

Highstead Arboretum

Fall 2005

From the Director

Lichens at Highstead Arboretum

Fall Programs



From the Director:

Fifteen years ago, I assisted a group of researchers on a project in the Congaree Swamp National Park in South Carolina. Our work led us to an undisturbed bottomland hardwood forest with strikingly large, old trees. As the group paused to look at a particularly imposing Bald Cypress, a forester innocently used the words “over mature” to describe the tree – not knowing the furor this would cause among the ecologists, who couldn’t bear to hear this “old growth” tree described in such utilitarian terms.

Both terms define the tree: to a forester with a view towards harvesting timber from the forest, an old tree, with its slow growth and incipient decay, is past the ideal time for harvest; for an ecologist, focused on the natural processes of a forest, the old tree is not past its prime, it is a home for animals, food for fungi, and will soon be a source of nutrients for the soil.

The difference in perspective between foresters and ecologists has lessened over the years. Foresters plan timber harvests with wildlife, water quality, and regeneration of the forest in mind. Ecologists realize that designating areas for timber production is the only economically feasible way to protect the large tracts that are needed to ensure the forests’ long-term survival. David Foster very eloquently discussed this last topic at Highstead’s recent Woodland Conversations.

Differences in approach to forest management still persist, however, as do different visions of what a well-managed forest looks like. Some advocate an active management approach – even on land where income from the forest is not the goal, or the size of the site makes profitable timber harvest impractical. Active management may take the form of selective removal of dead and diseased trees, invasive exotic species control, or management of wildlife populations. Others argue that the best way to care for your forest is to leave it alone.

The best judge of different forest management approaches may be the species that are native to the site. Native plants, birds, amphibians, reptiles, insects, fungi, lichens and other creatures that inhabit a site will either thrive or decline following management. The response of native species will indicate the health of the site and can be used as a tool to measure the success of management.

At Highstead, one of our goals is to demonstrate different approaches to forest management. Our vision is to be a place where landowners can visit sites given different management treatments and see the possibilities for their own land. Through programs and publications, we hope to elucidate some of the more subtle differences between the managed sites, like changes in water quality or changes in native species diversity.

This summer, we continued work to build our knowledge of the native species of Highstead by initiating inventory work on frogs, butterflies, birds, and lichens. The beautiful and mysterious lichens that were discovered at Highstead are described in this newsletter. We will tell you the stories of the frogs, butterflies and birds of Highstead in future newsletters, public programs, and on our web site. Over time, we will track the changes in the health and numbers of these species and connect the inventory work to specific woodland management projects at Highstead.

We can’t promise you an easy answer for questions about managing your land. We hope that we can help you get started on a pathway that makes sense for you as the steward of your land. The rewards of this work are tremendous. Enjoying the peace and beauty of a place like Highstead is one of the greatest rewards!

Margaret Shea
Executive Director

At first glance, as one hikes the trails or strolls among the laurel collection, lichens do not seem to be a major component of the natural features at Highstead. A closer inspection reveals that lichens are indeed an important part of the arboretum's natural heritage, and that Highstead contains a surprisingly large diversity of these little known life forms. Although often lumped with mosses because of similar size and habitat, lichens have no leaves, stems or roots and are unrelated to mosses and other plants.

Lichens

Dixie reindeer lichen (Cladonia subtenuis) The only true reindeer lichen known from Highstead, this distinctive fruticose lichen is uncommon on sterile acid soils in uplands.

Doug Ladd
Missouri Botanical Garden

A native of Vermont, Doug Ladd has spent more than thirty years researching and working with flora and natural areas in the northeast and Midwest.

Currently Director of Conservation Science with The Nature Conservancy's Missouri office and a research associate at the Missouri Botanical Garden, his most recent book is *North Woods Wildflowers*, which includes coverage of northern New England.



A lichen (pronounced "like-in") is actually a fusion of two unrelated organisms – a fungus and an alga or alga-like bacterium. Fungi are familiar to all of us as bread mold, mushrooms and the bracket fungi common on rotting hardwood logs in forests. Algae are most familiar as the slimy green scum that forms in stagnant waters. The fungi and algae in lichens are usually different from the species of algae and fungi that live independently. Almost every lichen species has a distinct fungus, but some algae species occur in many different types of lichens.

A lichen is unlike either of its component life forms. The combined organisms produce something that behaves in every respect like a distinct single organism, with a distinct appearance and ecology, and capability to reproduce. The relationship between the alga and fungus in a lichen is still not fully understood, and is not the same for all lichens. Typically the lichen takes its form from the fungus, in which there are embedded zones of algae. The fungus is incapable of producing food, and obtains its nutrients from the alga, which uses sunlight to produce carbohydrates through photosynthesis. This relationship has been characterized as mutually beneficial or a form of parasitism. It is interesting that lichens thrive in habitats that are unsuitable to either the fungus or alga alone.

Highstead Lichen Habitat



Lichens grow in a variety of climates and habitats throughout the world, and are responsible for much of the small-scale pattern and color on rocks and trees. Some lichens are among the hardiest life forms on earth, and survive extremes of heat, cold and drought in Antarctica, the Sahara Desert, on Himalayan peaks and even in salt water. Many lichens are widely distributed and occur on a variety of substrates, while others are very rare and restricted to specific habitats and tree or rock types. A single boulder or tree trunk in a high quality habitat in this part of the world may support 30 or more different lichen species, and more than 170 types of lichens were found on a single tree in New Guinea!

Many lichens grow very slowly and are sensitive to changes in habitat conditions, making them excellent indicators of environmental degradation. Some lichens are exceptionally sensitive to air pollution and are used as monitoring indicators. Although they may cover tree trunks, lichens are not parasites and do not damage the tree. Certain lichens can even extract nitrogen from the atmosphere, making them small-scale fertilizer producers, something that few other organisms except legumes can do.

Even a casual hiker can identify the three general growth forms of lichens. Fruticose lichens, such as reindeer lichen, resemble miniature trees or shrubs, or dangle like long cords. Foliose lichens are the conspicuous sheet-like round patches growing on trees and rocks, and can be peeled from the surface on which they are growing. The most diverse and also least noticed lichens are crustose lichens, which appear like crusts painted on or embedded in trees and rocks.



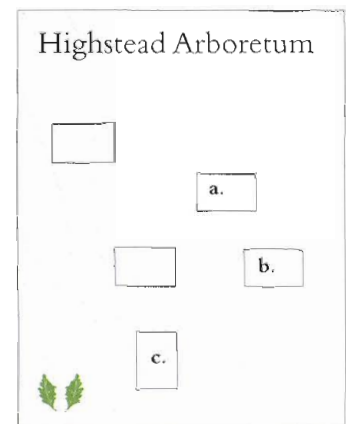
Pink Earth Lichen (*Dibaeis baeomyces*)
This distinctive and locally common lichen forms a gray crust over sandy soil with a history of previous disturbance; the spore producing structures of the fungus are rounded and pink, on narrow gray stalks.

Although lichens are individually small, a healthy forest in southern New England should have a well-developed and prominently visible lichen component. These lichens are critical as food resources for some animals and in nutrient cycling. In New England, even deer sometimes consume small quantities of lichens in winter. Lichens are used for nest construction by many birds that breed in Connecticut, such as the ruby-throated hummingbird, eastern wood-pewee, blue-gray gnatcatcher and northern parula warbler. Further north, massive mats of reindeer lichens are major winter food resources for caribou.

Most lichens are too bitter to be used as human food sources, although a few species are eaten. The "manna from heaven" described in the Bible is thought to have been a species of desert lichen. Certain lichens are used in medicines because of their antibiotic properties, and lichens have long been used to dye fabric. The distinctive colors of Harris tweed come from lichen dyes. Some lichens are even used to manufacture deodorant.

At Highstead Arboretum, lichens grow on all types of trees and many shrubs, with various types of lichens growing on bases, trunks and branches of trees all the way into the upper canopy. Lichens also grow on rocks, stable well-drained soil and even old concrete and old rusty iron. Lichen diversity and abundance at Highstead reflects the long history of European settlement and associated habitat disturbances that characterize the Redding area, including past large-scale land clearing for farming and industrial air pollution. Despite this, a recent inventory of lichens at Highstead I conducted with Richard Harris and William Buck of the New York Botanical Garden revealed a surprising diversity of nearly 100 different species of lichens.

Most of the lichens at Highstead are foliose or crustose species, although a few fruticose lichens occur on acidic well-drained soil. This diversity of lichens was surprising because of the limited size of the arboretum, its history of habitat alteration, and the limited variety of rock substrates— all of the



a. Common toadskin (*Lasallia papulosa*) An unusual type of foliose lichen that is attached only at a central point beneath, this leathery lichen has a brown, warty surface and occurs on shaded acidic rock outcrops in mature woodlands.

b. Rock greenshield lichen (*Flavoparmelia baltimorensis*) One of the most common foliose species at Highstead, this lichen is often abundant on lightly shaded acidic rock outcrops, with individuals ranging up to ten inches wide.

c. Fluffy dust lichen (*Leparia lobifrons*) This crustose lichen consists of a diffuse, greenish powdery mass. It is common in sheltered, heavily shaded sites, and occurs on rocks, tree bases, and soil banks.



Golden Moonglow Lichen (Dimelaena oreina) A yellowish green crustose lichen that is often lobed at the edges and appears almost foliose, but is tightly adherent to the exposed or lightly shaded rock outcrops where it grows.

rocks at the site are acidic. Some of the lichens at Highstead are wide-ranging generalists or even weedy lichens, while others are restricted to natural habitats.

While lichens can be found virtually throughout Highstead, except in dense fields and mowed areas, two areas of the Arboretum are notable for their diversity and abundance of lichens. The low wet valley of the Swamp contains some of the most sensitive lichens, including species restricted to high quality natural habitats. Here, stable conditions and high levels of humidity and light provide habitat for a variety of lichens typical of moist to swampy forests in northeastern North America. Many of these lichens can be seen on the large yellow birches along the boardwalk trail.

A different, but equally rich, lichen habitat occurs in the open rocky woods along the trail above the Barn. Here, a combination of some older chestnut and red oaks and other trees, abundant granite in both shaded and exposed sites, and sterile sandy soil with minimal competing leafy plants, provides excellent habitat for tree, rock, and soil lichens. Here one can see the only well-developed soil lichen associations at Highstead, with abundant reindeer lichens and related species.

Although small and often overlooked, lichens are a common component of the diversity of habitats and life forms at Highstead, and play an important role in the integrity of the natural communities. A closer look along your next hike will reward you with a glimpse into a new realm of nature in miniature, providing a window into the original lichen heritage of southwestern Connecticut.



Orange-cored shadow lichen (Phaeophyscia rubropulchra) Common on bases and lower trunks of hardwoods as well as on shaded rocks, the outer surface of this lichen is frequently grazed by slugs, revealing the bright reddish-orange tissue within.

Highstead Arboretum:

All programs require Reservations:
Please call 203.938.8809

September 28, Wednesday

10:00 am-12:00 pm



Impact of Deer on Native Plants

*Margaret Shea, Director
Highstead Arboretum*

In 1998, Highstead Arboretum fenced a 1-acre area of forest in order to observe the changes that occur in a forest where deer are excluded. This research project was also designed to study the impact of culling trees and removing invasive exotic plants within forests. Seven years later the differences between the fenced and unfenced areas are dramatic. Margaret Shea will lead you to this site and discuss some of the changes we have observed.

October 1- November 30



Art Exhibit: A Passion for Birds

Katie Lee, wildlife artist

This show of paintings and etchings of birds will be open October 1 - November 30, Monday - Friday, 8 am- 4 pm. Please call Highstead to make an appointment to view the show.

Artist's Reception: October 1, Saturday

1:00 pm- 4:00 pm

Please join us for a reception and to hear Katie Lee speak about her work. Katie Lee is a respected botanical and wildlife artist and instructor. A graduate of the New York Botanical Garden Botanical Illustration program, she has been an instructor at that institution for the past 15 years. Ms. Lee teaches drawing, watercolor, gouache and composition courses at various locations worldwide. Katie's uniquely realistic botanical and zoological paintings have been successfully shown in one-person shows in both the United States and abroad.

October 15, Saturday

2:00 pm-4:00 pm



The Sonoran Desert and their Human Friends

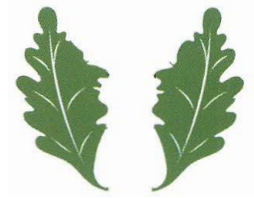
*David Yetman, Research Social Scientist
The Southwest Center of the
University of Arizona*

David will speak about this diverse community and his work to protect it from development. One of David's special interests is columnar cacti. For native peoples of the southwestern U.S. and northwest Mexico, these giant cacti have been their most important plants, providing food, shelter, medicine, and (very important) shade. Columnar cacti are of tropical origin, and have evolved over the last ten million years to become the supreme survivors of the desert.

About the Speaker

David Yetman is author of numerous books and articles on northwest Mexico, especially the state of Sonora, which he considers part of his back yard. His latest book "The Organ Pipe Cactus" will be published in 2006 by the University of Arizona Press. A Pima County Supervisor for twelve years, Yetman used the opportunity to study the effects of real estate development on the Sonoran Desert and mounted several campaigns to preserve large chunks of prime desert habitat. For the last five years he has hosted the PBS series "The Desert Speaks."

Fall Programs 2005



October 15, Saturday

9:00 am-4:00 pm

Fall Foliage Open Day

Highstead will be open so that members and guests can hike the trails and enjoy the fall foliage.



October 22, Saturday

2:00 pm-4:00 pm

Woodland Conservation in Southern New England:

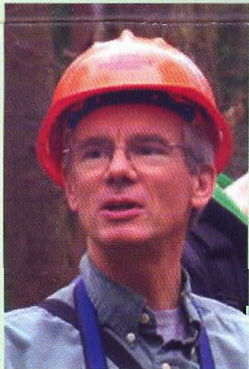
*David B. Kittredge, Associate Professor
University of Massachusetts - Amherst*

The Important Role of People in the Future of Forests

In spite of being some of the most densely populated states in the nation, southern New England is dominated by woods. Unlike other parts of the country, where forests are owned by state or federal governments or industry, southern New England woods are owned primarily by private families, individuals, and non-profit organizations. The future of a wooded landscape, and all its greater public benefits, is thus being decided by the actions of hundreds of thousands of people. Woodland conservation in these complex landscapes depends on much more than traditional approaches to forest management. In addition to good land stewardship, information, communication, policy, and education are important keys to ensuring the continued provision of woodland benefits in the future.

About the Speaker

David B. Kittredge is a Professor of Forestry at the University of Massachusetts-Amherst, and serves as the state's Extension Forester. He has a research appointment in forest policy at the Harvard Forest.



November 5, Saturday

2:00 pm-5:00 pm

How Birds Will Save The World:

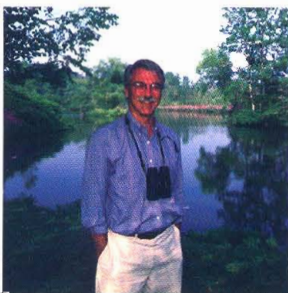
*John W. Fitzpatrick, Director
Cornell Ornithology Laboratory*

Biodiversity Conservation in the Internet Age

In this talk, Professor Fitzpatrick will present a variety of illustrated stories about the importance of birds in fostering conservation of wild areas throughout the world, emphasizing the role that individual citizens are playing as "citizen scientists" in interpreting and conserving the earth's biological diversity. With the advent of the Internet, human beings all over the world can serve as our planet's first real-time, self-monitoring system. The question is, do we have the will to change our cultural behaviors in order to live side-by-side with nature?

About the Speaker

John W. Fitzpatrick graduated from Harvard University in 1974, and received his Ph.D. from Princeton University in 1978. Since 1995 he has been Director of the Cornell Laboratory of Ornithology and professor in Ecology and Evolutionary Biology at Cornell University. He is a Fellow of the American Ornithologists' Union, recently served as its President (2000-2002), and in 1985 received its highest research honor (Brewster Award) for his research on the endangered Florida Scrub Jay.



Highstead Arboretum

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www.highsteadarboretum.org

About the Cover:

This new format of the Highstead Arboretum Newsletter is an introduction to our website which will be live in the next few months.

Highstead's Mission:

"To inspire curiosity and build knowledge about indigenous plants and woodlands in order to enhance life, preserve nature and advance sound stewardship practices."

Photography Credits:

We wish to acknowledge the following photographers who provided images to this publication.

Cover:

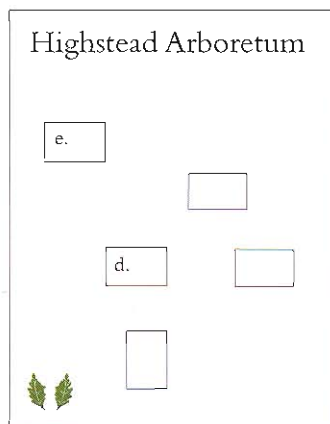
*Highstead images d,e:
Birgit Freybe Bateman*

Lichen Images:

Stephen Sharnoff

Lichen Article:

*Doug Ladd pages 3,4
Stephen Sharnoff pages 5*



When we try
to pick out
anything
by itself,
we find it hitched
to everything else
in the universe.

John Muir,
My First Summer in the Sierra, 1911