Review

Possible similarities between the folk medicine historically used by First Nations and American Indians in North America and the ethnoveterinary knowledge currently used in British Columbia, Canada

Cheryl Lans

IEZ (Institute for Ethnobotany & Zoopharmacognosy), Rijksstraatweg 158, 6573 DG Beek, Netherlands

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A B S T R A C T

Aims of the study: This paper compares sixty-four plants used as ethnoveterinary remedies in British Columbia with First Nations folk medicine.

Materials and methods: In 2003, I conducted semi-structured interviews with 60 participants obtained using a purposive sample. The data was then compared with historical documents on First Nations plant use.

Results: Exact parallels between First Nations/native American folk medicine and ethnoveterinary remedies used for farm animals and horses were Acer macrophyllum Pursh, Epilobium angustifolium L. and Lonicera involucrata (Richardson) Banks ex Spreng., used as stimulants and tonics for goats; Achlys triphylla DC. as a fly repellent in barns, Alnus rubra Bong., for rabbits' dental care, Berberis repens Lindl., Rumex crispus L., to treat sores and rashes on horses, Pinus ponderosa Douglas ex C. Lawson for stomach problems and Bovista pila Berk. and M. A. Curtis and Dolichousnea longissima (Ach.) Articus used on wounds.

Conclusion: This study revealed the parallel uses between sixty-four plants used as ethnoveterinary medicines in British Columbia and the folk medicines used by the First Nations peoples and by native American groups.

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1. Introduction

Ethnoveterinary research documents and validates traditional veterinary practices (Köhler-Rollefson and Bräunig, 1998). There are many historical records of ethnoveterinary remedies used in North America (Steedman and Teit, 1930; Speck, 1917). Vanilla leaf (Achlys triphylla DC.), and strong-smelling plants like big sagebrush (Artemisia tridentata Nutt.), were used as insect repellents (Turner, 2001a). Dogs and horses were often healed with the same plants that British Columbia’s Thompson Indians used on themselves (Steedman and Teit, 1930). The Cosióte of Utah used Galium aparine L. for horses (Chamberlin, 1911). The Ojibwa treated horses with Artemisia ludoviciana Nutt. (Moerman, 1982). Horses with distemper were treated with smoke from Echinacea angustifolia DC. (Gilmore, 1991). The Meskwaki used Artemisia ludoviciana Nutt., to smoke ponies with distemper (Smith, 1928b). The Apache and Navajo also used plants to treat their horses and the Hidatsa
used Artemisia spp., during the gelding operation. Pregnant mares were given chicory roots (Cichorium intybus L.) to encourage them to drink more water and improve their condition (Lawrence, 1996; 1998). Ethnoveterinary remedies include those of the Pawnee, Omaha and Dakota who used a boiled tea of juniper berries and leaves (Juniperus communis L.) for coughs in horses. Indians of the Missouri river region used a leaf and fruit decoction of Pinus murrayana Balf., for coughs in horses (Gilmore, 1991). Alder and birch barks (Alnus incana (L.) Moench and Betula nigra L., were used for skin conditions on horses and people. In British Columbia, the Okanagan used chocolate tips (Lomatium dissectum (Nutt.) Mathias & Constance) as a fish poison and an insecticide for livestock.

This paper traces the possible cultural origins of sixty-four plants used as ethnoveterinary remedies in British Columbia (BC) by comparing their uses with First Nations and Native American ethnobotany. The comparison study was undertaken because one respondent claimed to be the originator of the medicinal remedies used for goats in British Columbia. However during the validation process in which a manual was prepared and given to each research participant (Fig. 1), I noticed that I was replicating the already-published work of others except in rare cases where an animal had been observed using a plant. During public presentations of the research (Lans and Boepple, 2003; Lans et al., 2004), noted ethnobotanist Professor Nancy Turner of the University of Victoria (who was also the research supervisor), remarked that many of the plant uses originated in First Nations plant lore. Professor Turner also brought a traditionally wrapped vanilla leaf insect repellent (Achlys triphylla DC.) to a public discussion in 2003. Her observations predated the concern of Leonti (2011) who wrote that field based studies run the risk of repeating information and knowledge that informants have gleaned from publications.

2. Background and methods

Information on Ethnoveterinary remedies used in British Columbia was collected over a six-month period in 2003. The research area included Vancouver Island as far north as Port Alberni, the Lower Mainland of British Columbia (BC), and areas in the Interior (Armstrong, Chase, Salmon Arm, Kelowna, Cawston and Fauquier). British Columbia’s farms are located mainly in the Lower Mainland and the North Okanagan Valley and on Vancouver Island. Fig. 1 is the cover of the manual given to each participant at the end of the research and it includes two maps of the research area. All available literature about livestock farmers and the secondary literature on ethnomedicinal plants, folk medicine and related fields in British Columbia was reviewed.

A purposive sample of livestock farmers was necessary to target key informants with the knowledge sought. The sample size was 60. The sample was obtained from membership lists of organic farmers, horse and dog breeders and trainers, horse stables, sheep, cattle and goat breeders, naturopaths, farm womens’ networks, meat processors, other specialists in alternative medicine and holistic veterinarians. Of these, nine chicken and turkey and rabbit farmers and three herbalists provided ethnoveterinary remedies used for poultry and rabbits. The poultry farmers were either organic (commercial operations) or farm-gate producers. The researchers saw Asian specialty chicken on one farm. Interviewees with horses comprised one naturopath, four horse breeders/trainers, two herbalists, one farmer and one headmistress with horses at her school (for girls). Seven of the participants had goats and a few had cows. Information on pets came from 2 naturopaths, 10 herbalists, 5 dog trainers, breeders and pet shop owners, 9 holistic veterinarians and 6 of 27 organic farmers.

Two visits were made to each farm or respondent. A draft outline of the respondent’s ethnoveterinary remedies was delivered and discussed at the second visit in order to establish that dosages were accurately noted, for input on content, and to clarify any points. The respondent-approved drafts were compiled into a draft outline. The draft outline was then posted to the relevant address and a second phone interview or visit confirmed the information collected in the first interview was accurate. Medicinal plant specimens were collected where possible by two student ethnobotanists and two herbalists and were identified and deposited as vouchers in the University of Victoria herbarium (UVIC). Some plants were always used as purchased products and these plants could not be collected. In the cases where purchased products were used by respondents, the species used and active ingredient contents were checked on the product label and confirmed on the using the United States Department of Agriculture (USDA) Natural Resources Conservation Service Plants Database (http://plants.usda.gov/index.html) to confirm that their geographical distribution included British Columbia. Some manufacturers use non-native species in their products because the German Commission E monographs provide details on European and well-known Asian species, so it is easier to standardize products based on these species. This paper includes introduced species because they may have obtained new uses in their new locations. For example Solidago virgaurea ssp. minuta was one of several seeds exchanged at an event in Vancouver (http://www.agc-bc.ca/archive/2007-seedlist.asp). There is no physical border between Washington State in the United States and British Columbia in Canada that would prevent seed dispersal.

The plant-based remedies were evaluated for safety and efficacy with a non-experimental method, prior to including them in the draft outline. Published sources such as journal articles and
books and databases on pharmacology and ethnomedicine available on the Internet were searched to identify the plants’ chemical compounds and clinically tested physiological effects. Searches were also conducted on the reported folk uses of the plants, and their preparation and administration in North America and Europe. For each species or genus the ethnomedicinal uses in other countries are given; then follows a summary of chemical constituents, in addition to active compounds if known.

2.1. Validation workshop

A participatory workshop held in October 2003 involved group discussion of the previously recorded ethnoveterinary remedies. Ten participants with experience in traditional human and ethnoveterinary medicine took part in the participatory five-day-long workshop hosted by the first author and a German ethnoveterinary consultant. In the workshop the facilitators asked participants very specific questions in a supportive environment about the medicinal plants used (Mundy and Mathias, 1997). Each animal/livestock species was covered in a morning or afternoon session. At each session the participants introduced themselves and their work and were acquainted with the participatory workshop method. The participants discussed the previously produced poultry/pets/ruminant/horse section of the research information. There were two editorial assistants/facilitators in attendance. After the discussions, the information on each species was edited. Two herbalists in the Vancouver Island community of Port Alberni were visited by the consultant and the first author and the edited information on poultry and pets was discussed with them.

None of the respondents was of native or non-European origin. The 2006 census puts the number of British immigrants in British Columbia at 12.3% (137,445) and those from Western Europe at 7.1% (79,975). The 2001 census of BC (2001) revealed that German was spoken by 8.5% (84,605) of British Columbia residents, French by 85.5%, Spanish and Italian by 2.8% each and Dutch by 2.7%. Other languages spoken by more than 1% of the European-origin populations are Polish, Russian, Portuguese and Ukrainian.

The author noted on many visits that informants possessed one or more of the works of Professor Nancy Turner of the University of Victoria, British Columbia. Additional field guides of native plants and occasionally books on ethnoveterinary medicine were also observed on bookshelves.

Literature searches for parallel uses of ethnoveterinary plants used in BC by First Nations and Native American tribes (using all of their alternate names) close to the Canadian border began in 2003 and ended in December 2012, after which a previous version of this paper was uploaded to ResearchGate as a dataset (Lans, 2013). Blocks of time were set aside during this period (2008–2011) to search online databases and digitized books for plant uses. The Hathi Trust Digital Library, Google Books, the Biodiversity Heritage Library, Internet Archive, JSTOR and Project MUSE were the chief sources of information. A Database of Foods, Drugs, Dyes and Fibers of Native American Peoples, Derived from Plants’ at http://naemb.cbr.org/, was used in 2016. The functionality of this last database has been improved recently so that a search of primary documents (requiring funding to visit libraries) is no longer necessary for this review paper and it can be published. Some Native American groups have had no anthropological or ethnobotanical research conducted on them or have yet to be included in the database for other reasons.

2.2. First Nations people and their folk medicines

Recent genetic research has suggested that all present-day Native Americans, including Amerindians and Athabascans, migrated to North America from Siberia in one to three migration waves approximately 23 thousand years ago (Reich et al., 2012; Raghavan et al., 2015; Skoglund et al., 2015). In addition to this group that came from or through Siberia, there are some genetic links to a founding population linked to indigenous groups in Australia, Melanesia, and island Southeast Asia (Skoglund et al., 2015). Once in North America, ancestral Native Americans diversified into two main genetic branches about 13 thousand years ago. One of these groups is now dispersed across North and South America and the other is only found in North America (Raghavan et al., 2015).

In this paper I treat First Nations and Native Americans as one group of people with different names on both sides of the border. First Nations are located in Canada and Native Americans in the United States of America. Some tribal groups lived on both sides of the border and have different names on each side. Some tribes are descended from and aligned to larger groups such as the Sioux or Delewares. In addition, tribes defeated in various Wars were assimilated into other tribes or moved to different territories, presumably taking their plant knowledge with them.

British Columbia is divided into Culture Areas with common archeological features. British Columbia’s and Washington’s coastal peoples belong to the Northwest Coast Culture Area and lived close to water (Turner, 1973, 1995, 2001a). They also established camping sites close to Acer spp. and its Betula spp. and other food sources (Turner et al., 2003). Neighboring groups as the Comox and Stl’atl’imx, Inland Tingit, Gitxan and Nisga’a share many cultural features of the Northwest Coast Culture Area (Turner, 1995). The Nuxalk (Salish speaking) shared the plant technology of their neighbors the Haisla, Heiltsuk and Kwakwaka’wakw.

Bella Coola is a Salishan language but at least 11 plant names are taken from the Klikitat language suggesting a high degree of trade and other connections (Turner, 1973).

The Plateau Culture Area includes the Salishan peoples of the Interior Plateau and the Ktunaxa of eastern BC. The Subarctic Culture Area includes the Athapaskan groups of central and northern BC. The interior groups bordering the coastal area –the Lower St’atl’imx, Lower Nlaka’pamux, Inland Tingit, Gitxan and Nisga’a share many cultural features of the Northwest Coast Culture Area (Turner, 2001a). The coastal groups used interior plant products, and had exclusive access to coastal plant materials.

The Potowatomi, Ojibwe and Ottawa Indians are descendants of the Delewares. They lived in Ontario or in the Eastern US until they were driven to Wisconsin by the Iroquois (Smith, 1933). The ancestral lands of the Cree extended across Saskatchewan and Alberta (Mandellbaum, 1979). This brief introduction cannot include all of the First Nations and Native American groups whose knowledge appears in Tables 1 and 2.

Several plants of economic value were transplanted across North America (Smith, 2011). Turner and Loewen (1998) recorded that many plants were traded by First Nations groups and presumably with early settlers as well, but secret medicinal plant treatments did not become public knowledge until their success (or dangerous attributes) led to their notoriety; for example the use of cascara bark (Fragula purshiana Cooper) as a laxative.

Maps of the Native American and First Nation groups at the time of European contact are provided as Figs. 2–5.

Archeological records show that Echinacea pallida (Nutt.) Nutt. var. angustifolia DC., Echinacea tennesseensis (Beadle) Small, Portulaca oleracea L., and Urtica dioica L, were used by Native Americans before the arrival of the Europeans (Small and Catling, 2000). The following plants were found in Native American middens and growing adjacent to Native American settlements: kelp (Fucus vesiculosus L.), salmonberry (Rubus spectabilis Pursh), blackberry and dewberry (Rubus spp.), blueberry and cranberry (Vaccinium species), Acer circinatum Pursh, Sambucus racemosa Linn., red-cedar (Thuja plicata Donn ex D. Don), salal (Gaultheria shal1on Gr.), thimble berry (Rubus odoratus L.), wild strawberry (Fragaria virginiana Mill.), and bearberry (Arctostaphylos uva-ursi (L.) Spreng.) (Reagan, 1934; Smith, 2011).
<table>
<thead>
<tr>
<th>Scientific name, botanical family, voucher no.</th>
<th>Ethnoveterinary use</th>
<th>First Nations ethnobotany use</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Achillea millefolium</em> L. (Compositae) JS041</td>
<td>Diarrhea, colds and flu, ear problems, detox blood</td>
<td><em>Achillea lanulosa</em> plant infusion was used for coughs. The leaf tea was used for colds by the Cheyenne. The Mohegans used a leaf infusion for stomach problems, kidney disorders, liver problems</td>
<td>Grinnell, 1962; Tantaquidgeon et al., 1972</td>
</tr>
<tr>
<td><em>Achillea millefolium</em> L. (Compositae) JS041</td>
<td>Diarrhea, colds and flu, ear problems, detox blood</td>
<td>The Bella Coola used chewed leaves of <em>Achillea millefolium</em> on burns. The Southern Carrier used the plant top decoction for colds. The Gitksan used the young plant top decoction in June and July for sore throats and the roots in other seasons. Makah chewed leaves as a blood purifier.</td>
<td>Smith, 1928a, 1928b; Gunther, 1973</td>
</tr>
<tr>
<td><em>Arctium lappa</em> L. (Compositae) JB32</td>
<td>Skin conditions, rheumatism and joint pain, rhematoid arthritis, seasonal allergies</td>
<td>The Forest Potawatomi used a tea from the root of <em>Arctium minus</em> as a general tonic and blood purifier. The Mohegans used <em>Arctium minus</em> Berln., for rheumatism and winter colds</td>
<td>Smith, 1933; Tantaquidgeon et al., 1972</td>
</tr>
<tr>
<td><em>Arctostaphylos uva-ursi</em> L. SB. Spreng. (Ericaceae) JBC6</td>
<td>A commercial formula of <em>uva ursi/bearberry</em> (Arctostaphylos uva-ursi), bilberry (<em>Vaccinium myrtillus</em>) and juniper berries (<em>Juniperus communis</em> L.) is used for urinary problems in pets</td>
<td>Berries were eaten for kidney disorders. A decoction of leaves and stems was taken as a tonic for kidneys by the Okanagan, Thompson, Okanagan-Colville</td>
<td>Moerman, 1998; Turner et al., 1990</td>
</tr>
<tr>
<td><em>Crataegus hirsutiflora</em> Gand. (Rosaceae) not collected</td>
<td>Blood pressure, viral problems</td>
<td>The Forest Potawatomi used the <em>Crataegus rotundifolia</em> fruit for stomach complaints.</td>
<td>Smith, 1933</td>
</tr>
<tr>
<td><em>Echinacea purpurea</em> (L.) Moench (Compositae) JBC 07</td>
<td>snakebite</td>
<td>Used for snakebites by Native Americans. Used for poisons by the Dakota. Also Echinacea angustifolia DC and <em>Echinacea pallida</em> (Nutt.) Nutt.</td>
<td>Moerman, 1982; Gilmore, 1991</td>
</tr>
<tr>
<td><em>Equisetum palustre</em> L. (Equisetaceae) JS60</td>
<td><em>Equisetum arvense</em> plant infusion was used for colds, cough, grippe, and scurvy by the Maritime, Micmac, Malagasy.</td>
<td><em>Equisetum arvense</em> whole plant tea was used for kidney and bladder troubles by the Forest Potawatomi. The Menomini used horsetail tea for kidney troubles.</td>
<td>Smith, 1933; Kindscher, 1992</td>
</tr>
<tr>
<td><em>Frangula purshiana</em> Cooper</td>
<td>Cascara bark is used for chronic constipation in cats</td>
<td>Coastal First Nations used cascara as a laxative.</td>
<td>Turner, 1973; Turner, 1995</td>
</tr>
<tr>
<td><em>Frangula purshiana</em> Cooper (Rhamnaceae) not collected</td>
<td>Megacolon, constipation, cancer</td>
<td>The Forest Potawatomi used the inner bark of <em>Rhamnus alnifolia</em> L. for a physic.</td>
<td>Smith, 1933</td>
</tr>
<tr>
<td><em>Gentiana lutna</em> L. (Gentianaceae) purchased product</td>
<td>worms, ear infections</td>
<td><em>Gentiana flava</em> root was used by the Forest Potawatomi to make a tea considered alternative (no purging or vomiting).</td>
<td>Smith, 1933</td>
</tr>
<tr>
<td><em>Juniperus communis</em> L.</td>
<td>diarrhea</td>
<td>A decoction of roots, leaves, branches and bark of <em>Juniperus communis</em> was used for stomach pain and as a tonic by the Bella Coola; also by tribes in Nevada.</td>
<td>Teit and Steedman, 1986; Teit et al., 1900; Smith, 1928a, 1928b; Train, 1957</td>
</tr>
<tr>
<td><em>Juniperus communis</em> L. (Cupressaceae) not collected</td>
<td>diarrhea</td>
<td>A compound decoction of <em>Juniperus communis</em> berries was used for diarrhea by the Kwakwale. Debarked stem tea was used for diarrhea by the Woods Cree.</td>
<td>Moerman, 1998; Marles et al., 2000</td>
</tr>
<tr>
<td><em>Pinus contorta</em> Douglas ex Loudon (Pinaceae)</td>
<td>ditto</td>
<td>Pine tops of any pine species were used for colds, flu and pneumonia by the Lumbee. <em>Pinus strobus</em> plant was used for colds, cough, grippe, flu and scurvy by the Maritime, Micmac, Malacite, Mohegans, Montagnais, Menomini. <em>Pinus resinosa</em> inner bark was placed on the stomach for colds by the Tete-de-Boule. <em>Pinus contorta</em> and <em>Pinus banksiana</em> gum were chewed as cold medicine by the Cree.</td>
<td>Duke, 1986; Duke, 1988; Marles et al., 2000</td>
</tr>
<tr>
<td><em>Pinus contorta</em> Douglas ex Loudon (Pinaceae)</td>
<td>ditto</td>
<td><em>Pinus contorta</em> infusions of twigs with needles attached was used for influenza by the Thompson</td>
<td>Turner, 1990</td>
</tr>
<tr>
<td><em>Pinus contorta</em> Douglas ex Loudon (Pinaceae)</td>
<td>Respiratory problems, heart problems</td>
<td>The Southern Carrier boiled new shoots and drank the decoction for stomach pains. The pitch of <em>Pinus contorta</em> was chewed and the salvia swallowed for a cough by the Sikani. The Northern Carrier boiled needle tips of <em>Pinus contorta</em> with other plants for constitutional weakness.</td>
<td>Smith, 1928a, 1928b</td>
</tr>
<tr>
<td><em>Pinus ponderosa</em> Douglas ex Lawson (Pinaceae) JB98</td>
<td>Respiratory problems, heart problems</td>
<td>The pitch of <em>Pinus banksiana</em> and <em>Pinus trobus</em> from the wood and bark were used by the Forest Potawatomi as ointments. The leaves were used as a fumigant, and to clear the lungs of congestion. They used the leaves of <em>Pinus resinosa</em> as a reviver.</td>
<td>Smith, 1933;</td>
</tr>
<tr>
<td><em>Rubus ursinus</em> Cham. &amp; Shlecht. JS115 JS115 and <em>Rubus laciniatus</em> Willd. (Rosaceae)</td>
<td>Pregnancy, digestive problems, wound wash</td>
<td>The Forest Potawatomi used <em>Rubus ursinus</em> decoction of the leaves or flowers for diarrhea, dysentery and cholera. The leaves were also used as a wash for leucorrhoea, gonorrhoea and prolapsed uterus.</td>
<td>Smith, 1933</td>
</tr>
</tbody>
</table>
Elders of the Saanich and Cowichan Coast Salish people of southern Vancouver Island treat, or have treated in the recent past, many ailments with bark preparations (Turner and Hebda, 1990). Respiratory ailments were treated with bark of Abies grandis Douglas ex D. Don, Arbutus menziesii Pursh, Cornus nuttallii Audubon ex Torr. & A. Gray, Prunus emarginata (Douglas ex Hook.) Walp, Pseudotsuga menziesii (Mirb.) Franco and Quercus garyana Douglas ex Hook. Digestive tract ailments were treated with the bark of Abies grandis, Alnus rubra Bong., Arbutus menziesii, Malus fusca (Raf.) C. K. Schneid., Oemleria cerasiformis (Torr. & A. Gray ex Hook. & Arn.) J. W. Landon, Populus tremuloides Michx., Pseudotsuga menziesii, Frangula purshiana Cooper and Rubus spectabilis Pursh. Gynecological problems were treated with the bark of Abies grandis, Arbutus menziesii, Populus tremuloides, Prunus emarginata, Pseudotsuga menziesii and Sambucus racemosa L. Dermatological complaints were treated with the bark of Mahonia spp., Rubus spectabilis, and Symphoricarpos albus (L.) S. F. Blake. One Nation used medicinal preparations from Arbutus menziesii bark and leaves for colds, stomach problems, as a post-childbirth contraceptive, and in a ten-ingredient bark medicine for tuberculosis and spitting up blood (Turner and Hebda, 1990). Tree barks have also been used to treat fevers, diabetes, kidney problems, sore eyes, and hemorrhaging, and also used as general tonics. In most cases, infusions or decoctions of barks are used in First Nations ethnomedicines. The medicines are drunk or applied externally as a wash.
<table>
<thead>
<tr>
<th>Scientific name, botanical family, voucher specimen code</th>
<th>Part(s) used</th>
<th>Animal species</th>
<th>Ethnoveterinary use</th>
<th>Preparation/administration</th>
<th>First Nations/Native American ethnoveterinary use</th>
<th>Nation</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abies grandis (Dougl. Ex D. Don) Lindl. (Pinaeaceae) (not collected)</td>
<td>branch</td>
<td>goat</td>
<td>body heat</td>
<td>fed, browse</td>
<td>Abies balsamea and Abies lasiocarpa inner bark decoction was used for colds and the sap decoction was a cure all. Cough medicine, tonic and laxative for the Kwakiutl.</td>
<td>Cree, Dene; Bella Coola</td>
<td>Marles et al., 2000; Turner and Bell, 1973; Turner, 1990</td>
</tr>
<tr>
<td>Abies grandis (Dougl. Ex D. Don) Lindl. (Pinaeaceae) (not collected)</td>
<td>branch</td>
<td>goat</td>
<td>body heat</td>
<td>fed, browse</td>
<td>Balsam gum was eaten for colds and the Paiute and Washoe in Nevada ate the resin for tuberculosis or colds.</td>
<td>Potawatomi, Ojibwa, Meminnee; Thompson</td>
<td>Moerman, 1982; Smith, 1933; Turner, 1990</td>
</tr>
<tr>
<td>Abies grandis (Dougl. Ex D. Don) Lindl. (Pinaeaceae) (not collected)</td>
<td>branch</td>
<td>goat</td>
<td>body heat</td>
<td>fed, browse</td>
<td>Abies lasiocarpa inner bark was eaten. The inner bark of Abies grandis was eaten; bark infusion taken as an anti-aging tonic.</td>
<td>Thompson</td>
<td>Turner, 1990; Teit and Steedman, 1986; Teit et al., 1900</td>
</tr>
<tr>
<td>Acer macrophyllum</td>
<td>6-inch sticks</td>
<td>rabbit</td>
<td>tooth health</td>
<td>fed</td>
<td>Acer rubrum inner bark was used as a stimulant. A hair tonics for the Kwakiutl.</td>
<td>Appalachia</td>
<td>Bolyard, 1981; Turner and Bell, 1973</td>
</tr>
<tr>
<td>Acer macrophyllum Pursh, (Sapindaceae) JB26</td>
<td>inner bark</td>
<td>goat</td>
<td>body heat</td>
<td>browse</td>
<td>Acer macrophyllum young shoots were eaten raw in spring.</td>
<td>Thompson</td>
<td>Turner, 1990</td>
</tr>
<tr>
<td>Achillea millefolium</td>
<td>leaves</td>
<td>ruminants</td>
<td>insect repellent</td>
<td>hung</td>
<td>Achlys triphylla DC., leaves were used as an insecticide and a leaf decoction was used for lice.</td>
<td>Saanich, N;laka'pamux, Thompson</td>
<td>Turner, 1979; Turner and Loewen, 1998</td>
</tr>
<tr>
<td>Alnus rubra Bong. (Betulaceae) JB108</td>
<td>6-inch sticks</td>
<td>rabbit</td>
<td>tooth health</td>
<td>fed</td>
<td>Teeth were cleaned with burnt ashes of alder and birch, Alnus rubra, Alnus tenuifolia, Alnus crispa ssp. sinuata. The roots of Alnus rugosa were used for toothache.</td>
<td>Okanagan; Algonquin</td>
<td>Turner and Loewen, 1998; Turner and Bell, 1973; Duke, 1986</td>
</tr>
<tr>
<td>Alnus rubra Bong. (Betulaceae) JB108</td>
<td>branch</td>
<td>goat</td>
<td>body heat</td>
<td>fed, browse</td>
<td>The bark was held in the mouth for blood spitting by the Kwakiutl. Rotten wood rubbed on body for aching bones.</td>
<td>Okanagan</td>
<td>Turner and Loewen, 1998; Turner and Bell, 1973; Gunther, 1973</td>
</tr>
<tr>
<td>Arbutus menziesii Pursh (Ericaceae) JB24</td>
<td>fresh &amp; dried leaves</td>
<td>goat</td>
<td>body heat</td>
<td>fed, browse</td>
<td>Arbutus menziesii leaves were chewed for strength.</td>
<td>Halkomelem</td>
<td>Turner, 1990</td>
</tr>
<tr>
<td>Arctostaphylos uva ursi (L.) Spreng. (Ericaceae) JBCL6</td>
<td>aerial parts</td>
<td>horses</td>
<td>urinary problems</td>
<td>fed</td>
<td>Arctostaphylos uva ursi upper parts were made into an infusion for “back pain” or “disordered kidneys”.</td>
<td>Cheyenne</td>
<td>Grinnell, 1962</td>
</tr>
<tr>
<td>Artemisia dracunculus L. (Compositae) JS025</td>
<td>aerial parts</td>
<td>large animals and poultry, endoparasites</td>
<td>fed</td>
<td></td>
<td>Artemisia spp., and Artemisia nova teas are used as a physic. Various infusions of stem, seed pods and leaves of Artemisia tridentata Nutt., were taken as a laxative.</td>
<td>Paiute; Sanpoil</td>
<td>Murphey, 1959; Ray, 1932</td>
</tr>
<tr>
<td>Berberis aquifolium Pursh (Berberidaceae) JB79</td>
<td>root</td>
<td>horses</td>
<td>abscesses</td>
<td>infusion</td>
<td>Berberis repens root infusion was used on sores on horses.</td>
<td>Blackfeet</td>
<td>Helson, 1974</td>
</tr>
<tr>
<td>Berberis aquifolium Pursh (Berberidaceae) JB79</td>
<td>Root</td>
<td>goat</td>
<td>abscess</td>
<td>decoction</td>
<td>Mahonia aquifolium was used as a tonic for the blood. Shredded bark used as an antihemorrhagic</td>
<td>Thompson; Okanagan-Colville; Kwakiutl</td>
<td>Turner, 1990; Turner et al., 1980; Turner and Bell, 1973</td>
</tr>
<tr>
<td>Berberis aquifolium Pursh (Berberidaceae) JB79</td>
<td>Blechnum spicant (L.) Sm. (Blechnaceae) not collected</td>
<td>fronds</td>
<td>goat</td>
<td>magnesium supplement</td>
<td>Dermatological complaints are treated with the bark of Mahonia spp.</td>
<td>Salish</td>
<td>Turner and Hebda, 1990</td>
</tr>
<tr>
<td>Bovista pila Berk. &amp; M. A. Curtis (Agaricaceae) JB1</td>
<td>gleba</td>
<td>goat</td>
<td>wound dressing</td>
<td>poultice</td>
<td>Blechnum spicant was eaten to relieve hunger when lost, for stomach distress and as a tonic. The Kwakiutl used a root decoction for diarrhea.</td>
<td>Makah, Nootka, Nitinaht</td>
<td>Turner, 1983; Turner and Bell, 1973; Gunther, 1973</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Prairie mushrooms were gathered and kept for use as a styptic for any wounds, Spores of Bovista pila Berk. &amp; M. A. Curtis were used on wounds</td>
<td>Pawnee, Dakota, Ponca, Omaha; Bella Coola</td>
<td>Gilmore, 1991; Smith, 1928a, 1928b; Marles et al., 2000</td>
</tr>
</tbody>
</table>
The closely related *Lycoperdon* spp., also referred to as puffballs were used to stop bleeding cuts and wounds. Epilobium angustifolium young shoots and stalks were eaten raw. Epilobium angustifolium was thought to be good food for horses and deer. Equisetum arvense powdered stems are given to horses to perk them up.

Tincture; decoction of bark as a cathartic

Quillayute, Kwakiutl; Sanpoil Nitinaht; Kwakiutl

Reagan, 1934; Turner and Bell, 1973; Ray, 1932

Turner, 1983; Fenn et al., 1978; Turner, 1978; Turner and Bell, 1973

A tea of *Gaultheria procumbens* was drunk to feel good and as a panacea.

Gaultheria shallon Pursh (Ericaceae) JS100

Deer chewed leaves of *Gaultheria shallon* and used them on bullet wounds. A leaf tea of *Gaultheria procumbens* was used for fevers and contains methyl salicylate.

Glycyrrhiza lepidota root was used to treat windgalls in horses (a tumor or swelling on the fetlock joint).

Blackfeet

Hellsion, 1974

Turner, 1997; Smith, 1933; 1928a, 1928b

Gilmore, 1991

Duke, 1986

Turner, 1923; Duke, 1986

Duke, 1986

Turner et al., 1980; Steedman and Teit, 1930

Steedman, 1928

Teit and Steedman, 1928

Steedman and Teit, 1930

Duke, 1986

Turner, 1997; Smith, 1933; 1928a, 1928b

Montagnai, Potawatomi

Turner, 1990; Steedman and Teit, 1930

Thompson

Duke, 1986

Ray, 1932; Teit and Steedman, 1928

Turner et al., 1980; Teit and Steedman, 1928

Cherokee

Duke, 1986

Chiricahua Apache

Opler, 1959

Okanagan, Thompson

Okanagan-Colville

Okanagan-Colville

Okanagan, Thompson

Okanagan-Colville

Moerman, 1998

Turner, 1983

Turner, 1973; Turner, 1990

Okanagan, Bella Coola, Thompson

Turner et al., 1980

Blackfeet

Hellsion, 1974

Turner, 1997; Smith, 1933; 1928a, 1928b

Gilmore, 1991

Duke, 1986

Turner, 1923; Duke, 1986

Duke, 1986

Turner et al., 1980; Steedman and Teit, 1930

Steedman, 1928

Teit and Steedman, 1928

Duke, 1986

Turner, 1997; Smith, 1933; 1928a, 1928b

Montagnai, Potawatomi

Turner, 1990; Steedman and Teit, 1930

Thompson

Duke, 1986

Ray, 1932; Teit and Steedman, 1928

Turner et al., 1980; Teit and Steedman, 1928

Cherokee

Duke, 1986

Chiricahua Apache

Opler, 1959

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Okanagan-Colville

Moerman, 1998

Turner, 1983

Turner, 1973; Turner, 1990

Okanagan, Bella Coola, Thompson

Turner et al., 1980

Blackfeet

Hellsion, 1974

Turner, 1997; Smith, 1933; 1928a, 1928b

Gilmore, 1991

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Turner, 1923; Duke, 1986

Duke, 1986

Turner et al., 1980; Steedman and Teit, 1930

Steedman, 1928

Teit and Steedman, 1928

Duke, 1986

Turner, 1997; Smith, 1933; 1928a, 1928b

Montagnai, Potawatomi

Turner, 1990; Steedman and Teit, 1930

Thompson

Duke, 1986

Ray, 1932; Teit and Steedman, 1928

Turner et al., 1980; Teit and Steedman, 1928

Cherokee

Duke, 1986

Chiricahua Apache

Opler, 1959

Okanagan, Thompson

Okanagan-Colville

Moerman, 1998
<table>
<thead>
<tr>
<th>Scientific name, botanical family, voucher specimen code</th>
<th>Part(s) used</th>
<th>Animal species</th>
<th>Ethnoveterinary use</th>
<th>Preparation/administration</th>
<th>First Nations/Native American ethnoveterinary use</th>
<th>Nation</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Potentilla recta</em> L. (Rosaceae) JB93</td>
<td>plant</td>
<td>goat</td>
<td>diarrhea, loss of appetite</td>
<td>self-medication</td>
<td><em>Potentilla monspeliensis</em> was used as a medicine. The roots of <em>Potentilla glandulosa</em> were used internally.</td>
<td>Forest Potawatomi, Gosiute of Utah</td>
<td>Smith, 1933; Chamberlin, 1911</td>
</tr>
<tr>
<td><em>Potentilla recta</em> L. (Rosaceae) JB93</td>
<td>plant</td>
<td>goat</td>
<td>Diarrhea, loss of appetite</td>
<td>self-medication</td>
<td>The whole cooked plant of <em>Potentilla</em> spp., was used as a laxative.</td>
<td>Patauas</td>
<td>Murphey, 1959</td>
</tr>
<tr>
<td><em>Pseudotsuga menziesii</em> (Mirb.) Franco (Pinaceae)</td>
<td>branch</td>
<td>goat</td>
<td>endoparasites</td>
<td>fed</td>
<td><em>Pseudotsuga menziesii</em> decoction of first-year growth and shoots are used as a tonic, and emetic for anemia and high fever.</td>
<td>Okanagan- Colville, Thompson</td>
<td>Turner et al., 1980; Steedman and Teit, 1930</td>
</tr>
<tr>
<td><em>Pseudotsuga menziesii</em> (Mirb.) Franco (Pinaceae) JS049</td>
<td>branch</td>
<td>goat</td>
<td>coccidia</td>
<td>fed</td>
<td>A gum decoction of <em>Pseudotsuga taxifolia</em> was used as a diuretic for gonorrhea and stomach problems. <em>Pseudotsuga menziesii</em> gum was used for intestinal pains and diarrhea. Digestive tract ailments were treated with <em>Pseudotsuga menziesii</em> bark.</td>
<td>Bella Coola, Salish; Kwakiutl</td>
<td>Smith, 1928a, 1928b; Turner, 1973; Turner and Hebd, 1990; Turner and Bell, 1973</td>
</tr>
<tr>
<td><em>Rubus idaeus</em> L. (Rosaceae) not collected</td>
<td>leaves</td>
<td>goat</td>
<td>Pregnancy feed</td>
<td>fed fresh or dry</td>
<td>Leaf tea of <em>Rubus idaeus</em> was given to women giving birth and postpartum. <em>Rubus idaeus</em> astringent was used on displaced wombs. The dried pounded root was used as a wound poultice.</td>
<td>Chippewa, Ojibwa</td>
<td>Duke, 1986</td>
</tr>
<tr>
<td><em>Rubus idaeus</em> L. (Rosaceae) not collected</td>
<td>leaves</td>
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<td>Chippewa, Ojibwa</td>
<td>Duke, 1986</td>
</tr>
<tr>
<td><em>Rubus idaeus</em> L. (Rosaceae) not collected</td>
<td>leaves</td>
<td>horse</td>
<td>colic</td>
<td>fed fresh or dry</td>
<td><em>Rubus alpinus</em> was drunk as a physic and for diarrhea.</td>
<td>Delaware, Fox</td>
<td>Duke, 1986</td>
</tr>
<tr>
<td><em>Rubus ursinus</em> Cham. &amp; Schltdl. (Rosaceae) JS115</td>
<td>leaves</td>
<td>horse</td>
<td>colic</td>
<td>fed fresh or dry</td>
<td><em>Rubus alpinus</em> was drunk as a physic and for diarrhea.</td>
<td>Delaware, Fox</td>
<td>Duke, 1986</td>
</tr>
<tr>
<td><em>Rubus ursinus</em> Cham. &amp; Schltdl. (Rosaceae) JS115</td>
<td>leaves</td>
<td>horse</td>
<td>colic</td>
<td>fed fresh or dry</td>
<td><em>Rubus alpinus</em> was drunk as a physic and for diarrhea.</td>
<td>Delaware, Fox</td>
<td>Duke, 1986</td>
</tr>
<tr>
<td><em>Salix alba</em> L., Salix scouleriarae Barratt ex Hook., Salix lucida Muhl. (Salicaceae)</td>
<td>powdered bark</td>
<td>horse</td>
<td>muscle soreness</td>
<td>decoction</td>
<td>The pounded root was applied to saddle sores in Nevada. Poutice of green leaves of <em>Salix alba</em> was applied to boils. <em>Salix lucida</em> and <em>Salix amygdaloides</em> branch tip decoctions are used for cramps in legs and feet.</td>
<td>Okanagan-Colville</td>
<td>Turner et al., 1980</td>
</tr>
<tr>
<td><em>Salix alba</em>, Scoulers <em>Salix scouleriarae</em>, Pacific <em>Salix lucida</em> Muhl. (Salicaceae)</td>
<td>branches</td>
<td>goat, horses</td>
<td>arthritis and pain</td>
<td>fed, self-administration</td>
<td>“Dwarf willow with yellow catkins” (a plant not identified to Species level, pg. 471) was used hot as a wash for the body or for sitting in to subdue pain and reduce swellings.</td>
<td>Thompson</td>
<td>Steedman and Teit, 1930</td>
</tr>
<tr>
<td><em>Salix spp.</em></td>
<td>6-inch sticks</td>
<td>rabbit</td>
<td>tooth health</td>
<td>fed</td>
<td>Willow sticks were used to clean the teeth daily.</td>
<td>Okanagan-Colville</td>
<td>Turner et al. 1980</td>
</tr>
<tr>
<td><em>Sambucus racemosa</em> L. (Adoxaceae)</td>
<td>plant</td>
<td>goats</td>
<td>feed</td>
<td>browse</td>
<td>A root bark decoction of <em>Sambucus racemosa</em> was used for stomach problems. The root or bark decoction was used as a</td>
<td>Okanagan-Colville</td>
<td>Turner et al. 1980</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>root bark decoction was used for stomach problems. The root or bark decoction was used as a</td>
<td>Okanagan-Colville</td>
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<td>root bark decoction was used for stomach problems. The root or bark decoction was used as a</td>
<td>Okanagan-Colville</td>
<td>Turner et al. 1980</td>
</tr>
<tr>
<td>Species</td>
<td>Part Used</td>
<td>Animal</td>
<td>Treatment</td>
<td>Tribe/Group</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------------------------</td>
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<td>-----------------------------------------------------------------------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Sambucus racemosa</em> L. (Adoxaceae)</td>
<td>plant</td>
<td>goats</td>
<td>fed browse</td>
<td>Forest Potawatomi used the inner bark of <em>Sambucus racemosa</em> as a physic with some fatalities. The Mohegans used elder (<em>Sambucus nigra</em> ssp. <em>canadensis</em> (L.) R. Bolli) for colic and as an emetic, the Menominees drank the flower tea for fevers and the Houma used a bark decoction for inflamations. <em>Sambucus callicarpa</em> Greene bark or root tea was given to women in confinement by the Hob and Quileutes.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Symphoricarpos albus</em> (L.) S. F. Blake (Caprifoliaceae) J5037</td>
<td>branch</td>
<td>sheep</td>
<td>endoparasites fed browse</td>
<td>The entire plant of <em>Symphoricarpos albus</em> was brewed and drunk as a physic to clean out the system. The sap of young shoots of <em>Symphoricarpos albus</em> was used as a laxative and for stomach aches. Decoction of roots used for illness. Okanagan-Colville; Thompson; Sanpoil</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Taxus canadensis</em> Marshall or <em>T. brevifolia</em> Nutt. (Taxaceae)</td>
<td>branches</td>
<td>goat</td>
<td>feed, browse</td>
<td><em>Taxus brevifolia</em> bark decoction was used for &quot;any illness&quot;. Thompson</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Thuja plicata</em> Donn ex D. Don (Cupressaceae) JBR 21</td>
<td>Branch; inner bark &amp; fronds</td>
<td>goat</td>
<td>Endoparasites, body heat fed, browse</td>
<td>The cambium of <em>Tsuga heterophylla</em> was used as food. Coast Salish</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Tsuga heterophylla</em> (Rafl.) Sarg. (Pinaceae) J8113</td>
<td>branch</td>
<td>goat</td>
<td>pregnancy feed fed, browse</td>
<td>The bark decoction of <em>Tsuga heterophylla</em> was used for colds and influenza. The young tips of <em>Tsuga heterophylla</em> branches were chewed to alleviate hunger. Thompson; Nitinaht</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Tsuga sp.</em> (Pinaceae)</td>
<td>branch</td>
<td>goat</td>
<td>body heat</td>
<td>A tea of the inner bark was drunk to induce sweating and relieve colds and fevers. Hunters woke refreshed from beds of hemlock boughs. Forest Potawatomi, Menominees</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Tsuga sp.</em> (Pinaceae)</td>
<td>branch</td>
<td>goat</td>
<td>body heat</td>
<td><em>Tsuga heterophylla</em> inner bark was eaten in winter. Bella Coola, Gitksan, Ha-sl, coast Salish</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Zanthoxylum americanum</em> Mill. (Rutaceae)</td>
<td>bark</td>
<td>horses</td>
<td>remove lactic acid from muscles fed</td>
<td>Prickly ash berries were used as a diuretic for horses. Bark infusion for heart problems. Moerman, 1982; Tantaquidgeon et al., 1972</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2.3. Ecoregions in the research area

The Lower Mainland ecoregion includes the Cascade Range, the Fraser River delta and the Georgia Lowland (Environment Canada, n.d). The mean annual temperature ranges from 3.5 °C to 15 °C. Mean annual precipitation ranges from 850 mm to 2000 mm at higher elevations and in winter (rain). Native vegetation is typically Douglas-fir (*Pseudotsuga menziesii*) with an understory of salal (*Gaultheria shallon* Pursh), Oregon grape (*Berberis nervosa* Pursh), and mosses (*Eurhynchium oreganum* (Sull.) A. Jaeger, *Leucoboea baileyi* (Schwarz) Lindb., *Rhytidiadelphus triquetrus* (Hedw.) Warnst.). Drier areas contain Douglas-fir, western hemlock (*Tsuga heterophylla* (Raf.) Sarg.), dogwood (*Cornus sericea* L.), red alder (*Alnus rubra* Bong.), and arbutus (*Arbutus menziesii*). Wet sites support western red cedar (*Thuja plicata*). Lower elevations contain fir (*Abies grandis*), cedar, fir (*Abies grandis*), and big leaf maple (*Acer macrophyllum*). Wet areas contain *Salix* species. Douglas fir also grows together with Scouler willow (*Salix scouleriana* Barratt ex Hook.) and huckleberry (*Vaccinium parvifolium* Sm.) (Ray, 1938; Turner et al., 2003).

The Thompson–Okanagan ecoregion is one of the warmest and driest ecoregions in Canada. It includes the valley systems of the Okanagan, Thompson and Nicola rivers. The mean annual temperature of the major valleys is approximately 6 °C with a summer mean of 15 °C (high of 27.2 °C) and a winter mean of ~3.5 °C. The mean annual precipitation ranges 250–300 mm in the major valleys, plateau regions receive 400–600 mm and more than 1000 mm falls in subalpine and alpine areas. Engelmann spruce (*Picea engelmannii* Parry ex Engelm.), subalpine fir (*Abies lasiocarpa* (Hook.) Nutt.), and lodgepole pine (*Pinus contorta* Douglas ex Loudon) grow in subalpine areas. Lower elevations contain aspen (*Populus tremuloides* Michx.), white spruce (*Picea glauca* (Moench) Voss), and Douglas-fir. *Artemisia tridentata* Nutt, and several other sageworts and wormwoods cover large areas.

3. Results

Seven of the participants had goats, five had poultry (chickens, turkeys), a few had cows, seven had horses, four either bred dogs or sold products for dogs, thirteen were holistic practitioners or herbalists and ten were small animal veterinarians using standardised products. One of the organic farmers ran a historical farm open to visitors in the summer and one herbalist taught short
courses in herbal medicine. One respondent lived in humble circumstances and had Internet access and books from the public library. One hundred and twenty-eight plants were used for ruminants. Nineteen plants from 12 plant families were used for poultry parasite control, and 11 plants from eight families were used for parasite control in rabbits. Ninety-seven plants were used to treat horses. Respondents with horses used purchased standardized horse-specific products while goats and sheep were medicated or self-medicated with the Pinaceae, Cupressaceae and Ericaceae. Six plants were used to replace antibiotics in pets. Ten plants were used to treat cardiac problems in pets. Sixteen plants were used to treat stomach problems in pets. Eleven plants were used to treat pets with seasonal allergies, inhalant atopic dermatitis and asthma. Twenty-one plants were used to treat pets with viral infections. Thirty-one plants were used for respiratory conditions of pets. Twenty-two plants were used for digestive problems in pets. Fifteen plants were used to treat endoparasites in pets. Five plants were used for reproductive health in pets. Thirty plants were used for kidney, liver and urinary problems in pets.

In Tables 1 and 2, plants with more than one ethnoveterinary use have multiple table cells to make the comparisons between current and historical uses easier. In other cases multiple table cells represent multiple First Nations and Native American uses that are similar but not an exact match to ethnoveterinary uses in British Columbia. In Table 1 the ethnoveterinary remedies used for pets in BC is presented in column 2 and compared to First Nations/Native American ethnobotany uses in column 3. In Table 2 the ethnoveterinary remedies used for larger species such as horses and ruminants is detailed in columns 2–5 and the comparable First Nations/Native American use is documented in column 6.

Table 1 compares the plants used for pets (dogs, cats, one raccoon) to historical North American plant uses. The discussion is grouped by plant use, not on a geographical or tribal basis.

Table 2 lists the ethnoveterinary remedies used for large animals, rabbits and poultry that are compared to historical North American ethnobotany.

4. Discussion and conclusion

Exact parallels between ethnoveterinary medicine and folk medicine were found and the many comparable uses are
considered to be indications of borrowings and adaptations (Tables 1 and 2). Some of the plants used for pets that have exact parallels in First Nations/Native American ethnobotany are *Achillea millefolium* L., for colds, the plants used for urinary problems - *Arctostaphylos uva-ursi* (L.) Spreng., (also used for large animals), *Vaccinium parvifolium* Sm., and *Solidago virgaurea* L., for urinary problems, *Frangula purshiana* Cooper, as a laxative, *Echinacea purpurea* (L.) Moench for snakebites, *Juniperus communis* L., and *Rumex crispus* L., for diarrhea, *Pinus ponderosa* Douglas ex Loudon and *Pinus ponderosa* Douglas ex C. Lawson for respiratory problems, various *Rubus* species for healthy pregnancies in large and small animals, and *Valeriana officinalis* L., for heart problems.

Parallels between First Nations/native American folk medicine and ethnoveterinary remedies used for farm animals and horses were *Acer macrophyllum*, *Epilobium angustifolium* and *Lonicera caprifolium* used as stimulants and tonics for goats; *Achlys triphylla* as a fly repellent in barns, *Ailms rubra* for rabbit dental care, *Berberis aquifolium* and *Rumex crispus* to treat sores and rashes on horses, *Pinus ponderosa* for stomach problems and *Bovista pila* and *Dolichousnea longissima* used on wounds. *Berberis aquifolium* was used on abscesses on horses – a medicine for horses taken from the Blackfeet (Hellung, 1974).

*Epilobium angustifolium* whole plant decoction was used to bathe invalids by the.

Swinomish, this is the closest match to a goat tonic (Gunther, 1973). *Epilobium angustifolium* root infusion was used by the Snohomish for sore throats and by the Skokomish for tuberculosis (Gunther, 1992). *Epilobium species* were also used medicinally in Europe but for stomach and urinary complaints (Small and Catling, 2000).

The Southern Carrier boiled new shoots and drank the decoction of *Pinus contorta* for stomach pains, the closest match to the ethnoveterinary use of *Pinus ponderosa* for stomach problems (Smith, 1929). The Northern Carrier boiled *Pinus contorta* needle
tips with the inside bark of Ribes sp., the bark of Cornus stolonifera, the inside pulp of Rubus sp., stems of Lonicera involucrata and the inner bark of Rosa sp., and took two tablespoonsfuls of the decoction twice a day for constitutional weakness, body sores or paralysis (Smith, 1929). Indians of the Missouri river region used a leaf and fruit decoction of Pinus murrayana Balf., for coughs in horses (Gilmore, 1991). This is the closest match to the ethnoveterinary use of Pinus contorta to treat colds in pets in British Columbia.

Goats ate salal (Gaultheria shallon) as a rumen stimulant. The Quinault chewed salal leaves to relieve heartburn and colic while the Skagit drank a weak infusion as a tonic (Gunther 1992). The Klallam used Achillea millefolium infusion for colds and colic. The Cow-litz, Skagit, Snohomish and Squaxin drank it for diarrhea (Gunther 1992). The ethnoveterinary uses of Achillea millefolium for pets were for diarrhea, colics and flu and ear problems. The Winnebago used an infusion of Achillea millefolium to treat earaches, the Montagnais and Micmacs used it a tea or a sweat herb for colds and fever. The Meskwakis used Achillea lanulosa for fevers and ague (Smith, 1928b).

Examples of Native American ethnoveterinary remedies that include juniper are those of the Pawnee, Omaha and Dakota who used a boiled tea of berries and leaves for coughs in their horses (Vogel, 1970). In British Columbia Juniperus communis L., is used for endoparasites in goats and stomach problems in pets.

Differentiating the origin, transmission and rationale of plant use by humans for themselves and for their animals is important according to Leonti (2011). In a theoretical scenario in which patients were sought for the knowledge presented in this paper, they should not be granted because of the parallel historical uses in North America ethnomedicine presented in the tables. Another consideration is that some researchers like Smith (1933) admitted to collecting information from only six main informants, and this work continues to influence ethnoveterinary medicine today. Turner (2001b) noted that Elsie Steedman’s compilation of James Teit’s field notes, Ethnobotany of the Thompson Indians of British Columbia (1930) and the ethnobotanical notes of Franz Boas (1909, 1921), were taught during her undergraduate days. This paper shows that the influence of those scholars continues.

There are parallel uses between sixty-four plants currently used as ethnoveterinary medicines in British Columbia and the folk medicines historically used by the First Nations peoples and by Native American groups. Already published work on ethno-botanical knowledge in North America is being incorporated into current farming and pet health practices. This probably represents a continuation of indigenous traditions as part of a need for organic or natural methods of healing, rather than a deliberate cultural appropriation. It indicates that North America’s indigenous knowledge is not dying out but is being adapted for modern uses from anthropological and other records.

Undisputed transfers from Native American uses to ethnoveterinary uses are Achlys triphylla as a fly repellent and Bovista pilula and Dolichosneea longissima for wounds; these are three of the ethnoveterinary uses that were claimed to be the inventions of the respondent who inspired this review. While recognizing the creativity involved in the transfer of this knowledge to animal health care it is also important to recognize that the original sources of the ethnoveterinary remedies used in British Columbia were First Nations and Native Americans. In the future ethnoveterinary researchers need to distinguish between what plants are being chosen by animals, which plant uses are the result of new experimentation by animal owners and which plant uses are new ways of using the previously published cultural traditions of specific groups.

Fig. 5. More detailed map of Native Americans at time of contact.

References