

Contribution to the Knowledge of the Lichen Flora of Hagemeister Island, Bering Sea, Alaska

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Hagemeister Island, part of Alaska Maritime National Wildlife Refuge managed by the U.S. Fish and Wildlife Service, is a remote island located in the northern portion of Bristol Bay in the Bering Sea. Reindeer were introduced to the island in 1965, and in accordance with its responsibility for managing the wildland resources of the Refuge, the Service sought to assess the range condition. Lichens are known to be important in the diet of reindeer (Sjenneberg & Slagsvold 1979). The purpose of this study is to establish an initial list of lichens from a relatively small area (about 4 mi²) in the northwestern corner of Hagemeister Island, since the lichen flora of the island is virtually unknown and there are no known published lists. The resulting list is preliminary and future studies should increase the number of species considerably.

The climate of the study area according to Tuhkanen (1987) is classed as NB/O₁/h, or humid province, intermediate oceanic sector of the northern boreal subzone. One of the nearest climatic stations, located at Cape Newenham approximately 40 mi west of Hagemeister Island, reports a mean annual temperature of 32.1°F and precipitation of 42.6 inches (Patric & Black 1968).

The geology of the Hagemeister Quadrangle is mapped by Hoare & Coonrad (1961). For the study area their map delimits two major types: glacial drift - poorly sorted Pleistocene sand, gravel, and boulders; and the Gemuk group - chiefly massive, altered volcanic rocks, massive to thin-bedded siliceous siltstone and chert with lesser amounts of calcareous siltstone, fine-grained graywacke, and limestone. The upper part of Gemuk is chiefly fine- and coarse-grained graywacke, siltstone, and conglomerate.

Soil development occurs on three main surficial types: glaciofluvial, coastal, and coarse- and fine-grained deposits associated with moderate and steep-sloped mountains and hills (Karlstrom et al. 1964). The most widespread soil subgroups in descending order of areal importance are Dystric Cryandepts, Fluvaquentic Cryofibrists, and Dystric Lithic Cryandepts (Reiger et al. 1987).

The landscape of Hagemeister Island is treeless. The vegetation of the study area is predominately a mosaic of dwarf shrub heath and deciduous scrub. In a schematic profile ranging from coastal marine beaches to alpine tundra, the first plant

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communities encountered are coastal forb beaches with *Honkenya peploides* and *Mertensia maritima*. On upper beaches these are followed by coastal graminoid-dominated communities with *Elymus arenarius*, *Angelica lucida*, and *Ligusticum scoticum*. The relatively gently-sloping beaches change abruptly to steep, eroding cliffs composed of glacial drift that rise 30 to 50 feet above the sea, with communities characterized by *Epilobium latifolium* and *Artemisia tilesii*.

Above the cliffs and on elevated benches, the vegetation is a mosaic of graminoid meadows dominated by *Calamagrostis canadensis* and *Epilobium angustifolium*, and low deciduous scrub characterized by *Salix* spp., *Cornus suecica*, and *Epilobium angustifolium*. In sites protected from the wind, extensive thickets of *Alnus crispa* form with *Sambucus racemosa*, *Dryopteris austriaca*, and *Trientalis europaea*. On exposed upland sites, hummocky *Empetrum nigrum* dwarf shrub heaths predominate with *Ledum decumbens*, *Betula glandulosa*, *Vaccinium uliginosum*, *Salix arctica*, *Carex bigelowii*, and representatives of the lichen genera *Alectoria*, *Bryoria*, *Cetraria*, *Cladina*, *Cladonia*, *Nephroma*, *Peltigera*, *Sphaerophorus*, *Stereocaulon*, and *Thamnolia* and the bryophyte genera *Dicranum*, *Hylocomium*, *Pleurozium*, *Polytrichum*, and *Racomitrium*. More exposed heaths are dominated by lichens, particularly *Alectoria*, and the prostrate dwarf shrub *Loiseleuria procumbens* is usually present. These give way to fellfields on the most exposed sites.

All collections were made by the first two authors during the period July 21 to 24 1987 and the collection numbers are theirs. All determinations are by the third author. Voucher specimens are in the herbarium at the University of Wisconsin (WIS). Species nomenclature follows Egan (1987, 1989). Data for the collections follow:

A. 58°44'N, 160°52'W. Hagemeister Island (C-3) Quadrangle

- (1) Hummocky *Empetrum nigrum* heath. Elevation 265 ft.
- (2) *Carex bigelowii* - *Vaccinium uliginosum* wet meadow. Elevation 250 ft.
- (3) Open *Salix* scrub with *Empetrum nigrum* hummocks. Elevation 245 ft.
- (4) *Polytrichum* hummock. Elevation 200 ft.
- (5) Epiphytic on *Alnus crispa*. Elevation 200 ft.
- (6) Lichen tundra on ridge crest. Elevation 190 ft.
- (7) *Alnus crispa* scrub. Elevation 190 ft.
- (8) Hummocky *Empetrum nigrum* tundra. Elevation 20 ft.
- (9) Epiphytic on *Alnus crispa*. Elevation 190 ft.

B. 58°42'N, 161°01'W. Hagemeister Island (C-4) Quadrangle

- (1) Epiphytic on *Alnus crispa*. Elevation 350 ft.
- (2) On mineral soil. Elevation 350 ft.
- (3) Epilithic. Elevation 350 ft.

C. 58°45'N, 160°48'W. Hagemeister Island (D-3) Quadrangle

- (1) Dwarf shrub peatland. Elevation 430 feet.
- (2) Epiphytic on *Alnus crispa*. Elevation 430 ft.

D. 58°43'N, 160°56'W. Hagemeister Island (C-3) Quadrangle

- (1) On moss in fellfield. Elevation 800 ft.
- (2) Epilithic in fellfield. Elevation 800 ft.
- (3) Fellfield. Elevation 800 ft.
- (4) On soil in fellfield. Elevation 800 ft.

List of Species

Sixty three species are reported from Hagemeister Island. The collection site initials are given first with habitat information included in parentheses. Specimen numbers follow and are underlined.

Alectoria nigricans (Ach.) Nyl. A(6):H8701-18B; D(1):H8705-6A.

Asahinea chrysantha (Tuck.) Culb. & Culb. A(6):H8701-24.

Bryocaulon divergens (Ach.) Kärnef. A(6):H8701-12.

Buellia erubescens Arnold A(5):H61 (in mixture with *Melanelia septentrionalis* and *Caloplaca holocarpa*).

Caloplaca holocarpa (Hoffm.) Wade A(5):H61 (in mixture with *Melanelia septentrionalis* and *Buellia erubescens*).

Cetraria andrejevii Oxner A(6):H8701-20.

C. commixta (Nyl.) Th. Fr. D(2):H8705-19.

C. cucullata (Bellardi) Ach. A(6):H8701-18.

C. ericetorum Opiz A(6):H8701-23.

C. hepatizon (Ach.) Vainio D(2):H8705-17.

C. laevigata Rass. A(3):H30; A(6):H8701-18C.

C. nivalis (L.) Ach. D(3):H8708-5.

Cladina mitis (Sandst.) Hustich A(6):H8701-16A.

C. stellaris (Opiz) Brodo A(6):H8701-30.

C. stygia (Fr.) Ahti A(6):H8701-12A, -15.

Cladonia bellidiflora (Ach.) Schaerer A(1):H6A, H12.

C. coccifera (L.) Willd. A(6):H8701-14.

C. cornuta (L.) Hoffm. A(1):H6; C(1):H111.

C. crispata (Ach.) Flotow A(1):H9A.

C. fimbriata (L.) Fr. A(4):H56; A(5):H63; C(1):H110.

C. maxima (Asah.) Ahti A(1):H3, H9; A(6):H8701-29; A(8):H8715-14.

C. subfurcata (Nyl.) Arnold A(2):H26.

C. sulphurina (Michaux) Fr. A(4):H57; A(9):H8702-11.

Icmadophila ericetorum (L.) Zahlbr. A(2):H28.

Lecanora circumborealis Brodo & Vitik. A(5):H62; A(9):H8702-12; C(2):H107.

- L. intricata* (Ach.) Ach. D(2):H8705-13.
- L. polytrapa* (Hoffm.) Rabenh. D(2):H8705 (in mixture with *Rhizocarpon geographicum*).
- L. symmicta* Ach. A(9):H62 (in mixture with *L. circumborealis*).
- Lecidea atrobrunnea* (Ramond in Lam. & DC.) Schaerer D(2):H8705-31 (in mixture with *Pertusaria subplicans* and *Rhizocarpon geographicum*).
- L. lapicida* (Ach.) Ach. D(2):H8705-12.
- L. lithophila* (Ach.) Ach. D(2):H8705-10.
- Lobaria linita* (Ach.) Rabenh. A(1):H15.
- Melanelia septentrionalis* (Lyng.) Essl. A(5):H61.
- M. stygia* (L.) Essl. D(2):H8705-24.
- Nephroma arcticum* (L.) Torss. A(1):H1.
- N. bellum* (Sprengel) Tuck. A(9):H8702-9; B(1):H72A.
- Ochrolechia frigida* (Swartz) Lyng. A(6):H8701-17.
- O. subplicans* (Nyl.) Brodo D(2):H8705-11, -31.
- Parmelia omphalodes* (L.) Ach. D(2):H8705-30.
- P. sulcata* Taylor A(9):H60.
- Peltigera horizontalis* (Huds.) Baumg. B(2):H74A.
- P. leucophlebia* (Nyl.) Gyelnik A(1):H11.
- P. polydactyla* (Necker) Hoffm. A(3):H34.
- P. rufescens* (Weis.) Humb. A(1):H11A.
- P. scabrosa* Th. Fr. A(1):H10.
- Pertusaria dactylina* (Ach.) Nyl. D(1):H8705-1; -27.
- Phyllicum demangeonii* (Moug. & Mont. in Mont.) Nyl. D(2):H8705-22. This species was previously reported from southeastern Alaska by Herre (1919).
- Platismatia lacunosa* (Ach.) Culb. & C. Culb. B(3):H76.
- Porpidia flavicunda* (Ach.) Gowan D(2):H8705-16.
- P. speirea* (Ach.) Krempelh. D(2):H8705-31 (in mixture with *Pertusaria subplicans* and *Rhizocarpon geographicum*).
- Pseudephebe pubescens* (L.) M. Choisy D(2):H8705-20.
- Psoroma hypnorum* (Vahl) Gray A(6):H8701-16; D(1):H8705-5.
- Rhizocarpon anseris* Lyng. D(2):H8705-3. New to North America. This species was collected at Frobisher Bay (Thomson #13229) and listed in the as yet unpublished volume II of Thomson. It is known from Novaya Zemlya in the northwestern U.S.S.R. (Lyng. 1928).
- R. geographicum* (L.) DC. D(2):H8705-4, -7.
- Sphaerophorus fragilis* (L.) Pers. D(2):H8705-18.
- S. globosus* (Huds.) Vainio A(6):H8701-13.
- Stereocaulon botryosum* Ach. D(2):H8708-8.
- S. glareosum* (Savicz) Magnusson D(4):H8705-6.
- S. paschale* (L.) Hoffm. A(6):H8701-26.
- Thamnotia subuliformis* (Ehrh.) Culb. A(6):H8701-15A.
- T. vermicularis* (Swartz) Ach. ex Schaerer A(6):H8701-9, -18A.

Tremolecia atrata (Ach.) Hertel D(2):H8705-12 (in mixture with *Lecidea lapicida*).
Umbilicaria hyperborea (Ach.) Hoffm. D(2):H8705-15.

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