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The incomparable Incomappleux

B.C.'s stunning inland rainforest features 1000-year-old trees and an unusual diversity of lichens

By Anne Sherrod

In the summer of 2001, backcountry explorers emerged from the mountains south of Glacier National Park with reports of unusually large cedar trees. The area was in the upper Incomappleux River Valley, not far east of Revelstoke. Several local environmental groups visited the site, where they found a stunning primeval forest.

The Interior Cedar-Hemlock (ICH) forest in this area is noted for pockets of huge, old cedar trees. However, forest technician Craig Pettitt, representing the Valhalla Wilderness Society, had never seen cedars this big. Many were two metres in diameter; a few were three metres, several were even four metres.

Nor had he seen anything like the structure of this forest. Young, mature, old and ancient trees were intermixed. The forest was unusually open, with a ground cover of ferns, mosses, devil's club and, in the wettest areas, skunk cabbage. Nor was this just a pocket of big trees. One could walk all day and not come to the end of it.

The trees had engineering tape tied to their branches indicating the route of a future logging road. The area was slated to be cut in 2003. Environmentalists quickly contacted the logging company and government ministries, asking for immediate deferral of logging in the area. They were partly successful; some logging was deferred, but other cutblocks had already been approved. The company is currently undertaking further studies prior to seeking another cutting permit.



photo Craig Pettitt

The environmental groups first consulted Trevor Goward, curator of lichens at the UBC herbarium. He advised that the large size of the trees indicated an 'antique forest' that had been growing undisturbed for longer than the age of its oldest trees. Forest must be at least 350 years old to qualify for Goward's definition of antique. Various aging techniques used in the Incomappleux have since suggested that many of the trees are over 1,000 years old, and the largest could be much older.

The area is part of the Interior Wetbelt, a region that occupies the southeastern quadrant of B.C. and consists of several parallel mountain ranges, including the Monashees, Selkirks, Cariboo and Rocky Mountains. Scientists have long recognized

A rare fungal find

Previously known only from the coast, *Phaeocollybia piceae* was discovered in the Incomappleux in 2003. The mushroom, noted for its reddish-brown cap, viscous coating and long underground stem, is extremely rare in B.C., but also known from the ancient rainforests of Carmanah, on Vancouver Island, and Olympic National Park, WA.





photo Bonnie Boldt

Valhalla Wilderness Society director Craig Pettitt counting tree rings. Western redcedars about one metre in diameter had approximately 430 growth rings. Larger trees had hollow cores, preventing precise ring counts.

Wonders in the valley of rain

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the wettest low-elevation ICH forests as inland temperate rainforest, which shares many species with its coastal counterpart.

Coastal temperate rainforest occurs at eight locations around the world, but inland temperate rainforest occurs nowhere but in the wettest valleys of east central B.C. Even then, a number of factors related to climate and geography must come together.

One hallmark of rainforest on the coast is the abundance of lichens growing on the branches and trunks of trees, as well as an unusual diversity of lichen species. Lichens are extremely sensitive to moisture, temperature and light conditions. Many rare lichen species will tolerate only a narrow range of conditions, and are dependent upon high humidity and old-growth forest.

Since the 1990s, research by Goward, André Arsenault, a Minis-



The Incomappleux River Valley runs south of Glacier National Park. Some think it should be added to the park.

try of Forests silviculture systems researcher, and botanist Toby Spribille from the University of Göttingen has been drawing attention to lichen diversity as a defining characteristic of rainforest conditions.

The first known botanical exploration of the Incomappleux River Valley was carried out by Spribille in 2002. He found 59 species of tree-dwelling macrolichens, 18 of which were oceanic species (found predominantly on the coast). Several of the species are rare or uncommon in interior B.C. In addition, a large number of pin lichens and crusts were documented, including many species rare or previously unknown from the interior (Spribille 2002).

The lichen diversity found by Spribille was confirmed when the Ministry of Forests sent Arsenault to assess the area. Arsenault (2004) wrote in his report that the upper Incomappleux was "clearly one of the hotspots for epiphytic (tree-dwelling) cyanolichens in Canada." Cyanolichens are lichens that use cyanobacteria as their photosynthesizing partner.

Spribille's discoveries have attracted steadily increasing attention from the scientific community. In 2003, the Val-



photo Craig Pettitt

Loesel's liparis

The red-listed *Liparis loeselii* was found in the floating mats of a large wetland complex of the Incomappleux River. The discovery was only the third record in Canada west of Saskatchewan and only the fifth site in the mountains of western North America.

halla Wilderness Society accompanied Spribille, botanists Curtis Bjork and Viktoria Wagner, mycologist Oluna Ceska and Adolf Ceska, retired ecologist for the B.C. Conservation Data Centre, on a visit to the Incomappleux. Oluna Ceska found several specimens of the rare old-growth rainforest mushroom, *Phaeocollybia piceae* (see page 1), previously known only on the Pacific coast.

Non-forested habitats in the Incomappleux include an extensive wetland in the clearcut section of the valley. With only a cursory examination, the botanists discovered a red-listed orchid, Loesel's twayblade (*Liparis loeselii*), and a rare carnivorous plant, the red-listed ochroleucous bladderwort (*Utricularia ochroleuca*). The latter catches small underwater insects in bladder-like traps carried on modified leaves. Liard Hot Springs is the only other site where the bladderwort has been found in B.C. (Spribille 2004).

The swiftness with which these rare species were found suggests a thorough botanical survey would



photo Craig Pettitt

Colleen McCrory takes in a massive Incomappleux western redcedar. This giant measures 2.25 m in diameter and is about 1,000 years old.

yield much more; but this has yet to be organized, and logging further upstream could have serious effects on the wetland.

Field surveys have already identified over 350 species of plants, lichens and mushrooms – an assemblage of northern and southern rainforest species that has no immediate parallel. The great age of the forest has allowed thousands of years for colonization by rainforestdependent species, and for the development of a vast network of linkages and interactions between the hundreds of plants, fungi and thousands of poorly known invertebrate species.

The lower part of the Incomappleux *Continued on page 6*

Inland lichens boast coastal connections

The Devil's matchstick (*Pilophorus clavatus*) (not pictured, but the common name should conjure an image) is an oceanic club lichen locally common on exposed granite boulders in the upper Incomappleux Valley — one of only three inland locations for this lichen. On the coast, this species is often found with *P. acicularis*, a similar-looking lichen, but with ball-shaped as opposed to elliptic black apothecia.

Lobaria species in the Incomappleux include the lung lichen (*L. pulmonaria*) and its unfortunately-named relative, the smoker's lung lichen (*L. retigera*) (top photo at left). *L. pulmonaria* is common in coastal and inland rainforest, and an abundance of this species is a good indicator of rainforest conditions. *L. retigera* was discovered in the old-growth of the Incomappleux Valley in 2004, the southern limit of its known range.

Coral lichen (*Sphaerophorus* sp.) (bottom left) is a common denizen of coastal and inland rainforest. Both *S. tuckermannii* and *S. globosus* have been found in the Incomappleux.

Cryptic Paw Lichen (*Nephroma occultum*) (bottom right) is a rare oceanic



lichen dependent upon old-growth forest and listed as a COSEWIC species of concern. In North America, *N. occultum* was recorded exclusively along the west coast until recently, when discovered in the Upper Adams River in the inland temperate rainforest. The discovery of this lichen in the photos Craig Pettitt Incomappleux Valley has pushed its known range in the Interior considerably south. Cryptic paw is a yellowish-green foliose lichen that lacks the sexual fruiting bodies common to most lichens. Lichen taxonomy follows that used by Spribille (2004, 2002).

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River was heavily logged in the 1980s, leaving massive clearcuts with huge stumps. The upper part was spared because it was so remote. This area extends about 20 kilometres to the boundary of Glacier National Park, but contains only 1,000 hectares of operable forest. Many of the oceanic lichen species found by Spribille were in this unlogged portion.

Forest fragmentation poses a direct and immediate threat to many species whose distribution is limited to short distances. Clearcuts represent an immense migration barrier to these species, and the coincident forest fragmentation also allows drying winds into the heart of adjacent forest canopies that have been sheltered and humid for more than a thousand years. Species such as as the red-listed *Nephroma occultum*, a lichen whose existence depends on stable humidity and constant, undisturbed conditions, fare poorly in fragmented forest.

Spribille points out that these ecosystems have been shaped by a climate that is similar to, though in some ways distinctly different from that on the coast. It includes a wider range of temperatures, with cold winters and heavy snows. This means unique assemblages of species. The inland temperate rainforest brings together coastal, southern interior and boreal species. Examples of boreal species in this lowelevation rainforest ecosystem include the familiar clubmosses (*Lycopodium* spp.), one-sided wintergreen (*Orthilia secunda*) and twinflower (*Linnaea borealis*).

Recently, the Valhalla Wilderness Society commissioned a GIS mapping project of the B.C. Interior Wetbelt, a 14.3 million hectare area. Results indicated that after 40 years of logging, only 3.2 percent of the total forest land is low elevation intact old-growth. This is based upon the Ministry of Forests' definition of old-growth as 140 years old or older.

The results of this analysis corroborate the view stated by Goward and Arsenault (1999, p. 759):

"Maximum cyanolichen diversity is shown to occur in lowland old-growth rain forests. Such stands are generally restricted to the base of hill slopes in the wettest subzones of the Interior Cedar-Hemlock zone, where they not only support one of British Columbia's richest assemblages of rare cyanolichens, but also themselves represent one of the province's rarest and most endangered forest ecosystems. Further work is urgently needed."

There is nothing comparable to the Incomappleux River Valley forest in age, rare species or extent in the adjoining Glacier National Park. Environmental groups working in the area believe the valley should be added to the park.

Anne Sherrod is chairperson of the Valhalla Wilderness Society.

Where to learn more

For more information on the Incomappleux River Valley, and for copies of Spribille's reports, visit the Valhalla Wilderness Society at www. vws.org. Other organizations working to protect the Incomappleux include the Wilderness Society, the Purcell Alliance for Wilderness, the Western Canada Wilderness Committee and the West Kootenay Ecosociety.



photo Juscha Grunther

Botanist Toby Spribille, University of Göttingen, has played a key role in documenting the diversity of lichens in the Incomappleux River Valley.

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