



NDF WORKSHOP CASE STUDIES
WG 2 – Perennials
CASE STUDY 5
Panax quinquefolius
Country – **CANADA**
Original language – English

PANAX QUINQUEFOLIUS (AMERICAN GINSENG) IN CANADA: A CASE STUDY

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I. BACKGROUND INFORMATION ON THE TAXA

1. BIOLOGICAL DATA

1.1 Scientific and common names:

Panax quinquefolius

(American ginseng; Canadian ginseng; five-fingers; occidental ginseng; sang; seng)

1.2 Distribution

Ginseng is widely distributed in Eastern North America from Québec to Minnesota and South Dakota; south to Georgia, Louisiana, and Oklahoma. In Canada, ginseng occurs in low abundance in the southwestern province of Québec and the southern portion of the province of Ontario with its occurrence infrequent and fragmented throughout its range.

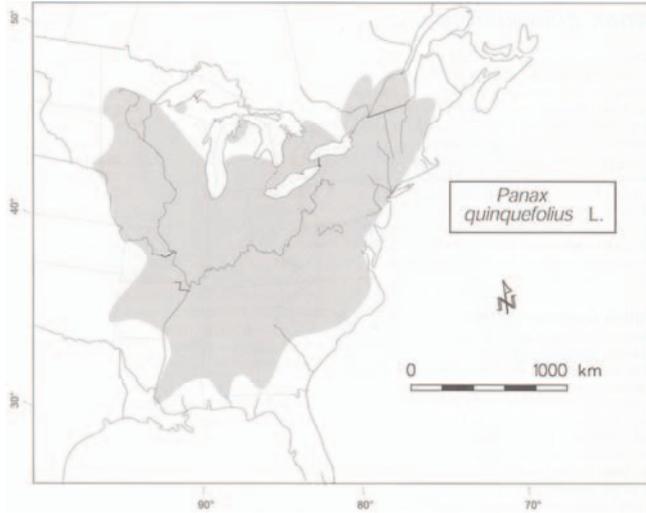


Figure 1. North American distribution of ginseng (*Panax quinquefolius*) (Small & Catling, 1999).

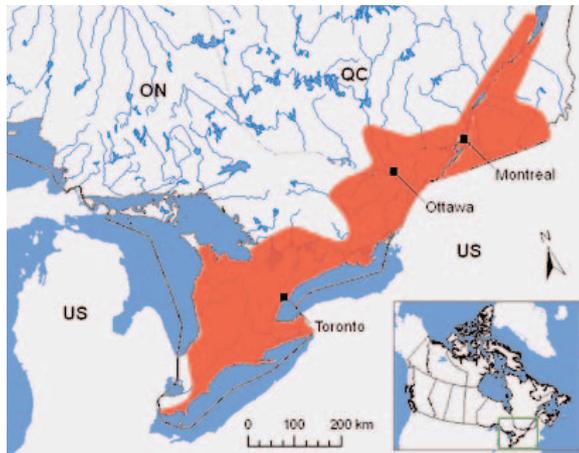


Figure 2. Distribution of ginseng (*Panax quinquefolius*) in Canada (Canadian Wildlife Service, 2004).

1.3 Biological characteristics

1.3.1 General biological and life history characteristics of the species

Ginseng is an herbaceous, long-lived forest perennial with slow population growth. Plants take approximately five to eight years to mature and are usually 20-70 cm tall with a whorl of three or four palmate leaves, each generally with five large leaflets. The flower is borne in mid-summer and 6-20 small, yellowish-white flowers emerge on a short stalk from the centre of the whorl. This species utilizes exclusively sexual reproduction to proliferate and is usually pollinated by generalist insects. Ginseng is considered to have a poor dispersal efficiency.

Fruits begin to ripen at the end of July and mature to a deep red colour. Seeds require approximately an 18-month dormancy period prior to germination and recruitment is low due to high levels of seed

predation and high seed mortality rates (~ 70-90%). Ginseng seeds have only a 0.55% probability of reaching maturity.

1.3.2. *Habitat Types:*

Ginseng prefers rich, shady, moist, undisturbed and relatively mature deciduous woods in areas of limestone or marble bedrock soils. Habitat is generally dominated by sugar maple (*Acer saccharum*), white ash (*Fraxinus americana*), hickory (*Carya spp.*) – especially bitternut hickory (*C. cordiformis*), and basswood (*Tilia americana*). Ginseng colonies are often found near the bottom of gentle slopes facing southeast to southwest, where the microhabitat is usually well-drained and species rich.

1.3.3 *Role of the species in its ecosystem*

The vegetative parts of ginseng and also the seeds are predated by deer, and the berries and seeds are often eaten by small mammals. Deer are not considered dispersers of ginseng but small animals may play a minor role. The flowers of ginseng plants are visited by generalist insects, and a few species of small bees are considered the most important pollinators.

1.4. **Population:**

1.4.1. *Global Population Size:*

Ginseng occurs fairly frequently in the major portions of its range (i.e. the Appalachia and the Ozark region of the United States) and although population numbers are often low, the total number of individuals may be in the millions. In Canada, abundance is low and only 49 of 418 recorded populations are considered viable (i.e. >172 plants); at least 369 of the 418 known populations are either extirpated, unviable, or in decline.

1.4.2. *Current global population trends:*

increasing decreasing stable unknown

The global population trend of ginseng is decreasing according to NatureServe (2008). Similarly, the population trend of ginseng in Canada is also decreasing.

1.5. **Conservation status**

1.5.1. *Global Conservation Status (according to IUCN Red List):*

Critically endangered Near Threatened
 Endangered Least concern
 Vulnerable Data deficient

Ginseng has not yet been assessed by IUCN and is currently not on the Red List. NatureServe (2008) has evaluated ginseng as vulnerable to apparently secure across its range, with an overall declining trend.

1.5.2. National conservation status for the case study country

Ginseng is considered endangered in Canada both nationally and in its provincial jurisdictions of Ontario and Québec.

1.5.3. Main threats within the case study country

- No Threats
- Habitat Loss/Degradation (human induced)
- Invasive alien species (directly affecting the species)
- Harvesting [hunting/gathering]
- Accidental mortality (e.g. Bycatch)
- Persecution (e.g. Pest control)
- Pollution (affecting habitat and/or species)
- Other__ Recreation (i.e. trails)__
- Unknown

Historically, ginseng populations were lost and/or reduced as a result of trade and habitat loss; decline in this species continues today. Primary threats are harvest and logging activities, and to a slightly lesser extent habitat loss/degradation/alteration and recreation. Threats to ginseng in Canada are severe. Harvest is considered unsustainable, dramatically reducing the reproductive potential of this declining species. A 5% root harvest has been shown to be sufficient to bring a viable ginseng population toward extirpation.

2. SPECIES MANAGEMENT WITHIN THE COUNTRY FOR WHICH CASE STUDY IS BEING PRESENTED

2.1 Management measures

2.1.1. Management history

Management of wild ginseng in Canada consists of prohibitions on trade:

- The international export of wild ginseng roots and/or derivatives from Canada has been prohibited since 1989.
- Harvest and trade in wild ginseng in Québec (whether imported or not) has been prohibited since the species was listed on Appendix II of CITES in 1973.
- As of July 2008, harvest and trade in wild ginseng is prohibited in

Ontario. Prior to July 2008, these activities were only prohibited in provincial Parks and Conservation Reserves.

2.1.2 *Purpose of the management plan in place*

The goal of the prohibition on international export of wild ginseng roots from Canada, as well as the ban on harvest and trade domestically in wild specimens from the provinces of Ontario and Québec, is to conserve remaining populations and enable population regeneration. Preventing removal of reproducing plants and allowing young plants to mature and reproduce aims to contribute to the establishment of seedlings and potentially stabilize/increase population numbers.

2.1.3. *General elements of the management plan*

The management plan for wild ginseng in Canada consists of the prohibitions on international export of wild roots as well as harvest and trade in wild specimens in the provinces of Ontario and Québec. A recovery strategy has also been developed.

2.1.4. *Restoration or alleviation measures*

A national recovery strategy is in place for ginseng as required for species listed on the federal *Species at Risk Act*. Public outreach initiatives have raised awareness of the endangered status of ginseng and its vulnerability to minimal levels of harvesting.

Surveys have been conducted to identify remaining wild populations of ginseng, their status, and any local threats. Landscape-level and site-specific protection and recovery plans have been determined. Populations are monitored annually to track the effectiveness of conservation measures.

The relocation of trails in parks and reserves, as well as the relocation of plants away from trails has been attempted. Researchers and landowners are collaborating to prepare and implement detailed plans to protect key ginseng populations that are located on private property.

The possibility of reintroduction is being investigated and the results of studies looking into specific ginseng habitat requirements are being applied to identify sites which may be suitable. The possibility of illegal harvest is considered when selecting potential reintroduction sites. Ginseng propagation techniques have been successfully developed and ginseng is being grown at a scientific institution to facilitate future reintroductions. Propagated ginseng has already been used to augment ten wild populations that were considered at risk of extirpation.

2.2. Monitoring system

2.2.1 *Methods used to monitor harvest*

There is no legal harvest of wild ginseng in Canada. However, populations are surveyed annually by species experts in the provincial jurisdictions in order to monitor population status and to identify the incidence of illegal harvest. Growth rates, harvesting impacts, and a minimum viable population size for ginseng have been calculated using projection matrix models.

Population estimates are made available in species status reports generated by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and also via consultations between the Scientific Authority and wildlife managers/species experts in the provincial jurisdictions. Baseline population data is available for the province of Ontario since 1987 and for the province of Québec since 1994.

2.2.2 *Confidence in the use of monitoring*

Wild harvest of ginseng continues despite prohibitions on international export from Canada as well as provincial bans on harvest and trade. Confidence in monitoring is moderate with the current levels of funding and researchers/staff, but challenges exist in documenting illegal harvest of ginseng (e.g. frequency required to be effective, the size of the geographical area in which ginseng occurs, the number of populations to monitor, and the ease of access to populations).

2.3. Legal framework and law enforcement

Ginseng was listed on the Canadian *Species at Risk* Act in 2003 which affords protection to the species on federal lands.

Québec listed ginseng as threatened (the highest risk category) on the *Loi sur les espèces menacées ou vulnérables* in 2001 which affords protection from harvest and trade in wild specimens, as well as ginseng habitat.

Ontario listed ginseng as endangered on the *Species At Risk in Ontario* list in 2008 and thus collection and trade in wild ginseng is now prohibited throughout Ontario under their *Endangered Species Act*.

3. UTILIZATION AND TRADE FOR RANGE STATE FOR WHICH CASE STUDY IS BEING PRESENTED

3.1. Type of use (origins) and destinations (purposes)

Ginseng has been used in Asian medicine for as long as 5000 years and is said to be an effective treatment for a wide variety of disorders and

ailments. As a result, it is harvested exclusively for medicinal and/or therapeutic uses. Trade in ginseng can be for either commercial or personal purposes.

In Canada, ginseng is grouped into four different categories based on the level of human-intervention: wild, wild-simulated, woods-grown, and field-grown. Wild ginseng grows naturally without human intervention of any kind. Wild-simulated ginseng is grown under a natural forest canopy in what would be considered suitable wild ginseng habitat and the seeds are cast by the grower without any cultivation or other interventions (e.g. removal of rocks, weeds, application of fertilizers or pesticides). Wild-simulated ginseng roots, despite being considered artificially propagated maintain the characteristics of a wild ginseng specimen and are therefore worth a high monetary value. Woods-grown ginseng is also grown under a forest canopy but is afforded a range of human interventions. Field-grown ginseng is grown under artificial shade structures and is subject to intense human intervention and cultivation.

The majority of export is of artificially propagated field-grown roots, usually in whole or sliced form, but also in powder or finished products (e.g. teas, capsules, extracts, confectionary, etc.). No legal trade in wild ginseng specimens from Canada exists.

3.2. Harvest:

3.2.1 *Harvesting regime*

Harvest of ginseng is destructive in that the whole root is taken and the vegetative portion of the plant is generally discarded. The harvest of wild roots involves the digging of individual plants, however artificially propagated field-grown ginseng is usually mechanically harvested using specialized machines. There is no season for collecting wild ginseng in Canada as harvest of this species is prohibited.

3.2.2 *Harvest management/ control*

In Canada, there is a zero quota for wild ginseng (i.e. no harvest or export of wild ginseng roots). Harvest of wild ginseng in Canada cannot be considered non-detrimental.

Exports of wild-simulated and/or woods-grown ginseng are currently assessed on a case-by-case basis by the Scientific Authority. To date, no Canadian export permits have been granted for wild-simulated or woods-grown ginseng due to concerns related to habitat disturbances associated with site preparation and maintenance, the introduction of seed-borne pathogens that are common in cultivated seed sources, and the potential for genetic contamination of wild ginseng

populations. Also of concern is the difficulty in differentiating between the roots of wild, wild-simulated, and woods-grown ginseng. Depending on the extent of human intervention during the growing period, the roots may resemble wild specimens or have characteristics similar to field-grown ginseng.

Harvest and export of artificially propagated field-grown ginseng is allowed, however all shipments must be accompanied by valid CITES documentation. CITES export permits may be issued for personal (< 4.5 kg) and commercial shipments (> 4.5 kg) depending on quantity. Field-grown roots have physical characteristics that make them easily distinguishable from ginseng roots grown by other means.

3.3. Legal and illegal trade levels

Legal harvest of ginseng in Canada exists primarily of artificially propagated field-grown specimens and is a lucrative industry with the export market value estimated at approximately \$65 million annually. Approximately 2.5 million kilograms of dried roots are exported from Canada annually, primarily to the Asian market.

Although harvest and trade of wild specimens is prohibited in Canada, the potential for illegal trade is high. Wild roots are considered to be significantly more valuable than those that are field-cultivated. It has been determined that illegal harvest has contributed to the decline and/or extirpation of wild ginseng populations in Canada. However, the exact amount of illegal harvest is difficult to quantify.

II. NON-DETRIMENT FINDING PROCEDURE (NDFs)

For wild ginseng in Canada there is currently a negative NDF (i.e. harvest of wild ginseng is considered detrimental to the species in the wild).

1. IS THE METHODOLOGY USED BASED ON THE IUCN CHECKLIST FOR NDFS?

_yes _no

2. CRITERIA, PARAMETERS AND/OR INDICATORS USED

In Canada, the IUCN Checklist for non-detriment findings is followed closely when making an NDF. All elements of tables 1 and 2 are considered by wildlife managers/species experts in the provincial jurisdictions and the information is provided to the CITES Scientific Authority. When the Scientific Authority reviews and finalises the Checklist, consideration is given to the primary experience of managers/experts in

the management and research of wild populations, as well as to any additional sources of information that are available (e.g. scientific journal articles, technical reports, and consultations with additional experts, wildlife management boards, species-specific committees/associations, etc).

3. MAIN SOURCES OF DATA, INCLUDING FIELD EVALUATION OR SAMPLING METHODOLOGIES AND ANALYSIS USED

Wildlife managers, who collaborate with species experts, in the provincial jurisdictions are responsible for the management of wild ginseng populations. The Canadian CITES Scientific Authority relies on these managers and experts to provide it with up-to-date information on wild ginseng populations, primarily in the form of the IUCN Checklist, but also through consultations, when making an NDF.

Growth rates, harvesting impacts, and a minimum viable population size for ginseng have been calculated using projection matrix models. Annual population surveys are carried out by species experts in the provincial range jurisdictions and the data is compared to baseline information to determine the trend of populations both individually and in Canada as a whole. Annual surveys are also used to monitor of illegal harvest and help to determine whether it is an actual or potential threat. Population surveys are useful for the identification of other potential threats to populations besides illegal harvest. Review of the primary literature is also conducted.

The Canadian CITES Scientific Authority itself does participate in field evaluations or surveys of wild ginseng populations. All population surveys are conducted by the wildlife managers/species experts in the provincial jurisdictions using species-specific field techniques.

4. EVALUATION OF DATA QUANTITY AND QUALITY FOR THE ASSESSMENT

Given that all jurisdictions have mandates to protect wildlife within their jurisdictions, and have the scientific and management information and expertise that contribute to the making of an NDF, the data and information provided to the Scientific Authority is assured to be of a high standard. It should be noted that the conservation and management of wild species is multi-jurisdictional in Canada, falling under the authority of various provincial, territorial, and federal acts and legislation related to wildlife management.

The details provided by the experts in the range jurisdictions are reviewed by the Scientific Authority to ensure that all the necessary information is complete. Whether trade will be detrimental to the species in the wild is determined based on the information provided by the wildlife managers/species experts in the jurisdictions.

5. MAIN PROBLEMS, CHALLENGES OR DIFFICULTIES FOUND ON THE ELABORATION OF NDF

Since management of wildlife in Canada is multi-jurisdictional, coordinating the numerous people involved in the NDF process can sometimes be difficult. Budget and time constraints are also significant challenges facing the Scientific Authority and the wildlife managers in regards to making NDFs.

The monitoring of illegal harvest (aside from annual population surveys) is a considerable challenge considering the frequency of visits required for monitoring to be effective, the geographical area in which ginseng occurs, and the number of populations to monitor. Eliminating the threat of illegal harvest to the survival of ginseng in the wild is problematic due to its greater market demand and value.

6. RECOMMENDATIONS

The Canadian CITES Scientific Authority has had great success in using the IUCN Checklist, either formally or via consultations, as a method to gather the information that is required to make an NDF. The IUCN Checklist covers a wide scope of the parameters that may be considered when developing an NDF and the format is useful in terms of focusing our approach for gathering information, recognizing gaps in information or management, and identifying the vulnerabilities for the species in question. Collectively it ensures a thorough analysis of the status and management practices currently in place for a species, regardless of taxa. It is recommended that Parties consider the IUCN Checklist when developing NDFs.

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