

Abstracts of the 2005 NEBC Graduate Student Research Award winning proposals:

Mr. David Ellum, Yale University School of Forestry and Environmental Studies for his proposal "Acclimation of shade-adapted understory herbs to seasonal canopy disturbances: incorporating physiology into plant conservation strategies for managed forests of southern New England." Herbaceous understory plants play an important role in the structural, functional and compositional integrity of managed forest ecosystems. However, there are very few studies that investigate the physiological responses of understory herbs to forest management activities. Understanding how the seasonality of canopy disturbance affects the survival of understory plants will be an essential component of plant conservation strategies that seek to protect and promote floristic diversity in managed forests. This study employs a common garden experiment to test hypotheses on the physiological acclimation capabilities of shade adapted understory herbs to seasonal increases in light intensities that result from winter versus summer canopy disturbances. CO₂ gas exchange, chlorophyll fluorescence and leaf spectral reflectance will be used to assess stress responses and acclimation potential between treatments. The study is being conducted during the 2005 growing season at Yale-Myers Forest in northeastern Connecticut using four common understory herbs; Canada mayflower (*Maianthemum canadense*), starflower (*Trientalis borealis*), wild sarsaparilla (*Aralia nudicaulis*) and Jack-in-the-pulpit (*Arisaema triphyllum*). Results can be applied to rare plant conservation strategies, cultivation techniques for non-timber forest products and plant biodiversity protection in managed forests. Funds from the award will be used for experimental materials and measurement equipment.

And

Mr. David Hewitt of Harvard University Farlow Herbarium for his proposal entitled "Species delimitations of the ascomycete genus *Neolecta* in New England based on ITS sequence comparison."

Two species of the genus *Neolecta* are widespread in New England. *N. vitellina* is smaller and the ascospores often bud in the ascus; it is generally found growing in depauperate soil. *N. irregularis* is larger and its ascospores usually do not bud in the ascus; it tends to be found growing in rich soil. The two species have not to our knowledge ever been found growing in the same locality. The study proposes to test the delimitations of species in the genus *Neolecta* by comparative DNA sequence analysis of the Internal Transcribed Spacer region (ITS). ITS will be sequenced from herbarium specimens from recent collections, and new collections will be made in fall 2005, from field sites established in New York, New Hampshire, and Massachusetts. The NEBC award will support trips to field sites.

And

Ms Sara Scanga of the State University of New York College of Environmental Science and Forestry for her proposal "The effects of demography and the abiotic environment on the rarity and persistence of a critically imperiled wetland wildflower, *Trollius laxus* (Ranunculaceae)." In New England, *Trollius laxus* (spreading globeflower), is known only from six sites in northwestern Connecticut. As part of a larger study, matrix modeling will be used in two comparative approaches in order to examine the population dynamics of *T. laxus*. The demography of a large *T. laxus* population at its northern range margin in New York will be compared to the demography of two smaller populations at its eastern range margin in Connecticut. Demographic characteristics will also be compared between *T. laxus* and its congener, *T. albiflorus*, which is widespread in high elevation wetlands of western North America. To examine how the population dynamics of *T. laxus* are related to the major factors

that define the abiotic environment, correlation and regression analysis will be used to relate climate, geology, water table depth, light, canopy openness, and frequency of canopy gap formation to the demographic characteristics of *T. laxis* populations in New York and Connecticut. This study will help to reveal the effects of demography and environmental factors on the rarity and persistence of *T. laxis*, making it possible to prescribe management strategies for conserving *T. laxis* that are specific to the varying environmental conditions across its range. This award will be used to fund several visits to Connecticut to obtain demographic and environmental data.