

## *Bartramia stricta*

**English name** rigid apple moss

**Scientific name** *Bartramia stricta*

**Family** Bartramiaceae

**Other scientific names** none

**Risk status**

BC: imperilled (S1); red-listed

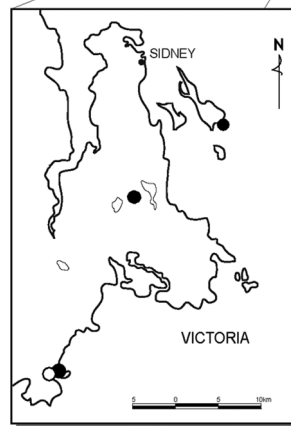
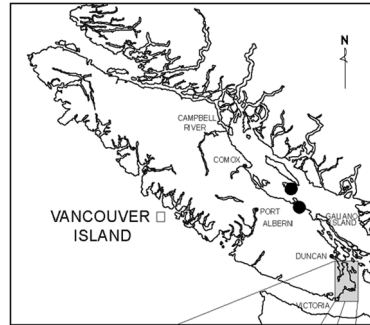
Canada: imperilled (N1); COSEWIC: endangered (2000)

Global: unrankable (GU)

Elsewhere: California, Texas – reported (SNR); New Mexico – not ranked

**Range/known distribution**

In North America, rigid apple moss is known from widely disjunct locations in southwestern British Columbia, southern Washington, northern California, New Mexico, and Texas. Globally, the species is also known from Europe, Asia, Africa and Australia. Although there are reports from Montana, Idaho, Colorado and Quebec, they are based on misidentification. In Canada, rigid apple moss has been found in 5 locations on southeastern Vancouver Island and adjacent islands: Nanoose, Metchosin, Lasqueti Island, Sidney Island and Saanich. The federal Department of National Defence (DND) owns 2 of the sites and the National Research Council owns a third. One location in Metchosin is likely extirpated.



**Distribution of *Bartramia stricta***

● recently confirmed sites

○ unconfirmed or extirpated site

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### Field description

Rigid apple moss is a **small moss (1-3 cm high)** that forms **small tufts or patches**. The leaves are straight and erect and have **non-clasping leaf bases**. The leaves spread and are yellow-green when the plants are wet, but are brownish-green and pressed close to the stem when dry. Male and female reproductive structures are on the same plant. The **capsules (spore sacs) are round or apple-shaped when young and have vertical furrows when old and dry**. The mouth of the capsule is surrounded by a single peristome (row of small lance-shaped tooth-like appendages).

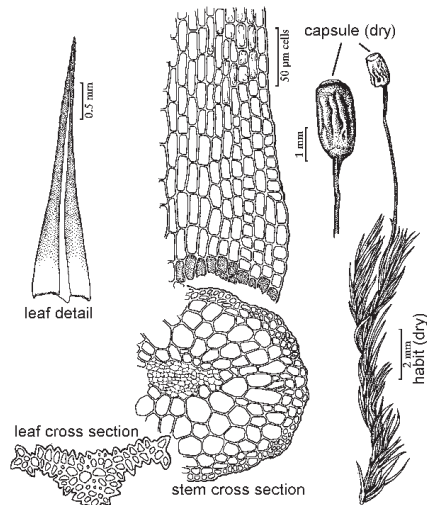
### IDENTIFICATION TIPS

Distinctive features of rigid apple moss include its small size, its non-clasping, straight leaves and the relatively uniform outline of leaf cells from the base to the tip. There are 3 other species of apple moss in British Columbia (*B. halleriana*, *B. ithyphylla* and *B. pomiformis*) but the other species are either larger, have clasping leaf bases, or lack the erect habit of rigid apple moss. *Anacolia menziesii* is found in the same habitats as the rigid apple moss and has been confused with it. However, *A. menziesii* lacks the distinct vertical furrows on the dried capsules, has stems that are matted with small hair-like structures (rhizoids), and has smaller and more angled basal leaf cells than rigid apple moss.



Terry McIntosh

*Bartramia stricta*



*B. stricta*

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### **Life history**

In Canada, rigid apple moss produces spores from January into early summer although in years with a dry fall and winter, sporophyte production may not occur. Plants are dormant during summer droughts. There is no information on dispersal distance, viability, germination, or longevity of spores. Rigid apple moss also reproduces vegetatively over short distances when small fragments or loose stems colonize suitable habitat.

### **Habitat**

Rigid apple moss requires open, steep, south to southeast facing slopes that are dry in summer and saturated in the winter. There is often winter/spring seepage or surface runoff. Soils are shallow (8-20 cm) over bedrock and some exposed mineral soil is usually present. Elevation ranges from 20-190 m. Sites include grass-dominated slopes with rock outcrops within open stands of Garry oak (*Quercus garryana*) and Arbutus (*Arbutus menziesii*). Other species present on adjacent habitat include Scotch broom\* (*Cytisus scoparius*), Himalayan blackberry\* (*Rubus armeniacus*), Wallace's selaginella (*Selaginella wallacei*), sweet vernalgrass\* (*Anthoxanthum odoratum*), hedgehog dogtail\* (*Cynosurus echinatus*), orchard grass\* (*Dactylis glomerata*), annual brome\* (*Bromus* sp.), and scattered patches of mosses (e.g., *Niphotrichum elongatum*, *Bryum* spp. *Grimmia trichophylla*, *Didymodon vinealis*, *Dicranoweisia cirrata*).

Rigid apple moss inhabits two distinct microsites: on rock outcrops and on soil. Where it occurs on rock, rigid apple moss grows on faces or ledges, or in crevices of rock outcrops. Most patches are located under overhanging rock or on vertical faces, which protect the plants during severe rains and erosional events. Where it occurs on soil, the sites are open and exposed with shallow soils that are mineral to humus-rich, and often stony.

### **Why the species is at risk**

Habitat loss due to urban development has destroyed some of the highly specialized habitat required by rigid apple moss. Trampling may dislodge the small, scattered patches that grow on soil. Rigid apple moss is highly vulnerable to competition from vascular plants and, possibly, from other moss species and lichens. Rigid apple moss requires open habitat and may be outcompeted if other species establish in or next to suitable microsites. Fire suppression combined with the introduction of invasive species has increased the encroachment of vascular plants onto rock outcrops, increasing litter and shade and facilitating invasion by other moss species.





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### **What you can do to help this species**

Management practices should be tailored to the specific circumstances at the site. Potential management tools will depend on the specific circumstances and may require experimentation prior to implementation.

**Before taking any action, expert advice must be obtained and no action taken without it. Please refer to the introductory section of this manual.**

Public and private landowners should be made aware of new populations of this species if they are discovered, and appropriate management practices suggested. Management needs include removal of invasive species and limiting access to sensitive habitat. Existing populations should be monitored on an ongoing basis to determine their viability, as well as for any negative impacts stemming from land development, trampling, fire suppression and weed encroachment.

### **References**

Belland, R.J. 1997. COSEWIC Status Report on the Apple Moss *Bartramia stricta* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa, ON.

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Griffin, D. 2003. Bartramiaceae. Provisional Publication for the Bryophyte Flora of North America Project, Missouri Botanical Garden.

McIntosh, T. 2009. Personal Communication. Bryologist, Vancouver, BC.

For further information, contact the Garry Oak Ecosystems Recovery Team, or see the web site at: [www.goert.ca](http://www.goert.ca)

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\*Refers to non-native species.

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