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

Polygala senega *photo by E. Saulys*

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 areas[2]. It is infrequent in wet or shaded areas[3]. 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 finger[4] and have a bitter milky juice[5].

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 area[6], but it is also quite 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 adulterants[7] 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*

Our knowledge about Seneca Snakeroot, its use and harvesting comes from First Nations people of North America. Any claims for safety and efficacy based on First Nations knowledge must acknowledge the source of this knowledge. Any commercialisation of the plant must be accompanied by benefit sharing as per the Convention on Biological Diversity.

Root	Agricultural Development Fund of Saskatchewan1997
Root	British Herbal Pharmacopeia 1983
Root	British Pharmaceutical Codex 1911
Root	Duke 1985 2002
Root	ESCOP 2003
Root	European Pharmacopoeia 2006
Root	Grieve 1975
Root	Heinrich 2004
Root	Hoffmann 1986
Root	Jackson 1990
Root	Kindscher 1992
Root	Kings American Dispensatory 1898
Root	Leighton 1985
Root	Lust 1974
Root	Moerman 1998
Root	Millspaugh 1974
Root	Smith 1929
Root	Turcotte 1997
Root	World Health Organisation 1999
Root	Wren 1988

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[8], [9] when the leaves are dead and before the first frost[10] for the best quality. Harvesting at this time is recommended to allow for maximum seed dispersal[11]

The plant is also incorrectly harvested in the early summer when the flower stems are still visible to allow for positive identification[12]. 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 soil[13]. 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 roadways[14].
In Manitoba Seneca root grows prolifically on Hydro Rights of Way[15]. 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"[16]. 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 harvested[17] 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 harvested[18].

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 Manitoba[19] 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 good[20].
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 populations[21]". Seneca snakeroot has been harvested to near extinction in Eastern North America[22].
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-harvesting[23].
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. CHSNC[24] 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"[25] 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 animals[26].
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.[27] 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 animals[28].

➢ *Toxicity or Health and Safety Cautions for Harvesters*

The powdered root is irritating to the mucus membranes. It will cause sneezing[29].
The root will cause nausea and vomiting if ingested in large amounts[30].

➢ *Extraction Techniques*

Infusion, Tincture, Decoction[31],[32],[33].

➢ *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 Texas[34]. 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)[35]. The lower part of the root is yellowish in colour but the crown is somewhat darker. The crown in knotty and hears 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[36], [37]. 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"[38].
Odour: Fresh root smells of methyl salicylate (wintergreen). Faintly aromatic in the dried root.[39]
Carefully dried and stored roots will retain a better smell of methyl salicylate and is a higher quality product.[40]

➢ *Official Monographs*

English language monographs:

British Herbal Pharmacopoeia[41].
E/S/C/O/P Monograph[42].
European Pharmacopoeia[43].
World Health Organisation Monographs on Selected Medicinal Plants[44].

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 Canada[45]. 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 Association[46].

➢ *Land Access for Harvesting*

Every square inch of land in Canada and the USA was First Nations land prior to settlers arriving and taking ownership of the land by force in the aftermath of genocide and forceable dismantling of First Nations societies and communities. It is with this in mind that with an understanding of the history and an understanding of your role in reconciliation that any permission must be sought from the Nation or Nations before harvesting.
First Nations Treaty Land: Permission must be obtained from the Nation 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. Knowing who to ask and how to ask for permission will take time and an understanding of the history and of reconciliation.
Crown Land: Permission should be obtained from First Nations before harvesting on any Crown Land, as above.
In Canada no permission or license is required from the provincial or federal government, however harvesting must be carried out within provincial Ministry guidelines as well as any First Nations protocols and requirements.
Private Land: Written permission to harvest must be obtained from the landowner.
National or Provincial Parks: It is illegal to harvest in National or Provincial Parks.
Treaty Land in Manitoba: https://www.sac-isc.gc.ca/eng/1100100020576/1616073943706

➢ *Points of Concern*

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The majority of the global trade in Seneca snakeroot is based on material wild harvested in Manitoba.[47] Seneca snakeroot is much less common than it used to be in its former range due to habitat loss and harvesting.[48], [49]

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.[50] 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.[51] A resurgence of interest in natural health products led to an increase in exports from Manitoba again in the 1980's[52].

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

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