

the rare plants *of forillon national park*



Parks
Canada

Parcs
Canada

the rare plants

of forillon national park

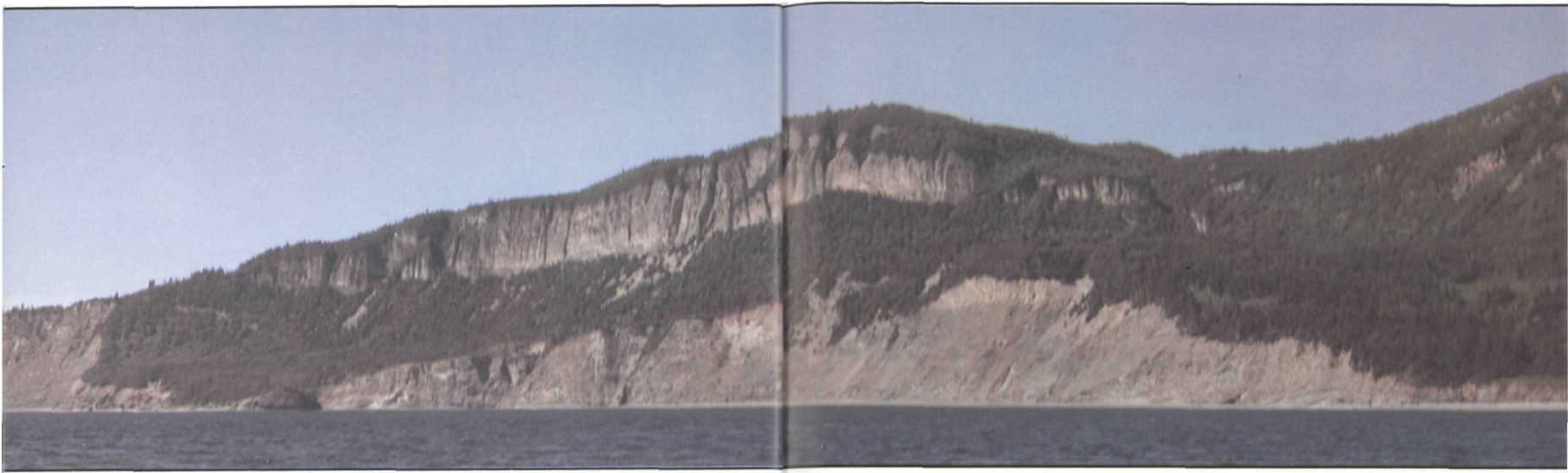


Parks
Canada

Parcs
Canada

TABLE OF CONTENTS

WARNING	5
INTRODUCTION	7
BIOGEOGRAPHY: LIVING REMINDERS OF THE PAST	10
ECOLOGY OF THE RARE PLANTS OF FORILLON NATIONAL PARK	14
OTHER ARCTIC-ALPINE PLANTS TO BE FOUND IN FORILLON NATIONAL PARK	15
Holly-Fern (<i>Polystichum Lonchitis</i> (L.) Roth)	16
Green spleenwort (<i>Asplenium viride</i> Hudson)	18
Purple Reed Grass (<i>Calamagrostis</i> <i>purpurascens</i> R. Br.)	20
Alpine Bistort (<i>polygonum viviparum</i> L.)	21
Scirpoid Sedge (<i>Carex scirpoidea</i> Michx.)	22
Franklin's Sedge (<i>Carex Franklinii</i> Boott)	23
Silky Willow (<i>Salix vestita</i> Pursh)	24
Small-flowered Anemone (<i>Anemone</i> <i>parviflora</i> Michx.)	26
Tufted Saxifrage (<i>Saxifraga cespitosa</i> L.)	28
Purple Muntain-Saxifrage (<i>Saxifraga</i> <i>oppositifolia</i> L.)	30
Livelong Saxifrage (<i>Saxifraga aizoon</i> Jacq.)	32
Snowy Cinquefoil (<i>Potentilla nivea</i> L.)	34
Yellow Dryad (<i>Dryas Drummondii</i> Richards)	36
White Dryad (<i>Dryas integrifolia</i> Vahl)	38
Spear-leaved Arnica (<i>Arnica lonchophylla</i> Greene)	40
Dwarf Groundsel (<i>Senecio cymbalaria</i> Pursh)	42
Divided-leaf Fleabane (<i>Erigeron compositus</i> Pursh)	44
GLOSSARY	47
TO LEARN MORE ABOUT THE RARE PLANTS OF FORILLON NATIONAL PARK	49



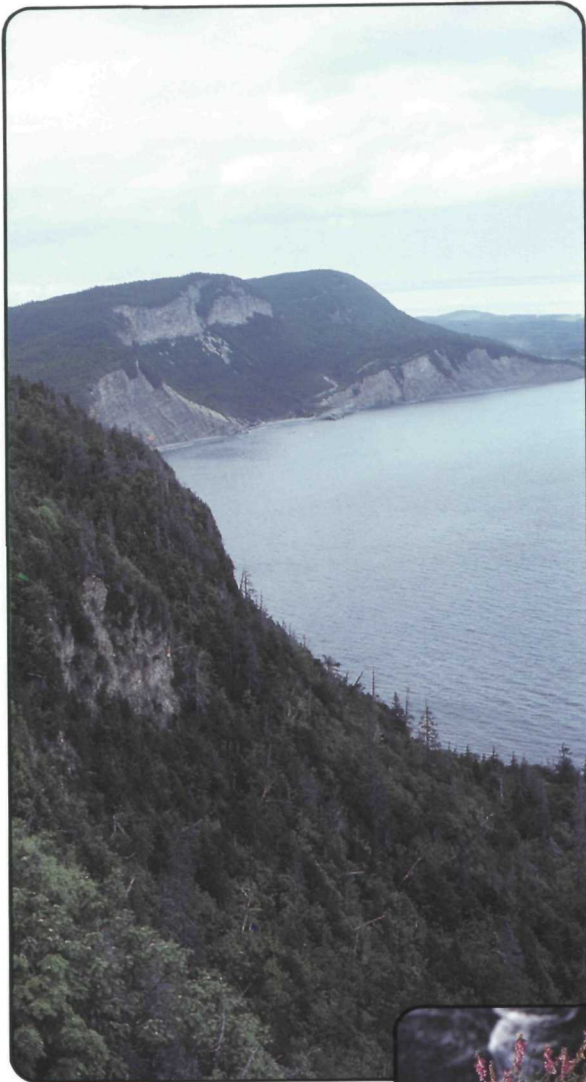
"National Parks are dedicated to the people of Canada for their benefit, education and enjoyment. . . and they shall be maintained and made use of so as to leave them unimpaired for the enjoyment of future generations".

WARNING

Remember that it is forbidden to pick flowers and plants in national parks. This rule is most important in the case of the rare arctic and alpine plants of Forillon where their habitats and their survival are endangered. It is also dangerous to try locating them since arctic and alpine plants grow in places that are often inaccessible and where there is constant risk of falling rocks and sometimes small landslides.

This booklet should help you appreciate the rare plants of Forillon. They tell a fascinating story and their presence gives the park an additional special value.

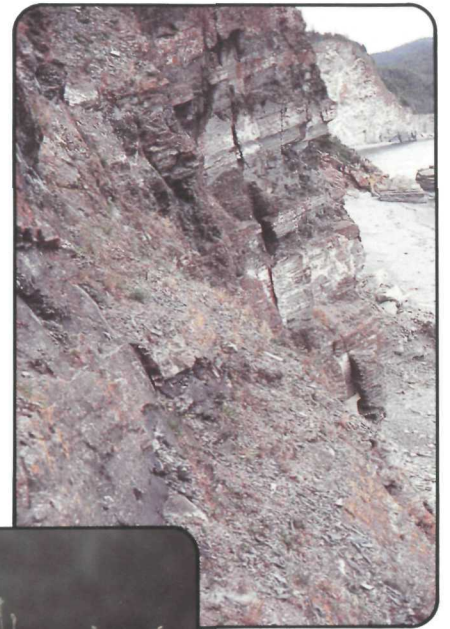
INTRODUCTION



Visitors to Forillon National Park will first be struck by the powerful landscape: between land and sea stand gigantic talus slopes and bold escarpments. But visitors to Forillon, provided they are not afraid of long excursions, may also make fascinating discoveries. For instance, this national park harbours a group of plants whose presence is truly unexpected at such low latitude. Some of these are major constituents of the carpet of tundra vegetation found in arctic localities such as Baffin Island more than one thousand kilometres north of Forillon. Others are abundant in the alpine meadows of the Yukon, Alberta and Oregon. However, in Forillon National Park, these plants are discrete, bloom in very restricted sites and are never very abundant. These plants — about thirty different species, — by their very peculiar requirements and narrowly restricted habitats, provide us with insights into the last phase of the ice age. This ice age which spanned several millennia left a profound imprint on the landscape, not only on Forillon, but on the country as a whole.

This brochure describes these plants and attempts to explain their initial establishment and subsequent survival in the park. A few technical concepts which may not be familiar to the reader must be used and, therefore, we have added a glossary with definitions of terms not commonly found in everyday language.

As indicated by the title of this brochure, several species are very rare and the whole population within the park may include fewer than one hundred individual plants. Other species, by comparison, may appear relatively abundant, numbering thousand of plants. However, the connotation of rarity applies to all these species, as they are limited to the periphery of the unbroken boreal



forest which carpets the region. There, they survive only in small and marginal sites in which forest plants are unable to establish themselves. Even other pioneering plants are unable to take a foothold in such sites because of the prevailing conditions.

BIOGEOGRAPHY: LIVING REMINDERS OF THE PAST

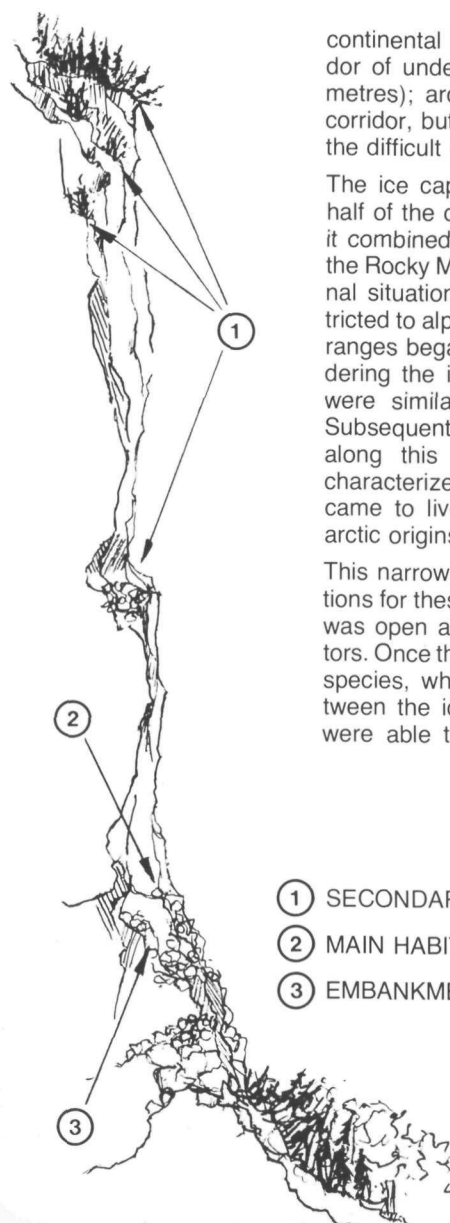
About 80,000 years ago, a marked climatic change was accompanied by a gradual increase in precipitation throughout the northern hemisphere. This reached such a scale that the snow that fell during winter did not melt during summer. With passing millennia, the unmelted snow turned to ice under the pressure of its own weight, covering most of Canada and parts of the northern United States. It has been estimated that this mantle of ice reached a thickness of several hundred metres and even up to two kilometres in some instance. This enormous mass of ice forced the underlying terrain to sink by tens or hundreds of metres. Moreover, the temporary immobilization of considerable volumes of water in this continental ice sheet led to a substantial lowering of the level of the seas. But, following a progressive improvement in climatic conditions, the gigantic ice mass began to melt about 18,000 years ago. Using sophisticated techniques, scientists are able to date the most important phases of this withdrawal which ended 6,000 years ago in central Québec.

What happened to plant life in this huge glaciated area? Of course, all boreal vegetation that existed before the ice age was either destroyed or pushed southwards in front of the advancing ice sheet to latitudes occupied today by temperate forest communities. By comparing the relative abundance of fossil pollen grains in the sediments at the bottoms of lakes that developed at the southern margin of the ice sheet, botanists have established a fairly detailed picture of vegetation existing at the peak of ice expansion. Analysis has shown that the area just ahead of the ice margin harboured arctic species (aven, saxifrage) as well as the expected set of typically boreal plants (fir, spruce, birch). Such observations on pollen profiles, together with observations made at the margin of ice sheets active today, have led scientists to propose the following hypothesis: just ahead of the

continental ice sheet existed an unforested corridor of undetermined width (probably a few kilometres); arctic flora was able to survive in this corridor, but boreal species could not because of the difficult growing conditions.

The ice cap reached across the entire northern half of the continent and, in the western foothills, it combined with a smaller ice cap that covered the Rocky Mountains. This led to another exceptional situation: several plant species, hitherto restricted to alpine meadows of the western mountain ranges began to grow in the narrow corridor bordering the ice margin where growing conditions were similar to those in their natural habitat. Subsequently, these plants expanded eastwards along this narrow path. Thus, plant species characterized as typically alpine or Cordilleran came to live side by side with species of truly arctic origins.

This narrow corridor offered ideal growing conditions for these arctic and alpine plants. The terrain was open and devoid of potential plant competitors. Once the ice-melt began, the arctic and alpine species, which until then had been wedged between the ice mass and the thick boreal forest, were able to occupy these new ice-free areas.



- ① SECONDARY HABITATS FOR RARE PLANTS.
- ② MAIN HABITAT FOR RARE PLANTS.
- ③ EMBANKMENT OF FALLEN EARTH.



SENECIO CYMBALARIA

However, this situation was of short duration. The boreal forest belt, favored both by improving climatic conditions and by the formation of new soils, soon invaded these new available habitats and displaced the arctic and alpine species. The latter were subsequently restricted to escarpments, mountain tops and maritime cliffs where the forest was unable to grow. This is where they are found in Forillon National Park, as well as in a few other sites throughout the Gaspé Peninsula today. Thus, the rare plants of Forillon are relics of a period corresponding to the retreat of the continental ice sheet. The rare plants of Forillon National Park are a living testimony to a colossal upheaval, the extent of which is difficult to imagine today.



ECOLOGY OF THE RARE PLANTS OF FORILLON NATIONAL PARK

All the rare plants of Forillon National Park share a marked preference for ground containing limestone. However, this is not the principal reason for their persistence, as limestones are found throughout the park. Another requirement they share is the presence of open habitats with sparse plant life. These open sites only exist in regions of broken topography. Wherever the terrain is gently rolling, the boreal forest blankets the whole landscape. Therefore, the lime-loving rare plants of Forillon are found on the numerous exposed cliff faces, narrow ledges, talus slopes and broad cornices where the boreal forest is unable to gain a foothold due to the extreme conditions of topography and climate. Furthermore, in such sites, naturally-occurring factors (intensive weathering of the parent-rock, landslides, ground creep, etc.) prevent the stabilization of the substratum, a prerequisite for the forest-flora to grow. The nearness of the cold water of the Gulf of St. Lawrence also contributes to maintaining cool, arctic and alpine-like summer growing conditions. For all these reasons, Forillon National Park is endowed with a remarkable collection of arctic and alpine plants.



Poa alpina



Solidago multiradiata

OTHER ARCTIC-ALPINE PLANTS TO BE FOUND IN FORILLON NATIONAL PARK

We are unable in this short brochure to introduce and describe all the arctic and alpine-like plants in Forillon National Park of phyto-geographical interest. We have restricted our discussion to seventeen which are the most spectacular and the most typical of Forillon's cliffs. However, eleven others merit mentioning.

One of the rarest is a draba (*Draba incerta* Payson) which was long regarded by botanists as locally wide-spread under the name of *Draba Peasei* Fern. It has been reported twice in the past, but it now seems to have disappeared. Forillon constituted the only known locality in eastern America where this Rocky Mountain alpine species has been recorded. Two species of saxifrage, *Saxifraga cernua* L. (very rare) and *Saxifraga aizoides* L. (common only in a few spots) not discussed in the brochure, also share an arctic-alpine distribution and grow in Forillon. Two meadow-grasses (*Poa alpina* L. and *Poa glauca* Vahl.) and two fescue-grasses (*Festuca baffinensis* Polunin and *Festuca prolifera* (Piper) Fern.), together with *Poa Canbyi* (Scribn.). Piper, a meadow-grass of Cordilleran variety, can also be found at various locations in the park.

There is also an arctic-alpine goldenrod (*Solidago multiradiata* Ait.) and a sedge (*Carex rupestris* All.) along with a rare antennaria (*Antennaria gaspensis* Fern). The latter is regularly found along the Gulf of St. Lawrence.

Other species of great phyto-geographical interest may have escaped notice and perhaps await discovery on the most remote ledges of the cliffs of Forillon National Park.



Draba incerta



Saxifraga cernua

Holly-Fern

Polystic faux-Lonchitis

Polystichum Lonchitis (L.) Roth

Polypodiaceae

Height: 10 - 60 cm

General distribution: Boreal-alpine circumpolar. In Québec, this fern is restricted almost exclusively to the Gaspé Peninsula. It occurs in the Forillon, Bic, Mont-Saint-Pierre and Percé areas. It has also been collected around Richmond Gulf on the eastern coast of Hudson Bay.

Peculiarities: Holly-Fern grows in limestone crevices in open or partly shaded habitats. It belongs to forest or shrub communities found on rocky slopes. This tall, erect fern is calcicolous as are the other rare plants of Forillon National Park.



Green Spleenwort

Asplénie verte

Asplenium viride Hudson

Polypodiaceae

Height: 5 - 30 cm

General distribution: arctic-alpine circumpolar. Occasional to locally abundant in limestone derived soil on the Gaspé Peninsula and elsewhere around the Gulf of St. Lawrence. It is also found in the mountain areas of Vermont and Pennsylvania.

Peculiarities: this delicate fern grows in rock crevices, in sheltered and partly shaded sites. It often shares this habitat with another small fern, the slender *Cryptogramma stelleri* (Gmel. Prantl).



Purple Reed-Grass

Calamagrostide pourpre

Calamagrostis purpurascens R.Br.

Graminae



Height: 30 - 50 cm

General distribution: North American and eastern Asiatic arctic-alpine. It is rare in the eastern Arctic. In southern Québec, it has only been found at Bic and in Forillon National Park.

Peculiarities: Purple Reed-Grass appears to prefer a relatively loose, yet stable rocky soil, in open, semi-sheltered habitats. Its occurrence is therefore restricted to cliffs where exposure is not too drastic.

Alpine Bistort

Renouée vivipare

Polygonum viviparum L.

Polygonaceae



Height: 15 - 30 cm

General distribution: arctic-alpine circumpolar. A calcicolous species characteristic of wet arctic meadows throughout the northern hemisphere, and found in the Rocky Mountains as far south as New Mexico. In the Gaspé Peninsula, Alpine Bistort occurs in a variety of habitats, i.e. river flats, sea cliffs, mountains and lake shores.

Peculiarities: Alpine Bistort differs from most arctic-alpine species found in Forillon in that it prefers damp, rich soils and open but sheltered sites. Such conditions are found on cliff ledges receiving abundant run-off water from above, especially where rock strata are tilted inwards thereby facilitating accumulation of fine particles and humus build-up. In this habitat, Alpine Bistort often grows with Small-flowered Anemone.

Scirpoid Sedge

Carex faux-scirpe

Carex scirpoidea Michx.

Cyperaceae



Height: 15 - 25 cm

General distribution: North American arctic-alpine, rather frequent in the Gaspé Peninsula, where it has been collected in more than fifteen localities.

Peculiarities: while Scirpoid Sedge may not qualify as a rare plant in Québec, it is not common either. It grows mostly on calcareous cliffs and river flats.

Franklin's Sedge

Carex de Franklin

Carex Franklinii Boott

Cyperaceae



Height: 40 - 50 cm

General distribution: Asiatic and north Cordilleran alpine and other localities in eastern North America (Québec and Newfoundland). Under the name *Carex misandroides* Fern., eastern plants were a distinct species. It is restricted to some rare spots in northern Québec and the Gaspé Peninsula and is certainly one of the rarest plants of Québec.

Peculiarities: Franklin's Sedge shows a remarkable distribution in the northern hemisphere: Québec, southern Alberta, Alaska-Yukon, and specific areas in eastern and central Asia. In Forillon National Park, it grows in rock crevices or among loose limestone debris. In such sites, it establishes itself in localized pockets of humus or fine silty materials that accumulate along irregular rocky slopes. However, it is nowhere abundant.

Silky Willow

Saule soyeux

Salix vestita Pursh

Salicaceae

Height: 1 - 1.5 m

General distribution: North American and Asiatic boreal species, in widely separate areas. It occurs sporadically in the Gaspé Peninsula, Saguenay County, the Mingan Islands, Anticosti Island, Newfoundland, Labrador and northern Québec, but generally not in great numbers.

Peculiarities: Silky Willow grows in limestone derived soil, on exposed to sheltered, north-facing cliffs. In Forillon National Park, it behaves as a post-pioneer species and, therefore, it is usually absent from the most exposed sites where arctic-alpine species tend to grow.



Small-flowered Anemone

Anémone à petites fleurs

Anemone parviflora Michx.

Ranunculaceae

Height: 10 - 30 cm



General distribution: North American boreal-alpine. Quite common in open, humid sites in northern Québec. Its eastern southerly limit is in New Brunswick. In Gaspé Peninsula, it is scattered in a variety of open habitats.

Peculiarities: this anemone is a white-flowered plant which grows profusely in open, sheltered sites. It is often found with Alpine Bistort and other boreal or arctic species such as goldenrod, fescue, bluegrass, etc., growing in open areas.

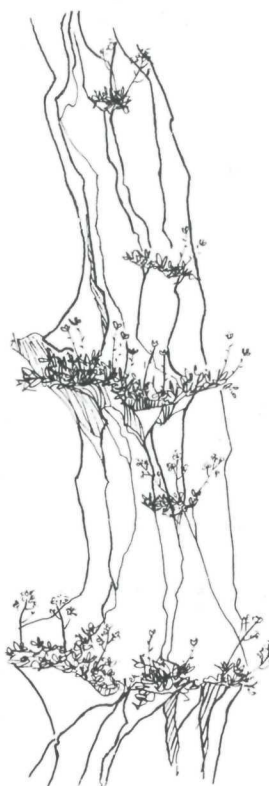
Tufted Saxifrage

Saxifrage cespiteux

Saxifraga cespitosa L.

Saxifragaceae

Height: 5 - 15 cm



General distribution: circumpolar arctic-alpine, widespread in arctic regions with its eastern North American southerly limit in the Bic area and Gaspé Peninsula.

Peculiarities: it grows in open habitats that are generally stable and moderately humid. These conditions often occur in sheltered escarpments where seepage and run-off water keep the soil from drying up in the summer. The great rareness of Tufted Saxifrage in Forillon National Park is puzzling as these conditions are common inside the park.



Purple Mountain-Saxifrage

Saxifrage à feuilles opposées

Saxifraga oppositifolia L.

Saxifragaceae

Height: 5 - 10 cm

General distribution: circumpolar arctic-alpine. Occurs as a late-glacial relic around the Gulf of St. Lawrence (Anticosti and Mingan Islands, Gaspé Peninsula, Newfoundland) and in northern Vermont.

Peculiarities: this calcicolous species is widespread in arctic and alpine regions throughout the northern hemisphere, occurring in a variety of humid habitats. In Forillon National Park, it grows on open slopes, preferring stable rock crevices and stabilized talus slopes. Purple Mountain-Saxifrage blooms very early in the spring.



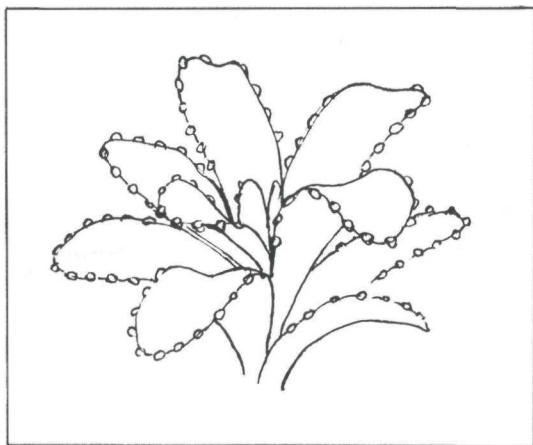
Livelong Saxifrage

Saxifrage Aizoon

Saxifraga Aizoon Jacq.

Saxifragaceae

Height: 10 - 25 cm



General distribution: arctic-alpine plant found in many different ecological regions. In southern Québec, it occurs in the Lower St. Lawrence region and around the Gaspé Peninsula.

Peculiarities: this saxifrage is noteworthy for the calcium carbonate excretions that dot the margin of the leaves. These whitish deposits look like small teeth and are quite indicative of the species.



Snowy Cinquefoil

Potentille des neiges

Potentilla nivea L.

Rosaceae

Height: 5 - 15 cm

General distribution: circumpolar arctic-alpine, with eastern North American southerly limit at Bic. In the Gaspé Peninsula, it is found in the Shick-shock Mountains area and at a few coastal sites.

Peculiarities: scattered on cliffs throughout the park. It is rarely abundant and fewer than ten plants are found together at most sites. Snowy Cinquefoil grows in stable rock crevices, generally in the most exposed sites at the top of cliffs. Slow-growing, crusty lichens that often occur with the cinquefoil are evidence that the rocky ground is very stable. Its yellow flowers, trifoliate leaves and whitish, tomentose appearance are quite characteristic of the Snowy Cinquefoil.



Yellow Dryad

Dryade de Drummond

Dryas Drummondii Richards

Rosaceae

Height: 15 - 25 cm



General distribution: North American Cordilleran, in a variety of locations north of Lake Superior and around the Gulf St. Lawrence.

Peculiarities: in the Gaspé Peninsula, Yellow Dryad generally occurs on gravel river flats where spring floods limit the development of dense, continuous plant cover. In Forillon, it is found in the narrow zone between the steep cliffs and the talus slope below. In such sites, repeated frost action shatters the bedrock producing shallow accumulations of frost-wedged debris where Yellow Dryad becomes established. This peculiar, unstable habitat is shared by other rare species such as Spear-leaved Arnica.



White Dryad

Dryade à feuilles entières

Dryas integrifolia Vahl

Rosaceae

Height: 15 - 25 cm



General distribution: North American arctic-alpine, abundant in the arctic tundra. It also occurs in more southern localities in eastern North America: Gaspé Peninsula, Mingan Islands, Anticosti Island, the lower North Shore, western Newfoundland and south-eastern New Brunswick.

Peculiarities: White Dryad only grows on steep calcareous cliffs. It establishes itself on narrow ledges, and eventually builds up large mats excluding almost all other vascular plants. It is restricted to escarpments which are too steep and too exposed for shrubs and trees to gain a foothold, and where the bedrock is hard enough to resist erosion.



Spear-leaved Arnica

Arnica à feuilles lancéolées

Arnica lonchophylla Greene ssp. *chionopappa*
(Fern.) Maguire

Compositae

Height: 30 - 40 cm

General distribution: the subspecies *chionopappa* is restricted to the Gulf of St. Lawrence area. It belongs to a North American species found in the Rocky Mountains.

Peculiarities: Spear-leaved Arnica generally establishes itself on relatively loose substrates of fine colluvia, or in wide and stable rock crevices. It grows both in quite exposed sites and on sheltered cliffs. Its ecological flexibility guarantees its long-term survival in Forillon National Park.



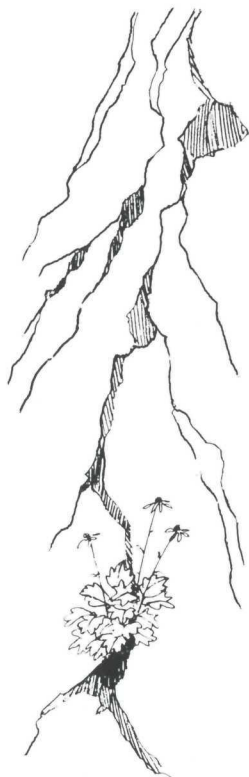
Dwarf Groundsel

Sénéçon nain

Senecio cymbalaria Pursh

Compositae

Height: 10 - 20 cm



General distribution: mainly northeastern Asiatic and separate locations around the Gulf of St. Lawrence (Newfoundland, Mount Logan and Forillon). Its distribution map appears on page 12.

Peculiarities: previously called *Senecio resedifolius* Less., this species grows in mesic, sheltered open sites. These requirements account for its present distribution within the park. Dwarf Groundsel is a calcicolous plant which certainly counts among the rarest plants in eastern North America.



Divided-leaf Fleabane

Vergerette à feuilles divisées

Erigeron compositus Pursh

Compositae

Height: 10 - 15 cm

General distribution: North American arctic-alpine, mainly Cordilleran. In eastern North America (excluding Greenland), it occurs only in Forillon, Percé, Bic, Mont-Saint-Pierre, Ungava Peninsula, western Newfoundland and a few localities in the Arctic Archipelago.

Peculiarities: this species grows in rock crevices. It is generally found on the lower reaches of vertical cliffs. It is easily recognized by its finely divided leaves and, as with other fleabanes, by the numerous fine rays of its flowering heads. In the Divided-leaf Fleabane, these rays are sometimes short or missing entirely.



GLOSSARY

ARCTIC-ALPINE: whose distribution is mainly centered in arctic and alpine regions, i.e. above the forest-line, both in latitude and in altitude.

CAESPITOSE: growing in tufts or dense clumps.

CALCAREOUS: containing limestone.

CALCICOLOUS: of plants growing solely or mainly on calcareous substrates.

CIRCUMPOLAR: whose distribution is generally more or less continuous in arctic regions throughout the northern hemisphere.

CIRQUE: natural amphitheatre with steep sides, excavated by glacial action on mountainsides.

COLLUVI(A)UM: material (boulders, pebbles, fines) accumulated by gravity at the foot of cliffs and slopes.

CORDILLERAN: whose distribution is mainly centered in mountain regions of western North America.

DISJUNCT: occurring in a locality or a region isolated from the main distributional area of the species.

ENDEMIC: restricted geographically to a given locality or small region.

FROST-WEDGED DEBRIS: angular debris derived from local bedrock, and resulting from the prying apart of fragments by repeated frost action.

LIMESTONE: various kinds of rocks rich in calcium carbonate that release ions which give soils an alkaline reaction.

MESIC: said of a site or soil where moderate moisture conditions always prevail.

MESOPHYTE: growing in mesic conditions.

PIONEER: plant growing in newly available sites or soils. Pioneer species give way to more competitive species as plant succession proceed.

TO LEARN MORE ABOUT THE RARE PLANTS OF FORILLON NATIONAL PARK

POST-PIONEER: plant which cannot grow in newly available, bare sites but which can become established after pioneer species have modified soils, shade and other site conditions.

TOMENTOSE: covered with a densely matted, soft wool.

Macjen, Zoran (1981). « Les forêts du parc national Forillon, Gaspésie, Québec. Étude phytosociologique ». Études écologiques, Numéro 4. Laboratoire d'Écologie forestière, université Laval, Québec.

Marie-Victorin, Frère (1964). Flore laurentienne, 2^e édition révisée par E. Rouleau. Presses de l'Université de Montréal.

Morisset, P. (1971). Endemism in the Vascular plants of the Gulf of St. Lawrence. Naturaliste Canadien 98: 167-177.

Porsild, A.E. (1957). Illustrated Flora of the Canadian Arctic Archipelago. National Museums of Canada, Bulletin 146: 1-209 (2nd edition revised, 1964).

Porsild, A.E. (1974). Rocky Mountain Wild Flowers. National Museums of Canada, Natural History Series, Number 2.

Raymond, M. (1950). Esquisse phytogéographique du Québec. Mémoires du Jardin Botanique de Montréal 5:1-147.

Scoggan, H.J. (1950). The Flora of Bic and the Gaspé Peninsula. National Museums of Canada, Bulletin No. 115: 1-399.

Scoggan, H.J. (1978). The Flora of Canada. National Museum of Natural Sciences, Publications in Botany No. 7 (Vol. 1 to 4).

[illegible]This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

© Minister of Supply and Services Canada 1983

Available in Canada through

Authorized Bookstore Agents
and other bookstores

or by mail from

Canadian Government Publishing Centre
Supply and Services Canada
Ottawa, Canada, K1A 0S9

Catalogue No. R 64-154-1983 E
ISBN 0-660-11397-X

Canada: \$ 4.00
Other countries: \$ 4.80

Price subject to change without notice

Published by authority of
The Minister of the Environment

**Cette brochure est aussi disponible
en français**

Concept	Ghislain Lefebvre
Illustrations	Ghislain Lefebvre
Text	Pierre Morisset and Jean Bédard
Layout	Prêt-à-photo inc.
Production	Parks Canada Information Services, Québec region.



4.00 \$

Canada