New England Botanical Club - Minutes of the 998th Meeting
4 June 2004

Karen B. Lombard, Recording Secretary, *pro tempore*

The 771th meeting of the New England Botanical Club, being the 998th since its original organization, was held on Friday, June 4, 2004, in the Lecture Room of the Fairchild Biochemistry Building, Divinity Avenue, Cambridge MA. There were 44 members and guests in attendance. Several members spoke about the highlights of the Southern Appalachian trip, including the various activities of the over 60 participants and the discovery of new plant records. Members also were reminded of the field trip on Saturday, June 5th, led by Elizabeth Kneiper in the Manchester-Essex Wilderness Conservation Area to learn about lichens and see their great diversity there [Note: over 50 species were seen].

Council member Ray Angelo introduced the evening's speaker, Dr. Jim Hinds. A former neuroscientist and present accountant from Orono, Maine, Dr. Hinds became interested in lichens through courses at Eagle Hill Biological Station. These initial courses have led him to wide-ranging studies in New England, which were the topic of his talk "New England Lichens, Ecology, Distribution and Changes in Abundance During the Last 100 Years."

Dr. Hinds began his talk with a review of different lichen groups, including crustose (closely adherent to rock), foliose (attached by rhizees on their lower surface), squamulose (a few mm in size and often grow on other lichens), fruticose (stick into the air and have no differences on their two surfaces), and hanging lichens. Lichens also fall into two major groups based on their fungi: ascomycetes and basidiomycetes. The lichen form evolved two separate times, once from each group of fungi. Most lichens in New England are ascomycetes.

Ecologically lichens are very important. Lichens colonized land about 1.2 billion years ago and were the only group on land until the mosses arrived. Dr. Hinds hypothesizes that they may have affected global levels of CO_2 and O_2 and thus facilitated life on Earth. Lichens help with soil formation from bare rock due to mechanical effects of their hyphae working in the interstitial spaces of rocks. Historically, lichens were important in nitrogen fixation, particularly in alpine areas, on calcareous rocks and soils, and in old-growth forests. For example, in the Pacific Northwest, *Lobaria* species fix over 50% of nitrogen in old-growth forests. Lichens are also important in food chains, serving as food for invertebrates, flying squirrels (spotted owl food), boreal red-backed voles, white-tailed deer, and caribou.

Humans have used lichens in many ways, but most importantly as old-growth forest indicators and as a biomonitor of air pollution. Lichens are particularly sensitive to SO_2. Zone charts have been developed for New England and the British Isles, where, by using lichen indicators, scientists can determine the amount of air pollution in a specific location. In New England, sensitive lichens are most common in Maine, where they are least affected by air pollution coming from midwestern states.

As a result of comparisons Dr. Hinds has made with the well known lichen flora of the British Isles, he feels that the macrolichens (all but the crust lichens) are well known in New England since there are similar numbers in each geographic region. The known crust lichens in New England, however, are about half the numbers known from the British Isles and more field work is needed to adequately inventory these species. He ultimately expects that lichen species numbers will be about 2/3 that of vascular plants in New England.

Macrolichens were well studied in New England in the 1800s and more recently since 1980. Dr. Hinds has compared state distributions of lichens from these two periods and has noticed some interesting trends. Eighteen species of macrolichens once found in three or more states are now found in none. Thirteen of these are sensitive to air pollution, particularly the nine species of cyanolichens (lichens that host cyanobacteria). In the 40 species that are absent in three states or more, 21 are cyanolichens and 18 are old-growth indicators. In all but three of these species, Maine is one of the remaining states where the lichens are found, which is most likely attributable to its higher air quality. For New England in general, three species of macrolichens are historic, two species are G1 (five or few locations), six species are G2 (20 or few locations), and 10 species are G3 (100 or fewer locations). Two hundred and sixty species of New England macrolichens (57%) are considered to be rare or declining.

Over the past three years, Dr. Hinds has had a rare opportunity to be part of a collecting team for lichens and mosses on Mt. Katahdin. Through this field inventory, they have discovered nine lichen species new to North America, 31 species new to New England, 18 new species to Maine, and 93 species new to Mt. Katahdin. Many of these species are crust lichens that are hard to collect and thus have been under-surveyed in the past. Dr. Hinds concluded his talk by commenting that intense surveys, such that on Mt. Katahdin, demonstrates that there is much to be discovered with an increase in effort. Also, more studies are needed on lichen floristics, ecology, and distribution. He encouraged the audience to switch from vascular plants to lichens in order to do new and interesting work!