

Ex Situ Conservation Of Wild Plant Species At Plant Gene Resources Of Canada

Plant Gene Resources of Canada (PGRC), Canada's national seed bank, has expanded its program to include a component focused on Canadian wild plant species.

Many populations of Canada's approximately 3,800 wild species of vascular plants are in danger of genetic erosion, and/or local extinction. This is a consequence of: a) habitat loss, alteration or fragmentation resulting from activities associated with agriculture, urbanization, forestry, and mining; and b) climate change, pollution, invasion of exotic species, and over-exploitation from unregulated harvesting. About 25 to 30% of the vascular plant species native to Canada are considered rare. Several native genera, such as *Amelanchier*, are important world genetic resources because of their broad range of distribution in Canada.

Wild plant species play essential roles in ecosystem structure and function. They mediate flows of energy and materials and thus are associated with a diversity of processes including ecosystem productivity, atmospheric oxygen and carbon dioxide levels, water cycling and purity, soil nutrient recycling, erosion control, and pest and disease cycles. As species diversity declines, such processes may become more variable and unpredictable, and resistance to environmental perturbations, such as drought, may be lessened. Loss of diversity also decreases the cultural and psychological benefits derived from aesthetic, recreational and spiritual activities in natural habitats. In terms of utilization, wild plant species provide many



Chimaphila umbellata (L.) W. Bart. (pipsissewa; Pyrolaceae)

products including food, medicines, wood and other fibres, oils, fuel, genetic resources for crop breeding, and natural pest control. A large number of plant species native to Canada are related to crop plants. A significantly greater proportion may have potential economic value.

In situ conservation within protected habitats must remain the primary means by which our wild plant species are conserved. However, *ex situ* preservation in botanical gardens, seed banks, home or farm gardens, and commercial operations plays an essential role in conserving our native botanical diversity. *Ex situ* conservation helps to provide the flexibility to respond to unforeseen environmental changes and consequent impacts on habitat conservation and utilization of wild plant species. *Ex situ* collections are sources of plant material for recovery of threatened or endangered species, habitat rehabilitation and restoration, crop improvement, new product development, and a wide variety of research studies. Researchers

can obtain access to rare and endangered species without disturbing or damaging natural populations. *Ex situ* conservation of plant species in seed banks is advantageous in terms of efficiency and economy of long-term storage.



Euphrasia stricta D. Wolff ex J.F. Lehm. (eyebright; Scrophulariaceae)

The primary responsibility of PGRC is the *ex situ* conservation of plant biodiversity, with a focus on the conservation of plant germplasm with economic value, or the potential for economic value. PGRC plays a significant role in Agriculture and Agri-Food Canada’s Action Plan on biodiversity, which is integral to the Canadian Biodiversity Strategy, Canada’s implementation of the United Nations’s Convention on Biological Diversity. PGRC participates in the worldwide network of plant genetic resources centres established by the Food and Agriculture Organization (FAO) of the United Nations and the International Plant Genetic Resources Institute (IPGRI). Over 110,000 seed samples are preserved in the seed bank in Saskatoon, Saskatchewan, and approximately 3,500 accessions are established at the Canadian Clonal Genebank in Harrow, Ontario. About two-thirds of the clonal collection consists of indigenous wild relatives

of Canadian fruit crops. However, in general, Canadian wild plant species are not well represented in PGRC’s collection.

The objectives of PGRC’s wild plant species program are:

- ◆ to develop a diverse collection of seed of Canadian wild plant species, with long-term emphasis on assembling collections with representative ecotypic variation and population genetic diversity; subsequent analyses of this genetic diversity may generate new knowledge with taxonomic, ecological, management, or utilitarian implications or applications
- ◆ to develop or refine protocols for regeneration of wild plant species under *ex situ* conditions; this involves the determination of the requirements for seed germination and pollination



Rhodiola rosea L. (roseroot; Crassulaceae)

- ◆ to study seed longevity under *ex situ* storage conditions, once regeneration protocols have been established
- ◆ to make seed available for research purposes, and to make species information available in PGRC's GRIN-CA database

Examples of wild plant genera of interest to PGRC include wild and weedy relatives of crop species (*Amelanchier*, *Iris*, *Helianthus*, *Panax*), wild grasses and grass-like species (*Agropyron*, *Carex*, *Poa*, *Zizania*), and wild forbs and legumes (*Agastache*, *Astragalus*, *Arnica*, *Baptisia*, *Chamaelirium*, *Chimaphila*, *Euphrasia*, *Gentiana*, *Hedysarum*, *Heuchera*, *Hydrastis*, *Polygala*, *Rhodiola*, *Sanguinaria*, *Scutellaria*, *Valeriana*, *Veronicastrum*). Note that these genera do not constitute a comprehensive or exclusive list.

Input from, and collaboration with, interested individuals, groups, or organizations will contribute substantially to the success of *ex situ*



Gentiana affinis Griseb. (prairie gentian; Gentianaceae)



Scutellaria galericulata L. (marsh skullcap; Lamiaceae)

conservation of Canadian wild plant species at PGRC. Contributions can take the form of:

- ◆ identifying species that should be included in the program
- ◆ help in identifying locations for seed collection, and the timing of seed collection (such information will be kept confidential if requested)
- ◆ collaboration in regards to seed collection and in developing protocols for regeneration

The contribution of arbitrarily collected samples of seed is not encouraged. It is important that all seed samples contributed to PGRC be accompanied by appropriate data. The information required for proper documentation of collected seed must include taxonomic identity, details about the location and nature of the population from which the sample was taken, and details of the collection site. PGRC

should be contacted in regards to the specific data required. Also, it should be noted that the collection of seed from threatened and endangered species, and from parks and protected sites requires appropriate permits and/or licences, and must follow protocols appropriate for collecting from such species.

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Additional Reading

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