

LICHENS OF EAST LIMESTONE ISLAND: THE FIRST CHECKLIST

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ABSTRACT

The Limestone Islands, Haida Gwaii (Queen Charlotte Islands), support a rich plant community owing to their unique geology and geographic location. Lichens are an integral and ecologically important component of old-growth forests, and some of the species are uncommon. In this paper, we describe the lichen flora of East Limestone Island and provide a preliminary checklist. We identified 45 species, mostly foliose and fruticose lichens; we did not attempt to document all encrusting species. Nearly 80% of the species were found in forest. Nine species were categorised as rare on the island, with some classified elsewhere as “ancient forest” species. This study is the first step towards an inventory of lichens on Limestone Island and we encourage others to add to the checklist.

INTRODUCTION AND METHODS

The Queen Charlotte Islands archipelago is home to many species of rare plants, including several endemics (Calder and Taylor 1968). The presence of limestone on East Limestone Island, as elsewhere on Haida Gwaii, suggests the likely occurrence of rare plants, (Roemer and Ogilvie 1983). In 1997, East Limestone Island was surveyed for vascular plants, especially less abundant taxa (Smith and Buttler 1998) and several species of lichens were collected and identified. However, no attempt was made to document all lichen species on the Island.

East Limestone Island is part of the North American temperate rain forest where there is abundant air moisture for lichen growth. In addition, the Pacific Ocean provides plants with airborne nutrients from salt spray. Limestone Island’s distinctive geology and geographic position, with minimal human disturbance and virtually no sources of pollution, suggests a high lichen diversity. Some lichen species only occur, or are abundant on, basic substrates such as limestone (Brodo *et al.* 2001) and like most vascular plants, many lichens are sensitive to pH.

Some species of lichens will grow on a variety of substrates, but most are found on specific surfaces or habitats. As such, lichens can be categorized based on the substrate where they grow (i.e., corticolous [on bark], lignicolous [on wood], saxicolous [on rock] and terricolous [on soil]).

The purpose of this study was to develop a checklist of lichens on East Limestone Island (52° 55' N 131° 36' W) and assess each species for relative abundance. Extensive documentation, collection and identification of lichens on the Island was done by R. Cameron in the spring of 2001 and 2002. A rarity assessment for each species was based on

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methods outlined by Smith and Buttler (1998). Species were characterised by growth form, substrate, geographic affinity and habitat (from Brodo *et al.* 2001, Goward *et al.* 1994, Goward 1999). All fruticose [shrub or club-shaped] and foliose [leaf-shaped] species found were identified. Some crustose species were identified, but no attempt was made to document all crustose species. Nomenclature for the species list follows Goward *et al.* (1994) and Goward (1999).

RESULTS AND DISCUSSION

We identified 45 species of lichen on East Limestone Island in 2001 and 2002 (Table 1). Of these, 19 were fruticose and 18 were foliose growth forms. Most lichens occurred in forest (80% or 36 species), with 14 species occurring most often, or exclusively, in coniferous forests. Twenty-three species occurred in either deciduous or coniferous forests and no lichens were considered to be exclusively deciduous forest species.

Substrate

In terms of substrate category, the greatest number of species occurred on bark (69% or 30 species). Almost half of these species are known to occur on coniferous trees, the dominant tree type on Limestone Island. The remaining corticolous species (16) are usually found on either deciduous or coniferous trees, and in this study grew mostly on coniferous trees. Only one species that was found, *Ramalina menziesii*, occurs most often on deciduous trees (Goward 1999), however this species occurs frequently on conifers on Haida Gwaii (J. Pojar, pers.comm.).

We found four species that were classified as strictly lignicolous [on wood]. *Xylographa abietina* was found growing on well dried, hardened wood, while *Imadophila ericetorum* and *Cladonia umbricola* were on very moist, well-rotted wood (*see* Brodo *et al.* 2001). *Calicium abietinum* grew on a dry, standing dead western redcedar (*Thuja plicata*) on East Limestone Island, but this species can be found on a variety of substrates (Goward 1999). The other lignicolous species occurred on dead wood but were not restricted to this substrate.

Three saxicolous taxa [on rock] were identified on Limestone Island: *Parmelia saxatilis*, *Pilophorus acicularis* and *Leparia* spp. *P. saxatilis* was found growing on rocks but can occasionally be found on bark or wood (Brodo *et al.* 2001). *Leparia* spp. will grow on a variety of substrates, depending on the species: on East Limestone Island, they were found on rock, wood and bark. *Pilophorus acicularis* was found almost entirely on rocks in open areas, which is typical for this species (Goward 1999).

Nine terricolous [on soil] taxa were identified: four species of *Peltigera* and five species of *Cladonia*. *Peltigeras* grew in forested habitats and elsewhere occurs mostly in humid forests on damp moss, soil or tree bases (Hale 1979). Most *Cladonia* species, with the exception of *C. umbricola*, are found in a variety of soil types from dry soil to damp moss (Hale 1979).

Biogeography

East Limestone Island supports coastal temperate rain forest and phytogeographic affinities of lichens found there largely reflect these conditions. About one third of the species identified in this study have a western, coastal distribution while another third are distributed more or less across North America. Ten species (22%) have general coastal affinities, found either on the west or east coast of North America. Only two species, *Cladonia bellidiflora* and *Usnea subfloridana*, have a boreal distribution (Brodo *et al.* 2001).

Rarity

Judging the abundance of lichens can be problematic. For some species, identification is fairly obvious and relative abundance can be determined with as much accuracy as vascular plants. However, other species cannot be distinguished except by careful examination or chemical tests. Therefore determining more than one occurrence for some species is either an educated guess or extremely time consuming. This needs to be considered when examining our rarity assignments.

Seven species were rated as rare for East Limestone Island (Table 1). *Peltigera degenii* was rare on East Limestone Island and is also considered a rare forest species by Brodo *et al.* (2001). None of the species that we found to be

rare on East Limestone Island are classified as rare in the province (Goward 1996) or Canada (Goward et al.1998). In the inland rainforests of British Columbia, several of the species we found are considered “ancient forest” species and are relatively uncommon in B.C. (Goward 1994, Selva 1994, Rose 1976). Included in this group are *Calicium abietinum*, *Hypogymnia tubulosa*, *Lobaria oregana*, *Lobaria pulmonaria*, *Ramalina thrausta*, *Sphaerophorus globosus* and *Usnea longissima*. However, Goward (1999) and Goward et al. (1994) suggest that *Lobaria oregana*, *Ramalina thrausta*, *Sphaerophorus globosus* and *Usnea longissima* are common on Canada’s west coast.

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REFERENCES

- Brodo, I. M., S. D. Sharnoff and S. Sharnoff. 2001. Lichens of North America. Yale University Press, London.
- Calder, J.A. and R. L. Taylor. 1968. Flora of the Queen Charlotte Islands. Research Branch, Canadian Department of Agriculture, Ottawa. Volume 1.
- Goward, T., I. M. Brodo and S. R. Clayden. 1998. Rare lichens of Canada a review and provisional listing. Committee on the Status of Endangered Wildlife in Canada.
- Goward, T., B. McCune and D. Meidinger. 1994. The lichens of British Columbia, illustrated keys part 1 foliose and squamulose species. Research Program British Columbia Ministry of Forests, Victoria.
- Goward, T. 1999. The lichens of British Columbia, illustrated keys part 2 fruticose species. Research Program British Columbia Ministry of Forests, Victoria.
- Goward, T. 1996. Lichens of British Columbia: rare species and priorities for inventory. Research Branch British Columbia Ministry of Forests and Habitat Protection British Columbia Ministry of Environment, Lands and Parks, Victoria.
- Goward, T. 1994. Notes on old growth-dependent epiphytic macrolichens in inland British Columbia, Canada. *Acta Botanica Fennica* 150:31-38.
- Hale, M.E. 1979. How to know the lichens. Second Edition. The Pictured Key Nature Series Wm. Brown.
- Roemer, H.L. and R.T. Ogilvie. 1983. Additions to the flora of the Queen Charlotte Islands on limestone. *Canadian Journal of Botany* 61: 2577-2580.
- Rose, F. 1976. Lichenological indicators of age and environmental continuity in woodlands. In D.H. Brown, D.L. Hawksworth and R.H. Bailey (Eds.). Systematics Association Special Volume No 8, *Lichenology: Progress and Problems*. Academic Press, London and New York.
- Selva, 1994. Lichen diversity and stand continuity in the northern hardwoods and spruce-fir forests of northern New England and western New Brunswick. *The Bryologist* 93:380-381.
- Smith, J. and I. Buttler. 1998. Plants recorded on East Limestone Island, with a particular emphasis on the occurrence of rare and uncommon species. In: Gaston, A.J. (ed.) *Laskeek Bay Research 8*. Laskeek Bay Conservation Society, Queen Charlotte City, B.C. p. 31-41.

Table 1.
Preliminary checklist of lichens of East Limestone Island with
abundance rating, growth form, substrate, phytogeographic affinities and habitat.

SPECIES	ABUNDANCE	GROWTH FORM	SUBSTRATE	PHYTO-GEOGRAPHY	HABITAT
<i>Alectoria sarmentosa</i> <i>ssp. sarmentosa</i>	4. common	Fruticose	on bark	coastal	conifer forest
<i>Bryoria capillaris</i>	1. rare	Fruticose	on bark	North American	conifer forest
<i>Buellia punctata</i>	4. common	Crustose	on bark	North America	forest
<i>Calicium abietinum</i>	1. rare	Fruticose/crustose	on wood	North America	forest
<i>Chrysothrix candelaris</i>	3. occasional	Crustose	on bark	North America	conifer forest
<i>Cladonia bellidiflora</i>	3. occasional	Fruticose	on soil	boreal	open/forest
<i>Cladonia furcata</i>	3. occasional	Fruticose	on soil	coastal	open/forest
<i>Cladonia macilenta</i>	3. occasional	Fruticose	on soil	North America	open/forest
<i>Cladonia squamosa</i>	1. rare	Fruticose	on soil	North America	forest
<i>Cladonia umbricola</i>	3. occasional	Fruticose	on wood	west coastal	forest
<i>Hypogymnia apinnata</i>	1. rare	Foliose	on bark	west coastal	conifer forest
<i>Hypogymnia enteromorpha</i>	4. common	Foliose	on bark	west coastal	conifer forest
<i>Hypogymnia tubulosa</i>	1. rare	Foliose	on bark	coastal	conifer forest
<i>Icmadophila ericetorum</i>	3. occasional	Crustose	on wood	North America	forest
<i>Lepraria</i> spp.	4. common	Crustose	on bark/ on rock	North America	forest
<i>Lobaria oregana</i>	4. common	Foliose	on bark	west coastal	conifer forest
<i>Lobaria pulmonaria</i>	4. common	Foliose	on bark	coastal	forest
<i>Mycoblastus sanguinarius</i>	2. uncommon	Crustose	on bark	North America	conifer forest
<i>Parmelia hygrophila</i>	2. uncommon	Foliose	on bark	west coastal	forest
<i>Parmelia saxatilis</i>	4. common	Foliose	saxicolous	North America	open/forest
<i>Parmelia squarrosa</i>	3. occasional	Foliose	on bark	coastal	forest
<i>Parmelia sulcata</i>	4. common	Foliose	on bark	North America	forest
<i>Peltigera britannica</i>	1. rare	Foliose	on soil	west coastal	forest
<i>Peltigera degenii</i>	1. rare	Foliose	on soil	North America	forest
<i>Peltigera membranacea</i>	3. occasional	Foliose	on soil	coastal	open/forest
<i>Peltigera neopolydactyla</i>	5. abundant	Foliose	on soil	North America	conifer forest
<i>Pilophorus acicularis</i>	1. rare	Fruticose	on rock	west coastal	open
<i>Platismatia glauca</i>	4. common	Foliose	on bark	North America	conifer forest
<i>Platismatia herrei</i>	3. occasional	Foliose	on bark	west coastal	conifer forest
<i>Platismatia lacunosa</i>	2. uncommon	Foliose	on bark	west coastal	forest
<i>Platismatia norvegica</i>	5. abundant	Foliose	on bark	coastal	forest

<i>Pseudocyphellaria anomala</i>	2. uncommon	Foliose	on bark	west coastal	forest
<i>Pseudocyphellaria anthraspis</i>	2. uncommon	Foliose	on bark	west coastal	forest
<i>Ramalina dilacerata</i>	4. common	Fruticose	on bark	North America	forest
<i>Ramalina farinacea</i>	4. common	Fruticose	on bark	coastal	forest
<i>Ramalina menziesii</i>	1. rare	Fruticose	on bark	west coastal	forest
<i>Ramalina roesleri</i>	2. uncommon	Fruticose	on bark	coastal	forest
<i>Ramalina thrausta</i>	5. abundant	Fruticose	on bark	North America	conifer forest
<i>Sphaerophorus globosus</i>	2. uncommon	Fruticose	on bark	North America	conifer forest
<i>Usnea chaetophora</i>	4. common	Fruticose	on bark	west coastal	conifer forest
<i>Usnea longissima</i>	3. occasional	Fruticose	on bark	coastal	forest
<i>Usnea madeirensis</i>	3. occasional	Fruticose	on bark	west coastal	forest
<i>Usnea subfloridana</i>	3. occasional	Fruticose	on bark	boreal	forest
<i>Usnea wirthii</i>	3. occasional	Fruticose	on bark	west coastal	forest
<i>Xylographa abietina</i>	2. uncommon	Crustose	on wood	North America	open/forest