

## Lichens and related fungi of Highstead Arboretum, Fairfield County, Connecticut

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ABSTRACT. – An inventory of the lichens at Highstead Arboretum in southwestern Connecticut documented 88 taxa of lichens and associated fungi. The lichen biota of the site is dominated by crustose taxa, and cyanolichens are notably absent. The lichens of the site have a strong preponderance of taxa with wide-ranging eastern temperate and pan-temperate biogeographic patterns, with minimal coastal plain influence. The sixth New England population of a regionally rare lichen, *Parmotrema reticulatum*, was discovered during this project, and 15 lichen taxa reported here are not listed in previous compilations of Connecticut lichens.

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### INTRODUCTION

Highstead Arboretum encompasses 58.4 hectares (146 acres) in the town of Redding in Fairfield County, the southwestern-most county in Connecticut. The site lies near the north-south midpoint of the Lower New England/Northern Piedmont Ecoregion, and is characterized by glaciated rolling uplands with predominately deciduous hardwoods. Founded in 1982, Highstead is located on lands that were subjected to a long history of agricultural activity and timber harvesting. In addition to open meadows and managed horticultural collections, there are significant areas of natural vegetation, which primarily consist of secondary forests.

Bedrock geology over most of the site is schist, with frequent boulders and outcrops. There is an area of granitic gneiss in the western part of the site. Both of these substrates are hard, acidic, nutrient-poor siliceous rocks. Elevation within Highstead ranges from 184 to 232 meters. A rocky ridge system in the western part of the site contains wooded uplands dominated by *Quercus coccinea*, *Q. prinus* and *Q. rubra*, with a prominent understory of *Kalmia latifolia*. The central part of the property is a low, shallow stream valley with a zone of swampy forest dominated by *Acer rubrum* and *Betula alleghaniensis*, with an abundance of *Clethra alnifolia*, *Lindera benzoin*, and *Symplocarpus foetidus* beneath. A mostly cleared drumlin on the east side of the property contains mixed hardwood stands of *Acer rubrum* and *Fraxinus americana*, with an understory of *Berberis thunbergii* and *Lindera benzoin*. Among the other trees present at the site are *Acer saccharum*, *Carya ovata*, *Liriodendron tulipifera*, and *Ostrya virginiana*.

In June 2005, the authors conducted an intensive one-day lichen survey at the site, working in all habitat types and areas of the site and attempting to examine all available substrates. The resultant list should be viewed as preliminary, but is of interest in profiling the lichens of a small scale woodland system in contemporary southwestern New England. Little modern information exists regarding Connecticut lichens, so this list provides a useful addition to the existing literature.

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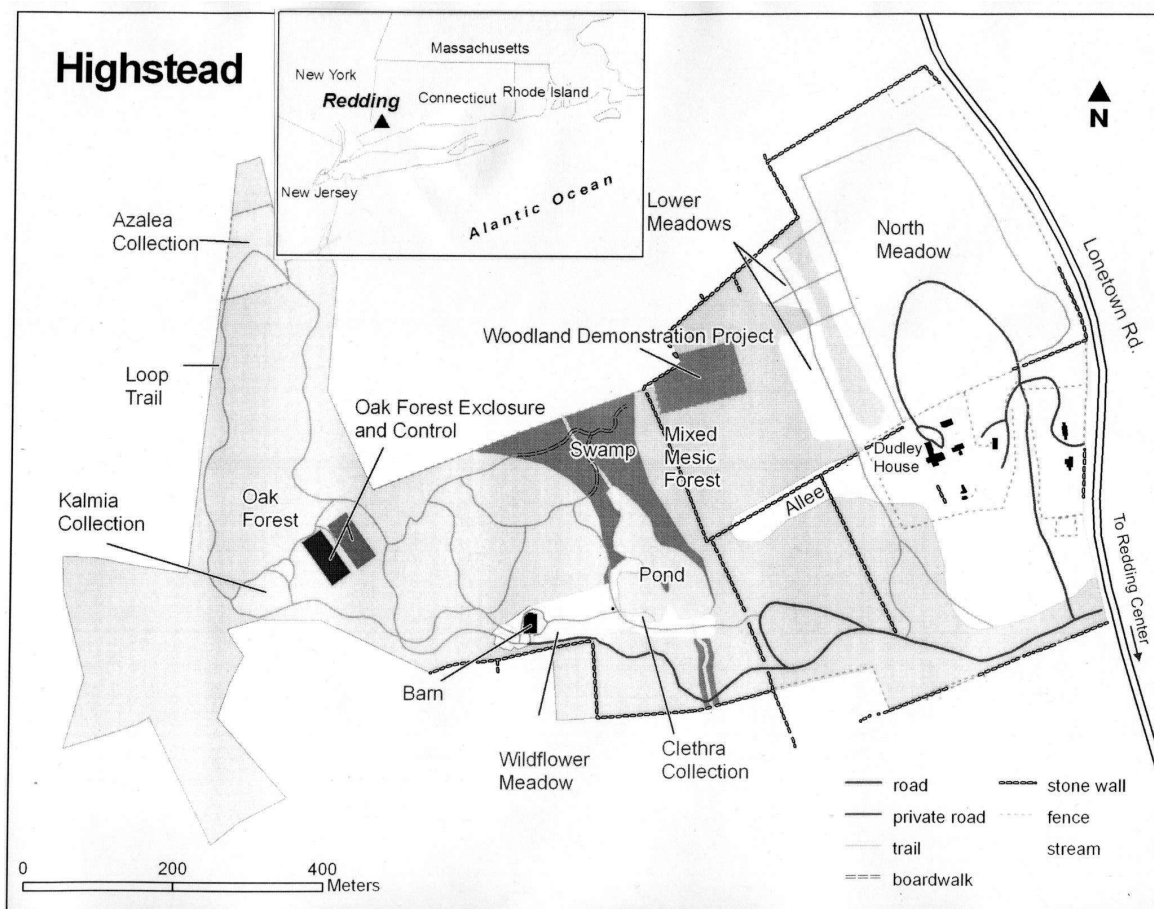


Figure 1. Map of Highstead Arboretum.

#### ANNOTATED LIST

The following list enumerates the lichens documented from Highstead, with general comments about abundance and substrate affinities within the site. Collection numbers are prefixed with the first letter of the collector's last name (B, H or L). Buck and Harris collections are deposited at NY; Ladd collections will be deposited at NY. Based on its North American distribution, each taxon occurring at Highstead was assigned a biogeographic pattern, using the general biogeographic patterns of Brodo et al. (2001). These are indicated by a letter code following each entry in the list: ET – eastern temperate; PT – pan-temperate; PT(B) – pan-temperate with boreal affinities; BO – boreal; AGL – Appalachian/Great Lakes; CP – Atlantic and Gulf coastal plains. Lichen taxa with an asterisk are not reported in previous compilations of Connecticut lichens (Evans & Meyrowitz 1926, Feuerer 2008, Hinds & Hinds 2007, Lendemer & Harris 2004, Slack et. al. 1993).

- Acarospora fuscata* (Schrader) Th. Fr. – Frequent on exposed to lightly shaded boulders and outcrops. B49170, L27268; PT
- Allocetraria oakesiana* (Tuck.) Randle & A. Thell – Uncommon on massive, shaded boulders in woodlands. H51537, L27281; AGL
- Amandinea polyspora* (Willey) E. Lay & P. May – Known from various corticolous substrates, including shaded twigs of *Kalmia latifolia* in a wooded upland and the bole of a large *Acer rubrum* in a wooded swampy depression. B49171, B49172, B49204, L27307, L27330; ET
- Anaptychia palmulata* (Michx.) Vain. – Known only from mossy bases and lower boles of large *Betula alleghaniensis* trees in a wooded swampy depression. L27326; AGL

- Anisomeridium polypori*\* (Ellis & Everhart) M.E. Barr – Uncommon on hardwood boles in woodlands. B49205; ET
- Arthonia caesia* (Flotow) Körb. – Locally frequent on shaded boles and branches of hardwoods. B49206, H51592; ET
- Aspicilia cinerea* (L.) Körb. – Occasional on large boulders in woodlands. L27269; PT
- Aspicilia laevata* (Ach.) Arnold – Frequent in woodlands; on shaded outcrops and large boulders. B49169, H51538; PT
- Biatora longispora* (Degel.) Lendemer – Occasional on hardwood boles in woodlands; typically occurring as small, easily overlooked thalli. B49207, L27301; BO
- Candelaria concolor* (Dicks.) Stein – Infrequent on branches and boles of hardwoods. H51593; PT
- Chromofulvea dialyta* (Nyl.) Marbach – Known from oak lignum in a woodland. This species was formerly called *Buellia dialyta* (Nyl.) Tuck. B49173; PT
- Cladonia cylindrica* (A. Evans) A. Evans – Uncommon on shaded decorticate hardwood logs in woodlands. H51539; ET
- Cladonia grayi* G. Merr. ex Sandst. – Common on lightly shaded boulders, outcrops, soil, and among mosses over soil in woodlands. All Highstead specimens that were tested contained fumarprotocetraric acid. H51540, H51541, L27270; PT
- Cladonia macilenta* Hoffm. var. *macilenta* – Frequent on exposed to lightly shaded boulders and outcrops in wooded uplands, sometimes growing over thin humus accumulations. H51542, H51543, H51544, L27267; PT(B)
- Cladonia ochrochlora* Flörke – Known from soil and humus along a road. H51545; BO
- Cladonia parasitica* (Hoffm.) Hoffm. – Occasional on rotting, decorticate hardwood logs and stumps in woodlands. B49174, L27294; ET
- Cladonia petrophila*\* R.C. Harris – Uncommon on shaded boulders in woodlands, usually on vertical faces. H51547; ET
- Cladonia pleurota* (Flörke) Schaer. – Uncommon on lightly shaded rocks in wooded uplands. H51548; PT
- Cladonia rei* Schaer. – Local on thin soils over massive, lightly shaded outcrops. H51550; PT(B)
- Cladonia squamosa* Hoffm. – Uncommon on lightly shaded, massive boulders. H51551, L27279; PT(B)
- Cladonia subcariosa* Nyl. – Local in exposed well-drained rocky soil. This collection is the norstictic acid element that has been called *Cladonia polycarpoides* Nyl. H51549; ET
- Cladonia subtenuis* (Abbayes) Mattick – Occasional in well-drained, acidic soils and humus, typically over massive rock expanses. H51552, L27291; ET
- Cladonia uncialis* (L.) F.H. Wigg. – Local in well-drained, sterile, rocky, acidic soils over bedrock in woodland openings. L27292; PT(B)
- Dermatocarpon luridum* (With.) J.R. Laundon – Known from wet rocks in a small stream. B49208; PT(B)
- Dibaeis baeomyces* (L.f.) Rambold & Hertel – Locally frequent on exposed to lightly shaded, well-drained soils. H51553, L27260; PT(B)
- Dictyocatenulata alba* Finley & E.F. Morris – Known from the shaded base of a large *Quercus rubra* along a woodland edge. B49209, L27320; ET
- Dimelaena oreina* (Ach.) Norman – Occasional on exposed to lightly shaded boulders and outcrops in wooded uplands. B49175; PT
- Distopyrenis americana*\* Aptroot – Known from a single collection, on *Betula lenta*. H51594; ET
- Epicoccum purpurascens* Schltldl. – Collected once on hardwood branches at the edge of a woods. B49211; ET
- Flavoparmelia baltimorensis* (Gyeln. & Főriss) Hale – Common on lightly shaded boulders and outcrops. B49176, H51554, L27275; PT
- Flavoparmelia caperata* (L.) Hale – Frequent in woodlands; on lower and mid boles of mature hardwoods, especially *Quercus prinus*. H51555, L27312; PT
- Fuscidea arboricola* Coppins & Tønsberg – Apparently uncommon or overlooked; collected on *Betula lenta*. H51556; BO
- Graphis scripta* (L.) Ach. – Common on shaded boles of hardwoods in woodlands; *Acer saccharum*, *Betula lenta* and *Carya ovata* are common substrates. H51557, H51595; PT
- Hypocenyce scalaris* (Ach. ex Lilj.) M. Choisy – Known from an old conifer stump in a wooded upland. H51558; PT(B)

*Hypogymnia physodes* (L.) Nyl. – Despite its regional abundance, at Highstead this lichen is known from only a few small populations on lightly shaded hardwood branches, and one population on a shaded boulder where it was associated with *Alloctraria oakesiana*. L27283; PT(B)

*Hysterographium mori* (Schw.) Rehm – Known from the bole of a dead *Acer rubrum*. H51591; PT

*Imshaugia aleurites* (Ach.) S.L.F. Mey. – Uncommon on old conifer stumps in woodlands. H51559; PT(B)

*Lasallia papulosa* (Ach.) Llano – Frequent on massive, lightly shaded boulders and outcrops. B49177, L27272; PT

*Lecanora subpallens* Zahlbr. – Uncommon on lightly shaded boles of hardwoods, typically *Quercus*, in woodlands. H51560; CP

*Lecanora thysanophora* R.C. Harris – Occasional on bases and boles of mature hardwoods in woodlands. B49178, H51561, L27310; ET

*Lecidea cyrtidia* Tuck. – Occasional on shaded outcrops in woodlands. B49179, B49180, H51562; ET

*Lecidea plebeja*\* Nyl. – Uncommon on shaded lignum of fallen decorticate hardwood logs. B49181; ET

*Lepraria caesiella*\* R.C. Harris – Occasional on shaded hardwood boles, especially *Betula alleghaniensis*; the Harris collection is from rock. B49182, H51563, L27305; ET

*Lepraria caesiocalba* (de Lesd.) J.R. Laundon – Uncommon on massive, lightly shaded outcrops and hardwood boles. H51564, H51565; ET

*Lepraria eburnea*\* J.R. Laundon – Known from the shaded base of *Betula lenta*. H51566; PT(B)

*Lepraria lobificans* Nyl. – Frequent in deeply shaded habitats, typically in somewhat mesic conditions, on sheltered rock faces, tree bases, and overhung mossy soil faces. H51567; PT

*Lepraria neglecta* (Nyl.) Erichsen – Known from the lightly shaded bole of *Betula lenta*. H51568; AGL

*Loxospora pustulata* (Brodo & W.L. Culb.) R.C. Harris – Known only from shaded boles of *Betula alleghaniensis* in a wooded swampy depression. L27327; ET

*Micarea erratica*\* (Körb.) Hertel, Rambold & Pietschm. – Infrequent on exposed to lightly shade boulders and outcrops. B49184, H51569; ET

*Micarea peliocarpa* (Anzi) Coppins & R. Sant. – Occasional on stumps and fallen logs in woodlands. B49185, B49186; ET

*Myelochroa aurulenta* (Tuck.) Elix & Hale – Occasional in woodlands; on shaded rocks and shaded lower boles and bases of hardwoods. H51596, L27299; PT

*Ochrolechia arborea* (Kreyer) Almb. – Uncommon on shaded boles of *Betula alleghaniensis* in a swampy woodland. L27325; PT(B)

*Ochrolechia yasudae*\* Vain. – Infrequent in woodlands, on lightly shaded boulders and outcrops. B49187, H51570; AGL

*Parmelia squarrosa* Hale – Known from the lightly shaded bole of *Carya ovata* in a wooded upland, and from the shaded bole of a small *Acer rubrum* in a wooded swampy depression. L27302B, L27322; PT(B)

*Parmelia sulcata* Taylor – Occasional on boles and larger branches of hardwoods and conifers. L27302A; PT

*Parmotrema reticulatum* (Taylor) M. Choisy – Known only from the lower bole of *Acer rubrum* in a shaded swampy depression. Hinds and Hinds (2007) ranked this lichen as regionally rare, with only five other records known from New England. L27323; PT

*Peltigera didactyla* (With.) J.R. Laundon – Uncommon in well-drained, lightly shaded soil among sparse vascular vegetation. H51571; PT(B)

*Pertusaria pustulata* (Ach.) Duby – Infrequent on lightly shaded boles of hardwoods, especially *Carya ovata*, in wooded uplands. H51597, H51598, L27300; ET

*Phaeocalicium polyporaenum* (Nyl.) Tibell – Known from thalli of Turkeytail Fungus (*Trichaptum bifforme*) growing on fallen hardwood logs in woodlands. B49210; ET

*Phaeophyscia rubropulchra* (Degel.) Essl. – Common on boles and bases of hardwoods, typically in shaded conditions, and also on shaded, typically somewhat mossy, boulders. H51572; ET

*Physcia millegrana* Degel. – Local on branches of *Quercus* and *Kalmia latifolia*, but probably more common than initial impressions indicate. H51599, L27306; ET

*Physcia stellaris* (L.) Nyl. – Frequent on exposed branches and twigs of hardwoods. L27324; PT

*Physcia subtilis* Degel. – Frequent on lightly shaded boulders and outcrops in wooded uplands. H51573, L27285; ET

*Polysporina simplex* (Davies) Vězda – Uncommon and local on exposed cobbles and boulders. H51574; PT

- Porpidia albocaerulescens* (Wulfen) Hertel & Knoph – Frequent on shaded boulders, often in somewhat mesic habitats. B49188, H51575, L27278; ET
- Porpidia crustulata* (Ach.) Hertel & Knoph – Occasional on exposed to lightly shaded outcrops. B49189; PT
- Porpidia subsimplex*\* (H. Magn.) Fryday – Occasional on exposed to lightly shaded outcrops and boulders (= *P. tahawasiana* Gowan). B49190, B49191; AGL
- Punctelia rudecta* (Ach.) Krog – Frequent on exposed to shaded boles of hardwoods and, less commonly, conifers, as well as occasionally on lightly shaded boulders in woodlands. H51576, H51577, L27321; ET
- Punctelia “subrudecta”* auct. amer. – Uncommon on lightly shaded boles of large *Quercus prinus* in wooded uplands; also on *Kalmia latifolia*. This material may be referable to *P. perreticulata* (Räsänen) G. Wilh. & Ladd (sensu Hinds & Hinds 2007), but seems sufficiently distinct from the Midwestern expression of that taxon as to warrant provisional segregation. H51578, H51579, L27315; PT
- Pyrenula pseudobufonia* (Rehm) R.C. Harris – Uncommon on lightly shaded boles of hardwoods, especially *Carya ovata* and *Quercus rubra*. L27298; ET
- Pyrrhospora varians* (Ach.) R.C. Harris – Occasional on exposed hardwood branches and boles, typically in disturbed areas or along woodland edges. H51580, H51581, L27309, L27319; ET
- Rhizocarpon infernum* (Nyl.) Lynge f. *sylvaticum* Fryday – Local on siliceous boulders of an old stone wall in a low woodland. B49192, H51600, L27288; ET
- Rhizocarpon obscuratum* (Ach.) A. Massal. (= *R. reductum* Th. Fr.) – Known from lightly shaded boulders in woodlands. H51582; PT
- Rhizocarpon rubescens* Th. Fr. – Occasional on shaded boulders and outcrops in woodlands. B49193; ET?
- Rinodina tephraspis*\* Tuck. – Occasional on lightly shaded boulders. B49194, L27274; ET
- Ropalospora viridis*\* (Tønsberg) Tønsberg – Occasional on shaded hardwoods. B49195, H51583, H51601; PT(B)
- Sarcogyne clavus* (DC.) Kremp. – Common on exposed to lightly shaded, massive, outcrops and boulders. B49196; PT
- Sarcogyne similis*\* H. Magn. – Occasional on exposed boulders and outcrops. L27271; PT
- Scoliciosporum chlorococcum*\* (Stenh.) Vězda – Known from shaded crevices on the bole of a large *Quercus*. B49197; ET
- Scoliciosporum umbrinum* (Ach.) Arnold – Occasional on shaded boulders. H51584, L27276; ET
- Thelocarpon superellum*\* Nyl. – Known from exposed soil along a roadbank. B49198; ET
- Trapelia glebulosa* (Sm.) J.R. Laundon – Occasional on lightly shaded cobbles and rocks, typically in sites with a history of disturbance. B49199, H51585; PT
- Trapelia placodioides*\* Coppins & P. James – Occasional on shaded cobbles and boulders in woodlands. H51586, L27266; PT
- Trapeliopsis flexuosa* (Fr.) Coppins & P. James – Known from weathered cedar planks on the walkway of a foot bridge along a trail near the *Kalmia* grove. L27297; PT
- Trypethelium virens* Tuck. ex E. Michener – Uncommon; known from shaded boles of *Betula alleghaniensis* and *Carya*. H51602, L27328; ET
- Umbilicaria mammulata* (Ach.) Tuck. – Locally common on lightly shaded, massive boulders and outcrops in woodlands. B49200, L27286; AGL
- Xanthoparmelia conspersa* (Ehrh. ex Ach.) Hale – Common on exposed boulders and outcrops. H51587, L27265, L27277, L27290; PT
- Xanthoparmelia viriduloumbrina* (Gyeln.) Lendemer – Apparently uncommon; on shaded outcrops in woodlands. H51588; PT

## RESULTS & DISCUSSION

A total of 88 taxa of lichens and related fungi was documented from Highstead Arboretum. Given the site’s relatively small size and long history of anthropogenic perturbations, this level of diversity is significant, and verifies the high habitat diversity and presence of intact natural remnants within the site. Crustose lichens were the most common physiognomy represented, with 52 taxa (59%); 23 (26%) lichens were foliose and 13 (15%) were fruticose. Only one lichen, *Peltigera didactyla*, has a cyanobacterial

photobiont; cyanolichens typically found in mixed hardwoods in this region, such as various species of *Collema* and *Leptogium*, were conspicuously absent.

Available lichen substrates were limited to siliceous rocks, hardwoods and a few conifers, lignin, and soil. Despite their relative homogeneity (all siliceous and acidic), saxicolous substrates hosted 40 lichen taxa. Corticolous substrates also had 40 taxa, 11 lichens occurred on terricolous substrates, and 9 were found on lignicolous substrates.

From a biogeographic perspective, the lichen biota at Highstead is overwhelmingly wide-ranging: 89% of the taxa have biogeographic patterns characterized as either wide-ranging eastern temperate (34 taxa) or pan-temperate (44 taxa). Of the taxa with pan-temperate distribution patterns, a third have boreal affinities. Taxa with other biogeographic patterns are only minor components of the lichen diversity, with three boreal taxa, one coastal plain species, and six taxa associated with the Appalachian–Great Lakes element.

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