

COVER SHEET FOR PROPOSAL TO THE NATIONAL SCIENCE FOUNDATION

PROGRAM ANNOUNCEMENT/SOLICITATION NO./CLOSING DATE/if not in response to a program announcement/solicitation enter NSF 04-23					FOR NSF USE ONLY	
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DEB - ECOSYSTEM SCIENCE CLUSTER					0507966	
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11/17/2004	1	08010000 DEB	7381	020657151	03/06/2013 4:00pm S	
EMPLOYER IDENTIFICATION NUMBER (EIN) OR TAXPAYER IDENTIFICATION NUMBER (TIN)		SHOW PREVIOUS AWARD NO. IF THIS IS <input type="checkbox"/> A RENEWAL <input type="checkbox"/> AN ACCOMPLISHMENT-BASED RENEWAL		IS THIS PROPOSAL BEING SUBMITTED TO ANOTHER FEDERAL AGENCY? YES <input type="checkbox"/> NO <input type="checkbox"/> IF YES, LIST ACRONYM(S)		
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NAME OF ORGANIZATION TO WHICH AWARD SHOULD BE MADE SUNY College of Environmental Science and Forestry			ADDRESS OF AWARDEE ORGANIZATION, INCLUDING 9 DIGIT ZIP CODE SUNY College of Environmental Science and Forestry PO Box 9 Albany, NY. 122010009			
AWARDEE ORGANIZATION CODE (IF KNOWN) 0028514000						
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IS AWARDEE ORGANIZATION (Check All That Apply) (See GPG II.C For Definitions)		<input type="checkbox"/> SMALL BUSINESS <input type="checkbox"/> FOR-PROFIT ORGANIZATION		<input type="checkbox"/> MINORITY BUSINESS <input type="checkbox"/> WOMAN-OWNED BUSINESS		<input type="checkbox"/> IF THIS IS A PRELIMINARY PROPOSAL THEN CHECK HERE
TITLE OF PROPOSED PROJECT Biotic Control of Calcium Supply: Distinguishing Sources to Regrowing Forests						
REQUESTED AMOUNT \$ 46,120	PROPOSED DURATION (1-60 MONTHS) 0 months	REQUESTED STARTING DATE	SHOW RELATED PRELIMINARY PROPOSAL NO. IF APPLICABLE			
CHECK APPROPRIATE BOX(ES) IF THIS PROPOSAL INCLUDES ANY OF THE ITEMS LISTED BELOW						
<input type="checkbox"/> BEGINNING INVESTIGATOR (GPG I.A)			<input type="checkbox"/> HUMAN SUBJECTS (GPG II.D.6) Exemption Subsection _____ or IRB App. Date _____			
<input type="checkbox"/> DISCLOSURE OF LOBBYING ACTIVITIES (GPG II.C)			<input type="checkbox"/> INTERNATIONAL COOPERATIVE ACTIVITIES: COUNTRY/COUNTRIES INVOLVED (GPG II.C.2.j)			
<input type="checkbox"/> PROPRIETARY & PRIVILEGED INFORMATION (GPG I.B, II.C.1.d)						
<input type="checkbox"/> HISTORIC PLACES (GPG II.C.2.j)						
<input type="checkbox"/> SMALL GRANT FOR EXPLOR. RESEARCH (SGER) (GPG II.D.1)						
<input type="checkbox"/> VERTEBRATE ANIMALS (GPG II.D.5) IACUC App. Date _____			<input type="checkbox"/> HIGH RESOLUTION GRAPHICS/OTHER GRAPHICS WHERE EXACT COLOR REPRESENTATION IS REQUIRED FOR PROPER INTERPRETATION (GPG I.G.1)			
PI/PD DEPARTMENT Forest and Natural Resources Management		PI/PD POSTAL ADDRESS 1 Forestry Drive 210 Marshall Hall Syracuse, NY 13210 United States				
PI/PD FAX NUMBER 315-470-6954						
NAMES (TYPED)	High Degree	Yr of Degree	Telephone Number	Electronic Mail Address		
PI/PD NAME Ruth D Yanai	PhD	1990	315-470-6955	rdyanai@syr.edu		
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SUMMARY OF PROPOSED WORK

This is a request for an ROA Supplement for Award 235650 "Biotic control of calcium supply: distinguishing sources to regrowing forests."

Summary of Proposed Work

There has been increasing concern about the status of calcium and other base cations in the forest soils of northern New England and New York, much of which naturally has very acidic soils. Forest health is believed to be negatively impacted by calcium losses attributable to chronic exposure to acid rain, making this an important forest management issue (Likens et al. 1996, DeHayes et al. 1999, Driscoll et al. 2001) Understanding the relative role of calcium losses resulting from acid rain is key to developing effective management scenarios.

Examining the long-term effects of liming on regeneration will allow us to determine whether Ca losses are likely to be having a significant impact on forest regeneration. Information about calcium movement, retention and effect on growth would be invaluable knowledge to land managers who are attempting to manage lands for desirable species. In particular, sugar maple is thought to be sensitive to calcium leaching and the recent decline in health and vigor of adult sugar maples has been attributed, at least in part, to nutritional imbalances in base cations due to acid rain (McLaughlin et al. 1985, Vogelmann et al. 1985, Bernier and Brazeau 1988a, Bernier et al. 1989, Kolb and McCormick 1993, Horsley et al. 2000). The interactions between sugar maple and beech, including infestation of beech bark disease, may also be altered by soil acidity and calcium availability, leading to changes in forest community composition (E. Hane, unpublished data). If we determine that the liming has not improved the regeneration of sensitive species such as sugar maple, then it is much less likely that there has been any significant impact to date related to soil calcium loss.

Project goal

Goal: Assess the long-term effects of calcium loss on forest patterns and processes in the northern hardwood forest

Supporting objectives for this project include:

- Assessing effects of added lime on forest floor and soil Ca in treated and control plots
- Determining infestation rates of beech bark disease as influenced by increased soil Ca and pH
- Assessing tree regeneration and forest composition as influenced by increased soil Ca
- Analyzing existing forest regeneration data from forests in New England and New York to understand regional patterns and processes
- Development of a conceptual model of regeneration and the influence of soil factors

Project Supervision and Coordination

We propose that Dr. Elizabeth Hane lead the implementation of this supplemental study. Dr. Hane received her Ph.D. from Brown University in Ecology and Evolutionary Biology in 2001. Her dissertation research focused on multi-factor disturbances in the White Mountains of New Hampshire, and the impact of those disturbances on sugar maple regeneration. She spent two years as a post-doctoral researcher at the Proctor Maple Research Center at the University of Vermont, doing applied research in forest disease, indirect effects of invasive species and the impact of acid rain on calcium nutrition in sugar maples. She joined the biology faculty at RIT in the fall of 2003, and is developing a research program that includes invasive species, conservation biology, and ecosystem-level effects of anthropogenic disturbances. She brings experience with plant community ecology and the effects of beech bark disease and other

disturbances on forest regeneration. The supplemental study adds important information about the interaction of calcium availability with beech bark disease, an important disturbance in the northern hardwood forest. Dr. Hane's published work has shown that multiple factors play a role in regeneration patterns, and that there are often synergistic higher-order effects that are missed in single-factor studies.

Budget Justification

Ruth Yanai from SUNY-ESF will coordinate the project. She will not receive any salary. Elizabeth Hane from RIT will act as the visiting investigator. Her budget includes one month summer salary, plus fringe benefits for a total of \$6,480.

Undergraduates will be important in accomplishing the field and lab work that is required for this project. For summer field work, the total number of undergraduates required is two. Each are paid \$3,000 for a field season of 10 weeks or 50 working days per student. Field work will include: an inventory of plant species (woody and herbaceous) in limed and adjacent unlimed areas (30 people-days), forest floor sampling (20 people-days), vegetation sampling for chemistry (wood and foliage, 20 people-days) and a snail survey (10 people-days). Lab work will include data entry, the processing of forest floors for density and chemistry, as well as the preparation of the samples for chemistry processing (20 people-days). We expect lab work to continue into the fall quarter, when two students would be paid hourly \$10/hour to process samples for a total of \$2,000 (2 students, 10 hrs/week, 10 weeks = \$2,000). The budget for undergraduate summer and academic year salary is thus \$8,000, which results in a total of \$9,730 for salaries and fringe benefits for students.

Travel is budgeted at \$10,657. Of this amount, \$1257 has been budgeted for travel to and from New Hampshire. For travel to and from the field site, \$1000 was budgeted. Housing for the 2 undergrads will cost approximately \$2000 and \$10/day/student (or \$1400) was budgeted for food for the undergrads. Domestic and International travel were budgeted at \$2000 and \$3000, respectively. This amount will cover the cost of travel to and from professional meetings where presentations associated with the project will be made. International travel includes travel for the visiting investigator and student(s) to travel to meetings such as the Ecological Society of America annual meeting, which is in Montreal, Quebec next year.

Publication and documentation costs are budgeted at \$1000.

Materials and supplies are budgeted at \$2000. This will include sample processing for chemistry (100 samples @ \$10/sample = \$1000), tree corers (\$500), and other miscellaneous supplies including sample bags, tapes, flagging, etc. (\$500).