New England Botanical Club – Minutes of the 1021st Meeting
3 November 2006
Robert Bertin, Recording Secretary *pro tempore*

The 794th meeting of the New England Botanical Club, being the 1021st since its original organization, was held on Friday, November 3, 2006, in the Lecture Room of the Fairchild Biochemistry Building, Divinity Avenue, Cambridge, MA. There were 45 members and guests in attendance. President Karen Searcy mentioned that the June 2007 "away" meeting would be in the northwest part of Massachusetts.

Dr. Elizabeth Farnsworth shared her research on rare New England plants in a talk entitled "Historical and current patterns of plant rarity in New England." In this study Elizabeth synthesized and analyzed information collected by the New England Wild Flower Society (NEWFS) during a recent effort to produce conservation research plans for many of the rarest vascular plant species in New England. Her goals were to evaluate the biological causes of rarity and nature of external threats, to determine whether specific geographical or habitat-related hotspots of rare species exist, and to determine which species or habitats should be accorded the highest priority in protection efforts.

The urgency of obtaining useful information on rare species is emphasized by the large number of vascular plants with populations at risk. This group includes one of eight species worldwide, 22% of U.S. species, and over 100 species in each New England state. Species reviewed in this study were a subset of a list of imperiled species drawn up for New England and published as *Flora Conservanda* in 1996 (Rhodora 98: 233-361). A conservation research plan had been created for each species, including information on status in North America and in each New England state, basic ecology and natural history, causes of rarity, descriptions of all sites of current or historical records, and recommendations for conservation. Each species was listed in the highest rarity category in at least one New England state, they were considered rare in an average of at least 5 states outside New England, and 76% had been extirpated in at least one state outside New England.

Examining herbarium records, Farnsworth documented two peaks in herbarium collecting, one around 1900 and a second one in the past couple of decades. A few populations (~ 10%) have been recorded over a long time period, though most (56%) have been recorded only once. Her work in herbaria was aided by recent work of Arthur Haines who, working on the Herbarium Recovery Project under the auspices of the NEWFS, had previously combed through herbarium material, locating, annotating, and correcting identifications of rare species.

Farnsworth identified several hotspots of rare species diversity in New England, including the St. Johns River in Maine, White Mountains of New Hampshire, marble belt of Vermont and western Massachusetts, southern coast, and Connecticut River Valley. The average range size of the rare species has declined from 25 km^2 to 16 km^2 and the ranges have become more fragmented. Southern populations have suffered more than northern populations, causing a northwards shift in the range centers, presumably as a result of greater disturbance in the south.

Examination of different guilds, or ecological groupings, showed that species with more southern ranges show more population losses. Furthermore, upland species have declined more than wetland species, and insect-pollinated species more than those pollinated by wind and water. Calciphiles did not, however, show greater losses than non-calciphiles.

Major threats included successional changes, trampling, invasive alien species and habitat conversion. Ten percent of all rare species occurrences were accompanied by one or more invasive species, especially *Lythrum salicaria*, *Berberis thunbergii*, *Celastrus orbiculatus*, and *Phragmites australis*. Frequencies of invasives were high in southern New England, in the marble belt, in the Connecticut River and Lake Champlain valleys, and near roads and disturbed sites. Population sizes of rare species tended to be lower when invasives were present than when they were not, though declines of rare species were only marginally more frequent in invaded populations than in uninvaded populations.

Dr. Farnsworth concluded her talk with a discussion of possible future directions for this work, including studies of population dynamics and population genetics, further examination of the geography of threats, and an effort to prioritize populations for seed collections.