

## Heritage Rank Status Factors

**Elcode** NBMUS6P010  
**Gname** SCHISTOSTEGA PENNATA  
**Gcomname** MOSS

### Number of Occurrences

E = >300

**Comments** Estimated more than 300 occurrences worldwide. New York Botanical Garden database has the most complete listing, with 103 records representing about 44 sites, mostly from Canada and the northeastern USA. The University of Alberta database contains 29 records, representing about 26 sites from Canada and Alaska. The ISMS database contains 98 records, representing about 59 sites. Review of these databases and the literature indicates a total of about 165 sites in North America.

### Number of Occurrences with Good Viability

D = Some (13-40) occurrences with good viability

**Comments** Estimated 40 occurrences worldwide with good viability.

### Population Size

E = 2,500-10,000 individuals

**Comments** Estimated 2500-10,000 individuals worldwide.

### Range Extent

H = > 2,500,000 km<sup>2</sup> (greater than 1,000,000 square miles)

**Comments** Estimated range greater than 1,000,000 square miles worldwide. Circumboreal, but with highly irregular distribution. North America (northern US, Canada), United Kingdom, Scandinavia, Europe, Russia, Japan.

### Area of Occupancy

A = <0.4 km<sup>2</sup> (less than about 100 acres)

LA = <4 km (less than about 2.5 miles)

**Comments** Estimated area of occupancy is 50 acres worldwide. Although widespread globally with 81-300 occurrences, this species has a spotty distribution and in most places occurs only in patches covering less than 1 square meter.

### Long-term Trend in Population Size, Extent of Occurrence, Area of Occupancy, and/or Number or Condition of Occurrences

E = Relatively Stable ( $\pm 25\%$  change)

**Comments** Long-term trend relatively stable. In many places populations of this species have persisted for decades, particularly in cave and crevice openings with stable illumination and humidity. Populations disappear naturally from unstable habitats such as animal burrows or under root balls of fallen trees, but these habitats are reproduced over time and the species may recolonize them. Populations probably decline in face of urban development because of loss of habitat and

substrate.

### **Short-term Trend in Population Size, Extent of Occurrence, Area of Occupancy, and/or Number or Condition of Occurrences**

E = Stable. Population, range, area occupied, and/or number or condition of occurrences unchanged or remaining within  $\pm 10\%$  fluctuation

**Comments** Short-term trend relatively stable for reasons cited above.

### **Threats**

F = Widespread, low-severity threat. Threat is of low severity but affects (or would affect) most or a significant portion of the population, occurrences, or area. Ecological community occurrences are not threatened severely, with changes reversible and recovery moderately rapid.

**Scope** High **Severity** Low **Immediacy** High

**Comments** Widespread, low-severity threat. Logging, road and trail construction, or other activities that increase incident light and decrease humidity may cause the species to disappear. Expanding urban development tends to have more calcareous or nutrient-rich substrates that are unsuitable for this species, although some populations are known to have occurred in old cellar holes and under decaying structures.

### **Number of Appropriately Protected and Managed Occurrences**

E = Very many (>40) occurrences appropriately protected and managed

**Comments** Estimated 50 sites protected worldwide and managed accordingly.

### **Intrinsic Vulnerability**

B = Moderately Vulnerable. Species exhibits moderate age of maturity, frequency of reproduction, and/or fecundity such that populations generally tend to recover from decreases in abundance over a period of several years (on the order of 5-20 years or 2-5 generations); or species has moderate dispersal capability such that extirpated populations generally become reestablished through natural recolonization (unaided by humans). Ecological community occurrences may be susceptible to changes in composition and structure but tend to recover through natural processes given reasonable time (10-100 years).

**Comments** Moderately vulnerable. Plants are small and fragile, but reproduce readily by spores and fragmentation of gametophytes. Populations are few and far between, yet dispersal happens and new sites are colonized naturally.

### **Environmental Specificity**

A = Very Narrow. Specialist or community with key requirements scarce.

**Comments** Very narrow environmental specificity. This species occurs on damp acidic rock, soil and decaying wood, in dark places such as openings of caves or mine shafts, in rock crevices or overhangs (particularly sandstone), in animal burrows, on shaded banks, in crevices of root balls of fallen trees, or around tree roots in dark, dense forests. Also reported from old cellars and under rotting sills in old barns. *Schistostega* can survive where other bryophytes cannot because of its ability to capture and concentrate low levels of light, just enough to photosynthesize. If the light gets too bright, other bryophytes invade, and *Schistostega* disappears. In many cases, the species is obviously a pioneer on disturbed soil, but despite an abundance of suitable habitat it remains rare because of its highly irregular distribution.

### **Other Considerations**

NRANK - N3N4. Despite its large range and an abundance of suitable habitat, *Schistostega* remains rare because of its highly irregular distribution. It is ranked S1 in Alberta, Idaho, New Brunswick, Wisconsin, and Montana, and S2 in Oregon. Populations are usually small, although Ignatov and Ignatova (2001) reported

locally large and expanding populations in Russia. This taxon is usually always considered rare and much sought after by collectors.

**Edition** 2/20/2003 **Edauthor** John A. Christy and Judith Harpel

**Grank** G3G4 **Grank Date** 1/13/2003

### Greasons

Estimated more than 300 occurrences worldwide. Estimated 40 occurrences worldwide with good viability. Estimated 2500-10,000 individuals worldwide. Estimated range extent greater than 1,000,000 square miles, but with highly irregular distribution. Estimated area of occupancy 50 acres worldwide. Long-term and short-term trends relatively stable. Widespread, low-severity threat. Estimated 50 sites protected worldwide. Moderately vulnerable. Very narrow environmental specificity.

### BCD Sources

### New Sources

Christy, J.A. & D.H. Wagner. 1996. Guide for the identification of rare, threatened or sensitive bryophytes in the range of the northern spotted owl, western Washington, western Oregon, and northwestern California. USDI Bureau of Land Management. 200 pp.

Crum, H. 1983. Mosses of the Great Lakes Forest. 3rd ed. Univ. Michigan Herbarium, Ann Arbor. 417 pp.

Crum, H. & L.E. Anderson. 1981. Mosses of Eastern North America. 2 vols. Columbia University Press, New York. 1328 pp.

USDA Forest Service, USDI Bureau of Land Management, USDI Fish and Wildlife Service. 2002. Interagency Species Management System [ISMS] database. Portland, Oregon.

University of Alberta. 2002. Devonian Botanic Garden bryophyte database. Edmonton, Alberta.

<<http://www.devonian.ualberta.ca/devonian/bryosearch.cfm>>.

New York Botanical Garden. 2002. Catalog of American bryophytes database. New York, NY.

<<http://www.nybg.org/bsci/hcol/bryo>>

Ignatov, M.S. & E.A. Ignatova. 2001. On the zoochory of *Schistostega pennata* (Schistostegaceae, Musci). *Arctoa* 10: 83-96.