vaccinium cespitosum</i> Michx.	<i>kigutanginnalikait, nalikak</i>	<i>pungajuk, kigutanginnakuluk</i>
Ericaceae	<i>Vaccinium oxycoccos</i> L.		<i>kimminaujak</i>
Ericaceae	<i>Vaccinium</i>	<i>kigutanginnaq,</i>	<i>kigutanginnak,</i>

	<i>uliginosum</i> L.	<i>kigutangirnnaq</i>	<i>kigutanginnait,</i> <i>kigutanginnakuluk</i>
Ericaceae	<i>Vaccinium vitis-idaea</i> L.	<i>kimminaq</i>	<i>kimminak, pungajuinnika?</i>
Grossulariaceae	<i>Ribes glandulosum</i> Grauer	<i>mirqualik, miqqualik,</i> <i>mikquaalik</i>	<i>kimminaujak, mikKulik,</i> <i>ummilikkuluk, ummilikuluk</i>
Grossulariaceae	<i>Ribes glandulosum</i> Grauer (green immature berries)	<i>mirqualiksait,</i> <i>mikquaaliksait</i>	
Rosaceae	<i>Rubus arcticus</i> L. ssp. <i>acaulis</i> (Michx.) Focke	<i>arpiliqaq, arpilikak</i>	<i>apiujak</i>
Rosaceae	<i>Rubus chamaemorus</i> L.	<i>arpik, aqqiq</i>	<i>appik</i>
Rosaceae	<i>Rubus chamaemorus</i> L. (yellow fruits)	<i>auniq</i>	<i>aunik</i>
Rosaceae	<i>Sorbus decora</i> (Sarg.) Schneid.	<i>aupaalurtaaluk,</i> <i>aupaaluktaluq</i>	<i>kimminaujak</i>

Table 3. Taxa used for at least three usage categories and taxa used medicinally in more than one ailment category in Kangiqsualujuaq and Nain.

General Use					
Family	Identified Plant	Common Name	Growth Form	Usages	Community Reported
Betulaceae	<i>Alnus alnobetula</i> (Ehrh.) Koch subsp. <i>crispa</i> (Ait.) Raus	Green Alder	shrub	5	both
Betulaceae	<i>Betula glandulosa</i> Michx.	Dwarf birch	shrub	4	both
Bryophyta	moss (<i>niKak</i>) ^a		bryophyte	4	Nain
Chlorophyceae	green algae ^b		aquatic	5	both
Cladoniaceae	<i>Cladonia</i> spp. ^c	Lichen	lichen	4	both
Cornaceae	<i>Cornus canadensis</i> L.	Northern Bunchberry	herb	3	both
Cupressaceae	<i>Juniperus communis</i> L.	Common Juniper	shrub	4	both
Cyperaceae	<i>Eriophorum</i> spp. ^d	Cotton grass	grass	3	both
Ericaceae	<i>Empetrum nigrum</i> L.	Black crowberry	shrub	6	both
Ericaceae	<i>Rhododendron groenlandicum</i> (Oeder) Kron & Judd	Labrador tea	shrub	3	both
Ericaceae	<i>Rhododendron tomentosum</i> Harmaja	Northern Labrador	shrub	3	both

		tea			
Ericaceae	<i>Vaccinium</i>	Dwarf	shrub	3	both
	<i>cespitosum</i> Michx.	bilberry			
Ericaceae	<i>Vaccinium</i>	Alpine	shrub	4	both
	<i>uliginosum</i> L.	bilberry			
Grimmiaceae	<i>Racomitrium</i>	Woolly	bryophyte	4	both
	<i>lanuginosum</i>	moss			
	(Hedw.) Brid.				
Onagraceae	<i>Chamaenerion</i>	Fireweed	herb	4	both
	<i>angustifolium</i> (L.)				
	Scop.				
Onagraceae	<i>Chamaenerion</i>	River	herb	4	both
	<i>latifolium</i> (L.) Sweet	beauty			
Phaeophyceae	seaweed (<i>KikKuak</i>) ^f		aquatic	4	Nain
Pinaceae	<i>Larix laricina</i> (Du	Tamarack	tree	5	both
	Roi) K. Koch				
Pinaceae	<i>Picea glauca</i>	White	tree	7	Nain
	(Moench) Voss	spruce			
Pinaceae	<i>Picea mariana</i> (P.	Black	tree	7	both
	Mill.) B.S.P.	spruce			
Poaceae			grass	3	Nain
	graminoids ^g				
Poaceae	<i>Leymus mollis</i>	American	grass	3	both
	(Trin.) Hara	dune grass			
Rosaceae	<i>Rubus chamaemorus</i>	Bakeapple	herb	3	both
	L.				
Salicaceae	<i>Populus balsamifera</i>	Balsam	tree	3	Kangiqsualujjuaq
	L.	popular			
Salicaceae		Willow	shrub	5	both
	<i>Salix</i> spp.				
	(<i>uqaujaq/uKaujak</i>) ^h				

Salicaceae	<i>Salix</i> spp. (urpik/uppigak) ⁱ	Willow	shrub	5	both
Saxifragaceae	<i>Saxifraga</i> <i>tricuspidata</i> Rottb.	Three- cusped saxifrage	herb	3	Kangiqsualujjuaq
Sphagnaceae	<i>Sphagnum</i> spp.		bryophyte	4	both
Medicinal Use					
Chlorophyceae		Green algae ^b	aquatic	2	both
Crassulaceae	<i>Rhodiola rosea</i> L.	Roseroot	herb	6	both
Cupressaceae	<i>Juniperus communis</i> L.	Common juniper	shrub	5	both
Cyperaceae	<i>Eriophorum</i> spp. ^d	Cotton grass	grass	2	both
Ericaceae	<i>Rhododendron</i> <i>groenlandicum</i> (Oeder) Kron & Judd	Labrador tea	shrub	2	both
Ericaceae	<i>Rhododendron</i> <i>tomentosum</i> Harmaja	Northern Labrador Tea	shrub	2	both
Ericaceae	<i>Vaccinium vitis- idaea</i> L.	Partridge cranberry	herb	5	both
Onagraceae	<i>Chamaenerion</i> <i>angustifolium</i> (L.) Scop.	Fireweed	herb	4	Kangiqsualujjuaq
Pinaceae	<i>Larix laricina</i> (Du Roi) K. Koch	Tamarack	tree	6	both
Pinaceae	<i>Picea glauca</i>	White	tree	4	Nain

	(Moench) Voss	spruce			
Pinaceae	<i>Picea mariana</i> (P. Mill.) B.S.P.	Black spruce	tree	5	both
Rosaceae	<i>Rubus chamaemorus</i> L.	River beauty	herb	3	Kangiqsualujjuaq
Salicaceae	<i>Salix</i> spp. (<i>uqaujaq/uKaujak</i>) ^h	Willow	shrub	4	both
Salicaceae	<i>Salix</i> spp. (<i>urpik/uppigak</i>) ⁱ	Willow	shrub	4	both
Umbilicariaceae	<i>Umbilicaria</i> spp.	Rock tripe	fungus	3	both

^a General term for mosses growing on the ground

^b Colonial green algae found in freshwater streams

^c Including *C. rangiferina* (L.) E.H. Wigg., *C. pleurota* (Flörke) Schaerer

^d Including *E. angustifolium* G.H. Honckeny, *E. scheuchzeri* Hoppe

^e Most likely *Fucus* spp.

^g All grass-like species

^h Prostrate *Salix* spp.

ⁱ Tree-like *Salix* spp.

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Figure captions:

Figure 1. Map showing locations of the communities included in the survey, Nain (56.539781, -61.697317) and Kangiqsualujjuaq (58.710660, -65.966871) on the Labrador Peninsula of northeastern Canada. The locations of Herbron, Nutak, and Okak are also shown on the map, three communities from which some Nain residents have been relocated in the last century. Longitude is along the horizontal axis and latitude is along the vertical axis. This map was produced using the R package ggmap. See map attribution in the bottom, righthand corner.

Figure 2. Plant uses in Nain and Kangiqsualujjuaq. Thirty-nine of 78 total species were used in both communities (50%). Unique taxa were taxa that were reported in only one community.

Figure 3. Medicinal uses of all taxa in Nain and Kangiqsualujjuaq. Thirteen of 30 medicinal species were used in both communities (43%). Unique taxa were taxa that were reported in only one community.

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Figure 2.

Figure 3.