



# **Plant Collection Guidelines for Researchers, Students and Consultants Alberta Native Plant Council**

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## **Plant Collection Guidelines**

### **Introduction**

The Alberta Native Plant Council (ANPC) strongly supports and encourages research on plant species and their habitats. Plant collections are a valuable tool both in research and as a valid means of providing students at many educational levels with knowledge of and appreciation for the wonder, diversity, and beauty of plant life. Concepts in taxonomy and identification are best learned by examining specimens, both live and pressed or otherwise preserved. Involving students in plant collecting is a valuable way for them to study and learn to identify species. Therefore, it is important that students learn to properly collect, document and handle specimens.

### **The Value of Plant Collections**

The use of plant collections for research and their value in teaching and in documenting biodiversity is under-appreciated. This is reflected in the lack of support for institutions such as herbaria. With initiatives such as the Convention on Biodiversity, it is hoped that the need for trained taxonomists and the value of collections in documenting and understanding biodiversity will be better recognized.

Plant collections are important for many reasons:

1. Voucher specimens are the only verifiable record of the occurrence of a species in time and space. Little validity can be given to floristic lists if vouchers are lacking.
2. The taxonomy of species is continually evolving. With herbarium specimens, species that have been subject to taxonomic change can be verified for an area without the expense of additional field work.
3. Even common species are sometimes misidentified in the field; less common species can be easily misidentified (lack of distinguishing features, lack of magnification, lack of time, large or difficult groups) or overlooked. The best way to be certain of identification is to collect specimens and identify them in a lab with all the tools and resources at hand.

4. Even common or widespread species collected repeatedly over time add to scientific knowledge by monitoring the health of specific regions or habitats and in ways that we cannot necessarily anticipate.
5. The work of field professionals can be available to a wide audience through depositing specimens in an herbarium as the specimens are available to many researchers, in many fields, the world over for hundreds of years to come.

Of course, only well collected, well pressed, well mounted and well curated specimens will fulfill the needs of future environmental professionals, researchers, policy makers and educators. The value of good collecting and of active herbaria is clear, as discussed above, and there are many good manuals available that discuss the techniques of good collecting (e.g. Savile 1973 or on line at [http://www.botany.utoronto.ca/courses/BOT307/B\\_How/janeTOC.html](http://www.botany.utoronto.ca/courses/BOT307/B_How/janeTOC.html)). The purpose of this document is to educate collectors in the ethics of plant collecting.

Indiscriminate collecting should be discouraged, and clear guidelines are needed regarding rare, protected or sensitive species and habitats. These guidelines are provided to help those involved in collecting plants to consider the impacts they may be having on the viability of plant populations and on the habitat and how to collect responsibly.

## Acknowledgements

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## Some Definitions

**Native plant species** are those that are indigenous to a particular region; plants that were in the landscape prior to Euro-American settlement. Native species are recognized for their intrinsic value as part of natural ecosystems.

**Alien species** are plants that are not native to Alberta. They may have been purposely brought into the province as agricultural or horticultural species, or they may have been accidentally introduced. There are hundreds of introduced plant species, and some of these are invasive. Once established in an area, **invasive aliens** can replace native plants by aggressive competition for resources or by direct chemical antagonism (allelopathy). Co-evolved predators and pathogens are often absent, and can allow populations to grow rapidly. Some alien invaders have significant impacts on natural habitats. This definition is from "A Rogue's Gallery of Invasive Non-native Plants". To learn more, check out <http://www.anpc.ab.ca/roques.pdf>.

**Rare plants** are native species that have either a small population size in Alberta, or occur only in a small portion of the province; often both. Generally, a rare plant is defined here as a species on the Alberta Natural Heritage Information Centre (ANHIC) Tracking And Watch Lists - Vascular Plants, Mosses, Liverworts And Hornworts (check the ANHIC website [www.cd.gov.ab.ca/preserving/parks/anhic/flashindex.asp](http://www.cd.gov.ab.ca/preserving/parks/anhic/flashindex.asp) for the most current lists).

Tracking lists include plants of high priority for conservation because the taxa are rare or of conservation concern in some other way. While species on this list do not necessarily have any legal status, some plants have been legally designated under provincial legislation. These can be viewed at <http://www3.gov.ab.ca/srd/fw/speciesatrisk> or by contacting the Alberta Sustainable Resource Development, Species at Risk Program. Some plant species are also protected by federal legislation under the Species at Risk Act. Information on these can be viewed at <http://www.cosewic.gc.ca/index.htm> or contact COSEWIC Secretariat, c/o Canadian Wildlife Service, Environment Canada.

## **Why Develop Guidelines for Collecting Plant Materials?**

The collection of plant materials can have serious impacts on both the target plant species and the surrounding habitat if it is not done in an ethical manner. It is important not to collect plants whose viability may be adversely affected or to significantly impact plant communities through collecting. It is the responsibility of researchers and students to ensure that they collect in a conscientious and ethical manner to minimize their impacts. The following is a list of suggestions designed to help researchers and students self-regulate their collecting. These are drawn from a number of sources, including collection guidelines from other Native Plant Societies and from the Plant Conservation Roundtable (1986) Conservation Guidelines.

### **Consider the purpose of the collection**

Ask whether collecting this plant will contribute to educational or scientific advancement, and what impact removing this plant will have on the population. Collect only if the collection will add significantly to scientific knowledge, this is particularly relevant to rare or sensitive species.

There are two levels of collection for educational and scientific purposes:

- 1) Collection of plant specimens for research and for augmenting herbarium collections, and
- 2) Collections of plant specimens for introductory or junior science and biology classes.

Most of the considerations discussed apply to both levels.

One of the primary reasons for collecting plants for herbaria is to increase our knowledge of the flora. These collections are important for an understanding of species distributions. Range extensions, new populations of common and

especially of rare or uncommon species, and even of rare or uncommon habitats should be documented with voucher specimens (or partial specimens with photographs). Voucher specimens collected in areas that are remote, inaccessible and/or infrequently visited are scientifically significant. All collections, even those of common plants, can be valuable and add to the scientific knowledge. Some recommend that all field biologists collect at least one voucher specimen of each species listed in their report from any given study area. Any recognized herbarium would accept well collected, well pressed and well documented specimens.

However, repeated collecting of rare species in well-known areas may serve no useful purpose. While collections are important to document the distribution of plants, including rare species, it is critical to first evaluate the impact of collecting on each plant population. Documented populations of rare plants should not be subject to additional collection, unless the collection has a specific purpose that cannot be accomplished using the existing specimens. The considerations when collecting rare or sensitive species are discussed further below.

### **Instructors:**

When an instructor requests students to collect plants, he or she has a duty to ensure that the students are provided with guidelines for ethical collecting, and that they are aware of the sensitive and rare plants in the region.

- Encourage students to collect common or weedy and/or cultivated species for identification in taxonomy classes and for demonstrating collecting techniques
- Teach students which species are sensitive to harvesting (lilies, orchids etc. and rare plants). Discourage collection of these, and consider deducting marks for inappropriate collections.
- Encourage students to collect from a wide variety of regions so that the collections may provide some useful information about plant distribution.
- Request that students observe and describe the habitat in which each plant was growing. This will help to increase environmental awareness
- Avoid taking students to the same area year after year.
- For classroom work, use plants or plant parts from propagated sources whenever possible. When using wild plant specimens, collect in the manner least likely to damage the wild populations and collect common species or plants that are not sensitive to collection.

### **Students:**

Collections for the purpose of learning proper collection, and processing techniques and plant identification can be done with minimal impact by considering the following:

- Where possible, collect from areas where vegetation will be removed or otherwise destroyed in the near future.

- Collect from disturbed habitats such as roadsides, where impacts will generally be minimal. The following should be considered when doing roadside collecting:
  - Park and walk with care; roadside collecting can be dangerous.
  - Avoid areas where native species have been planted in an effort to re-establish natural vegetation or beautify the landscape.
- Avoid areas that are visited by large numbers of people, such as urban trails and walkways.
- Avoid protected lands such as national, provincial, and municipal parks and protected natural areas. Please note it is usually illegal to collect from these areas without a permit.
- Avoid rare or fragile habitats such as sand dunes or wetlands.
- Collect common species or plants with sufficiently large populations (i.e. 1000 or more plants).
- Avoid rare species or species sensitive to collecting (more about this below).

## **All Collectors:**

### **Which species are sensitive to collecting?**

Understand the biology of the plant and its method of reproduction, so that you can make knowledgeable decisions about what to collect. Here are some considerations when determining how sensitive a species may be to collecting:

- Is the plant fast- or slow-growing? The slower a plant grows the more sensitive it will be to collecting.
- How does it reproduce? By seeds, rhizomes, stolons, bulbs, or otherwise?
  - A few seeds, cuttings or bulblets (above-ground) can often be taken without seriously affecting the survival of the parent plant.
  - If a plant produces rhizomes or stolons, it may be possible to remove small rooted shoots without seriously damaging the parent.
  - Plants with bulbs or corms are much more sensitive to collection of rooted specimens, because it is often difficult to avoid removing the entire plant. Aboriginal communities that have collected bulbs from the same populations for generations, maintain or increase the populations by carefully replanting the small bulbs.
  - Annual plants are almost entirely dependent on being able to produce and disperse seed for their populations to continue. Consequently, these species may be particularly sensitive to the loss of flowering or fruiting individuals.
- Is it a rare species? Species that are found in few areas and/or in small numbers are especially sensitive to the impacts of collecting. Those that persist near the limit of a plant's range may be especially sensitive to disturbance.
- How large is the population? Small populations are easily eradicated by indiscriminate collecting.

## Getting Permission

- On private, leased, or conservation land (such as those owned by NCC, Ducks Unlimited, etc), permission to collect native plant materials must be obtained from the landowner or lessee.
- Indian reserves are considered private land. Permission must be obtained from the band office.
- Research and collection permits are required for collecting in any protected area, including National Parks, Provincial Parks, Natural Areas and Municipal Parks. Researchers wishing to work in any of these areas need to contact the appropriate agency, well in advance, to ensure that the required permits are obtained.

## General Collecting Guidelines

Know the flora of the area before you collect. Be aware of the collecting guidelines that follow and of the rare plants in your region.

- Avoid unnecessary damage to the site
- Avoid unnecessary damage to the plant, especially if it is a tree/shrub. Where possible, collect twigs from well-established trees or shrubs
- Avoid collecting whole plants when plant parts are sufficient. Removal of entire plants, including the roots, can rapidly reduce populations. Only collect the full plant if it is required for research, for identification or for other documentation.
- When collecting may be detrimental to the reproductive success of a population, take a picture. Be sure to include diagnostic features in the photograph.
- Identify each plant before collecting. A list of books that you may find helpful for identifying plants is given in the reference section below.
- Know which species are sensitive to collecting (lilies, orchids, rare species, mosses, lichens etc.).
- If you are sure that a plant is an alien species (especially an invasive alien) the collection of full plants may be helpful to reduce the spread of weeds. Take precautions not to scatter live plant material such as seeds, roots or other parts of the plant which could spread invasive plants.
- If you encounter a plant with which you are unfamiliar and you really want to identify it, assume it is rare and exercise one of the rare plant options described below
- Avoid collecting rare species, and avoid affecting such plants when they are growing nearby. Take a specimen only if the collection will add significantly to scientific knowledge.
  - If the plant has a small population (fewer than 50 plants) and is easily revisited, photograph the plant for identification.
  - If the plant has a small population (fewer than 50 plants) and is difficult to revisit, collect only a single specimen.
  - If the plant has a large population (1000 or more plants), follow the general guidelines described below.

- When rare species collections are made, submit the specimens to a herbarium (Universities of Alberta, Calgary or Lethbridge, Provincial Museum. Ensure that accurate and detailed herbarium labels are included.
- Submit a rare plant report form to the Alberta Natural Heritage Information Centre (available on line <http://www.cd.gov.ab.ca/preserving/parks/anhic/flashindex.asp>)
- Do not collect indiscriminately. Take the minimum amount needed and avoid collecting samples so large as to adversely affect a population's reproduction and survival.
- If you collect in an area periodically, note the vigour and size of the stand each time you visit. Is the stand growing, shrinking, or staying the same size? It is often necessary to leave an area to rest for one or more growing seasons between collections.
- Collect discreetly. All collecting activities should be done inconspicuously, so that casual (uninformed) observers are not encouraged to do likewise.
- Consider placing your collections in a recognized herbarium. An herbarium, well curated and properly maintained, has a mandate to care for specimens using the best available archival materials and methods (not always available to private, government or corporate collectors). Reputable herbaria not only care for specimens but are active in promoting their continued use in research, education and outreach. This can only happen if the herbarium continues to acquire specimens.

### **How much to collect**

Although the Plant Conservation Round Table (1986) suggests a 1 in 20 rule, there is concern that this may not be adequate, particularly for smaller populations of plants. ANPC suggests a 1 in 50 "rule of thumb" for collecting from populations with fewer than 1000 plants or clumps, unless the species is especially sensitive to collection.

- For species that grow as clumps, count each clump as a single plant.
- No more than 1 plant (or clump) should be collected for every 50 that are present in a population.
- If only a small percentage of the population is flowering or fruiting, collect only one in 50 flowers or fruits. These may be critical to the continued vigour of the population.
- Do not collect from small populations (less than 1000) of sensitive species (annuals; perennials with bulbs such as onions; non-vascular plants such as mosses; lichens).
- Avoid small populations with fewer than 50 plants and never collect the only plant in an area.
- The exceptions to these rules are alien (introduced) plants (e.g. dandelion, lamb's quarters, purslane). If you are sure that a species is introduced and is now growing wild, take all you want, but be careful not to spread seeds or leave portions of rhizomes or roots that could sprout. Also, try not to create additional habitat for weeds by leaving disturbed ground.

For bigger populations (more than 1000 plants or clumps), the suggested rule of thumb is to collect no more than 1 in 10.

- Leave 9 of every 10 plants (including 90% of the flowers, seeds, berries, etc.) to allow natural propagation, and to provide food and habitat for insects, birds, and mammals.
- Reduce this level of collecting for sensitive species (annuals; perennials with bulbs such as onions; non-vascular plants such as mosses; lichens). Take no more than 1 in 500.
- Even common plants with healthy populations can be impacted by over harvesting. In areas that may be subjected to further collecting or where activities such as grazing, mowing or heavy traffic reduce natural regeneration, collecting should be minimal. Take no more than 1 in 50 plants. It may also be helpful to record population levels so that over-harvesting can be documented.

Common species and plants with large populations (i.e. 1000 or more plants) are best for many situations such as for teaching collections and student projects. Avoid collecting or otherwise harming rare or endangered species. The most important guideline is never cause any population of native plant to go extinct.

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