

Lichen Survey of Mount Everett Summit Southwest Berkshire County, Massachusetts

Philip F. May

42 Stults Road
Belmont, MA 02478-3431
(617) 484-1914
PFMay@aol.com

November 14, 1999
revised December 29, 1999

SUMMARY

Sixty-four lichen species were found on the summit of Mount Everett, Massachusetts, during a twelve-hour period. The summit lichen community has affinities with lichen communities of lowland pitch pine forest, mid-elevation hardwood forest, and upland rock outcrops. With the exception of one very rare lichen and another that is probably undescribed, the species encountered are a subset of typical lichen species of these communities elsewhere in the state. Lichen coverage was moderately high on rock outcrops, low to moderate on trees, and relatively low on soil. Taller trees away from the summit tower had higher coverage and diversity of corticolous lichens than those nearer the tower. Rain wetted rock-dwelling lichens could easily be damaged by extensive foot traffic associated with construction, but this damage can mostly be avoided if workmen do not stray from the construction area. Only one rock-dwelling species is worth concern, but that species is extremely rare and should be protected. Some soil lichens may be temporarily damaged by construction disturbance, but others could be favored. One lichen species growing on pitch pine bark is apparently undescribed. Nothing is presently known about its distribution or abundance except that it is not uncommon on the summit. No other tree- or wood-dwelling species are of concern, and unless trees are bulldozed or herbicides used, the lichens growing on them should be safe.

INTRODUCTION

The lichens on the summit of Mount Everett were briefly surveyed in late autumn, 1999. The purpose of the survey was to assess lichen diversity within the pitch pine/bear oak/birch community growing on the summit and to see if any unusual lichens were present. The author spent a total of 12 hours on the summit, spread over two days, October 31 and November 1.

The survey was conducted entirely within the area that pitch pine was growing. The survey included lichens growing on trees, on rocks, and on the ground. Lichens on man-made substrates, such as concrete, were excluded.

Standard non-randomized survey methods were used. A reconnaissance was made for major subhabitats. Two major subhabitats were selected: the southwest slope community which featured stunted

pitch pines and dense thickets of bear oak, shrub-size birches, blueberry, and mountain laurel, and the slightly more mesic northern slope community, which featured more red oak and somewhat larger pitch pines. Within the two subhabitats, detailed searches were made for various microhabitats and for concentrations of lichens, and within these, for lichen species not previously recorded at the site. At the end of field work, the area near the summit tower itself and the area southeast of the tower were checked briefly for comparison.

A specimen of each lichen species was collected as a voucher specimen. The identity of each species was later confirmed in the laboratory using microscopy and standard chemical tests, including, in some cases, thin-layer chromatography (TLC). A special effort was made to identify normally sterile species, as these lichens often are important members of the community. A few specimens were sent to specialists for confirmation or identification. Labeled voucher specimens will be placed at the Farlow Herbarium of Harvard University or in the private herbarium of the author.

LIMITATIONS

Surveys of total lichen diversity are rather sensitive to the amount of time spent in the field and the size and uniformity of the study area. Field time is important because many lichen species are present only as widely scattered individuals. Finding them is partially a matter of chance. This problem is exacerbated by the small size of certain taxa, which requires close inspection of the substrate. Size of the study area influences results in two ways. A larger area usually provides more types of habitats and microhabitats. Within any habitat, a larger area give more opportunities for widely scattered individuals to occur.

In the case of Mount Everett, the total area covered by pitch pine was of modest size, so that most types of habitats and microhabitats were probably found and examined during the course of the survey. However, results should be compared with caution to larger sites with more diverse habitats.

Most of the recorded species were found in the first four hours of surveying. A few additional species per hour were found during the remaining eight hours, up to the very end. Without doubt, additional field time would result in the finding of additional lichen species, perhaps even 30% more. And there is always the possibility of additional rarities. However, the overall picture is unlikely to change.

RESULTS

Coverage by lichens:

Coverage was not measured, so the following are field impressions. Overall coverage within the study area depended on substrate. The highest coverage was found on the schist ledges, many of which were almost completely covered with lichens.

Coverage of trees was modest and spotty, with some individuals almost devoid of lichens and others having, say, 30%-50% coverage over portions of their trunks. Coverage seemed to be highest (but still modest) on red oaks, followed by pitch pine, low for bear oak and *Vaccinium*, and almost non-existent on birch and mountain laurel. Larger trees generally had higher percentage cover than smaller trees of the same species. Coverage seems to be higher near the periphery of the community and on the north slope, but, if true, this may be due to larger tree sizes. Trunks and low branches had most of the lichen coverage, with relatively low twig coverage.

Copious leaf litter over most of the study area apparently inhibits the growth of ground lichens. Overall coverage was low and patchy, with occasional lichen mats on elevated patches of soil associated with rock ledges. A disturbed soil/pebble lichen community exists on the trampled gravel area surrounding the summit tower.

Species diversity:

Sixty-four species in 39 genera were found in the study area. Of these 20 were found on rock, 35 on bark or wood, and 11 on soil or duff. Some species were found on more than one substrate. Red oaks found at the periphery of the pitch pine forest provided roughly half the diversity of corticolous lichen species. An annotated list of species is attached at the end of the report.

For comparison, here are some species counts for some other New England sites. As mentioned above, caution should be used in interpreting this data, since in all cases the sites are much larger and mostly more diverse in habitat than Mount Everett.

Table 1. Comparison of total lichen diversity at selected regional sites

Site	Size in acres	Field days	Species
Mount Everett, MA (this report)	ca. 12	1.5	64
Shawangunk Mountains, NY, summit areas ¹	ca. 20,000	>10	125 ⁹
Mount Greylock, MA (ridge summit areas) ²	ca. 250	>5	125 ¹⁰
Bartholomew's Cobble, MA ³	277	0.5	110
Wachusett Mountain, MA (old growth area) ⁴	130	11	151
Cape Cod Canal, MA ⁵	1,100	20	145
Westover Air Reserve Base, MA ⁶	1,500	18	121
Devens Reserve Forces Training Area, MA ⁷	4,200	14	173
Katama Plains Conservation Area ⁸	129 ¹¹	6	75

¹Dirig, 1994, and personal communications; ²May, P., unpublished data; ³Harris, R.C., unpublished data; ⁴May, 1998; ⁵Lay et al., 1995; ⁶Kneiper et al., 1995a; ⁷May et al., 1998; ⁸Kneiper et al., 1995b

⁹based on a site study and on a partially reported species count from a field workshop

¹⁰partially reported species count from a field workshop

¹¹most of the study area was periodically burned

Lichenologists studying old-growth forests in northern New England have counted in four field days 100-120 species growing on living and dead trees only (Selva 1994, 1996). These numbers exclude lichens growing on rocks or on the ground. This compares to 35 found so far at Mount Everett.

A total species counts for a site is only one measure of diversity. Species seen per unit time or per unit area would be other measures. By these measures, Mount Everett would be probably be average for a habitat mixed conifer/hardwood forest and open ledges of comparable elevation.

Noteworthy species:

Diploschistes badius was found on a schist outcrop approximately 100 meters southwest of the tower. The identification has been confirmed by Dr. H. Thorsten Lumbsch of Essen, who is the world expert on the genus. *D. badius* is a rare species, previously known only from southeast Arizona and Costa Rica (Lumbsch, 1989; Lumbsch and Elix, 1989). It was segregated from *D. aeneus*, based mainly on differing chemistry. (*D. aeneus* is also rare, with known specimens from South Carolina, California, Sonora, and the West Indies.) *D. badius* is neither small nor inconspicuous, so it probably represents an example of a true rarity, rather than of undercollecting. The number of individuals on the summit of Mount Everett is not known.

Lecanora minutella is a tiny lichen that grows on weathered pine cones still attached to the tree. It has rarely been collected because of its small size and because lichenologists have infrequently examined pine cones. The lichen has recently received publicity, so that lichenologists are now inspecting pine cones more carefully. The species turns out to be not uncommon. Thalli were found on approximately ten percent of suitable pitch pine cones from Mount Everett.

Biatoroid-lecanoroid species #1 is small, gray crustose lichen containing atranorin and sometimes possibly also usnic acid. It grows on pitch pine bark. According to Dr. Christian Printzen at Essen, the Mount Everett specimens represent an undescribed species. He will describe it as new during the upcoming year. Dr. Printzen is an expert in the genus *Biatora* s. lat. and has recently examined the type specimens of ca. 500 holarctic species of biatoroid and corticolous lecideoid lichens. The specimens were also seen by Richard C. Harris of the New York Botanical Garden, and by H. Thorsten Lumbsch of Essen. Dr. Harris is the lichenologist most knowledgeable about the crustose lichen flora of eastern North America. Dr. Lumbsch is an expert on the genus *Lecanora*. Nothing yet is known about the distribution or abundance of the species except that it is fairly common in the summit area.

DISCUSSION

From a lichenological perspective, the summit of Mount Everett may be characterized as a relatively dry, mixed conifer/hardwood forest with many open ledges and small areas of open ground. With two exceptions, the lichen community is unremarkable.

The lichens on the trees represent a subset of those found in the much larger and more diverse pitch pine forest located in the high elevations of the Shawangunk Mountains of New York, plus a few additional species typical of hardwood forests. The lichens on the rocks at Mount Everett summit are typical of those found on siliceous outcrops of similar elevation throughout Massachusetts. Several rock-dwelling species were expected but not found. Some of these are presumably present and will be found with additional searching.

The diversity of ground lichens is lower than expected, undoubtedly due in part to a lack of suitable habitat. Unforested ground is rare on the summit, except in high traffic areas. Patches of duff on or next to rock outcrops are the major substrate for ground lichens. Under the forest canopy, ground lichens mostly get shaded out by leaf litter, and possibly also by the dense shrub layer occurring in parts of the study area.

The diversity of lichens in forest communities depends on a number of factors. These include the variety of substrates available, the variety of habitats and microhabitats available, the wetness and

humidity of the local climate, the amount and type of airborne pollutants, the size of the stand, the history of habitat disturbance, and the ecological continuity of the forest.

In the case of Mount Everett summit, lichen diversity may be limited by the size of the pitch pine forest, by historically high levels of SO₂ air pollution (both from out of state and from the industrial making and burning of charcoal locally), by lack of fog and rainfall compared to higher elevations, by low retained soil moisture, by a history of major and minor fires, and by the lack of a variety of mature hardwood tree species. However, these explanations are necessarily somewhat speculative.

MANAGEMENT RECOMMENDATIONS

Diploschistes badius is a rare lichen whose only other North American localities are in Arizona. Some thought should be given to protecting any other individuals of the species that may be growing on the summit. If construction is planned, then a search should be made for other individuals. If found, these should be protected by preventing disturbance to the rock outcrops they grow on. If no construction is planned, the best policy is probably benign neglect combined with passive methods designed to keep hikers on the trail.

There is a fair chance that the undescribed species growing on pitch pine will turn out to be uncommon or rare. Until this can be determined, the pines should be protected.

Otherwise the lichen community as a whole is unremarkable and requires no special concern. Nevertheless, it can and should be protected in the event of construction. The main danger is of excessive foot traffic over soil lichens and wetted rock-dwelling lichens. Though construction activities may be localized to the tower area, bored workmen will probably want to wander into the forest during breaks or lunch. DEM should restrict foot traffic to the main trails and the construction area and enforce this restriction. Use of the woods as a restroom should likewise be restricted.

Herbicides, pesticides, and fertilizers should be used only with caution in the summit area as all of these are known to adversely affect lichen communities.

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ANNOTATED SPECIES LIST

In order to make the list easier to read, I have not cited authorities. My comments on abundances are (1) for Massachusetts not Mount Everett, (2) relative to other lichens, and (3) estimates based on limited data.

- Acarospora fuscata** -- common on siliceous rock
- Allocetraria oakesiana** -- fairly common on hardwoods and sometimes conifers
- Biatoroid-lecanoroid species #1** -- apparently an undescribed species, known so far only from Mount Everett, but not necessarily rare (see discussion in text)
- Candelariella efflorescens** -- fairly common on hardwoods
- Cetraria arenaria** -- locally common on sandy soils in the lowlands, rare on ridge tops
- Cladina rangiferina** -- common on sunny soil in upland localities
- Cladonia bacillaris** -- common on duff and bark
- Cladonia coniocraea** -- common on rotted wood and bark
- Cladonia didyma** -- occasional
- Cladonia macilenta** -- occasional on duff and bark
- Cladonia grayi** -- common on soil, duff, and bark
- Cladonia pleurota** -- common on soil
- Cladonia pyxidata** -- occasional
- Cladonia squamosa** -- common on duff
- Cladonia strepsilis** -- occasional on soil
- Cladonia uncialis** -- fairly common on duff
- Dimelaena oreina** -- common on siliceous rock
- Diploschistes badius** -- extremely rare, on rock (see discussion in text)
- Flavoparmelia caperata** -- abundant on hardwoods and conifers
- Fuscidea arboricola** -- a sterile crust on bark, common, but rarely reported
- Fuscidea recensa** -- fairly common on upland siliceous outcrops, occasional on bark
- Graphis scripta** -- common on hardwoods
- Hypocnomyce scalaris** -- common on conifers
- Hypogymnia physodes** -- abundant on conifers, fairly common on hardwoods
- Imshaugia aleurites** -- common on conifers in certain habitats
- Lasallia papulosa** -- common on siliceous boulders and outcrops
- Lasallia pennsylvanica** -- infrequent on siliceous boulders and outcrops
- Lecanora minutella** -- rarely collected but fairly common on weathered cones

Lecanora pulicaris -- occasional, on bark
Lecanora symmicta -- common on hardwood twigs
Lepraria neglecta -- abundant on trees and rocks
Melanelia subaurifera -- fairly common on hardwoods
Micarea erratica -- common on pebbles
Micarea melaena -- occasional on trees and rocks
Micarea peliocarpa -- occasional on rocks
Mycoblastus fucatus -- a sterile crust, rarely reported, but occasional
Ochrolechia arborea -- common on hardwoods, occasional on conifers
Ochrolechia pseudopallescens -- infrequent on conifers
Parmelia saxatilis -- fairly common on siliceous rock
Parmelia sulcata -- abundant on hardwoods
Parmeliopsis capitata -- occasional, on conifers and hardwoods
Pertusaria trachythallina -- occasional, on hardwoods
Pertusaria velata -- occasional, on hardwoods
Porpidia albocaerulescens -- common on shaded siliceous rock
Porpidia herteliana -- occasional, on siliceous rock
Pseudevernia consocians -- infrequent, on upland conifers
Punctelia rudecta -- common on hardwoods
Punctelia subrudecta -- occasional, on hardwoods
Pycnothelia papillaria -- locally common on disturbed soils
Rhizocarpon grande (= R. eupetraeum) -- occasional, on siliceous rock
Rhizoplaca subdiscrepans -- occasional, on siliceous rock
Scoliciosporum chlorococcum -- abundant on conifers and hardwoods
Stereocaulon glaucescens -- occasional on rock
Stereocaulon saxatile -- occasional on rock
Trapelia involuta -- abundant on pebbles
Trapelia placodioides -- occasional, on siliceous rock
Trapeliopsis flexuosa -- occasional, on wood or bark
Trapeliopsis granulosa -- occasional, on wood or soil
Tuckermannopsis fendleri -- occasional, on conifers
Umbilicaria muehlenbergii -- occasional, on siliceous rock
Usnea strigosa -- occasional, on hardwoods and conifers
Xanthoparmelia conspersa -- abundant on siliceous rocks
Xanthoparmelia plittii -- occasional, on siliceous rocks