

Development of Good Wildcrafting Practices and Wildcrafter Certification for Medicinal Plants

Phase One: Development of Draft Guidelines for Good Wildcrafting Practices



Polygala senega root

The Centre for Non-Timber Resources,
Royal Roads University
Victoria, BC

July 2006



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Amanda Howe, MSc. MNIMH

With thanks to Tim Brigham, Centre for Non-Timber Resources, Royal Roads University,
for his insightful feedback and help with this project.

Project Partners:

Canadian Herb, Spice, and Natural Health Products Coalition
Northern Forest Diversification Centre, Manitoba
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Wanda Wolf - Lonewolf Native Plant & Herb Farm, Saskatchewan
Dave Buck, Buck Enterprises, Manitoba

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1. Introduction

The Health Canada Natural Health Products Research Program provided funding for a literature search and wildcrafter survey for a two-stage research initiative to develop Good Wildcrafting Practices and Wildcrafter Certification for the harvesting of wild medicinal plants.

1.1. Background: Why are Good Wildcrafting Practices and Wildcrafter Certification needed?

Canada has vast areas of forested land and wilderness and has a rich resource of medicinal plants, many of which are species used in natural health products (NHPs). There are a number of small and medium sized operators involved in harvesting these wild medicinal plants, and there is a growing awareness of their value (Wills and Lipsey 1999) (Levesque 2000) (Oliver 2000). This is in part due to an increasing awareness of non-timber forest products (NTFPs) and the potential role they could play in economic diversification for rural communities. A search of the internet on NTFPs in North America shows a large number of reports concerning the value of NTFPs, many of which make reference to the potential value of medicinal plants. The wild harvesting of medicinal plants is well established in many parts of the world; according to the World Health Organisation (WHO) 70 – 90% of starting materials for phytomedicines are wild harvested (Lange 1998). The use of these materials in Canadian NHPs is increasing with many manufacturers diversifying into this area due to consumer demand (Wills and Lipsey, 1999). The trade in wild harvested medicinal plants across the world is largely unmonitored with no way to assess or control the impact of the trade on individual plant species until a species becomes endangered (Schippmann, Leaman and Cunningham 2002). The World Health Organisation document “Good Agricultural and Collection Practices (GACP)” (World Health Organization, 2003) raises the following concerns about wild collected botanicals:

“Safety – *The plant must be carefully identified to ensure that the correct species is harvested and to ensure that there is no adulteration or mixing of different species within harvest batches. Post harvest handling activities should ensure that contamination by microbial or chemical agents does not occur. Harvest site assessment must be carried out to ensure that there is no site contamination with toxic substances.*

Quality- *The botanicals must be harvested at the correct time of year to maximise therapeutic levels of active constituents. The botanicals must be processed, handled and dried correctly to ensure that breakdown of active constituents does not occur.*

Efficacy – *The botanicals must be correctly identified, the correct part of the plant harvested at the right time of year, and the processing and handling must be done correctly for the final product to be therapeutically effective.”*

Health Canada has recently implemented regulation of NHPs sold in Canada and these regulations require manufacturers to have documentation of the supply chain for raw

materials being used to produce NHPs. These regulations and Good Manufacturing Practices (GMPs) have been developed to address the need for safety, quality and efficacy of NHPs and recognise the fact that the safety, quality and efficacy are dependent on the quality and safety of the raw medicinal plant material.

At the present time agriculturally grown medicinal plants are a much better “fit” for GMP requirements than wild harvested material. However most botanicals used in NHPs are not agriculturally grown and it will be neither feasible nor necessarily desirable for the industry to switch from wild harvested sources to agriculturally grown botanicals in order to meet GMP requirements. Many wild harvested plants are not easily grown in an agricultural setting, if at all, and cultivated plants may well have a different balance of chemical constituents to the wild harvested plant. Wild plants will often grow at a slower rate than agriculturally grown plants and produce secondary metabolites for the purposes of defence. These metabolites are medicinally active (Small and Catling 2003) and may well be missing or in smaller quantities in agriculturally grown plants. In addition to questions about the feasibility of domesticating wild plants there is also the fact that a number of people derive their living or part of their living from wild harvesting. These people are usually making a marginal living from their work and removing this source of income would not be desirable.

In addition to the concerns about safety, quality and efficacy of the final product, the collection of medicinal botanicals from the wild can also give rise to a number of related and interconnected issues such as sustainability of the resource and over-harvesting, protection of endangered species, environmental impact, benefit sharing, intellectual property rights, access to harvesting areas, and working conditions and equity for harvest workers (Europam 2003). To date, the NHP industry has shown little interest in any of the concerns surrounding wild harvesting and has had very little interest in the source of the raw materials they use or the impact of their industry (Laird, Pierce and Schmitt 2003).

A number of individuals and organisations are working to raise awareness of the issues surrounding wild collection of medicinal plants and there are attempts to address the complex issues that surround wild harvesting.

The World Conservation Union (IUCN), World Wildlife Fund (WWF), TRAFFIC, the German Federal Agency for Nature (BfN) and the Medicinal Plant Specialist Group (MPSG) are collaborating on creating an “International Standard for Sustainable Wild Collection of Medicinal and Aromatic Plants” (ISSC-MAP) (Leaman 2005). This document is in draft form and comprehensively builds on existing guidelines, standards and relevant principles including the Convention of Biological Diversity, the World Health Organisation Good Agricultural and Collection Practices for Medicinal Plants (WHO – GACP) (WHO 2003), various non-timber forest practice guidelines and standards, organic standards, and fairtrade standards. The ISSC-MAP is intended to provide a framework of principles and criteria that can be applied to the management of MAP species and their ecosystems. It provides guidance for sustainable wild collection of MAPs, and a basis for audit and

certification. It does not address product quality and processing, storage and transport issues which are addressed by initiatives such as the WHO – GACP (WHO 2003).

Pierce, Laird and Malleson (2002a; 2002b) surveyed the natural products industry and reviewed the existing standards and regulations and quality control standards that apply to the botanicals industry. The existing guidelines include organic standards, good agricultural practices (GAPs), GMPs, good laboratory practices, finished product certification, methods validation programs, best business practices and labour accords. Most of these existing standards focus on part, but not all, of the botanical supply chain. Most of the existing standards are also quite descriptive and general in content with little in the way of prescriptive “species specific” guidelines and standards from harvest to sale of raw materials. Pierce and Laird have also extensively researched the botanical industry, standards, and sourcing of raw materials (Laird et al. 2003; Pierce et al. 2002(a); Pierce et al. 2002 (b)).

The implementation of GMPs for natural health products in Canada (Health Canada 2003) provides an opportunity for government to create proactive regulatory measures that could have a positive effect on the responsible management of the wild medicinal plant resources in Canada, in addition to creating a safe, transparent, traceable and high quality supply chain. The Convention on Biological Diversity, to which Canada is a signatory, also provides a legal instrument for requiring that industry addresses both conservation and benefit sharing issues.

Although many wildcrafters harvest in a sustainable and responsible way, the growing demand for medicinal plants means that some resources are vulnerable to over-exploitation. And quite apart from questions of sustainability most wildcrafters are currently ill-equipped to furnish manufacturers with documentation required for current GMPs (see survey results Appendix III). Given emerging trends within the industry, GMP requirements will likely make it increasingly difficult for smaller operators to continue supplying buyers, and unless they can provide the necessary documentation they will be squeezed out of the market.

This project was initiated following the recognition that Good Wildcrafting Practices could provide wildcrafters with the information necessary to supply manufacturers with high quality, safe raw materials and documentation that is in compliance with current GMPs, and also initiate steps to create safeguards for the resource.

1.2. Aims of the larger research initiative.

The original stated aims of the larger research initiative were to develop Good Wildcrafting Practices and Wildcrafter Certification for the harvesting of wild medicinal plants in order to:

- improve the safety, quality and efficacy of wild harvested raw materials used in natural health products (NHPs) in Canada;
- provide wildcrafters with the tools necessary to meet the documentation needs of manufacturers of NHPs who are implementing the newly enforced GMPs for natural health products;
- provide manufacturers with a means of assessing product reliability at the start of the supply chain for raw materials;
- address concerns about sustainability and overharvesting of medicinal plants;
- harmonise guidelines with international standards being developed elsewhere;
- enhance knowledge about indigenous Canadian medicinal plants.
- Enhance the acknowledgement and accommodation of Indigenous Peoples' traditional knowledge and use of medicinal plants.
- assess suitability of running certification through an existing certifying body such as organic certifiers, Forest Stewardship Council, Fairtrade etc. and work on developing certification with such a body.

2. Objectives of the literature search and wildcrafter survey

The project was undertaken in three parts: a literature search, a survey and the final report.

2.1. Phase One: Literature Review.

The stated aim of the literature search was to identify six medicinal botanicals from B.C., Saskatchewan and Manitoba for future use as case studies in development of good wildcrafting practices. These provinces were chosen because they have active wildcrafter networks willing to work on this project. The species were selected in consultation with both project partners and the NHPD.

Following identification of the medicinal plants, a literature search was undertaken to research and review the background information necessary for the collaborators to develop Good Wildcrafting Practices Fact Sheets described in Stage One of the main project.

The following literature was reviewed:

- 1) Literature relating to plant identification for each of the six species.
- 2) a) Review of information specific to each of the botanicals:
 - Part of the plant that should be harvested;
 - Correct time of year for harvesting;
 - Sustainable harvesting practices for the species; and
 - Post harvest and processing practices for the species.

- b) Review of relevant Fact Sheets that have been developed for similar or compatible purposes in order to design the most appropriate style.

The stated aim was to compile the information into a report that would furnish partners and collaborators with all the information necessary to develop Fact Sheets for each of the species. The project has gone beyond these stated aims and developed a draft “species specific” Good Wildcrafting Practices template and draft Good Wildcrafting Practices for all six selected medicinal plants. These can be found in Appendix I and II.

2.2. Phase Two: Wildcrafter Survey

Wildcrafters were surveyed for information about current wildcrafting practices. The inclusion of wildcrafters at this stage in the project was intended to encourage participation in future stages of the project and to develop trust in the process, the guidelines, and the certification.

The survey questionnaire and results can be found in Appendix III.

2.3. Phase Three: Preparation of Final Report

A final report was to be prepared from the findings of the literature review and survey. Further stakeholders to be included as partners in this project were to be identified. In addition, the final report also includes the draft “species specific Good Wildcrafting Practices” template and Good Wildcrafting Practices for the six selected medicinal plants.

3. Details of the literature review and survey.

The literature was reviewed for:

- Good Wildcrafting Practice documents.
- Review of relevant Fact Sheets on harvesting of medicinal plants that have been developed for similar or compatible purposes.
- Existing Wildcrafter Certification in Canada and Europe.

Existing standards and guidelines pertaining to wild harvested medicinal plants were reviewed. Following this review they were compiled into a draft template for Good Wildcrafting Practices (GWPs) for individual species. Most of the Wildcrafter ethics and Good Wildcrafting Practice guidelines are quite general in nature and the need for species specific guidelines was identified. The GWP template has been designed to not only meet Canadian GMPs, and to start to address sustainability issues, but also to harmonise with and contribute to European standards that are in the process of being developed for wild harvested medicinal plants. The rationale behind this harmonisation is that the harvested plant material could then potentially be both exported to and imported from Europe and meet standards for wild harvested medicinals as they become established. The draft template for the “species specific” Good Wildcrafting Practices is included in Appendix I. The document contains a bibliography of all the sources used in its development.

3.1. Selection of medicinal plants for the project.

The project also identified and researched six medicinal botanicals as case studies for the “species specific” Good Wildcrafting Practices.

The six plants were identified for the project using the following criteria:

- A demonstrated market demand for the species.
- The species is used in NHP production in Canada and is subject to NHPD regulations.
- Significant gaps exist in the knowledge regarding harvesting and processing.
- The species has been identified in reports or demonstrates significant potential for mis-identification, adulteration, contamination, and/or issues regarding the sustainability of current harvesting practices.
- Is not a registered CITES species and is not endangered or threatened in Canada.

The medicinal botanicals selected were:

1. *Oplopanax horridus*
2. *Mahonia aquifolium*
3. *Chimaphila umbellata*
4. *Polygala senega*
5. *Urtica dioica*
6. *Plantago lanceolata/major*

The following plants were excluded from the study because they are endangered, threatened, or face other specific concerns and wild harvesting should not be encouraged: American Ginseng - *Panax quinquefolius*, Black Cohosh - *Actaea racemosa (Cimicifuga)*, Bloodroot - *Sanguinaria canadensis*, Blue Cohosh - *Caulophyllum thalictroides*, Echinacea - *Echinacea spp.*, Eyebright - *Euphrasia spp.*, False Unicorn Root - *Chamaelirium luteum*, Goldenseal - *Hydrastis canadensis*, Lady's Slipper Orchid - *Cypripedium spp.*, Lomatium - *Lomatium dissectum*, Osha - *Ligusticum porteri, L. spp.*, Sundew - *Drosera spp.*, Trillium, Beth Root - *Trillium spp.*, True Unicorn - *Aletris farinose* (United Plant Savers 2006)

The rationale for the selection of the six species identified is as follows:

***Oplopanax horridus* :**

- ❑ There is increasing demand for the species (Wills and Lipsey 1999) and evidence of inappropriate harvesting practices in British Columbia.
- ❑ *Oplopanax horridus* is used in natural health products in Canada and is subject to NHPD regulations.
- ❑ There is considerable confusion and misinformation about correct harvesting and processing techniques (Howe 2003).

- ❑ Knowledge about sustainable yields is rudimentary at best and more research is needed (McKenzie 2004) (Lantz 2001).
- ❑ Identified as a priority for further study due to concerns re: sustainability of wild harvest by TRAFFIC ([Robbins 1999](#)).

Mahonia aquifolium:

- ❑ There is increasing demand for the species (Wills and Lipsey 1999).
- ❑ *Mahonia aquifolium* is used in natural health products in Canada and is subject to NHPD regulations.
- ❑ Confusion exists re: correct species to harvest and correct harvest technique and sustainability issues.
- ❑ On United Plant Savers “Plants to Watch” list (UPS 2006).
- ❑ Identified as a priority for further study due to concerns re: sustainability of wild harvest by TRAFFIC ([Robbins 1999](#)).

Chimaphila umbellata:

- ❑ Market demand for the species.
- ❑ *Chimaphila umbellata* is used in natural health products in Canada and is subject to NHPD regulations.
- ❑ Confusion exists re: correct harvest technique and sustainability of harvest.
- ❑ On United Plant Savers “Plants to Watch” list (UPS 2006).
- ❑ Identified as a priority for further study due to concerns re: sustainability of wild harvest by TRAFFIC ([Robbins 1999](#)).

Polygala senega:

- ❑ Market demand for the species.
- ❑ *Polygala senega* is used in natural health products in Canada and is subject to NHPD regulations.
- ❑ Confusion exists re: correct harvest technique and sustainability of harvest.
- ❑ On United Plant Savers “Plants to Watch” list (UPS 2006).
- ❑ Identified as a priority for further study due to concerns re: sustainability of wild harvest by TRAFFIC ([Robbins 1999](#)).

Urtica dioica:

- ❑ Market demand for the species.

- *Urtica dioica* is used in natural health products in Canada and is subject to NHPD regulations.
- Quality issues due to poor harvesting, drying and processing techniques.
- *Urtica dioica* frequently grows in areas subject to contamination by heavy metals and other pollutants and the literature illustrates that these contaminants are found in the plant. *Urtica* was chosen to illustrate the need for testing and awareness of these “harvest area” issues.

***Plantago lanceolata/major*:**

- Market demand for the species.
- *Plantago lanceolata/major* is used in natural health products in Canada and is subject to NHPD regulations.
- Quality issues due to poor handling and drying.
- *Plantago* was involved in a case of adulteration and toxicity in 1997 due to probable misidentification of wild harvested plants (Blumenthal 1997). It is used as an example of the need for awareness of such problems.

The literature was reviewed for information relating to each of the six botanicals in the following areas:

- Literature relating to plant identification for each of the six species.
- Review of information specific to each of the botanicals:
 - Part of the plant that should be harvested;
 - Correct time of year for harvesting;
 - Sustainable harvesting practices for the species;
 - Post harvest and processing practices for the species; and
 - Harvest area, harvesting or processing concerns/issues.

Information was compiled for each of the six botanicals through literature searches and through personal communication with various individual researchers and organizations involved in medicinal plant research, harvesting, or development of standards. Literature on medicinal use by respected authors, and relevant ethnobotanical literature was reviewed for reference to relevant information on part used, harvesting and processing. Literature and information on sustainable harvest and regeneration rates for the plants was difficult to obtain. This is a significant area where more research is required.

The compiled information was used in conjunction with the general good wildcrafting practices (as outlined in the GWP template in Appendix I) to develop specific Good Wildcrafting Practices for each of the six species. The references within the individual documents are hyperlinked to the reference section with the intention that in future they will be hyperlinked to the actual research for those people who wish to access the source

of the information in the GWP document. This idea was proposed by Uwe Schippmann of BfN for the datasheets they are developing.

These GWPs provide clear specific guidelines and information on plant identification, harvest area assessment, avoiding contamination and misidentification, part of the plant that should be harvested, harvest time, sustainability of harvest, processing, drying and storing for high product quality, batch tracking, official English language monographs, identification of commercial product, access to harvest areas, special points of concern for the species. They are designed to harmonise with and complement the ISSC-MAP standard (Leaman 2005) providing species specific indicators and verifiers.

They are intended to address practices directly connected with wildcrafting of the plant and do not include templates for documentation etc. or details of medicinal uses and active constituents. The “species specific” GWPs are designed to be used in conjunction with the “*Good Practices for Plant Identification for the Herbal Industry*” (Brigham *et. al* 2003) and the “*Good Agriculture Practice Workbook*” for medicinal plants developed by the Canadian Herb, Spice and Natural Health Products Coalition (CHSNC 2005). The latter is currently in draft form. These workbooks provide detailed steps for documenting the processes and procedures involved in wild harvesting and processing raw medicinal herbs from identification for harvest through to drying, storing and sale. The draft “species specific” Good Wildcrafting Practices Sheets can be found in Appendix II.

The GWP sheets build upon the knowledge and work that has been initiated by a number of people, some of whom also contributed to their development. Both the Northern Forest Diversification Centre and the Siska Traditions Ethical Picking Practices have already developed criteria for harvesting medicinal plants, berries and wild foods in their respective regions in Canada. They have also implemented local wildcrafter certification as a way of implementing the harvesting criteria. Both act as purchasing stations from wildcrafters and in order to sell their harvests wildcrafters are required to have completed the Wildcrafter Training. Both these projects have attracted requests for assistance to implement their programs in other places in Canada but they do not have the resources to be able to do this. This project is in part aimed at helping to address the need for increased access to this information by wildcrafters.

Silvia Müller and Uwe Schippmann of the German Federal Agency (BfN) for Nature have developed an initial MAP species data sheet template that is intended to be used to compile information about specific medicinal and aromatic plants. Their intention is to create a layered database with referenced summaries of the different fields through which the user can access a second layer of the actual material being referenced. This promises to be a very useful database of information. Dr. Schippmann kindly shared the work they have done so far on developing the template. The GWP document developed for this project is similar to the data sheet being developed by Dr. Schippmann but it also includes batch tracking criteria and specific points of concern with regards to harvest areas for each species.

The Institute for Marketecology (IMO) in Switzerland (www.imo.ch) has been active for many years in developing ideas and criteria for wild collection systems and – as a partner of WWF/BfN – has been involved in developing the ISSC-MAP criteria. IMO has been instrumental in the development of a certification scheme for sustainable wild collection in the Balkan region (and other countries) and is also active as certifier for FSC, organic and other schemes. They have also been involved in developing a Manual for Collectors in Bosnia which also contains Good Harvesting Practices (Dunjiaie 2003). Dr. Rainer Bächli of IMO kindly contributed feedback to the development of criteria for the template.

Both Rainer Bächli and Uwe Schippmann concurred with the idea that harmonising Good Wildcrafting Practices as much as possible is a desirable outcome for the various projects working on these initiatives.

A request to the Plant Conservation Alliance [Medicinal Plant Working Group](#) list serve was made for information on any published or unpublished studies on sustainable harvest yields for the six botanicals chosen for the project. The response was one of interest in the project from a number of people and requests for the GWP sheets when they are complete. References to useful studies on sustainable harvesting were also forthcoming from the group. Trish Flaster from the Medicinal Plant Working Group conservation committee offered help in putting together volunteer groups to further study the GWPs (Trish Flaster personal communication 2006).

Wildcrafters also contributed to development of the GWPs through participation in the survey. The survey requested information about how wildcrafters learn their craft and train people working with them; how they assess harvest sustainability rates; how they handle, dry, process and store plants; how they track harvest batches; how they get permission to access harvest areas. The survey also asked wildcrafters whether they had seen a decline in species over the years due to factors other than harvesting such as reduction in available habitat etc. The survey instrument was approved through the Request for Ethical Review process at Royal Roads University. The survey tool and survey results are attached in Appendix III.

4. Next Steps:

Four projects and one area of research have been identified as next steps for this project:

- Dissemination of the GWP template and GWP for individual species for review and feedback.
- Pilot Projects to implement and test the Good Wildcrafting Practices for the individual species.
- Focussed research is urgently needed on harvest sustainability and regeneration rates for wild-harvested medicinal plants used in NHPs in Canada to provide data for future development of GWP for individual species.

- Development of organic certification for wild-harvested medicinal plants in Canada.

4.1. Dissemination of the Good Wildcrafting Practices template and the Good Wildcrafting Practices for individual species for review and feedback.

These documents are in draft form and will benefit from review by experts in the field. These experts will include individuals and organisations that have been involved in the development of standards and also researchers and experts on each of the medicinal plants selected for this project.

4.2. Pilot Projects for the Good Wildcrafting Practices for each of the medicinal plants selected.

The next step in development of these GWPs is to run pilot projects to assess and fine tune them for workability both from the wildcrafters perspective and to verify the compatibility of the GWPs with manufacturers needs to meet the Natural Health Products Directorate GMP requirements.

The recent IFOAM conference in Bosnia in May 2006 hosted a workshop on wildharvesting of MAP species and the implementation of the ISSC-MAP standard as the new international baseline standard. The need for valid indicators and control systems for certification was identified and discussed (pers. communication with R. Bächli of IMO). The next steps for implementation of ISSC-MAP was identified in April 2006 as the need to test them in pilot studies (Kathe 2006). The GWPs developed in this project are harmonised with the ISSC-MAP criteria and would provide a useful vehicle for testing of indicators and verifiers for the ISSC-MAP document.

Both Dr. Schippmann at BfN (pers. comm. 2006), and Rainer Bächli at IMO (pers. communication 2006) have been involved in the ISSC-MAP project and have expressed an interest in working collaboratively on this project to develop Good Wildcrafting Practices and Wildcrafter Training and Certification. The result would be the creation of information sheets and standards for wild crafted products in a harmonized system that can be a global framework for the certification of sustainable systems.

4.3. Research on sustainable harvest and regeneration rates.

The review of information for the GWPs revealed a lack of good studies on sustainable harvest and regeneration rates for different wild-harvested medicinal plants. This information is crucial in the development of future GWPs for wild-harvested medicinal plants in Canada. Trish Flaster of the Medicinal Plants Working Group conservation committee has offered to help get a volunteer group to work on the project and such a group could potentially provide valuable expertise. Unfortunately funding for such studies is often only available once a plant has become threatened, at which point wildcrafters are asked to stop harvesting and there is a move to cultivation. This does nothing to protect

the wild-resource as rising prices render the plant vulnerable to unethical harvesting. This is certainly the case with goldenseal and wild ginseng.

What is needed is a pro-active approach whereby all the medicinal plants being wild-harvested in Canada for use in NHPs are studied to assess sustainable harvest and regeneration rates.

Both manufacturers and regulators have a responsibility to provide proactive funding to help protect medicinal plant species that are being used in NHPs from the same fate as goldenseal and wild ginseng and numerous other threatened MAP species.

4.4. The development of organic certification for wild harvested medicinal plants as a means of implementing the GWPs.

Encouragement to implement the GWPs would probably be best served by certification and labelling that gives recognition to the fact that the plant has been harvested using GWPs. Certification was seen as the most appropriate way of implementing GWPs in a report for the Medicinal Plant Working Group who are developing the ISSC-MAP standards. A number of interviewees from around the world were presented with different implementation options and certification was seen as the best option (Kathe 2006).

The harvesters who use GWPs will incur an increased workload due to harvest monitoring and documentation and ideally, this would be reflected in the price of the dried herb and products. At the very least certification would help to preserve access to markets that require certain chain of supply criteria to meet GMP requirements. The most logical “fit” for this type of certification would appear to be organic certification. Organic certification is already geared towards food, and in this regard is better suited to NHP raw material certification than is, for example, Forest Stewardship Council certification. Fairtrade certification is available for foods but is more focussed on benefit sharing than on the additional issues of quality, safety and sustainability that affect medicinal plants. Organic certification also has the advantage that it is already understood by consumers and could be adapted for wild-harvested medicinal plants with some work. Organic certification for wild-harvested medicinal plants will differ from established certification for agricultural products; it will not be possible to certify land as organic as is the current practice, it will be necessary to certify the product. This will necessitate the certification of wildcrafters who wish to participate in the potential financial and marketing benefits of organic certification.

There is as yet no organic certification available for Wild Harvested products in Canada (COGA; PACS; personal communication). The Soil Association (organic certifiers in the UK) have developed Wild Harvesting Standards for any wild harvested product, and organic certification that is recognised across Europe can be obtained for medicinal plants that are harvested to these standards (Soil Association 2005). However specific GWPs for individual species have not yet been developed to facilitate implementation of these standards and standards remain weak at this point.

The Institute for Marketecology (IMO) in Switzerland has been instrumental in the development of a certification scheme for sustainable wild collection of medicinal plants in the Balkan region (and other countries) and have developed a Guidance Manual for Organic Collection of Wild Plants (IMO 2005). This document would be an invaluable resource for aiding in the development of internationally recognised organic certification within Canada for wildcrafted medicinal plants.

The Soil Association of the UK has developed Wild Harvesting Standards as a part of their organic standards and has expressed an interest in this project and the development of species specific guidelines and standards (Helen Taylor pers. communication 2006).

The Canadian Organic Growers Association and Pacific Agricultural Certification Society recognise the need for internationally recognised certification for wild harvested products and there is a growing awareness of the need for such certification for wild-harvested medicinal plants. The work carried out in this project can be built on to begin developing the necessary standards in this area.

5. How to move ahead with these next steps.

There is a need for funding for each of these next steps. The funding for Phase One of this project came from the Natural Health Products Research Program, which recognises the overlapping areas and issues involved with sourcing raw medicinal plant material used in NHPs. These include the need for safety, quality and efficacy of the raw material, traceability of the product through what can be a complex supply chain, and sustainability of supply issues. These issues span areas of expertise in medicinal plant use, wild-harvesting of medicinal plants, handling of food/medicine raw materials, manufacture of NHPs and knowledge of NHP good manufacturing practices, and plant conservation issues. The diverse nature of these issues means that the next steps do not fit neatly into any one funding area. However the impact of the NHP market on the wild plant resource has reached global awareness. And this is an area in which Canada with its rich wild medicinal plant resource could take innovative steps and provide valuable leadership in the process of implementing the NHPD regulation of natural health products.

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Appendix I – “Species Specific” Template

GOOD WILDCRAFTING PRACTICES “Species Specific” Template

Draft Version 1.

**Good Wildcrafting Practices
“Species-Specific” Template
Draft July 2006**

- **Latin name**
- **Family**
- **Common names**
- **Synonyms (Latin)**
- **Photo**
- **Description of Plant for Identification**
 - Distribution
 - Habitat
 - Ecology
 - Altitude
 - Life form
 - Range
- **Similar species and common misidentification errors**
- **Part of the plant used medicinally** – table of parts of the plant used. Referenced in literature
- **Harvest Area**

Any possible concerns with where the plant grows vis a vis harvesting. Ensure that the harvest area is not contaminated with heavy metals, industrial pollutants, pesticides or herbicides, or run off from roads or mines.

The harvest area should not be within the fall out area for industrial pollutants as the plants can absorb pollutants through their leaves even if the pollutants are not found in significant amounts in the soil¹. Check with landowner that harvest area has not been sprayed with herbicide or pesticides. If the history of the harvest site or any adjacent waterway is not known a soil sample should be tested for the above pollutants. Harvesting should not take place within 50metres of main roads².

- **Harvest time** – correct time of year to harvest. Referenced.

- **Harvest Method**

The plant should be identified using “Good Practices for Plant Identification for the Herbal Industry”³. If there is any doubt about identity of the plant seek an experienced person to confirm identity;

Detailed description of sustainable harvest method for each species for area; sustainable harvest rate (if known), tools to use etc. Referenced.

(sustainable rates will differ in different areas, see regeneration below)

The following practices should be avoided as they may cause overheating and deterioration in quality of the product. DO NOT: harvest into plastic bags, pack a large amount of plant into a harvesting container, leave the plant piled up for any period of time prior to drying, bruise the plant during harvesting, harvest on a hot day. Do not delay transporting plant to drying facility.

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

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

- always make sure there are enough mature plants left after harvesting to maintain habitats that other wildlife depend on;
- avoid damage to neighbouring species, especially rare or threatened species;
- take particular care with species that have symbiotic relationships or otherwise depend on each other;
- avoid harvesting operations that lead to erosion or damage to sensitive habitat, and
- take and keep samples of each batch harvested⁴.

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

Tools must be cleaned between harvest batches;

➤ **Harvest Records^{5,6}.**

The harvester must keep records of each harvest batch which should include identification of the plant, name of plant in Latin, common name, harvest date, harvest location (using map reference or indicated on a map), part harvested, quantity harvested, sustainable harvest rate for area (if known), harvest rate for this harvest, quality of material collected, unusual weather during the growing season that might influence plant constituents, delays in getting the plant to drying stage which would affect quality. Each harvest batch must be given a batch code that will correspond with the record for the harvest batch and with the batch sample and this code will follow the batch through drying, processing and storage or to whatever point the material is sold. Record sale details including name and contact details of buyer. Records should be kept for two years. CHSNC⁷ is in the process of developing templates for GAP records that can be used for wildcrafting. The “Good Practices for Plant Identification for the Herbal Industry”⁸ can be used to document plant identity.

➤ **Regeneration**

Regeneration methods, rates and response to harvest. Referenced.

Regeneration and sustainable harvest rates will be site specific. If possible permanent sample plots must be set up to monitor and assess sustainability and harvest impact. This will almost certainly be required should organic certification become available in the future.

➤ **Preparation for Drying**

Instructions for special preparation if necessary e.g. some roots must be cut prior to drying as they will not dry properly.

➤ **Drying Methods**

Temperature and any special problems the species might be prone to during drying - Referenced.

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

Drying, processing and storage facilities should provide protection of the plant-material against pests, rodents, insects, birds, and pets and other domestic animals⁹.

Drying racks must be cleaned between harvest batches.

➤ **Processing**

Method of cutting etc, size of screen if appropriate – Referenced.

Fresh processing – juicing etc.

➤ **Storage**

Species-specific storage needs – Referenced.

Each harvest batch must be stored in a clean storage container, which must be labeled appropriately with the name of the plant, quantity and the code applied at harvesting. Details of any problems that occurred during storage (e.g. Loss of heat, overheating, insect infestation in building etc.) must be recorded with the corresponding batch records.

Drying, processing and storage facilities should provide protection of the plant-material against pests, rodents, insects, birds, and pets and other domestic animals¹⁰. The storage area should be heated to avoid damp and mould, but not at high temperatures as degradation of the product will occur.

➤ **Toxicity or Health and Safety Cautions for Harvesters**

Problems with handling plant, potential sensitisers or allergens. Cautions for harvesting and processing - referenced.

➤ **Extraction techniques**

Form in which the plant is usually extracted e.g. [tincture, fluid extract, encapsulation, infusion and decoction, juice, syrup](#)¹¹ etc.

➤ **Identification of Commercial Product:**

Pharmaceutical name in commerce.

Macroscopical and microscopical identification, taste and odour of commercial dried herb – referenced.

➤ **Official Monographs**

List of official English language monographs available for the species.

➤ Land Access for Harvesting

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

Crown Land: No permission or license is required however harvesting must be carried out within provincial Ministry guidelines. In BC such harvesting is subject to the Forest and Range Practices Act.¹²

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

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

➤ Points of Concern

Vulnerability; legislation; protection and population status; potential concerns and problems associated with wildcrafting of this species; benefit sharing. Referenced.

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NOTE

The “species specific” GWP’s are designed to be used in conjunction with the “*Good Practices for Plant Identification for the Herbal Industry*”(Brigham2003) and the “*Good Agriculture Practice Workbook*” for medicinal plants developed by the Canadian Herb, Spice and Natural Health Products Coalition (CHSNC 2005). The latter is currently in draft form. These workbooks provide detailed steps for documenting the processes and procedures involved in wild harvesting and processing raw medicinal herbs from identification for harvest to drying and storing.

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Appendix II – Individual Species Information Sheets

GOOD WILDCRAFTING PRACTICES FOR INDIVIDUAL MEDICINAL PLANT SPECIES IN CANADA

Draft Version 1.

DRAFT VERSION 1

GOOD WILDCRAFTING PRACTICES
INFORMATION SHEETS FOR SELECTED MEDICINAL PLANT SPECIES
IN CANADA



The Centre for Non-Timber Resources,
Royal Roads University
Victoria, BC

July 2006



ROYAL ROADS
UNIVERSITY

The Good Wildcrafting Practices for Individual Medicinal Plant Species in Canada are information sheets designed to provide wildcrafters of Canadian wild medicinal plants with the information they require to harvest, dry and process sustainable yields of high quality herbs that can be traced from harvest to manufacture.

All the information is referenced.

The Good Wildcrafting Practices sheets are not static documents and information will be added as new research and knowledge becomes available.

They are designed to be stand alone documents, but can be used in conjunction with the “*Good Practices for Plant Identification for the Herbal Industry*” (Brigham et. al 2003) and the “*Good Agriculture Practice Workbook*” for medicinal plants developed by the Canadian Herb, Spice and Natural Health Products Coalition (CHSNC 2005). The latter is currently in draft form. These workbooks provide detailed steps for documenting the processes and procedures involved in wild-harvesting and processing raw medicinal herbs from identification through harvesting, drying and storing, and they complement the species specific information for each of these steps provided by the Good Wildcrafting Practices information sheets.

The following Good Wildcrafting Practice information sheets have been developed:

<i>Chimaphila umbellata</i>	Pipsissewa
<i>Mahonia aquifolium</i>	Oregon grape
<i>Oplopanax horridus</i>	Devil’s club
<i>Plantago lanceolata</i>	Plantain
<i>Polygala senega</i>	Senega snakeroot
<i>Urtica dioica</i>	Stinging nettle

The Good Wildcrafting Practices information sheets were researched and compiled by Amanda Howe MSc MNIMH, Centre for Non Timber Resources, Royal Roads University, Victoria, BC. The project was funded by the Natural Health Products Research Program, Health Canada.

PIPSISSEWA

Chimaphila umbellata (L.) W. Bart.
Pyrolaceae
(also placed in Ericaceae)

Common Names in English:

Prince's Pine, Umbellate Wintergreen, Wintergreen, Ground Holly, Bitter Wintergreen, Love in Winter, King's Cure, Rheumatism Weed.

Other species and subspecies:

Chimaphila menziesii
Chimaphila maculata

A number of subspecies exist.

Other taxonomic names in literature:

Pyrola umbellata L.

Description of Plant

Pipsissewa is a dwarf evergreen native shrub. It grows up to 35cm tall with whorls of leathery evergreen leaves that are 3-7cm long. The leaves are shiny, narrow and sharply toothed above the middle.

The flowers are nodding, waxy, whitish–pink to rosy, saucer shaped. There are 3–15 flowers in a small loose cluster and they are 5-7mm long. They have a faint perfume. Pipsissewa blooms from June to August throughout its range and is a long-lived perennial with rhizomatous growth. It most commonly occurs in mixed woods and coniferous forests on dry, well-drained, rocky or sandy soils up to 3,500m. Pipsissewa also occurs in moist or imperfectly-drained situations throughout its range.¹

Range

Pipsissewa is widely distributed in the northern latitudes of the northern hemisphere. It is found from Newfoundland to Alaska south to California and Mexico, and east to New Mexico, Colorado, and South Dakota. It is also found in the eastern United States from Maine south in the mountains to Georgia and west to Minnesota.²



© Jim Stasz
Chimaphila umbellata

Common Misidentification Errors

Many of the plants in the Wintergreen (Pyrolaceae) family have similar flowers to pipsissewa so care must be taken to properly identify the plant because the other members of the family cannot be substituted for Pipsissewa medicinally.

The name wintergreen is most commonly used for *Gaultheria procumbens*.

Gaultheria procumbens cannot be substituted for pipsissewa medicinally. The plant should be identified carefully using the Latin name.

Chimaphila maculata is endangered in Ontario and Quebec so great care should be taken not to harvest it by mistake.

➤ *Part of the Plant Used Medicinally*

Leaves	Bartram 1995³
Leaves and roots	Blankenship 1905⁴
Roots	Bolyard 1981⁵
Leaves	Gladstar 2000
Leaves	Grieve 1975⁶
Leaves	Hebda 1996⁷
Whole Plant	Hutchens 1973⁸
Leaves	Jellin et al 2000⁹
Leaves	Kings American Dispensatory 1898¹⁰
Leaves	Kloss 1988¹¹
Leaves	Lust 1974¹²
Leaves	Miller 1985
Leaves and roots	Millspaugh 1974¹³
Leaves	Moore 1979¹⁴, 1993¹⁵
Leaves	Tilford 1993¹⁶
Leaves	Turner 1971¹⁷
Leaves and roots	Willard 1996¹⁸
Leaves	Wren 1988¹⁹
Leaves	Youngken 1948²⁰

The leaves, not the roots, are currently used in natural health products. The roots have been used traditionally as a medicine but the plant regenerates too slowly for commercial wildcrafting of the roots. The roots have also been used as a flavouring in root beer.

➤ *Harvest Times*

Pipsissewa can be harvested at any time of year, but the best time to harvest is in the Fall once the seeds have fallen to aid reproduction²¹.

➤ *Harvest Area*

It is important to ensure that the harvest area is not contaminated with heavy metals, industrial pollutants, pesticides or herbicides, or oil run off from roads, or run off from mines.

The harvest area should not be within the fall out area for industrial pollutants as the plants can absorb pollutants through their leaves even if the pollutants are not found in significant amounts in the soil²². If the history of the harvest site or any adjacent waterway is not known a soil sample should be tested for the above pollutants.

Harvesting should not take place within 50metres of main roads²³. Check to make sure that the area has not been sprayed with herbicides or pesticides prior to harvesting.

➤ *Harvesting Methods*

The plant should be identified using "Good Practices for Plant Identification for the Herbal Industry"²⁴. If there is any doubt about the identity of the plant seek an experienced person to confirm identity.

Pipsissewa is very sensitive to harvesting and great care must be taken not to damage the plant colonies or surrounding area. Pipsissewa is slow growing and does not tolerate trampling²⁵ so care must be taken not to compact the soil around the plants in the act of harvesting.

Although there is traditional use of the roots they should not be commercially harvested due to the very poor regeneration of the plant colony after root harvesting²⁶.

There are insufficient studies to show reliable data on sustainable harvesting methods, but the studies that have been carried out demonstrate some methods that are definitely not sustainable.

Removal of entire stems and foliage is not sustainable²⁷ and results in a large percentage of the plants dying completely.

Removal of roots is not sustainable.

Only plants with more than two whorls of leaves should be harvested with the bottom two whorls of leaves being left on the plant²⁸. (A whorl means three or more leaves radiating from one point on the stem.) Pipsissewa responds to harvesting by sprouting new growth in the year following harvest, but may take up to ten years to reach pre-harvest levels²⁹.

Leaves should not be wet with rain or dew when harvesting.

The stem, above the bottom two whorls of leaves, should be cut using sharp cutters rather than a knife to avoid the roots being pulled.

The following practices should be avoided as they will cause the plant to sweat and quality will deteriorate DO NOT: harvest into plastic bags, pack a large amount of plant into a harvesting container, leave the plant piled up for any period of time prior to drying, bruise the plant during harvesting, or harvest on a hot day.

Do not delay transporting plant to drying facility.

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

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

- always make sure there are enough mature plants left after harvesting to maintain habitats that other wildlife depend on;
- avoid damage to neighbouring species, especially rare or threatened species;
- take particular care with species that have symbiotic relationships or otherwise depend on each other;
- avoid harvesting operations that lead to erosion or damage to sensitive habitat, and
- take and keep samples of each batch harvested³⁰.

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

Tools must be cleaned between harvest batches.



Plant with more than two whorls of leaves. (Photo A.Howe)

➤ *Regeneration*

Regeneration is slow. The plant produces seed but this is not the primary method of spread. It spreads mainly by its rhizomes and this growth is slow³¹. Insufficient studies have been carried out to ascertain regeneration rates post harvest but the studies do show that regeneration is slow^{32, 33}, and may take up to ten years to reach pre harvest levels. Regeneration and sustainable harvest rates will be site specific so permanent sample plots must be set up to monitor and assess sustainability and harvest impact. This will almost certainly be required should organic certification become available in the future.

➤ *Harvest Records*

The harvester must keep records of each harvest batch, these should include identification of the plant, name of plant in Latin, common name, harvest date, harvest location (using map reference or indicated on a map), part harvested, quantity harvested, sustainable harvest rate for area, harvest rate for this harvest, quality of material collected, unusual weather during the growing season that might influence plant constituents, delays in getting the plant to drying stage which would affect quality. Each harvest batch must be given a batch code that will correspond with the record for the harvest batch and with the batch sample and this code will follow the batch through drying, processing and storage or to whatever point the material is sold. Record sale details including name and contact details of buyer. Records should be kept for two years. CHSNC³⁴ is in the process of developing templates for GAP records that can be used for wildcrafting. The “Good Practices for Plant Identification for the Herbal Industry”³⁵ can be used to document plant identity.

➤ *Preparation for Drying*

As the leaves are spread on racks for drying ensure that no other plants have been included in the harvest. The leaves must not be washed prior to drying.

➤ *Drying*

The leaves should be spread out on racks and dried between 30C to 45C out of direct light, in a drying shed. A good airflow around the drying racks is essential. Drying outside, or with no heat will tend to result in browning³⁶. The leaves should be crisp, but not brittle when dry.

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

Drying, processing and storage facilities should provide protection of the plant-material against pests, rodents, insects, birds, and pets and other domestic animals³⁷.

Drying racks must be cleaned between harvest batches.

➤ *Extraction Techniques*

[Tincture, Fluid Extract, Encapsulation, Infusion and Decoction](#)³⁸ are all used.

➤ *Storage*

Pipsissewa must be stored in dry conditions out of direct light. The storage area should be heated to avoid damp and mould, but not at high temperatures as degradation of the product will occur. Dry material should be stored in new polypropylene sacks. Each harvest batch must be labeled appropriately with the name of the plant, quantity and the code applied at harvesting. Details of any problems that occurred during storage (eg. Loss of heat, overheating, insect infestation in building etc.) must be recorded with the corresponding batch records.

Drying, processing and storage facilities should provide protection of the plant-material against pests, rodents, insects, birds, pets, and other domestic animals³⁹.

➤ *Toxicity or Health and Safety Cautions for Harvesters and Processors*

Pipsissewa leaves contain chimaphilin which is a skin sensitizer⁴⁰. Pipsissewa is traditionally used as a counter-irritant to irritate or blister the skin over rheumatic joints, so caution should be exercised when handling this plant.

➤ *Identification of Commercial Product*

Pharmaceutical Name: *Herba Chimaphilae umbell.*

Entire leaves and a few stems, olive green in appearance. Leaves 2.5 to 7 cm in length and from 8 to 20mm in breadth, the distal portion coarsely and sharply serrate, acute or somewhat obtuse, the proximal wedge shaped and nearly entire; leathery, smooth shiny. Veins prominent.

Powdered herb: Moderate yellowish brown to light olive. Microscopical: Fragments of epidermis composed of cells with clear unevenly thickened, porous and wavy vertical walls. Those from the lower epidermis showing broadly elliptical stomata up to 40 µm in length; fragments of mesophyll, some of the cells of which contain chloroplasts, others tannin; fragments of parenchyma containing a reddish brown to yellowish orange amorphous substance; fragments of the epidermis of the stems, the cells of which contain a purplish pigment that is coloured yellowish red with acids and green with alkalis; calcium oxalate in rosette aggregates up to 65µm in diameter; starch grains few, simple, spheroidal, up to 16µm in diameter or 2 to 4 compound; fragments of sclerenchyma fibers; trachea with spiral or annular thickenings; elongated, thick walled, lignified cells showing minute reticulations.⁴¹

Odor: slight

Taste: Astringent, bitter.

➤ *Official Monographs*

No current English language monographs.

See "*Classic Herbal Texts*" for historical monographs. Available online at:

<http://www.henriettesherbal.com/eclectic/index.html>

➤ *Organic certification*

Standards for organic certification of wildcrafted plants has not yet been formalised in Canada⁴². The Soil Association (organic certifying body in the UK) have standards for Wild Harvesting. These standards are recognized in the EU. The standards address endangered species, harvesting areas, requirements for sustainable harvest management plans, processing, personnel training, batch tracking, samples and record keeping. The full Wild Harvesting Standards can be ordered from the Soil Association⁴³.

➤ *Land Access for Harvesting*

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

Crown Land: No permission or license is required however harvesting must be carried out within provincial Ministry guidelines. In BC such harvesting is subject to the Forest and Range Practices Act.⁴⁴

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

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

➤ *Points of Concern*

Chimaphila umbellata is endangered or threatened in some US states⁴⁵ and in Ontario and Quebec in Canada. The local status should be checked and no harvesting should take place if the plant is on endangered or threatened lists.

It is on the United Plant Savers "To Watch" list.

Although it is reported as common in some provinces in Canada it is vulnerable in several provinces due to various factors including declining habitat⁴⁶.

Its slow growth rate, the increasing demand and lack of agriculturally grown product could have a negative impact on already sensitive wild populations.

Claims for safety and efficacy based on First Nations knowledge must be accompanied with details of benefit sharing as per the Convention on Biological Diversity.

¹ Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: <http://www.fs.fed.us/database/feis/plants/shrub/chiumb/all.html>

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⁵ Bolyard, Judith, W.Hardy Eshbaugh, Ronald D Daley, S. Michael Gaston. *Medicinal Plants and Home Remedies of Appalachia*. Charles C. Thomas, Springfield Ill. 1981.

⁶ Grieve, M. *A Modern Herbal*. London: Jonathan Cape. 1975.

⁷ Hebda, R.J, Turner, N.J., Birchwater, S., Kay, M. and the Elders of Ulkatcho. *Ulkatcho Food and Medicine Plants*. Anahim Lake, B.C.: Ulkatcho Publishing. 1996.

⁸ Hutchens, A, *Indian Herbalogy of North America*. Ontario, Canada: Merco. 1973.

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¹⁰ King's American Dispensatory. Harvey Wickes Felter, M.D., and John Uri Lloyd, Phr. M., Ph. D. Available at: <http://www.henriettesherbal.com/eclectic/kings/index.html>. 1898.

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- ²⁰ Youngken, H. *Textbook of Pharmacognosy*. 6th ed. Philadelphia ; Toronto : Blakiston, 1950
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- ²⁴ Brigham, Tim, Michelle Schröder and Wendy Cocksedge. 2004. *Good Practices for Plant Identification for the Herbal Industry*. Saskatchewan Herb and Spice Association. February 2004. Available from <http://www.saskherbspice.org/Good%20Practices%20for%20plant%20identification.pdf>.
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Researched and compiled by Amanda Howe MSc. MNIMH

OREGON GRAPE

Mahonia aquifolium (Pursh.) Nutt.
Berberidaceae

Common Names in English: Oregon grape, Mountain grape, Tall Oregon grape, Holly grape, Mountain Holly, Mahonia,

Other species and subspecies:

Mahonia nervosa (Pursh.) and *Mahonia repens* (Lindl.) G. Don. are frequently substituted for *M. aquifolium*

Other taxonomic names in literature:

Berberis aquifolium Pursh¹.

Description of Plant

Mahonia aquifolium is an evergreen shrub that grows in mixed coniferous woods to 2000m. It grows to 2 metres tall with glossy green leaves made up of 5 – 9 spiny holly shaped leaflets. Each leaflet has one central vein². Some of the leaves may turn red in wintertime.

It flowers in spring with bright yellow flowers. The flowers grow in erect clusters to 20cm long³. The flowers have a faint lemony fragrance. The fruits are blue berries with a whitish bloom that ripen in the late summer and autumn. The berries grow in clusters and each berry is about 1cm across. They have large seeds and are very sour.

M. aquifolium grows in full shade to part shade under the forest canopy.

The roots of *M. aquifolium* are bright yellow beneath the root bark.⁴

M. nervosa and *M. repens* are two other common species. They are both smaller than *M. aquifolium*. *M. nervosa* is a low-growing evergreen shrub that typically reaches 10 to 60cm in height. On exceptional sites, plants may grow to 2 m⁵. *M. nervosa* has three central leaf veins (vs. one in *M. aquifolium*)⁶.

M. repens is an evergreen, perennial shrub with a low or prostrate growth form; stem heights of 4 to 10 to 30cm are common⁷. *M. nervosa* and *B. repens* have smaller roots and are more rhizomatous than *M. aquifolium*, which has larger roots⁸.

Range



Mahonia aquifolium leaves and berries

Mahonia aquifolium is found in drier coniferous woodland up to 2000m in western North America. It is found in British Columbia, California, Idaho, Montana, Oregon and Washington.⁹

M. nervosa occurs across a wide range of habitats in submontane to montane forests of the Pacific Northwest. It is a characteristic shrub of spruce-fir forests but also occurs in northern coastal coniferous forests and in redwood, mixed evergreen, and bottomland forests.¹⁰

M. repens occurs throughout the western United States from western Texas (Guadalupe Mountains), New Mexico, Arizona, and California north to British Columbia and Alberta.

Common Misidentification Errors

Care must be taken not to confuse the plant with *Ilex aquifolium* (Christmas holly).

Mahonia nervosa (dull or dwarf Oregon grape) and *Mahonia repens* (creeping Oregon grape) are frequently substituted for *Mahonia aquifolium*¹¹, in trade and are accepted.

All three are medicinally active and used by herbalists^{12,13}. These three different species are all referred to as Oregon grape in the literature. The official medicinal product is *Mahonia aquifolium*¹⁴.

There is often confusion in the literature and therefore potential confusion with the product with other berberine containing plants in the Berberidaceae such as *Berberis vulgaris*^{15,16}. *B. vulgaris* (another medicinal plant) is not the same as *M. aquifolium* and it should not be used as a substitute in trade

➤ *Part of the plant used medicinally*

Root, rhizome	BHP, 1983
Rootbark, rhizome	Drum 2005
Bark	Duke 2002 ¹⁷
Root	Felter 1922 ¹⁸
Root, rhizome and lower part of aerial stem	Gladstar 2000
Root, rhizome	Green ¹⁹
Root	Grieve 1975
Root	Harding 1936
Root, rhizome	Hoffman 1986
Root	King's American Dispensatory, 1898 ²⁰
Root	Kloss 1988 ²¹
Root	Lonner 2002
Rootstock	Lust 1974 ²²
Root	McCutcheon 1994 ²³
Root, rhizome	Moore 1979 1993
Root and rootbark	Schauenberg and Paris 1977 ²⁴
Root, rhizome	Tilford 1997
Rootbark	Turner 1990 ²⁵
Rhizome	Turner, 1983 ²⁶
Root	Vance 2001
Rootbark	Willard 1996 ²⁷
Root	Wren 1988 ²⁸

As can be seen from the above table the part of the plant that is used medicinally is the root and rhizome. The root must include the rootbark to be medicinally active.

➤ *Harvest Times*

The roots should be harvested in the late summer and fall^{29, 30, 31, 32}. The alkaloid content is likely to be higher in the fall but this has not been scientifically proven³³. Harvest the plant after the berries have fallen or have been eaten by wildlife in order to maximise regeneration potential and to minimise impact on wildlife food sources.

➤ *Harvest Area*

It is important to ensure that the harvest area is not contaminated with heavy metals, industrial pollutants, pesticides or herbicides, oil run off from roads, or run off from mines. The harvest area should not be within the fall out area for industrial pollutants as the plants can absorb pollutants through their leaves even if the pollutants are not found in significant amounts in the soil³⁴. Check with landowner that harvest area has not been sprayed with herbicide or pesticides. If the history of the harvest site or any adjacent waterway is not known, a soil sample should be tested for the above pollutants. Harvesting should not take place within 50metres of main roads³⁵.

➤ *Harvesting Methods*

The plant should be identified using “Good Practices for Plant Identification for the Herbal Industry”³⁶. If there is any doubt about the identity of the plant seek an experienced person to confirm identity.

Oregon grape roots and rhizomes should be lifted with a fork and pulled up by hand until the root or rhizome stops lifting, then cut with a sharp knife^{37, 38}. Care must be taken not to destroy the duff or surrounding plant life when harvesting. The soft outer bark is easily removed so care must be taken that is not stripped off and lost during harvesting. Roots and rhizomes without rootbark are unacceptable to buyers.

Harvest in areas where the soil is not easily compacted.

Mechanical harvesting destroys other plants in the area, compacts the soil, and damages the root bark resulting in an inferior product. Mechanical harvesting will negatively affect any regeneration of the plant. Organic certification would not be obtainable for mechanically harvested plants as it would not meet the standards for wild harvested medicinal species^{39, 40}.

Oregon grape should be harvested in areas where it grows abundantly and densely rather than in areas where it grows more sparsely as it will regenerate better. There are some resource management plans that suggest one in four plants can be harvested every two years – or 25% of the total area can be cut every two years. Such harvesting regimes of either one in four plants or 25% of total area were tested and found to be unsustainable⁴¹.

It is also suggested that only the top 10cm of rhizome is harvested, but regeneration seems to occur at the same rate as if the whole rhizome is harvested if the method described above is used. This is probably because part of the rhizome usually remains in the ground. The advantage of taking more than the top 10cm of rhizome is that fewer plants have to be harvested to meet the demand⁴².

The number of plants that can be sustainably harvested will depend on the particular site. Oregon grape will regenerate better if plants are harvested selectively rather than large areas being cleared⁴³.

The stems and leaves are considered medicinal by many First Nations peoples⁴⁴ and herbalists^{45, 46} in addition to the roots. Herbalists will often include the lower part of the stem (as long as it contains the yellow berberine) along with the roots⁴⁷. However wildcrafters should check the exact requirements of the buyers before including any part of the stem when drying the roots and rhizomes.

Harvested plant material should be collected in clean containers and harvesting containers or tarps must be cleaned between harvest batches. Tools must be cleaned between harvest batches.

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

- always make sure there are enough mature plants left after harvesting to maintain habitats that other wildlife depend on;
- avoid damage to neighbouring species, especially rare or threatened species;
- take particular care with species that have symbiotic relationships or otherwise depend on each other;
- avoid harvesting operations that lead to erosion or damage to sensitive habitat, and
- take and keep samples of each batch harvested⁴⁸.

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

➤ *Regeneration*

The plant regenerates from rhizomes and spreads slowly. It will also regenerate from seed, but less effectively. The plant will sprout from rhizomes after above ground portions of the plant have been cut⁴⁹,⁵⁰. As noted in the above section on harvesting, regeneration will depend on the site therefore harvest monitoring and a permanent sample plot must be set up if possible to monitor and assess sustainability and harvest impact. This will almost certainly be required should certification become available in the future.

Seeds require freezing to germinate.⁵¹

➤ *Harvest Records*

The harvester must keep records of each harvest batch which should include identification of the plant, name of plant in Latin, common name, harvest date, harvest location (using map reference or indicated on a map), part harvested, quantity harvested, sustainable harvest rate for area, harvest rate for this harvest, quality of material collected, unusual weather during the growing season that might influence plant constituents, delays in getting the plant to drying stage which would affect quality. Each harvest batch must be given a batch code that will correspond with the record for the harvest batch and with the batch sample and this code will follow the batch through drying, processing and storage or to whatever point the material is sold. Sale details must be recorded including name and contact details of buyer. Records should be kept for two years. CHSNC⁵² is in the process of developing templates for GAP records that can be used for wildcrafting. The “Good Practices for Plant Identification for the Herbal Industry”⁵³ can be used to document plant identity.

➤ *Preparation for Drying*

The roots and rhizomes should be washed with some care to avoid removing the root bark. A brush should not be used. Commercial ginseng root washers can be employed for larger amounts. Roots and rhizomes should be cut prior to drying unless access to commercial cutting machinery is available as the roots become very hard when they are dry. Water used for washing roots must be potable. Equipment must be cleaned between harvest batches.

➤ *Drying*

The roots and rhizomes should be spread out on racks for drying. A good airflow around the roots and rhizomes is essential. Drying temperature should be kept low at around 35°C to 40°C to allow for even drying. The roots and rhizomes can be tested for dryness by snapping a root and rhizome. They are dry when they snap cleanly but are not brittle. Larger pieces of root will take longer to dry than the rhizome and it is essential that larger pieces of root are dried through to the middle otherwise there is the possibility of mould destroying the entire crop.

Outdoor drying or drying without heat can present problems with mould developing due to the fact that harvest is in late summer and fall, and Oregon Grape is usually growing in areas of relatively high humidity at that time of year.

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

Drying, processing and storage facilities should provide protection of the plant-material against pests, rodents, insects, birds, and pets and other domestic animals⁵⁴.

Drying racks must be cleaned between harvest batches.

➤ *Storage*

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

Drying, processing and storage facilities should provide protection of the plant-material against pests, rodents, insects, birds, and pets and other domestic animals⁵⁵.

The storage area should be heated to avoid damp and mould, but not at high temperatures as degradation of the product will occur.

➤ *Toxicity or Health and Safety Cautions for Harvesters.*

No known toxicity or cautions.

➤ *Extraction Techniques*

Tincture, Fluid Extract, Encapsulation, Infusion and Decoction are all used.

➤ *Identification of Commercial Finished Product*

Pharmaceutical name: *Radix Berberis aquifolii*.

The roots must have the rootbark intact or they will not be acceptable for medicinal use.^{56, 57}

Cut Root: The rootstock and roots of Oregon grape are more or less knotty, in irregular pieces of varying lengths, and about 1-4cm in diameter, with brownish bark and hard and tough yellow wood, showing a small pith and narrow rays.

Powder: Yellowish brown powder. Microscopical: Yellow brown powder consisting of medullary ray cells containing starch grains 3-20um in diameter, 2-3 compound; pitted and reticulate vessels, thick walled lignified xylem fibres, fragments of thick walled pith parenchyma.⁵⁸

Taste: Very bitter

Odour: Not strong, but distinct.

Historically, Sayre⁵⁹ advises that the product must be “without the admixture of more than 5 per cent. of the overground parts of the plant or other foreign matter” to be acceptable for use in the United States Dispensary in 1917, and “Berberis without the bark should be rejected”.

➤ *Official Monographs*

English language monographs:

British Herbal Pharmacopoeia⁶⁰

See “*Classic Herbal Texts*” for historical monographs. Available online at:

<http://www.henriettesherbal.com/eclectic/index.html>

➤ *Organic certification*

Standards for organic certification of wildcrafted plants has not yet been formalised in Canada⁶¹. The Soil Association (organic certifying body in the UK) has standards for Wild Harvesting. These standards

are recognized in the EU. The standards address endangered species, harvesting areas, requirements for sustainable harvest management plans, processing, personnel training, batch tracking, samples and record keeping. The full Wild Harvesting Standards can be ordered from the Soil Association⁶².

➤ *Land Access for Harvesting*

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

Crown Land: No permission or license is required however harvesting must be carried out within provincial Ministry guidelines. In BC such harvesting is subject to the Forest and Range Practices Act.⁶³

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

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

➤ *Points of Concern*

On United Plant Savers “Plants to Watch” list.⁶⁴

In many areas the plant is abundant, but local stocks should be assessed before any harvesting is started. Oregon Grape is frequently cited as a substitute for goldenseal (*Hydrastis canadensis*) and is therefore being harvested more heavily than in the past due to the endangered status of goldenseal. Claims for safety and efficacy based on First Nations knowledge must be accompanied with details of benefit sharing as per the Convention on Biological Diversity.

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Researched and compiled by Amanda Howe MSc. MNIMH

DEVIL'S CLUB

Oplopanax horridus (Sm) Miq
Araliaceae

Common Names in English:

Devil's club
Alaskan ginseng
Wild armored ginseng
Pacific ginseng

Other taxonomic names in literature:

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

Description of Plant

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

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

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



Oplopanax horridus leaves and stems

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

Range

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

Common Misidentification Errors

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

➤ *Part of the plant used medicinally*

Bark	Birket-Smith, K. 1938²
Leaves, roots and berries	Compton, B.D. 1993³
Inner bark	Emmons, G.T. 1991⁴
Inner bark, stem, root	Fortuine, R. MD. 1988⁵
Inner bark	Gottesfeld, L. 1994⁶
Inner bark	Gottesfeld-Johnson, L. 1992⁷
Inner bark of stem, root, berries	Graham, F. 1985
Inner bark of stem, root	Gunther, E. 1973⁸
Inner bark	Hebda et al. 1996⁹
Inner bark, root	Justice, J. MD. 1966
Inner bark	McGregor, M. 1981¹⁰
Inner bark, bark, root	Smith, H.I. 1929¹¹
Stem	Steedman, E.V. 1930¹²
Inner bark, root, stem, berries	Turner, N.J. 1973¹³ , 1979¹⁴ , 1983¹⁵ , 1990¹⁶
Stem bark, roots	Moore, M. 1993¹⁷
Inner bark (few refs to roots)	Moerman 1998¹⁸
Inner bark	Ray, V.F. 1932¹⁹
Inner bark	Lantz 2001
Inner bark	Howe 2003
Inner bark	McCutcheon 1997
Inner bark, berries	Thommasen 1990²⁰

The upright stems and the horizontal or decumbent stems are the parts of the plant that are usually used medicinally. The flowering stems are described as being too oily for use²¹.

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

➤ *Harvest Times*

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

According to Lantz²² there is significant variation in the time of year that different First Nations people perceive the plant to be most powerful. Possibly the action required would dictate when it should be picked.

McCutcheon *et al.*²³ harvested the plant when it was in flower for their “Anti-mycobacterial screening of British Columbian medicinal plants”.

Graham²⁴ has recorded that the plant harvested in autumn or winter may contain toxic amounts of the active ingredients however no specifics are given as the nature of this toxicity and the active ingredients were not identified nor were constituents of the plant known at the time Graham recorded this.

No research has been done to compare chemical constituents of different parts of the plant, or to compare how the chemical constituents differ at different times of year²⁵.

➤ *Harvest Area*

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

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

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

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

The harvest area should not be within the fall out area for industrial pollutants as the plants can absorb pollutants through their leaves even if the pollutants are not found in significant amounts in the soil²⁶.

Check with landowner that harvest area has not been sprayed with herbicide or pesticides. If the history of the harvest site or any adjacent waterway is not known a soil sample should be tested for the above pollutants. Harvesting should not take place within 50metres of main roads²⁷.

➤ *Harvesting Methods*

The plant should be identified using "Good Practices for Plant Identification for the Herbal Industry"²⁸. If there is any doubt about the identity of the plant seek an experienced person to confirm identity.

Harvest the upright stems above the lowest leaf or above a lower branch of the stem²⁹. The total quantity of plant in the harvest area should be assessed.

Preliminary data by McKenzie shows that no more than 2% of the patch should be harvested³⁰.

However he goes on to say that this is probably too low. Vance et al.³¹ recommend a harvest rate of 20% which is probably too high. An eight-foot stem will be ten to twelve years old in many areas³².

Given this relatively slow growth rate the impact of harvesting 20% of the stand each year could have a significantly negative impact. Vance et al. also recommend harvesting the roots and decumbent stems but this was found to be unsustainable by McKenzie and reported as unacceptable practice by Lantz³³.

Do not harvest flowering stems as these are described as being too oily for use³⁴.

Do not harvest decumbent stems or roots, as this is not commercially sustainable³⁵.

Sharp cutters should be used to harvest the stems.

Harvesting should be carried out by hand. Machine harvesting damages the decumbent stems and roots necessary for regeneration. It also damages the sensitive riparian habitat the plant grows in.

Organic certification would not be obtainable for mechanically harvested plants, as it would not meet the standards set for wild harvested medicinal species³⁶.

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

Do not delay transporting plant to drying facility.

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

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

- always make sure there are enough mature plants left after harvesting to maintain habitats that other wildlife depend on;
- avoid damage to neighbouring species, especially rare or threatened species;
- take particular care with species that have symbiotic relationships or otherwise depend on each other;
- avoid harvesting operations that lead to erosion or damage to sensitive habitat, and
- take and keep samples of each batch harvested³⁷.

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

Tools must be cleaned between harvest batches.

➤ *Regeneration*

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

Traditionally when the plant is harvested pieces of the stem are stuck back in the mud to root³⁸.

However this method is not suitable for commercial wildcrafting as regeneration using this method is not reliably successful³⁹.

Preliminary data from regeneration studies on devil's club show that harvesting decumbent stems and roots is not sustainable, with regeneration being almost non-existent. Trials also showed that harvest of stems at ground level has a slower regeneration rate than harvesting the stems above the lowest leaf or lower branch. Generally regeneration rates are slow, and three years post-harvest the test sites had not returned to pre-harvest levels. Most of the regeneration occurs on cut stems and very little natural regeneration comes as new shoots from the ground. New shoots from the ground and from replanted stems showed less vigour than new shoots from the stems⁴⁰.

More research is needed to assess sustainable harvest rates for devil's club^{41, 42}.

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

➤ *Harvest Records*

The harvester must keep records of each harvest batch which should include identification of the plant, name of plant in Latin, common name, harvest date, harvest location (using map reference or indicated on a map), part harvested, quantity harvested, sustainable harvest rate for area (if known), harvest rate for this harvest, quality of material collected, unusual weather during the growing season that might influence plant constituents, delays in getting the plant to drying stage which would affect quality. Each harvest batch must be given a batch code that will correspond with the record for the harvest batch and with the batch sample and this code will follow the batch through drying, processing and storage or to whatever point the material is sold. Record sale details including name and contact details of buyer. Records should be kept for two years. CHSNC⁴³ is in the process of developing templates for GAP records that can be used for wildcrafting. The "Good Practices for Plant Identification for the Herbal Industry"⁴⁴ can be used to document plant identity.

➤ *Preparation for Drying*

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

The green inner bark is processed as follows:

1) Remove the spines from the outer bark.

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

2) Remove the brown outer bark.

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

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

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

Tools must be cleaned between harvest batches.



Green inner bark peeled from the white inner core

➤ *Drying*

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

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

Drying, processing and storage facilities should provide protection of the plant-material against pests, rodents, insects, birds, and pets and other domestic animals⁴⁵.

Racks must be cleaned between harvest batches.

➤ *Extraction Techniques*

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

Decoction and Infusion: Traditionally the plant was extracted by decoction or infusion. There are also references to the fresh plant being chewed for a short period of time in an acute situation, or used fresh

in a topical application. Any long term use of the plant traditionally involved extraction using heat and water⁴⁶.

Tincture: Traditionally the plant was not extracted in alcohol and there is no evidence to support safety or efficacy of its use in tincture form⁴⁷. Justice cautions against using with alcohol⁴⁸. Extracting devil's club in alcohol would raise the following concerns⁴⁹:

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

Encapsulation: There is no evidence to support safety or efficacy of ingesting dried herb in capsule form.

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

➤ *Storage*

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

Drying, processing and storage facilities should provide protection of the plant-material against pests, rodents, insects, birds, and pets and other domestic animals⁵⁰. The storage area should be heated to avoid damp and mould, but not at high temperatures as degradation of the product will occur.

➤ *Toxicity or Health and Safety Cautions for Harvesters*

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

➤ *Identification of Commercial Product*

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

Odour: reminiscent of celery.

Taste: biting and pungent.

➤ *Official Monographs*

There are no official monographs for devil's club.

➤ *Organic certification*

Standards for organic certification of wildcrafted plants has not yet been formalised in Canada⁵¹. The Soil Association (organic certifying body in the UK) has standards for Wild Harvesting. These standards are recognized in the EU. The standards address endangered species, harvesting areas, requirements for sustainable harvest management plans, processing, personnel training, batch tracking, samples and record keeping. The full Wild Harvesting Standards can be ordered from the Soil Association⁵².

➤ Land Access for Harvesting

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

Crown Land: No permission or license is required however harvesting must be carried out within provincial Ministry guidelines. In BC such harvesting is subject to the Forest and Range Act.⁵³

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

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

➤ Points of Concern

The harvest of devil's club for the herbal and nutraceutical markets has increased dramatically in recent years. In 1997 it is estimated that in excess of 2 000 kg of bark was harvested in British Columbia⁵⁴. Its relationship to ginseng (*Panax spp.* also Araliaceae) is fuelling the increasing demand and it is sometimes even being erroneously used interchangeably with ginseng. Its medicinal action is quite different.

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

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

The lack of necessary information re: wild harvesting and number of concerns about the harvest of devil's club is discussed by Lantz⁵⁵: "Escalating commercial interest and over harvesting of devil's club, a lack of information about its ecology and basic life history, and its cultural significance to First Nations people make devil's club a plant that touches on many aspects of medicinal plant commercialisation". All knowledge of medicinal uses of the devil's club comes from First Nations People. Any commercial use of that knowledge to support claims of safety and efficacy must be accompanied by details of benefit sharing as per the Convention on Biological Diversity.

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Researched and compiled by Amanda Howe MSc. MNIMH

PLANTAIN

Plantago lanceolata L.

Plantago major L.

Plantaginaceae

Common Names in English:

P. lanceolata: English plantain, lanceleaf plantain, narrowleaf plantain, ribwort plantain, ribwort;

P. major: common plantain, greater plantain, broadleaf plantain, white mans foot.

Other species and subspecies:

There are a number of subspecies of both *P. major* and *P. lanceolata* in North America.

Other taxonomic names in literature:

None

Description of Plant.

Plantago major is a non-native low-growing perennial weed. It has short perennial rootstock which sends up a basal rosette of leaves, which are oval to broadly ovate, 50-300mm long, dark green, with 7 prominent parallel veins¹. The leaves are ground-hugging and fibrous. The small inconspicuous flowers are borne along the length of the stalk, which somewhat resembles a rat's tail and is 50 – 400mm tall. The plant dies down in winter but retains some green leaves².

Plantago lanceolata is also a non-native perennial weed. It grows in a rosette with the leaves more or less erect. Leaves are lanceolate or ovate-lanceolate, smooth edged, 30-200mm long, with 3 to 7 parallel veins. Flowers are in a cylindrical or ovoid spike, much shorter than the length of their stalk which stands taller than the leaves. The flower stalk has longitudinal furrows on it^{3, 4}.

P. lanceolata has much narrower leaves than *P. major*, but sometimes develops broader leaves in early spring which can make it look like *P. major*. However the flower stalks of *P. lanceolata* are quite different. They are tall with a short, thick flowering spike at the end, whereas *P. major* flowers extend all the way down the stem

Both bloom in late spring and early summer. Both plantains are common in disturbed areas, such as roadways, grazed areas, lawns, and



Plantago major leaves and flowers



Plantago lanceolata leaves and flowers

agricultural areas. It can be found in very diverse habitats.

Range

Both these plantains are common weeds from low elevations to timber line across North America. It is also found across the globe.

Common Misidentification Errors

Several years ago there was a case where *Plantago* was adulterated with *Digitalis*, believed to be the result of misidentification by a wildcrafter⁵. There are several plants such as *Digitalis* and *Verbascum thapsus* that could be mistaken for *P. major* when the plants are young. This mistake cannot be made when the plant is flowering.

Members of the lily family could also be mistaken for *P. lanceolata* with potentially toxic results. Once again, such a mistake could not happen when the plant is flowering.

P. major and *P. lanceolata* should both be harvested when flowering to eliminate the potential for misidentification.

➤ *Part of the Plant Used Medicinally*

<i>P. major</i>	Leaf and root fresh	Bairacli Levi 1982⁶
<i>P. lanceolata</i>	Leaf and flower	Blumenthal 2000
		Bolyard 1981⁷
		Boon 1999⁸
<i>P. major</i>	Leaf. Dried	British Herbal Pharmacopoeia 1983
<i>P. major</i>	Leaf, Root	Cook 1869⁹
unspecified	Leaf, Root, seed. Juice	Culpeper 1819¹⁰
<i>P. major</i> and <i>P. lanceolata</i>	Leaf	Drum 2005¹¹
<i>P. major</i>	Leaf. Juice	Ellingwood 1919¹²
<i>P. major</i>	Whole Plant	Felter 1922¹³
<i>P. major</i> and <i>P. lanceolata</i>	Leaf, root	Grieve 1975¹⁴
<i>P. major</i>	Leaf	Hoffmann 1986¹⁵
<i>P. major</i>	Leaf, root and seed. Fresh and Dried	Hutchens 1973¹⁶
<i>P. major</i>	Root and leaf, fresh only.	King's American Dispensatory 1898¹⁷
<i>P. major</i>	Leaf, root. Juice.	Kloss 1988¹⁸
<i>P. major</i> and <i>P.lanceolata</i>	Leaf. Juice	Lust 1974¹⁹
<i>P. lanceolata</i>	Leaf	Mills 1991²⁰
		Millsbaugh 1974²¹
		Moerman 1998²²
<i>P. major</i> and <i>P.lanceolata</i>	Leaf. Fresh and Dried. Juice	Moore 1993²³
		Ray 1932²⁴
<i>P. major</i> and <i>P.lanceolata</i>	Leaf. fresh	Remington 1918²⁵
<i>P. major</i> and <i>P.lanceolata</i>	Whole plant. Leaf	Schauenberg and Paris 1977²⁶
<i>P. major</i> and <i>P.lanceolata</i>	Leaf	Tilford 1993²⁷
<i>P. major</i>	Leaf, fresh	Turner 1982²⁸ , 1983²⁹
	Leaf	Weiss 1988³⁰
<i>P. major</i>	Leaf Fresh and Dried	Wren 1988³¹

Plantago lanceolata and *Plantago major* are both included here because both are referred to as plantain. They are medicinally similar but have slightly different uses. Find out which species of plantain the buyer requires before harvesting.

➤ *Harvesting Times*

Harvested at flowering time^{32, 33}.

➤ *Harvest Area*

Plantain frequently grows in previously disturbed sites, in ditches, on the edge of agricultural fields and on roadways³⁴. It is therefore very important to ensure that the harvest area is not contaminated with heavy metals, industrial pollutants, pesticides or herbicides, oil run off from roads, or run off from mines. The harvest area should not be within the fall out area for industrial pollutants as the plants can absorb pollutants through their leaves even if the pollutants are not found in significant amounts in the soil³⁵. If the history of the harvest site or any adjacent waterway is not known a soil sample should be tested for the above pollutants.

Harvesting should not take place within 50 metres of roadways³⁶.

Plantago is considered a weed so it is important to ensure that it has not been sprayed with herbicide at any point prior to harvesting.

➤ *Harvesting Methods*

The plant should be identified using “Good Practices for Plant Identification for the Herbal Industry”³⁷. If there is any doubt about identity of the plant seek an experienced person to confirm identity.

Harvest the leaves at ground level using a sharp knife or small reaping hook. Avoid any method that will bruise the leaves as this will result in blackening during drying. Only leaves are harvested, not flower stalks.

DO NOT: harvest into plastic bags, pack a large amount of plant into a harvesting container, leave the plant piled up for any period of time prior to drying, bruise the plant during harvesting, or harvest on a hot day. These practices will cause the plant to sweat and the leaves will blacken.

Ensure that you:

- Avoid damage to neighbouring species, especially rare or threatened species;
- take particular care with species that have symbiotic relationships or otherwise depend on each other;
- avoid harvesting operations that lead to erosion, and
- take and keep samples of each batch harvested³⁸.

Harvested plant material should be collected in clean containers and contact with the ground should be avoided. Do not delay transporting plant to drying facility.

Harvesting containers or tarps must be cleaned between harvest batches.

Tools should be cleaned between harvest batches.

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

➤ *Regeneration*

Propagates by seed and is very prolific.

➤ *Harvest Records*^{39, 40}

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

whatever point the material is sold. Record sale details including name and contact details of buyer. Records should be kept for two years. CHSNC⁴¹ is in the process of developing templates for GAP records that can be used for wildcrafting. The “Good Practices for Plant Identification for the Herbal Industry”⁴² can be used to document plant identity.

➤ *Preparation for Drying*

As the leaves are spread on racks for drying ensure that no other plants have been included in the harvest. No roots should be included. Plantain leaves must be handled gently to avoid bruising which will result in blackening of the leaves as they dry. The leaves must not be washed prior to drying.

➤ *Drying*

The leaves should be spread out thinly and gently on racks and dried between 30°C to 45°C out of direct light, in a drying shed. A good airflow around the drying racks is essential. The leaves of *P. major* are quite thick and fleshy and need to be dried quickly to avoid fading. If they are dried too slowly they are subject to remoistening and will discolour badly. The fleshy leaf stalks are the slowest part of the leaf to dry and the level of dryness can be deceptive⁴³.

Drying outside, or with no heat will tend to result in browning⁴⁴. The leaves should be crisp, but not brittle when dry.

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

Drying, processing and storage facilities should provide protection of the plant-material against pests, rodents, insects, birds, and pets and other domestic animals⁴⁵.

Drying racks must be cleaned between harvest batches.

➤ *Processing*

Chaff cutting is not an option as too much flower stalk would be included if the flower stalks have been harvested with the leaves. Cut and sift to ½ inch for tea grade⁴⁶.

➤ *Storage*

Plantain does not contain volatile oils therefore it can be baled or stored in polypropylene sacks. Store in dry conditions out of direct light. The storage area should be heated to avoid damp and mould, but not at high temperatures as degradation of the product will occur. The level of dryness can be difficult to determine, so it is important to check moisture levels a week or two after processing⁴⁷.

Each harvest batch must be stored in a clean storage container, which must be labeled appropriately with the name of the plant, quantity and the code applied at harvesting. Details of any problems that occurred during storage (e.g. Loss of heat, overheating, insect infestation in building etc.) must be recorded with the corresponding batch records.

Drying, processing and storage facilities should provide protection of the plant-material against pests, rodents, insects, birds, and pets and other domestic animals⁴⁸. The storage area should be heated to avoid damp and mould, but not at high temperatures as degradation of the product will occur.

➤ *Toxicity or Health and Safety Cautions for Harvesters.*

No toxicity or safety concerns for harvesters. Plantain may cause seasonal allergies⁴⁹.

➤ *Extraction Techniques*

[Tincture, Fluid Extract, Encapsulation, Infusion and Decoction and Cataplasm](#) are all used. The fresh herb is commercially juiced.

➤ *Identification of Commercial Finished Product*

German pharmacopoeial grade plantain herb consists of the whole or cut, dried aerial parts of *P. lanceolata* L. It may contain no more than 5% dark-brown to blackish-brown fragments and no more than 2% other foreign matter. The pulverized dried herb must have a swelling index of not less than 6. Botanical identity must be confirmed by thin-layer chromatography (TLC), macroscopic and microscopic examinations, and organoleptic evaluation (DAB 10, 1991–1996). The Swiss pharmacopoeia requires that it contain not less than 30% water-soluble extractive and not more than 10% discolored and brown leaves (Ph.Helv.VII, 1987; Wichtl and Bisset, 1994)⁵⁰.

Macroscopical: Pieces of folded, brittle, dull grey-green leaves. Pieces of grooved winged petiole⁵¹.

In Germany, Plantain is official in the *German Pharmacopeia*, approved in the Commission E monographs, and the tea form is official in the German Standard License monograph⁵².

➤ *Official Monographs*

English language monographs:

British Herbal Pharmacopoeia⁵³

Commission E Monographs⁵⁴

E/S/C/O/P Monographs⁵⁵

European Pharmacopoeia⁵⁶

See "*Classic Herbal Texts*" for historical monographs. Available online at:

<http://www.henriettesherbal.com/eclectic/index.html>

➤ *Organic certification*

Standards for organic certification of wildcrafted plants have not yet been formalised in Canada⁵⁷. The Soil Association (organic certifying body in the UK) has standards for Wild Harvesting which are recognized in the EU. The standards address endangered species, harvesting areas, requirements for sustainable harvest management plans, processing, personnel training, batch tracking, samples and record keeping. The full Wild Harvesting Standards can be ordered from the Soil Association⁵⁸.

➤ *Land Access for Harvesting*

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

Crown Land: No permission or license is required however harvesting must be carried out within provincial Ministry guidelines. In BC such harvesting is subject to the Forest and Range Practices Act.⁵⁹

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

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

➤ *Points of Concern*

Toxic reactions due to adulteration with digitalis⁶⁰ occurred in 1997. This occurred due to misidentification of the plant. *Plantago major* and *Plantago lanceolata* usually grow interspersed with

other plants and there are a number of broad-leaved plants that could be mistaken for *Plantago major* particularly when plants are young. It is also possible to mistake members of the Lily family for *Plantago lanceolata*. It is therefore important that *Plantago major* and *Plantago lanceolata* are picked when they are flowering to avoid misidentification.

Plantago major and *lanceolata* both grow on sites that could be contaminated, so care should be taken to ensure that the harvest site is free from contamination – see above.

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Photos of *Plantago lanceolata* and *Plantago major* with kind permission of Henriette Kress.

Researched and compiled by Amanda Howe MSc. MNIMH

SENECA SNAKEROOT

Polygala senega L. var. *latifolia* Torr. & Gray
Polygalaceae

Common Names in English:

Seneca Root, Senega Root, Senega snakeroot, Seneca snakeroot, snakeroot.

Other species:

There are many other species of *Polygala*. Not all of them are medicinal. *Polygala* comes from the Greek: poly – much, gala – milk, and refers to the milky latex in these plants and not to any medicinal action such as increasing lactation.

Other taxonomic names in literature: None

Description of Plant

Seneca snakeroot is a native perennial plant consisting of a circle of erect shoots 10-50cm high growing from a large purplish-brown branching root crown. The lance-shaped leaves are alternate and have a prominent mid-vein. The lower leaves are small and scale-like, gradually getting larger towards the top of the shoot. The small greenish-white flowers appear in spikes in May - June and gradually turn pinkish with age. Seed capsules form in July and each one contains two black hairy seeds.¹ Seneca snakeroot is found in open woods, along roadsides, and in prairie areas. It is often found in disturbed areas. It prefers good soil with rotted manure or leaf litter, a neutral to slightly alkaline pH, and full sun or partial shade, but it is also found in rocky calcareous areas². It is infrequent in wet or shaded areas³. Seneca snakeroot is usually found growing in a patch. The roots are yellowish grey and are from the size of a straw to the size of a little finger⁴ and have a bitter milky juice⁵.

Range

Its natural distribution is from southern Alberta across the southern half of the prairie provinces and eastward into New Brunswick, southward into South Dakota, Arkansas, Tennessee, and Georgia. In Manitoba the largest populations are in the Interlake area⁶, but it is also quite



Polygala senega

photo by E. Saulys

commonly found throughout the southern part of the province.

Common Misidentification Errors.

Care must be taken to properly identify the plant before harvesting; this can be difficult if harvesting takes place after the flowering stem has died down in the late summer or fall. Many other species are found as adulterants⁷ and this could be due to misidentification after the stem has died down.

Polygala alba and *Polygala boykini* are both substituted for *Polygala senega*, but are not the correct medicinal species.

Seneca snakeroot may resemble some white orchids, such as Ladies Tresses (*Spiranthes romanzoffiana*).



Polygala senega flower – Photo by E. Saulys

The name 'snakeroot' has been applied to a number of other medicinal plants therefore it is important to carefully identify the plant using the Latin name rather than the common name.

➤ *Part of the Plant used Medicinally*

Root	Agricultural Development Fund of Saskatchewan ⁸ 1997
Root	British Herbal Pharmacopeia 1983
Root	British Pharmaceutical Codex 1911 ⁹
Root	Duke 1985 ¹⁰ 2002
Root	ESCOP 2003 ¹¹
Root	European Pharmacopoeia 2006 ¹²
Root	Grieve 1975
Root	Heinrich 2004
Root	Hoffmann 1986 ¹³
Root	Jackson 1990 ¹⁴
Root	Kindscher 1992 ¹⁵
Root	Kings American Dispensatory 1898
Root	Leighton 1985 ¹⁶
Root	Lust 1974 ¹⁷
Root	Moerman 1998 ¹⁸
Root	Millspaugh 1974
Root	Smith 1929 ¹⁹
Root	Turcotte 1997
Root	World Health Organisation 1999
Root	Wren 1988 ²⁰

The above is a selection of the numerous references for the medicinal use of Polygala senega root.

➤ *Harvesting Time.*

Harvest the root in the late summer or early fall^{21, 22} when the leaves are dead and before the first frost²³ for the best quality. Harvesting at this time is recommended to allow for maximum seed dispersal²⁴. The plant is also incorrectly harvested in the early summer when the flower stems are still visible to allow for positive identification²⁵. This is not the right time to harvest for two reasons 1) the seed has not had time to disperse, and 2) saponin content is highest in the Fall. The root is not large enough to harvest until it is four years old.

➤ *Harvest Area*

If the Seneca root to be harvested is growing in a disturbed area it is important to ensure that the harvest area is not contaminated with heavy metals, industrial pollutants, pesticides or herbicides, or oil run off from roads, or run off from mines.

The harvest area should not be within the fall out area for industrial pollutants as the plants can absorb pollutants through their leaves even if the pollutants are not found in significant amounts in the soil²⁶. If the history of the harvest site or any adjacent waterway is not known a soil sample should be tested for the above pollutants.

Harvesting should not take place within 50metres of roadways²⁷.

In Manitoba Seneca root grows prolifically on Hydro Rights of Way²⁸. Ensure that the area has not been sprayed with herbicide prior to harvesting.

➤ *Harvesting Method*

The plant should be identified using “Good Practices for Plant Identification for the Herbal Industry”²⁹. If there is any doubt about identity of the plant seek an experienced person to confirm identity.

The roots are dug with a spade and collected in sacks. Usually only the largest roots are harvested³⁰ but no studies have been carried out to determine if this is the most sustainable harvest technique.

The following practices should be avoided as they will cause deterioration of quality. DO NOT: harvest into plastic bags, pack a large amount of roots into a harvesting container, leave the roots piled up for any period of time prior to drying.

Harvested plant material should be collected in clean containers and harvesting containers or tarps must be cleaned between harvest batches. Tools must be cleaned between harvest batches.

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

- always make sure there are enough mature plants left after harvesting to maintain habitats that other wildlife depend on;
- avoid damage to neighbouring species, especially rare or threatened species;
- take particular care with species that have symbiotic relationships or otherwise depend on each other;
- avoid harvesting operations that lead to erosion or damage to sensitive habitat, and
- take and keep samples of each batch harvested³¹.

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

➤ *Regeneration*

Seneca snakeroot regenerates vegetatively and through seed dispersal. Experiments conducted in Manitoba³² showed that root and shoot cuttings were not successful while the plant was flowering. There was limited success with cuttings taken in early Spring and late Fall. Division of the root in spring or late fall showed some success in controlled conditions but this has not yet been documented in the field.

Seed germination in sites where the soil is disturbed is generally good³³.

Save our Species states that for several reasons Seneca snakeroot is not an ideal choice for commercial wildcrafting. Foremost is that several years are required to develop a harvestable root (even a four-year root weighs less than 5 grams).”This drastically limits the amount that can be safely collected each year without damaging the wild populations³⁴”. Seneca snakeroot has been harvested to near extinction in Eastern North America³⁵.

No studies have been carried out to find out how often an area can be harvested sustainably or the percentage of plants that can be sustainably harvested in a given area. Wildcrafters state that they harvest the largest roots but no minimum size or number of flowering stalks per plant is given which means the largest root is a relative term and this makes the plants very vulnerable to over-harvesting³⁶. Regeneration and sustainable harvest rates will be site specific so permanent sample plots must be set up if possible to monitor and assess sustainability and harvest impact. This will almost certainly be required should certification become available in the future.

➤ *Harvest Records*

The harvester must keep records of each harvest batch which should include identification of the plant, name of plant in latin, common name, harvest date, harvest location (using map reference or indicated on a map), part harvested, quantity harvested, sustainable harvest rate for area (if known), harvest rate for this harvest, quality of material collected, unusual weather during the growing season that might influence plant constituents, delays in getting the plant to drying stage which would affect quality. Each harvest batch must be given a batch code that will correspond with the record for the harvest batch and with the batch sample and this code will follow the batch through drying, processing and storage or to whatever point the material is sold. Record sale details including name and contact details of buyer. Records should be kept for two years. CHSNC³⁷ is in the process of developing templates for GAP records that can be used for wildcrafting. The “Good Practices for Plant Identification for the Herbal Industry”³⁸ can be used to document plant identity.

➤ *Preparation for Drying*

The root must be well washed prior to drying. Water used for washing roots must be potable. Equipment must be cleaned between harvest batches.

➤ *Drying.*

The roots should be spread out on racks for drying. A good airflow around the roots is essential. Drying temperature should be kept low at around 35 to 40C to allow for even drying. The roots can be tested for dryness by snapping a root - they are dry when they snap cleanly but are not brittle.

If high heat is used the outer root will dry and trap moisture inside the root which leads to mould and spoilage of the harvest. High heat will also lead to loss of the volatile oils making it a lower quality product. The root will lose its aroma of methyl salicylate (wintergreen) and this will make it less commercially desirable.

The roots dry to about 1/3rd their fresh weight.

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

Drying, processing and storage facilities should provide protection of the plant-material against pests, rodents, insects, birds, and pets and other domestic animals³⁹.

Drying racks must be cleaned between harvest batches.

➤ *Processing*

Dried root should be cut into pieces 5-20mm long

➤ *Storage.*

Store in a tightly closed container to avoid loss of volatile oils, protected from light and humidity.⁴⁰ The storage area should be heated to avoid damp and mould, but not at high temperatures as degradation of the product will occur. Each harvest batch must be stored in a clean storage container, which must be labeled appropriately with the name of the plant, quantity and the code applied at harvesting. Details of any problems that occurred during storage (eg. Loss of heat, overheating, insect infestation in building etc.) must be recorded with the corresponding batch records.

Drying, processing and storage facilities should provide protection of the plant-material against pests, rodents, insects, birds, and pets and other domestic animals⁴¹.

➤ *Toxicity or Health and Safety Cautions for Harvesters*

The powdered root is irritating to the mucus membranes. It will cause sneezing⁴².
The root will cause nausea and vomiting if ingested in large amounts⁴³.

➤ *Extraction Techniques*

[Infusion, Tincture, Decoction](#)^{44, 45, 46}.

➤ *Identification of Commercial Product.*

Pharmaceutical name: Radix senegae

There are two commercial varieties of this drug, Northern and Southern Seneca snakeroot. The northern Seneca snakeroot is collected mainly in the province of Manitoba and in Minnesota; the Southern, mainly from Virginia to Texas⁴⁷. The Northern root is generally larger and considered more valuable.

Northern Senega entire root can be up to 15cm long. (southern Senega up to 8cm long) and is up to 12mm in diameter (7mm Southern root)⁴⁸. The lower part of the root is yellowish in colour but the crown is somewhat darker. The crown is knotty and bears numerous, often purplish buds and the remains of aerial stems, which should not exceed about 2 per cent. The tapering often curved root frequently divides into two or more branches. Some, but not all of the pieces bear a keel or ridge in the form of a rapidly descending spiral. The root frequently has a marked odour of methyl salicylate.

Powdered Root: Pale brown to weak yellow with an odour resembling methyl salicylate or wintergreen. The microscopy of the powder can be found in Jackson 1990, Youngken 1948, WHO 1999, European Pharmacopoeia 2006.

Taste: at first sweetish, but afterward pungent, bitter, and rather acrid^{49, 50}. The fresh roots produce an acrid taste and "enlargement is felt at the root of the tongue, which once recognised will always mentally associate itself with this plant"⁵¹.

Odour: Fresh root smells of methyl salicylate (wintergreen). Faintly aromatic in the dried root.⁵²
Carefully dried and stored roots will retain a better smell of methyl salicylate and is a higher quality product.⁵³

➤ *Official Monographs*

English language monographs:

British Herbal Pharmacopoeia⁵⁴.

*E/S/C/O/P Monograph*⁵⁵.

European Pharmacopoeia⁵⁶.

World Health Organisation Monographs on Selected Medicinal Plants⁵⁷.

See "*Classic Herbal Texts*" for historical monographs. Available online at:

<http://www.henriettesherbal.com/eclectic/index.html>

➤ *Organic certification*

Standards for organic certification of wildcrafted plants have not yet been formalised in Canada⁵⁸. The Soil Association (organic certifying body in the UK) has standards for Wild Harvesting. These standards are recognized in the EU. The standards address endangered species, harvesting areas, requirements for sustainable harvest management plans, processing, personnel training, batch tracking, samples and record keeping. The full Wild Harvesting Standards can be ordered from the Soil Association⁵⁹.

➤ *Land Access for Harvesting*

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

Crown Land: No permission or license is required however harvesting must be carried out within provincial Ministry guidelines. In BC such harvesting is subject to the Forest and Range Practices Act.⁶⁰

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

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

➤ *Points of Concern*

The majority of the global trade in Seneca snakeroot is based on material wild harvested in Manitoba.⁶¹ Seneca snakeroot is much less common than it used to be in its former range due to habitat loss and harvesting.^{62, 63}

Saskatchewan and Manitoba are the last two provinces in Canada to have a significant amount of Seneca snakeroot. It has been eradicated in most other areas of North America as happened to wild ginseng (*Panax quinquefolium*) in the eastern provinces and states.⁶⁴ SAVE OUR SPECIES argues that loss of habitat is a major reason for its decline.

Seneca snakeroot was harvested heavily in Canada and exported to the USA and Europe from the early 1900's to the 1960's with demand peaking in the 1930's. Demand dropped off in the 60's due to synthetically available substitutes.⁶⁵ A resurgence of interest in natural health products led to an increase in exports from Manitoba again in the 1980's⁶⁶.

This resurgence in demand could negatively impact wild populations and therefore more work needs to be carried out to understand wild regeneration and cultivation.

Claims for safety and efficacy based on First Nations knowledge must be accompanied by benefit sharing as per the Convention on Biological Diversity.

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Researched and compiled by Amanda Howe MSc. MNIMH

STINGING NETTLE

Urtica dioica L.
Urticaceae

Common Names in English:

stinging nettle, common nettle, American stinging nettle, European stinging nettle, hoary nettle

Other species and subspecies:

Many varieties and subspecies of *Urtica dioica* have been described including an introduced subspecies from Europe. Although formerly separated into four species, most recent authors agree that the North American plants cannot be distinguished at the species level from each other and from European plants¹. The following three subspecies are currently recognized:

Urtica dioica ssp. *dioica* (European stinging nettle)
Urtica dioica ssp. *gracilis* (Ait.) Selander (American stinging nettle)
Urtica dioica ssp. *holosericea* (Nutt.) Thorne (hoary nettle)

Two subspecies, American stinging nettle and hoary nettle, are native; the third subspecies in North America, European stinging nettle, was introduced in the mid-1800's².

American stinging nettle is the most common subspecies in North America.

Urtica urens L. is an annual stinging nettle with a tap root and is also medicinal.

Other taxonomic names in literature:

None

Description of Plant

Stinging nettle is a native perennial herbaceous plant. It grows 1-3m tall with leafy stems and forms dense patches. These dense clonal patches can dominate large areas.³ Both leaves and stems are armed with stinging hairs. The leaves are opposite, narrowly lance shaped, to oval or heart-shaped, coarsely saw-toothed. It flowers from early summer through to fall; the flowers are tiny, greenish and numerous in dense, drooping clusters in the leaf axils and at the stem tips. There are separate male and female



Urtica dioica leaves

flowers, sometimes on the same plant, sometimes on different plants⁴. The seeds ripen in mid summer to fall. The rhizomes form dense underground and surface mats.

Stinging nettle occurs in moist sites along streams, coulees, and ditches, on mountain slopes, in woodland clearings, and in disturbed areas. Stinging nettle generally grows on deep, rich soils.

Range

Much of United States and southern Canada; lowlands to subalpine elevations, under 3000m.

Common Misidentification Errors

Can be misidentified as a mint but this mistake is quickly discovered on contact with the stinging hairs⁵.

Should not be confused with dead nettle (*Lamium album*) or any of the other plants with the common name nettle such as Hedge nettle (*Stachys spp*), red dead nettle etc or hemp nettle (*Galeopsis spp*). None of these “nettles” have the stinging hairs of *Urtica dioica*. They have different medicinal actions and cannot be substituted for *Urtica dioica*.



Urtica dioica and *Lamium album* growing together

➤ *Part of the Plant Used Medicinally*

Root	Leaf	Flower	Seed		
x	x	x	x	All parts fresh and dried	Bairacli Levi 1982⁶
	x			Dried leaf	Bartram 1998⁷
x				Root	Blankenship 1905⁸
x	x	x		Root, leaf, flower	Bolyard 1981⁹
x	x				Boon 1999¹⁰
	x	x			British Herbal Pharmacopoeia 1983
x	x	x			Blumenthal 2000
x	x	x	x		Cook 1869¹¹
x	x		x	Fresh and Dried	Culpeper 1819¹²
x	x		x		Drum 2005
x					ESCOP 1997¹³
x	x	x	x	Fresh and Dried	Grieve 1975
x	x				Heinrich et al 2004¹⁴
	x	x			Hoffmann 1986¹⁵
x	x				Hutchens 1973¹⁶
x	x	x	x	Root, leaf, fresh and dried	Kavalali 2003
x	x	x	x	Root, leaf fresh and dried, flower, seed	King's American Dispensatory 1898¹⁷
x	x		x		Kloss 1988¹⁸
	x				Leighton 1985¹⁹
x	x				Lust 1974
x	x			Root, leaf fresh and dried	Mills and Bone 2000²⁰
	x		x		Millsbaugh 1974²¹
x	x	x		Roots and aerial parts	Moerman 1998²²
	x		x	Leaf, Seed	Moore 1993
x	x	x	x		Moore 1993
	x			Fresh Plant	Ray 1932²³
	x			Fresh and Dried	Schauenberg and Paris 1977²⁴
	x		x		Schofield 1998
	x				Tilford 1993²⁵
x	x			Leaf - fresh and dried	Turner 1971²⁶, 1982²⁷, 1990²⁸, 2004²⁹
	x			Fresh and Dried	Weiss 1988³⁰
x	x			Fresh and Dried leaf and root	Willard 1992³¹
x					World Health Organisation 2003³²
	x	x	x	Fresh and Dried	Wren 1988³³

The parts used in natural health products are the roots, leaves both fresh and dried, flowers and seeds.

➤ *Harvesting Times*

Stinging nettles will produce a flush of new growth after harvesting and can potentially be harvested two or three times a year, depending on the climate. Therefore the times of year given below will vary if the second or third harvest is being collected. Stinging nettles may not achieve flowering with the second or third harvest depending on the climate.

Leaf: The leaf should be harvested in spring/early summer before flowering^{34, 35, 36, 37}. The mature leaves, post flowering, can cause kidney irritation and should not be harvested^{38, 39}. This irritation is frequently reported as due to cystoliths in the leaves but the cause of the irritation is not completely clear (the cystoliths contain calcium carbonate⁴⁰). Stinging nettles are prone to being eaten by insects and should be harvested before any holes begin to appear in the leaves. The plants elongate with more stem between the leaves as they mature and the stem becomes woody, so they should be harvested before too much stem develops. The WHO and ESCOP monographs and Hoffmann (1986) recommends harvesting during flowering, however this may be too late to harvest in some areas due to insect attack. Protein levels in the leaves significantly increase with flowering and then drop to the lowest levels in December⁴¹.

If the leaves are being harvested for juicing rather than drying they should be harvested before flowering.

Specific buyer requirements should be requested before harvesting.

Seed: The seed should be harvested while the seed husks are still green^{42, 43}. The seeds themselves have a light brown coat. Harvest whenever the fruit is ripe which can be anytime from late Spring to Fall. Harvest before the husks are dried and have become brown or grey⁴⁴.

Flower: The flowers should be harvested when the plant just starts to bloom rather than waiting until some of the flowers have gone to seed. The flowers are often harvested along with the leaf. If this is the case care should be taken to ascertain whether the plant has just started to flower or if it has already gone to seed. If it has gone to seed the leaves should not be harvested as they will be over-mature and may cause kidney irritation.

Root: The roots are usually harvested in fall^{45, 46}.

➤ *Harvest Area*

Stinging nettle frequently grows in previously disturbed sites, in ditches, on the edge of agricultural fields and on roadways. It is therefore very important to ensure that the harvest area is not contaminated with heavy metals, industrial pollutants, pesticides or herbicides, or oil run off from roads^{47, 48}.

Stinging nettles absorb heavy metals^{49, 50, 51} and other pollutants readily so the harvester should be certain that the area is not polluted. The harvest area should not be within the fall out area for industrial pollutants as the plants can absorb pollutants through their leaves even if the pollutants are not found in significant amounts in the soil⁵². If the history of the harvest site or any adjacent waterway is not known a soil sample should be tested for the above pollutants.

Stinging nettles are considered noxious weeds in some areas and invasive species and as a result may have been sprayed with herbicide. Make sure that the stinging nettles have not been sprayed.

➤ *Harvesting Methods*

The plant should be identified using "Good Practices for Plant Identification for the Herbal Industry"⁵³. If there is any doubt about identity of the plant seek an experienced person to confirm identity.

Leaf: The plant should be harvested on a cool dry day when the leaves are dry. A catching scythe can be used to harvest⁵⁴. The leaf and stem can be harvested just above the ground⁵⁵, taking care not to include yellow or damaged leaves in the harvest. It may be necessary to harvest from higher on the stalk if lower leaves are damaged or yellowing.

Nettle bruises very easily and care should be taken not to bruise the leaves during harvest; breathable harvest containers should be used. If harvesting onto a tarp ensure that the leaves are not left in piles as they will sweat and this will cause blackening on drying. The plant should be spread out to dry as soon as possible.

The following practices should be avoided as they will cause the plant to sweat and the leaves will blacken. **DO NOT:** harvest into plastic bags, pack a large amount of plant into a harvesting container, leave the plant piled up for any period of time prior to drying, bruise the plant during harvesting, or harvest on a hot day.

Flower and Seeds: The flowers and seeds hang in clusters and these can be picked individually as recommended by some authors for a high quality product. Alternatively the whole stem can be harvested and the flowers or seeds can be removed from the stems at the processing site.

Roots and rhizomes: Prior to harvesting the roots cut off the aerial parts as close to the ground as possible⁵⁶. First ensure that there are no other plants growing among the nettles that will adulterate the root harvest. The roots can be dug using a fork or vine hoe. Nettles often form dense colonies that exclude other vegetation; this can be used to advantage by harvesting from areas where there is no other vegetation so that roots from other plants are not harvested with the nettle roots by mistake. The brownish yellow roots and rhizomes should be harvested rather than the younger white roots. The roots and rhizomes may form dense mats depending on the site. Mechanical harvesting will bruise the roots and will lead to decay during drying which will result in a lower quality product⁵⁷.

In order to ensure that the harvesting is not having a negative impact:

- always make sure there are enough mature plants left after harvesting to maintain habitats that other wildlife depend on;
- avoid damage to neighbouring species, especially rare or threatened species;
- take particular care with species that have symbiotic relationships or otherwise depend on each other;
- avoid harvesting operations that lead to erosion or damage to sensitive habitat, and
- take and keep samples of each batch harvested⁵⁸.

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

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

Tools must be cleaned between harvest batches.



Urtica dioica roots

➤ *Regeneration*

Stinging nettles are considered a noxious weed in some provinces in Canada and are considered invasive in some states in the USA⁵⁹.

Stinging nettles regenerate both vegetatively and by seed. Stinging nettle produces abundant seed and the seedlings produce spreading roots in the first year.

Stinging nettle also reproduces and spreads through rhizomes and sends new shoots up each year from perennating buds on rhizomes. Maximum root development occurs in the spring prior to flowering⁶⁰.

Stinging nettles will send up a flush of new growth if they are cut down during the growing season. Continual mowing may kill them, but two harvests per year are unlikely to impact on the size of the colony.

When distributed through the soil by disturbance such as mechanical cultivation, stinging nettle rhizomes can establish dense new colonies. However, repeated ploughing will eliminate stinging nettle⁶¹.

Stinging nettle patches provide habitat for butterflies and certain animals and this should be taken into account when harvesting large amounts.

➤ *Harvest Records*^{62, 63}.

The harvester must keep records of each harvest batch which should include identification of the plant, name of plant in Latin, common name, harvest date, harvest location (using map reference or indicated on a map), part harvested, quantity harvested, sustainable harvest rate for area (if known), harvest rate for this harvest, quality of material collected, unusual weather during the growing season that might influence plant constituents, delays in getting the plant to drying stage which would affect quality. Each harvest batch must be given a batch code that will correspond with the record for the harvest batch and with the batch sample and this code will follow the batch through drying, processing and storage or to whatever point the material is sold. Record sale details including name and contact details of buyer. Records should be kept for two years. CHSNC⁶⁴ is in the process of developing templates for GAP records that can be used for wildcrafting. The "Good Practices for Plant Identification for the Herbal Industry"⁶⁵ can be used to document plant identity.

➤ *Preparation for Drying*

Leaf: Ensure that no other plants have been included in the harvest. The leaves must not be washed prior to drying. Handle with care to avoid bruising the plant and ensure that the leaves are spread out for drying as soon as possible after harvesting.

Flowers and Seeds: should be picked off the stem prior to drying if this was not done at harvest. Ensure that no other plants or seeds have been included in the harvest at this point.

Roots: the fine roots should be washed carefully of debris and soil⁶⁶. Ensure that roots from other plants have not been included in the harvest. Remove any old dead roots. There is no need to chop roots prior to drying⁶⁷.

➤ *Drying*

Leaf: The leaves should be spread out on racks and dried between 30°C to 45°C out of direct light, in a drying shed. A good airflow around the drying racks is essential. Drying outside, or with no heat will tend to result in reabsorption of moisture and blackening of the finished product^{68, 69}. The leaves should be crisp, but not brittle when dry. The stems and young tips are the slowest part to dry and should be checked carefully. The stem should snap when dry. Once the leaves are dry they can be easily removed from the stem if the buyer requires no stem. Wear protective clothing and dust mask during processing of dried material.

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

Drying, processing and storage facilities should provide protection of the plant-material against pests, rodents, insects, birds, and pets and other domestic animals⁷⁰.

Drying racks must be cleaned between harvest batches.

Flowers and Seeds: The Flowers and Seeds should be spread out on racks and dried between 30°C to 45°C out of direct light, in a drying shed. A good airflow around the drying racks is essential. Unless the racks are very small mesh, sheets should be spread under the racks to collect any falling seed or flowers as they dry.

Roots: The roots should be spread out on racks an inch thick and dried slowly at 15 – 30°C for about six days⁷¹.

Drying racks must be cleaned between harvest batches.

➤ *Processing*

Leaf: Rub through 2 ½ to 3 dent screen for tea grade leaf.

Aerial parts: Chaff cut.

Roots: Work over a 2 ½ to 3 dent screen. Any root big enough to be yellow can be included. Can also be chaff cut.

Equipment must be cleaned between harvest batches.

➤ *Storage*

Stinging nettles do not contain volatile oils so can be baled or stored in clean, new polypropylene sacks. Store in dry conditions out of direct light. The storage area should be heated to avoid damp and mould, but not at high temperatures as degradation of the product will occur. Each harvest batch and storage bag or container must be labeled appropriately with the name of the plant, harvest date, harvest location and harvesters name.

Be sure to wear protective clothing and dust mask during handling of dried material.

➤ *Toxicity or Health and Safety Cautions for Harvesters.*

Protective clothing and gloves should be worn when harvesting stinging nettles. Take care to protect the wrist area between the glove and the sleeve. The sting of *Urtica dioica* causes minor irritation for a few minutes up to 24 hours (the stinging action has traditionally been used medicinally). It does not recur like poison ivy and will not cause permanent skin damage. The cause of the stinging pain could be due to oxalic acid and tartaric acid in the stinging hairs, not formic acid as was formerly thought⁷².

A dust mask should be worn when processing dried stinging nettles.

There are species of *Urtica* growing in other parts of the world that can cause a significant reaction and even death⁷³.

➤ *Extraction Techniques*

[Tincture, fluid extract, encapsulation, infusion and decoction](#) are all used. Stinging nettles are also used in shampoos and other medicinal skin and hair products. The fresh herb is commercially juiced.

➤ *Identification of Commercial Finished Product*

Leaf: Leaf pieces wrinkled and rolled, of various shades of dark green, bearing obvious stinging hairs. Stem pieces ridged, hollow, perhaps split, hairy, pale green-brown. May cause irritation if handled⁷⁴.

Root: greyish-brown, irregularly twisted, about 5mm thick, distinct longitudinal furrows; hollow in cross-section, cut surface white; fracture fibrous and tough.

Rhizome: cylindrical and tapering, occasionally branched, up to about 6mm thick at upper end; outer surface yellowish-brown; internodes with deep longitudinal furrows, numerous smooth, very thin and wiry roots arising from the nodes; in the outer part, inner surface creamy-white with a central hollow; fracture fibrous and tough.

Odourless;

Taste: faintly aromatic, characteristically bitter

Pharmacopeial grade stinging nettle herb (leaf, flower, and stem) must be collected during the flowering period and contain not less than 18% water-soluble extractives, not more than 2% stem above 3 mm in diameter, and other quantitative standards, and the German Pharmaceutical Codex specifies not more than 10% stem fragments⁷⁵.

The Mater report states that there is good market demand from Europe for stinging nettles⁷⁶.

➤ *Official monographs*

English language monographs:

British Herbal Pharmacopoeia.⁷⁷

Commission E Monographs⁷⁸

European Pharmacopoeia⁷⁹

Natural Health Products Directorate Monographs.⁸⁰

United States Pharmacopoeia⁸¹

World Health Organisation Monographs on Selected Medicinal Plants⁸²

See "*Classic Herbal Texts*" for historical monographs. Available online at:

<http://www.henriettesherbal.com/eclectic/index.html>

➤ *Organic certification*

Standards for organic certification of wildcrafted plants have not yet been formalised in Canada⁸³. The Soil Association (organic certifying body in the UK) have standards for Wild Harvesting. These standards are recognized in the EU. The standards address endangered species, harvesting areas, requirements for sustainable harvest management plans, processing, personnel training, batch tracking, samples and record keeping. The full Wild Harvesting Standards can be ordered from the Soil Association⁸⁴.

➤ *Land Access for Harvesting*

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

Crown Land: No permission or license is required however harvesting must be carried out within provincial Ministry guidelines. In BC such harvesting is subject to the Forest and Range Practices Act.⁸⁵ First Nations Reserve Land: Permission must be obtained from the Band with details of exactly what you wish to harvest. For many First Nations harvesting of medicinal plants is a spiritual practice with strict rules about how the harvest is carried out. Knowledge of and respect for these practices should be a part of any request for permission to harvest.

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

➤ *Points of Concern*

It is important not to harvest over-mature *Urtica dioica* leaves due to the possibility of kidney irritation with leaves harvested after the plant has flowered.

Do not introduce *Urtica dioica* into an area for the purposes of harvest as it is an invasive weed in some areas.

Always check carefully to ensure that herbicides have not been used on *Urtica dioica* patches; it is at higher risk due to its noxious weed status.

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Researched and compiled by Amanda Howe MSc. MNIMH

Appendix III – Wildcrafter Survey

SURVEY OF WILDCRAFTERS

- Survey Report
- Survey Questionnaire
- Summary of Survey results
 - Volumes and Species Harvested
 - Harvest Sustainability
 - Cleaning, Drying and Processing of Plant
 - Assuring Quality
 - Land Access and Marketing

Draft Version 1.

APPENDIX 3

Survey Report

Wildcrafters were invited to participate in a survey designed to provide information on current wildcrafting practices. They were also invited to participate at this stage in the project to encourage participation in future stages of the project and to develop trust in the process, and the proposal to develop Good Wildcrafting Practices.

No representative association of wildcrafters exists at this time. Contact with wildcrafters was made through the Centre for Non-Timber Resources, Siska Traditions Ethical Picking Practices program, the Northern Forest Diversification Centre, Lonewolf Native Plant & Herb Farm, the Canadian Herb, Spice, and Natural Health Products Coalition network, the members of the Canadian Herbalists Association of BC, the Nova Scotia Herbalists Association, the Ontario Herbalists Association, and through institutions/organizations that teach wildcrafting of medicinal botanicals, with requests to all the above to forward the survey on to other wildcrafters.

The wildcrafter questionnaire (attached) was focussed on the following areas:

- How long has the person been commercially wildcrafting?
- What is their background?
- How did they learn to wildcraft?
- What species do they wildcraft?
- How do they identify the plant they are harvesting?
- How do they know when to harvest and what part to harvest?
- How do they handle the plant post harvest?
- Do they dry the harvested botanicals, or does someone else process the harvested botanicals?
- How do they handle problems with mould, insect infestation etc.
- Hygiene and “food-safety” issues.
- Do they keep records of their harvests?
- Do they harvest the same “patches” every year?
- How do they ensure that the plant population is maintained for future harvests?
- Do they have one particular buyer they sell to, or does this change from time to time and with different botanicals?

Prior to implementation, the survey was approved for use through the ethical review process of Royal Roads University.

Response to request to participate in survey

There was limited response to the survey with a number of the people who were approached expressing concern about regulation. The discussions with the people who declined to participate in the survey are worth noting. Their concerns were focussed on the impact of recent NHP regulation, which is perceived to have put many small scale NHP manufacturers

out of business. There is a perception that NHP regulation has been too onerous and that implementation of certification of wildcrafters could follow the same route. There was overall agreement among these people that there is a need for high quality raw materials and there was also unanimous agreement that safeguarding of wild harvested medicinal plants from over harvesting and unethical harvesting practices is important. However any implementation of regulation should be done with awareness that wildcrafters are often very small scale or single operators making a marginal living.

Survey Results

The participants in the survey were mostly small-scale harvesters with limited commercial experience, with the exception of one large scale commercial harvester. The results of the survey cannot be seen to be a survey of the practices of the commercial wildcrafting sector as a whole. However, many of the wildcrafters surveyed sell small amounts of their products and are interested in expanding what they do. The survey results are useful in providing insight into the areas of expertise of small scale wildcrafters, and into the areas where training or enhanced understanding of the good wildcrafting practices would be valuable.

Many of the harvesters had received some kind of training with another wildcrafter or had taken a course on the subject. All expressed the importance of sound plant identification knowledge. All the respondents expressed the need for an ability to identify plants in the harvest area other than the target species and none of the harvesters allowed non-target species to be included in the harvested batches. Most of the harvesters return to harvest areas and informally assess regeneration following harvest. One of the wildcrafters who has been harvesting for over thirty years notes that there are other wildcrafters in her area and has noticed a decline in some species. Most of the harvesters use some sort of regeneration method while harvesting, from spreading seed to leaving “parent plants” etc. One of the respondents expressed that he “farms” his harvest patches with the result that they improve year after year. The respondents who employ other people in their harvesting business provide on the job training, with some of them requiring employees to have prior experience or training of some sort.

All the respondents were concerned about sustainability issues and the potential impact of over harvesting and loss of habitat due to development and logging practices. Three species were identified by harvesters as potentially being in decline or at risk for over-harvesting – cascara, senega root and jensen root (harvester only gave common name, species not identified).

All the respondents dry the plants they harvest with several of them additionally supplying fresh plants to buyers. There was a spectrum of responses to the best drying procedures from drying plants on a tarp in the shade, to drying on racks in a heated drying shed. There were differing responses to the need for cleanliness and hygiene. Most of the respondents agreed that the plant should be kept free of dust, insects and cobwebs etc while drying. However the need for clean hands and the importance of keeping the plant clean and out of the dirt while harvesting and transporting was deemed very important by some and not 100% important by others.

The response to the best course of action if the plant becomes mouldy during drying, processing or storage was also variable with many of the responses being in favour of removing mouldy pieces and recovering the rest of the batch.

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Storage of the plants varied from the use of dedicated storage areas to storing in shared space. Not all the storage areas were heated, which resulted in loss of harvest batches due to mould for a number of the respondents. Harvest batches also had to be destroyed due to insect infestation and due to lack of market for the harvested plant. Most of the harvesters stored their product for a maximum of one year, with some storing batches for two years. Batches were destroyed by harvesters after this time due to reduction in quality as a result of age.

Very few of the respondents had batch tracking and harvest sampling in place and none of the respondents had buyers who required certificates of analysis with many of them pointing to their reputation being the only assurance the buyer needs.

Most of the respondents access either Crown land, private forest land or private range land in order to harvest and most of them seek permission from landowners. Most of them expressed concern about loss of harvesting areas due to development.

Harvesters expressed difficulty in accessing markets for their products and difficulty in securing a fair price for their labour intensive harvesting.

Conclusion

This was a very small survey sample of mostly small scale harvesters. However, the survey was interesting in that most of the respondents expressed a desire to increase their harvesting businesses.

The larger-scale harvesters with many years of experience appeared to understand the importance of sustainability of their practices and also had some sort of batch tracking system in place. The following areas would need to be addressed and improved in order for most of the harvesters to expand their businesses, and be able to meet manufacturers requirements in light of the new GMPs: knowledge about drying requirements; knowledge about storage requirements; knowledge about handling of food stuffs; knowledge of how to address batch problems such as mould, insect infestation etc; knowledge about how to implement adequate batch tracking and harvest sampling.

The areas of harvest sustainability did not appear to be a problem given the scale of current operations of most of the respondents. However, knowledge of objective monitoring of harvest areas could be of increasing importance as harvesters increase their harvesting rates.

The good wildcrafting practices (GWPs) that are being developed in this project address many of these areas of concern, although the details of “safe food handling” are not addressed by the GWPs. The survey highlights that there could be a need for an educational component on “safe food handling” of medicinal plants for people who are just starting out in this field.

It is hoped that the GWPs being developed in this project will assist harvesters who decide to implement them to access better markets and to be able to secure better prices for their products in future.

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Survey Questionnaire

Purpose of this Survey.

We are asking wildcrafters to participate in this survey to provide information for the development of Information Sheets on harvesting Canadian wild medicinal plants. The experience and knowledge of wildcrafters who respond to this survey will help ensure that the Information Sheets are based on the knowledge and experience of the experts in the field.

Informed Consent

The information you share will be used only by the Wildcrafted Herb Information Sheet Development Project for the purpose described above. Please avoid disclosing any information that may be considered sensitive or confidential. You will not be required to identify yourself, or to give any specific information about who you sell to, or to disclose harvesting locations.

Project Description

Buyers of wild medicinal herbs, wildcrafters, and manufacturers of natural health products have all expressed concern about over-harvesting, misidentification, the wrong part of the plant being harvested, and the plant being processed incorrectly. New regulations are affecting buyers and manufacturers of natural health products; regulations demand that batch tracking and quality assurance is in place for the products they buy, raising concerns about the purchase of these products from wildcrafters.

The Project will develop Information Sheets to help address growing concerns about the harvest of wild medicinal plants in Canada. The Information Sheets are intended as an information base that all parties can refer to and rely upon so that buyers and manufacturers can be confident in the product they are buying, and the market for wildcrafted medicinal plants can continue to bring economic benefits to communities and to wildcrafters themselves.

Partners in the Project

The partners in this project are the Centre for Non-Timber Resources at Royal Roads University, BC; The Siska Traditions Ethical Picking Practices Project, BC; The Northern Forest Diversification Centre, Manitoba; and Wanda Wolf, Lonewolf Native Plant & Herb Farm, Saskatchewan. The Project is funded by Health Canada.

Topics covered in the Survey.

The questions in the sections below will cover the following topics:

- 1) How wildcrafters learn their craft.
- 2) Harvest sustainability.
- 3) Handling, drying and processing of plants (i.e. cutting, grinding, extracting etc) prior to selling.
- 4) Tracking harvest batches.
- 5) Access to harvest areas.
- 6) Selling wildcrafted plants.

Completion of this survey indicates your informed consent to participate in the project.

If you are interested in contributing further to this project we would welcome your input. Please see the contact information at the end of the survey.

Section 1

- 1) Did you learn how to wildcraft medicinal plants from:
 - Another wildcrafter
 - A book
 - A course
 - Other (please specify):
- 2) How many years have you been wildcrafting?
- 3) How did you learn to correctly identify the plants that you wildcraft?
 - Another wildcrafter
 - A book
 - A course
 - Other (please specify):
- 4) Can you identify a number of the plants in your harvesting area/s, or only the plant(s) you are wildcrafting?
- 5) Do you consider exact identification of the plant and the ability to distinguish between similar looking plants to be important?
If “no”, what are the reasons.....
.....

Section 2

- 6) Do you have any concerns about medicinal plants being over-harvested in the wild? Y/N
If “yes”, please name the species you are concerned about?
- 7) Do you harvest the same species every year?
- 8) Do you harvest from the same areas every year?
- 9) Do you monitor how the previous years harvest patch has regenerated?
- 10) Do you have specific approaches to sustainable harvesting of each species?
- 11) Are other wildcrafters harvesting the same species in the same areas as you?
- 12) Have you noticed a decline in any species over the years?
If “yes”, what species have you noticed a decline in?.....

Section 3

- 13) What medicinal plants do you harvest?
- 14) How many kilograms of each plant do you harvest in a year?
- 15) What parts of each of the above plants do you harvest?
- 16) Do you dry the plants prior to selling them?
 If “no” which herbs do you sell fresh?.....
- 17) What do you think is the best way to dry medicinal plants?
 Inside a building
 Outside under cover
 Outside no cover
- 18) If you dry plants inside a building, do you have a dedicated space for this activity?
- 19) Do you harvest medicinal plants at a particular time of day or phase of the moon? Y / N
 If “yes” please describe (if it is appropriate for you to do so)
- 20) What is the best way to dry: (If ‘other’ please specify)
 a) Roots: Racks.....Bunches.....Tarps on the ground.....Other.....
 b) Leaves: Racks.....Bunches.....Tarps on the ground.....Other.....
 c) Bark: Racks.....Bunches.....Tarps on the ground.....Other.....
 d) Berries Racks.....Bunches.....Tarps on the ground.....Other.....
 e) Flowers: Racks.....Bunches.....Tarps on the ground.....Other.....
 f) Seeds: Racks.....Bunches.....Tarps on the ground.....Other.....
 Comments about drying techniques?:

- 21) How do you clean roots?
 Soak
 Scrub
 Hose off
 Dry then shake off
 Other.....
- 22) How important do you think it is for the plant to be kept free of dust, insects and cobwebs etc while it is drying? Please tick one:
 Very important
 Important but not 100% necessary
 Not important because the plant will be further processed

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Comments.....
.....

23) Do you think it is important to keep the plant clean and out of the dirt when you are harvesting or transporting it? (for instance cleanliness of container or tarp you are harvesting into, or while it is in the back of a trailer or pick up,) Please tick one:

- Very important
- Important but not 100% necessary
- Not important because the plant will be further processed

Comments.....
.....

24) Do you think it is important to have clean hands while you are harvesting? Please tick one:

- Very important
- Important but not 100% necessary
- Not important because the plant will be further processed

25) What would be the best course of action if a plant starts to become mouldy while it is drying? Please tick one:

- Pick out the mouldy pieces and dry the rest
- Throw out the whole batch
- Other (please describe)

26) Do you cut the dried plant material before selling it or do you sell it uncut? CUT / UNCUT

27) Do you grind the plant material into powder before selling it? Y / N

28) Do you have machinery to cut or grind the herbs?

If “yes” what machinery do you use?

.....

29) Do you extract the plants in alcohol (tincture) or use any other kind of processing other than drying prior to selling them?

If “yes” please describe the machinery:

.....

30) How long do you usually store the harvested plants before selling them?

31) What kind of storage area do you use?

32) Do you have a dedicated space for storage? Y / N

If “no”, what other activities is the space used for?.....

33) Is the storage area heated?

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34) What kind containers are most appropriate to store the dried plant material?:

- Paper bags
- Plastic bags
- Glass containers
- Plastic containers
- Foil Pouches
- Other.....

35) Do you ever have any trouble with mould during storage?

If “yes”, was this due to the plant not being fully dried before storage, or becoming damp during storage?

36) Do you ever have to destroy harvested batches?

If “yes” was this due to:

- Mould
- Insect infestation
- Misidentification of plant
- Wrong part harvested
- No buyers for plant
- Plant too old for sale
- Contamination with oil, gasoline, chemicals, etc. through spill or other mistake
- Other (please explain).....

37) How many different people handle the plant from harvest to sale?

38) What sort of experience in wildcrafting and processing do these people have?

.....
.....
.....

39) What are the main difficulties with drying and otherwise processing wildcrafted medicinal plants? (E.g. drying facilities, cutting, storage facilities or any other areas of difficulty)

40) Do you participate in co-operatively owned drying facilities?

Explain:.....

If “no” would you be interested in co-operatively owned drying facilities?

Section 4

41) In your opinion, what would be the best way to keep records of the batches of plants that you harvest so that you can track who they have been sold to, where and when they were harvested etc?

.....

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.....
.....

42) Do you have any kind of tracking system in place to keep records of the batches of plants that you harvest so you can track who they have been sold to, where and when they were harvested, etc? Y / N

If “yes”, what system do you use?

.....
.....
.....

43) Do you keep samples of the harvest batches? Y / N

If “yes”, how do you store and record these samples?.....

.....

44) Do any of your buyers expect you to have harvest batch tracking in place? Y / N

45) Do any of your buyers require certificates of analysis for the plants they are buying? Y / N

If “yes”, do they provide these or do you?

46) How does your buyer assure quality in the plants they buy (if you know)?

.....

47) When harvesting large amounts do you allow any plants other than the plant you are intending to harvest to be included in the batch? Y/N

If “yes” what percentage do you allow to be included?.....%

Section 5

48) Do you harvest on:

- Crown Land
- Private Forest Land
- Private Range Land
- First Nations Reserve Land
- Your own land
- Other (specify)

49) Do you seek permission from landowners before wildcrafting? Y / N

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Please describe any land access problems associated with wildcrafting.....

.....

50) Have you seen harvesting areas disappear due to development etc?

Explain.....

.....

51) Do you think that Wildcrafter Certification could be a possible way to assure buyers of product quality and to gain possible higher pricing for wildcrafted medicinal plants of high quality? Y / N

Comments.....

.....

.....

Section 6

52) Do you (please tick one):

- Sell everything you wildcraft
- Keep some of the harvest to make your own products and sell the remainder
- Wildcraft to make dispensary stock for your herbal practice
- Wildcraft for your own personal use

53) Do you sell your herbs through a co-op?

If “no”, would you be interested in selling through a co-op?

54) Do you sell your wildcrafted plants to:

- Retail stores
- Brokers
- Wholesalers
- Natural health product manufacturers
- Other.....

55) What are the main difficulties associated with selling or marketing wildcrafted medicinal plants?.....

.....

.....

.....

56) Why do you wildcraft medicinal plants?

ADDITIONAL COMMENTS:

.....
.....
.....
.....
.....
.....
.....
.....
.....

You are NOT required to fill in this section.

Please only fill in this section if you are interested in contributing further to this project.

Name.....

Phone number or email.....

Alternatively you can contact Amanda Howe project co-ordinator at (250) 336 2488 or amandahowe@shaw.ca.

Thank you very much for your contribution to this project!

Please return this survey to the person who gave it to you, or you can mail it to:

Amanda Howe

Box 1000, Cumberland, B.C. V0R 1S0

Or Fax to:

Amanda Howe (250) 336 2501

Summary of Survey Responses

- Experience and Training
- Volumes and Species Harvested
- Harvest Sustainability
- Cleaning, Drying and Processing of Plant
- Assuring Quality
- Land Access and Marketing

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Experience and training		
	How did you learn to wildcraft	Plant identification knowledge and issues
1	Grandfather	Grandfather and a book
2	from another wildcrafter (michelle hull) - wildcrafting for 2 years	from another wildcrafter and from a book. I can identify a number of plants and exact identification is important
3	from another wildcrafter, a book and a herb teacher. I have been wildcrafting 15 years	from a book and a herb teacher. I can identify a number of plants in my area and exact identification is important
4	from a course and a book. I have been wildcrafting for 3 years	from a wildcrafter and a book. I can identify a number of plants in my area and exact identification is important
5	from another wildcrafter, a book and a course. I have been wildcrafting for 3 years	from another wildcrafter and a course. I can identify a number of plants in my area and exact identification is important. The study of ecosystems is very beneficial in learning where to harvest.
6	from another wildcrafter, a book and a course. I have been wildcrafting for 34 years	from another wildcrafter, a book and a course. I can identify a number of plants in my area and consider exact identification important
7	from a course	from a course. I can identify a number of plants in my area and exact identification is important
8		from another wildcrafter, a book, a course and other. I can identify a # of plants in my area and exact identification is important
9	from another wildcrafter, a book. I have been wildcrafting for 12 years	from another wildcrafter, a book, a course and worked for a range ecologist. I can identify a number of plants from my area and consider exact identification important
10	n/a - I have been harvesting since 2003 (3 years)	never did, need to take a course. I can identify a number of plants in my area but I don't think exact identification is important
11	From another wildcrafter. I have been wildcrafting for 2 years	From another wildcrafter. I can identify a # of plants and consider exact identification important
12	from a course	from a book. I can identify a # of plants and consider exact identification important
13	from a course	from a book. I can identify a # of plants and consider exact identification important

Volumes and Species Harvested.

	Harvest Volume	Species/part of plant harvested
1	n/a	balsam root, burdock root, labrador tea leaves, elderberry bark
2	none - just getting started	mullein (leaves in year with no stack), pokeweed (just the root), stinging nettle (when whole plant top is about 10" tall)
3	Supply medicine to islanders	arnica (flowers, root and rhizome), devil's club (bark), plantain (leaf), dandelion (all), burdock (root), yellow dock (root), st johns wort (flowertops), comfrey (all), echinacea (all), passion flower (leaves), mint (arial parts), skullcap (arial parts), yerba buena (arial parts), hawthorne (flowers and berries), mullein (leaves and flowers), elecampane (root), red clover (flowers), nettle (leaves), yarrow (flowering top), willow (bark), strawberry leaf (leaf), raspberry (leaf), huckleberry (leaf), bogbean (leaf), oregon grape (root bark), asnea (thallus), bladderwack (whole plant), indian consumption (seeds), violet (leaves and flowers), cottonwood (buds), grindelia (flowers)
4	0.2 - 6kg depending on the plant	dandyion (roots, leaves, flowers), clover (flower), st. john's wort (flower), mint (leaves), yerba buena (leaves), burdock (root), chicory (root), elder (flower, fruit), nettle (leaf), horsetail (leaf), hawthorne (flower, fruit), cleavers (above ground portion), yarrow (flower), plantain (leaf), bunchberry (leaf), willow (bark), selfheal (above ground portion), wild rose (petal, fruit), cat tail (roots, shoots), bogbean (leaf), sweetgale (leaf), arnica (flower), sage (leaf), oregon grape (root, flower)
5	1-2kg, some more some less - ie. Fresh nettles up to 50kgs	the shoots, flowers, fruits, bark, leaves and roots (depending on the plant) of nettles, red clover, raspberry, yarrow, st johns wort, mullein, dandelion, willow, plantain, valerian, arnica, balm of gilead, seaweeds, berries, glasswort, cherry bark, alder bark, fireweed, cattail etc.
6	between 0.5 kilo to max of 3 kilos each	chickweed (whole folia), hawthorne (leaf/flower), berries, plantain (leaf), linden flower (leaf), yarrow (flower, leaf), dandelion (root, leaf), redclover (blossom), goldenrod (stock with leaf and flower), st johns wort (flower tops), devil's club (root bark), selfheal (flower), burdock (root), small flowered willow herb (arial parts), oregon grape (root bark), shpards purse (plant folia), gumweed (flower), nettles (leaf)
7	1 to 2 kilograms of each plant	Comfrey (flowers), Calendula (flowers), St. John's Wort (flowers and some leaves), Plantain (leaves), Alder (leaves), Raspberry (leaves), Dandelion (roots and leaves), Burdock (root), Stinging nettle (leaves), Sweet fern (leaves), Red clover (blossoms), Wormwood (leaves), Mugwort (leaves), Motherwort (leaves)
8	under 1 kg of most of them, not more than 2 kg of anything	Goldenrod (aerial parts), Goldthread (gold roots - replant rest of plant), Hypericum (flowering tops), Yarrow (flowering tops), Dandelion (flower, leaf, root), Plantain (leaf), Meadowsweet (flowering tops)
9	10,000 kilograms	Rumex crispus (root, aerals), senega (root), Artemisia (leaves), Burdock (root), Nettle (leaves and stems), Dandelion (leaf and root)
10		wreaths
11	n/a	n/a
12	n/a	n/a
13	n/a	n/a

Harvest sustainability				
	Is overharvesting a concern?	Do you harvest the same species from the same area every year?	Sustainable harvesting techniques used	Notes and concerns re: sustainability issues
1	yes	yes and I monitor the previous years harvest patch	use sustainable harvesting techniques. Not specified.	concerned about Jensen Root declining
2	yes - goldenseal, american ginseng	I harvest the same species from the same area every year and monitor previous harvest patch		I harvest in the morning just after the dew dries off. there are no other wildcrafters in my area and I haven't noticed a decline in any species
3	yes - cascara sagrada, as more people harvest the potential is there to lose or reduce plant populations. Education and knowledge or knowing the plants will lessen the likelihood of this happening. Also new restrictive legislation makes it difficult to sell extra harvest. In my teaching we gather only what we need. And so far all my teaching places still thrive after 10 years.	I harvest the same species in the same area every year and monitor regeneration	yes, by monitoring each year and adjusting the harvest accordingly. Generally I harvest each plant species in a different way with different guidelines. Each year the conditions are different and each year different species thrive. If, for example, we have a rainy august, eyebright will thrive so we can pick more that year. I teach that after the group (usually 10) has harvested we shouldn't be able to tell we were ever there	There are other wildcrafters harvesting the same species in the same area but I have been carefully watching and so far have noticed no decline
4	no	I don't harvest the same species every year but I harvest from the same area and monitor patch regeneration	selective harvesting; leaving the plants that seem to be the "parent plants" (provide many seeds/roots for new growth to continue); harvesting small amounts at regular intervals, allowing time for regeneration	There are other wildcrafters harvesting the same species in the same area but I have not noticed a decline in any species over the years. I harvest ideally in the morning, around full moon, leaves/flower at waxing to full, roots at full to waning.
5	no	I harvest the same species every year in the same area but am always exploring new areas. I monitor my previous harvest patches.	Depending on the nature of the plant. Some regenerate continually with harvesting others depend on seed, then selective harvest is important	There are other wildcrafters and I have not noticed a decline in any species - every year is different (one of my st. john's wort patches was devastated by the predator beetles this year). Greens are harvested in the morning, everything else is when I'm there and it's there.
6	yes	I harvest the same species every year in the same area but am always exploring new areas. I monitor my previous harvest patches (mainly from memory - not written records).	conduct a visual survey of the area and only take what I need and try to spread seed if it's the right season	there are some wildcrafters in my area and I have noticed a decline in some species over the years
7	Overharvesting is a concern but not in my area.	yes and I monitor the previous years harvest patch	I harvest carefully, only choosing a few plants from each growing location	There are no other wildcrafters harvesting the same species in the same area and I have not noticed a decline in any species over the years.
8	Yes, there are many plants that are overharvested.	yes and I monitor the previous years harvest patch	Never pick more than one plant in 10	Sometimes there are other wildcrafters harvesting the same species in the same area but I have not noticed a decline in any species over the years
9	Yes, I'm concerned about the overharvest of senega.	yes	I more or less farm my harvesting areas. I firmly believe that stands of the species I harvest improve year after year.	There are no other wildcrafters harvesting the same species in the same area and I have not noticed a decline in any species over the years. Many species are dependent on weather - some flourish in wet years, others in drier seasons.
10	No	no and I don't monitor the previous years harvest patch		
11	No	Yes	no answer	
12	No	not yet. And there are not yet any of the wildcrafters harvesting the same species from the same area	no - I haven't noticed a decline in any species over the years	
13	No	no and I don't monitor the previous years harvest patch		There are no other wildcrafters that harvest same species from same area and I haven't noticed a decline in any species over the years

Cleaning, drying and processing of plant

	Cleaning	Drying: Best practices and difficulties	Other processing	Storage and storage issues	Contamination issues
1	Scrub and rinse roots	No dedicated drying space. Best to dry inside or outside under cover. Dry on racks. Berries on a suspended tarp. If plant becomes mouldy during drying remove mould as soon as possible		store plants for up to two years in a dry storage area. dedicated heated space. Batches have had to be destroyed due to insect infestation. Damp weather has affected drying.	very important to keep free of dust insects and cobwebs, very important to keep plant clean and out of the dirt while harvesting. Very important to have clean hands while harvesting. Mould should be removed as soon as possible.
2	Scrub and rinse roots	I sell pokeroor fresh and dry the rest inside a building in a space dedicated to this activity. I dry everything in a retro fit kiln, not against steel. It is very important to keep the plant clean during drying. If there is mould, pick out mouldy pieces and dry the rest. Main difficulty is mould.	sell uncut, don't grind plant material or extract in alcohol.	store 1 year in space dedicated to storage in paper bags. I have never had problem with mould but have had to destroy batches due to no buyers for plant and plant too old for sale.	It is very important to keep the plant clean during harvest/transport and important but not 100% necessary to have clean hands while harvesting.
3	clean roots - dry then shake off.	I usually dry plants inside a building (usually I make medicine from them and sell that) in a space dedicated to drying. Roots, berries, flowers, seeds (racks), leaves (bunches). A little electric or extra heat dries things nicely. It is very important to keep plant clean during drying. If there is mould, throw out the whole batch.	Cutting the dry plant is a difficulty. I don't have machinery. I extract the plants in alcohol.	store plants 1-2 years in a dedicated, heated storage space in glass containers. Never had trouble with mould, have had to destroy batches due to insect infestation.	It is very important to keep plant clean and hands clean while harvesting/transporting.
4	Roots should be soaked and scrubbed and	I dry plants inside a building in a space dedicated to drying. I dry roots in racks, a dehydrator or a very low heat over, I dry leaves, bark and flowers on racks and berries/seeds on racks or in a dehydrator. Notes: Low light, dry area, moderate to warm temperature, ready when plants make a snapping sound when bent. It is important but not 100% necessary that plants be kept free of dust, insects and cobwebs while drying. Insects should be kept away to avoid introducing bacteria and to keep them from eating plants and stealing nutrients. Dust and cobwebs (if only a small amount) can be cleaned when plant is dry. If there is mould the whole batch should be thrown out. The main difficulty with drying plants is providing enough space for all plants during busy harvest times, keeping area dry enough, dark enough, warm enough for proper drying.	I cut the dried plant material before selling and grind plant material into a powder. I extract plants in alcohol.	I store plants up to 2 years in a pantry dedicated to storage in glass containers. I don't have problems with mould during storage. I have had to destroy batches due to misidentification of plant and age of plant material	it is important but not 100% necessary to keep the plant clean and out of the dirt during harvest/transport and very important to have clean hands while harvesting. Containers should be relatively clean but more importantly plants should be cleaned as first step in processing.
5	Plants are very vulnerable when wilting - mostly use baskets or paper bags)	I dry most of my plants but sell nettles, dandelion greens and plantain fresh. The best way to dry is inside a building or outside under cover. I dry roots on a rack (chopped or grated), leaves in bunches (hanging), bark and berries and seeds on racks and flowers on racks or in bunches. Lots of air flow all around the plant in a warm but not hot temp. If a plants starts to get mouldy throw out the whole batch (depends on the situation, it may be isolated or not for sale). The main difficulty with drying is having enough space at peak times and the damp west coast climate.	tincture, salves and oils - don't grind	I store plants no more than a couple of months (as little time as possible) except for roots - up to a full cycle. Store in glass jars, sealed in a dark spot dedicated to storage (unheated). I have had to destroy batches due to mould and insect infestation.	It is important but not 100% necessary to keep the plant clean and out of the dirt during harvest/transport (the bugs and dirt are part of nature and unavoidable but certainly care is taken to avoid unnecessary contamination. I try to preserve the integrity of the plant as best as possible.
6	Roots should be scrubbed, hosed off and then dried and brushed off.	I dry plants inside a building or outside under cover (out of sun with drying racks or hang to dry). I dry roots on racks or on tarps on the ground, leaves on racks or in hanging bunches, bark, berries, seeds, and flowers on racks and ariel plant stock with leaves on a rack and in bunches/hanging. It is very important to keep plant free of dust, insects and cobwebs while drying. If mould is found I generally throw out batch but have super carefully thrown out mould then watched rest of batch to be sure it's ok before putting away. Main difficulty = cutting.	I cut dried plant material and sometimes grind it into a powder before selling using a coffee grinder and vita mixer. I extract plants in alcohol in assorted sterilized jars	I store plants one year or less in brown bags and jars. I have had trouble with mould during storage due to plant not being fully dried and/or becoming damp during storage. I have destroyed batches due to mould, insect contamination and age of plant material	It is very important but not always possible to keep plant clean during harvest/transport
7	Roots should be scrubbed.	I dry some plants. Drying inside or outside under cover works best. I often have to wait until later in the day to harvest so that the plants will be completely dry. It is best to dry roots, berries, flowers and seeds on racks and leaves in bunches. It is important but not 100% necessary for the plant to be kept free of dust, insects and cobwebs while drying. If a plant starts to become mouldy the best course of action depends on the specific situation, if there was a lot of mould I'd throw the whole works out, otherwise I would pick through.	I make infused herbal oils, ointments and tinctures with fresh herbs.	Simple shelving in a darkish area (main area of the house and therefore heated). Paper bags and glass containers are most appropriate for storing dried plant material	it is important but not 100% necessary to keep the plant clean and out of the dirt during harvest/transport and have clean hands while harvesting
8	Roots should be scrubbed, hosed off and then dried and brushed off.	Drying inside a building works best. Roots, berries and flowers are best dried on racks, leaves can be dried on racks or in bunches and seeds should be dried in a basket. It is important but not 100% necessary for the plant to be kept free of dust, insects and cobwebs while it is drying. If a plant starts to become mouldy while it is drying I would throw the whole batch out.	tinctures/oils/creams/ointments, cut/uncut = n/a, grind = n/a	Dried plants store for less than a year, if processed they last longer. I store dried plants in glass bottles, which are stored in a cupboard under my stairs. Paper bags and glass containers are most appropriate for dried plant material. I have had to destroy batches due to insects and age of plants (too old).	I try to keep the plants clean and insect free while I'm drying them but I wouldn't throw out the bunch if I did find an insect in them. I wouldn't put the plants in the back of a truck or somewhere they would be exposed to a lot of dust/contaminants; however, you are wildcrafting, so there will be some dirt that gets into your containers - particularly if you're harvesting roots. I think it's important to start with clean hands.
9	I clean the roots with a commercial root washer and dry then shake off.	I dry plants prior to selling them but the best way depends on the plant part harvested. Roots can be dried on racks or tarps on the ground, leaves should be dried on racks. It is very important for the plants to be kept free of dust, insects and cobwebs while drying. Dry so roots don't touch then then won't get mouldy	machinery to grind the herbs (hammer mill etc.), cut and uncut, don't grind	I usually store the harvested plants 6 months in a commercial warehouse before selling them (heated depending on crop). I have had to destroy harvested batches because there were no buyers for the plant and the plants were too old for sale. The products are checked at regular interval during storage.	It is very important to keep the plant free of dirt while harvesting/transporting and to keep your hands clean
10	I soak, scrub, dry and shake off roots.	It's very important to keep the plant free of dust, insects and cobwebs while drying.	cut/uncut = n/a, grind = n/a	If a plant starts to become mouldy while it is drying I pick out the mouldy pieces and dry the rest	It is very important to keep plants clean during harvest/transport and have clean hands
11		The best way to dry plants is inside a building or outside under cover	cut/uncut = n/a, grind = n/a	If a plant becomes mouldy I pick out the mouldy pieces and dry the rest. I use a storage shed (unheated). Paper bags are most appropriate for storing dried plant material	It is very important to have clean hands while harvesting and keep the plant clean and out of the dirt while transporting
12		the best way to dry plants is outdoors, no cover. It is very important the plant is kept free of dust, insects and cobwebs while it is drying	uncut, don't grind	If a plant becomes mouldy I pick out the mouldy pieces and dry the rest.	It is very important to have clean hands while harvesting and keep the plant clean and out of the dirt while transporting
13	I clean roots by soaking then drying and shaking them off.	Racks are best for roots, leaves, bark, berries, flowers and seeds. It is very important to keep the plant free of dust, insects and cobwebs while drying.	cut/uncut = n/a, don't grind	If a plant starts to become mouldy, pick out the mouldy pieces and dry the rest	Cleanliness is very important during harvest and transport

Assuring Quality					
	Tracking batches	Should there be wildcrafter certification?	Allowance of non target species in batch?	Buyer Quality assurance	# of people involved in processing
1	Tag in the storage bag, when and where picked. No tracking of sales. No samples kept	yes	I don't allow non-target species in any batch		1
2	Record date of harvest and receipt from buyer. Keep samples of harvest batches in paper bags with date of harvest and buyer	yes	I don't include non-target species in any	buyers expect me to have harvest batch tracking in place and certificates of analysis (quality assured by identification from lacroin consulting).	2 - we are new at it and want to learn more
3	No tracking system - just a recipe and lot number book. I keep samples of harvest batches (stored in jars with labels).	don't know	I don't allow non-target species in any batch	buyers don't require certificates, quality is assured by trust.	2 - excellent experience, I taught them, and they collect their own herbs too
4	I label containers with date and should record sale information but don't because I mostly wildcraft on a small personal scale. I don't keep samples of harvest batches.	yes - this would be worthwhile as it could create a market for wildcrafting that is separate from the large-scale herb manufacturing market and brings value to hand harvesting and processing within local communities. These types of certification can often be expensive, however, keeping them out of the reach of many wildcrafters.	I don't allow non-target species in any batch.	My buyers don't expect certificates of analysis.	1-3 (these are students and experienced wildcrafters with 10-20 years experience)
5	Proper labelling on my part helps keep track of where and when harvested. Journaling, receipts of sale - but once I sell to a practitioner I'm satisfied that they will redistribute responsibly. I keep batch samples in jars, they become herbs I use for myself.	no - it would just complicate a beautiful, simple thing. Wildcrafters generally work out of love for the plants, the medicine and the earth herself. I think the way to assure quality as a buyer is to get to know your wildcrafter if they are a good person who loves the earth then you'll get quality.	I don't allow non-target species in any batch.	My buyers don't expect certificates of analysis. They use their intuition and trust my work, I think?	1-2 Mostly I do all the work myself. If it is a big project then my mom or partner helps. Mom doesn't have much experience with herbs, nor my partner. Both do a lot of wild food harvesting and gardening.
6	computers, codes, labels on bags with info of above, notebook. I don't keep samples of harvest batches. I have no tracking system	yes	I don't allow any non-target species in any batch	My buyers don't expect certificates of analysis. They believe in my experience and integrity.	1-2 (under my supervision)
7	n/a	I really don't know		n/a	Just me
8	I don't have a tracking system in place but labels could be used to track where and when they were harvested. I don't keep samples of harvest batches	no answer			Just me
9	I designed a batch form which follows the batch. I keep samples of the harvest batches, most are only kept for a year after sale of purchase.	it will still come down to honesty and integrity of the wildcrafter certified or not	I don't allow non-target species into the batch.	To assure quality of plants, most of my customers have testing facilities.	depending on the product 1-5. Most receive on the job training
10	n/a	I don't know		no answer	no answer
11	Maps would be the best way to keep records of the batches of plants	Yes			2
12	no answer	no answer			no answer
13	n/a	yes		buyers don't require certificates, quality is assured by trust	

Access to harvest areas. Marketing and Selling			
	Harvesting area	Access issues	Difficulties with marketing and selling harvest
1	Crown land, private range land, first nations reserve land, my own land. I have seen harvesting areas disappear due to logging: clear cut areas	no answer	
2	my own land. I have seen harvesting areas disappear due to logging/ clear forest		Main difficulty is finding the buyers and learning how to become a supplier.
3	crown land, private forest land, my own land. I have seen harvesting areas disappear due to logging and housing developments	seek permission (it does get more difficult as we lose land to houses, industry. I've always thought that an area such as forbidden plateau which provides so many herbs should be set for wildcrafters)	
4	crown land, private forest land and my own land. Development seems to be happening ever more quickly yet with little or no consideration of the value (medicinal, edible or monetary) of the plants in the development zones.	seek permission from landowners. Crown land/ private forest land becomes developed and plants are sometimes destroyed completely before I get a chance to harvest/transplant them	I don't participate in a drying/selling co-op but I would be interested. The main difficulty in marketing is finding appropriate prices that reflect the amount of effort involved in harvesting/processing but that are not too expensive for buyers and competing with large scale herb companies. I'm a very small scale and new wildcrafter. This survey has helped me to consider many of the details necessary for larger scale wildcrafting. I'm interested in wildcrafting for others as a source of income and/or for bartering, but I feel I would need to develop better strategies for sustainably harvesting and properly handling/processing large amounts of plants if I were to do this.
5	crown land, private forest land, private range land, first nations reserve land, my own land and organic farms. Logging and housing developments are having a huge impact. Although herbs are usually first plants back on the site.	generally if there's someone around to ask I'll ask, though often there is no one to ask. I go ahead unless marked with no trespassing signs	I don't participate in a drying/selling co-op but I would be interested. The main difficulties associated with marketing is that you can't market yourself, in retail facility, regulations prevent local quality herbs from reaching the public in health food stores unless you're at commercial capacity. I'm really happy that this information is being collected. I hope it will encourage the retailing industry as well as the regulatory boards to recognize that wildcrafters and herbalists honour their trade and that it is important to get medicine from small producers to ensure quality. Regulation and standardization is incompatible with nature and healing.
6	crown land, private forest land and my own land. I have seen harvesting areas disappear due to expanding population, houses developed where I use to wildcraft.	I don't seek permission from landowners	I don't participate in a drying/selling co-op but would possibly be interested.
7	My own land and I haven't seen any harvesting areas disappear due to development in my area	n/a	
8	Private forest land, private range land and my own land. I have seen harvesting areas disappear due to development.	seek permission from landowners	
9	Crown land, private range land, first nations reserve land, my own land. I have seen harvesting areas disappear due to development (land taken for roadways or ecosystems destroyed due to power lines/logging etc.)	seek permission from landowners	The main difficulty associated with selling or marketing wildcrafted medicinal plants is finding contacts and companies that deal honestly and with integrity
10	I harvest on crown land and I have seen harvesting areas disappear due to development	seek permission from landowners	I only make wreaths and walking sticks but I would maybe do this kind of thing if I knew what to look for
11	my own land	seek permission from landowners	the main difficulty associated with selling or marketing wildcrafter medicinal plants is travelling
12	no answer	no answer	
13	Crown land, my own land	seek permission from landowners	

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Medicinal Plant Specialist Group (MPSG) is a global network of experts contributing within their own institutions and in their own regions to the conservation and sustainable use of medicinal plants. The MPSG was founded in 1994, under the auspices of the Species Survival Commission (SSC) of the IUCN - the World Conservation Union, to increase global awareness of conservation threats to medicinal plants, and to promote conservation action. <http://iucn.org/themes/ssc/sgs/mpsg/index.html>

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