Preview of Award 0949324 - Annual Project Report

Cover

Federal Agency and Organization Element to Which Report is Submitted:	4900
Federal Grant or Other Identifying Number Assigned by Agency:	0949324
Project Title:	Collaborative Research: Nutrient co-limitation in young and mature northern hardwood forests
PD/PI Name:	Ruth D Yanai, Principal Investigator
Submitting Official (if other than PD\PI):	Ruth D Yanai Principal Investigator
Submission Date:	05/09/2013
Recipient Organization:	SUNY College of Environmental Science and Forestry
Project/Grant Period:	07/01/2010 - 06/30/2015
Reporting Period:	07/01/2012 - 06/30/2013
Signature of Submitting Official (signature shall be submitted in accordance with agency specific instructions)	Ruth D Yanai

Accomplishments

*** What are the major goals of the project?**

To test for co-limitation by N and P of aboveground production in young and old northern hardwood stands; to evaluate mechanisms for maintaining co-limitation of N and P; and to predict the long-term forest response to anticipated future conditions using a revised and improved Multiple Element Limitation (MEL) model.

*** What was accomplished under these goals (you must provide information for at least one of the 4 categories below)?**

Major Activities: Activities this year included maintaining fertilizer treatments; collecting foliar, litter and soil samples; incubating soils for carbon and nitrogen mineralization; measuring trees; surveying herbs; and processing and analyzing samples and data.

Specific Objectives:

Significant Results:

Key outcomes or Other achievements:

*** What opportunities for training and professional development has the project provided?**

Training and development continue to rely on active interactions among PIs and senior scientists, science teachers, post-docs, graduate students, undergraduates and technicians. We use weekly conference calls to involve PIs when they are off site, and frequent email on specific topics. We have weekly Science Nights with visiting speakers, alternating between the dormitories at Bartlett and Hubbard Brook. Each undergraduate and graduate student has a mentor or a committee of mentors, who review proposals and consult on implementation of projects.

Most of our students, including the summer crew, will present talks at the annual HBES Cooperators' Meeting. They also can present their final reports at a symposium in August, shared with REU students from Hubbard Brook.

*** How have the results been disseminated to communities of interest?**

Journal publications, conferences, websites.

*** What do you plan to do during the next reporting period to accomplish the goals?**

Nutrient additions will be maintained, additional sampling and measurement. 2-4 additional theses are anticipated during this reporting period.

Products

Journals

Rastetter, E. B., R. D. Yanai, R. Q. Thomas, M. A. Vadeboncoeur, T. J. Fahey, M. C. Fisk, B. L. Kwiatkowski, and S. P. Hamburg (4/1/13). Recovery from disturbance requires resynchronization of ecosystem nutrient cycles.. *Ecological Applications*. 23 (621–642), 621–642.

Status = PUBLISHED; Acknowledgment of Federal Support = Yes ; Peer Reviewed = Yes ; DOI: 10.1890/12-0751.1

Vadeboncoeur MA, SP Hamburg, JD Blum, MJ Pennino, RD Yanai, and CE Johnson. (10/5/12). The Quantitative Soil Pit Method for Measuring Belowground Carbon and Nitrogen Stocks.. *Soil Sci. Soc. Am. J.* 76 (6), 2241-225.

Status = PUBLISHED; Acknowledgment of Federal Support = Yes ; Peer Reviewed = Yes ; DOI: 10.2136/sssaj2012.0111

Levine, C.R., R.D. Yanai, M.A. Vadeboncouer, S.P. Hamburg, A.M. Melvin, C.L. Goodale, B.M. Rau, and D.W. Johnson. (9/12/12). Assessing the suitability of using rotary corers for sampling cations in rocky soils. *Soil Science Society of America Journal*. 76 (5), 1707-1718.

Status = PUBLISHED; Acknowledgment of Federal Support = Yes ; Peer Reviewed = Yes ; DOI: 10.2136/sssaj2011.0425

Yanai, R.D., M.A. Arthur, M. Acker, C.R. Levine and B.B. Park. (7/25/12). Variation in mass and nutrient concentration of leaf litter across years and sites in New Hampshire northern hardwoods. *Canadian Journal of Forest Research*. 42 (8), 1597-1610.

Status = PUBLISHED; Acknowledgment of Federal Support = Yes ; Peer Reviewed = Yes ; DOI: 10.1139/x2012-084

Fahey, T.J., R.D. Yanai, M.C. Fisk. (12/31/14). Nitrogen availability reduces soil respiration and belowground carbon allocation in northern hardwood forests of New Hampshire.. *Ecosystems*. tbd tbd.

Status = UNDER_REVIEW; Acknowledgment of Federal Support = Yes ; Peer Reviewed = Yes

Books

Book Chapters

Thesis/Dissertations

Conference Papers and Presentations

Bae, K., Yanai, R.D., S.P. Hamburg, J.D. Blum, M.A. Arthur, M.A. Vadeboncoeur, C.R. See, and C.R. Levine. (8/6/12). *Sustainable harvest requires calcium supply from soil pools: Ecosystem budgets for second-growth northern hardwoods in New Hampshire.*. Ecological Society of America Annual Meeting. Portland, OR.

Status = OTHER; Acknowledgement of Federal Support = Yes

See, C., B.A. Quinero, and R.D. Yanai (8/8/12). *Nitrogen and phosphorus resorption efficiency ratios vary with stand age in northern hardwoods*. Ecological Society of America Annual Meeting. Portland, OR.

Status = OTHER; Acknowledgement of Federal Support = Yes

Bae, K., R. Yanai, and T. Fahey (9/9/12). *No fertilization effects on soil respiration and root respiration in northern hardwoods of New Hampshire.*. Long Term Ecological Research All Scientists Meeting. Estes Park, CO.

Status = OTHER; Acknowledgement of Federal Support = Yes

Diggs, F.D., R.D.Yanai, T.R. Horton (11/10/12). . *2012. Variance in mycorrhizal colonization in stands of mixed hosts. —, November 10, 2012*. Rochester Academy of Science. Rochester, NY.

Status = OTHER; Acknowledgement of Federal Support = Yes

Bae, K., and R.D. Yanai (11/10/12). *Fertilization effects on soil respiration, root respiration, and microbial respiration in northern hardwoods of New Hampshire.*. Rochester Academy of Science. Rochester, NY.

Status = OTHER; Acknowledgement of Federal Support = Yes

See, C.R., H.A. Tremblay, R.D. Yanai (10/6/12). *The Grass in always greener: nitrogen processes in lawns and adjacent forest land in the White Mountains.*. 10th Annual Symposium in Plant Biology. Amherst, MA.

Status = OTHER; Acknowledgement of Federal Support = Yes

See, C.R., R.D. Yanai, M.C. Fisk. (4/14/13). *Foliar N:P ratios and resorption efficiencies provide evidence of nutrient co-limitation in a northern hardwood forest*. Northeastern Natural History Conference. Springfield, MA.

Status = OTHER; Acknowledgement of Federal Support = Yes

Fisk, Melany, Tera Ratliff, Shinjini Goswami, Craig See, Brendan Naples, Ruth Yanai, Matt Vadeboncoeur , Tim Fahey. (9/9/12). *Examining nutrient co-limitation in northern hardwood forests.*. Long Term Ecological Research All Scientists Meeting. Estes Park, CO.

Status = OTHER; Acknowledgement of Federal Support = Yes

Goswami, S., C. See, M. Fisk, M. Vadeboncoeur, and R. Yanai. (9/9/12). *Evidence for species-specific nutrient limitation of growth efficiency in northern hardwoods.*. Long Term Ecological Research All Scientists Meeting. Estes Park, CO.

Status = OTHER; Acknowledgement of Federal Support = Yes

Other Publications

Technologies or Techniques
Nothing to report.

Patents
Nothing to report.

Inventions
Nothing to report.

Licenses
Nothing to report.

Websites

Title:	Multiple Element Limitation in Northern Hardwood Ecosystems
URL:	http://www.esf.edu/MELNHE
Description:	We use the MELNHE website to provide news blurbs about the project to any interested party, and also use a password protected section to share data, photos, and documentation among collaborators.

Other Products

Product Type:	Physical Collections
Description:	Many samples with long-term value are stored at SUNY-ESF and tracked through a

system developed by the Soil Fertility Laboratory. Samples in active use are at many locations. Samples are tracked on a googledoc. Resultant data is shared among cooperators via http://www.esf.edu/melnhe

Other:

Participants

Research Experience for Undergraduates (REU) funding

How many REU applications were received during this reporting period? 30

How many REU applicants were selected and agreed to participate during this reporting period? 3

What individuals have worked on the project?

Name	Most Senior Project Role	Nearest Person Month Worked
Hannah Tremblay	Research Experience for Undergraduates (REU) Participant	1
Matthew Vadeboncoeur	Technician	3
Christina Kim	Technician	1
Mariann Garrison-Johnston	Faculty	1
Clarissa Lyons	Research Experience for Undergraduates (REU) Participant	1
Tyler Loucky	Research Experience for Undergraduates (REU) Participant	0
Adam D Wild	Other	2
Alannie-Grace G Grant	Other	2
Ruth D Yanai	PD/PI	1
Mark Green	Faculty	1

What other organizations have been involved as partners?

Name	Location
Cornell University	Ithaca, NY
Hubbard Brook Research Foundation	North Woodstock, NH
Marine Biological Laboratory	Woods Hole, MA
Miami University	Oxford, OH

Name	Location
USDA Forest Service - Northeastern Forest Experiment Station	Bartlett, NH
University of Michigan	Ann Arbor, MI

Have other collaborators or contacts been involved? Y

Impacts

What is the impact on the development of the principal discipline(s) of the project?

Ecosystem theory tested by the MEL model. Also see Journal publications, above.

What is the impact on other disciplines?
Nothing to report.

What is the impact on the development of human resources?

See Training and Development, above.

What is the impact on physical resources that form infrastructure?

The identification, treatment (N,P, Ca), and study of replicate plots at three different site and two or three stand ages on each federal property represents a huge investment in research infrastructure.

What is the impact on institutional resources that form infrastructure?

The project contributes to the HBR LTER. We invite participation from any potential collaborators with the ideas and the motivation to join us, and the team continues to grow.

What is the impact on information resources that form infrastructure?

We contribute data sets to the HBR LTER.

What is the impact on technology transfer?
Nothing to report.

What is the impact on society beyond science and technology?
Nothing to report.

Changes

Changes in approach and reason for change
Nothing to report.

Actual or Anticipated problems or delays and actions or plans to resolve them

One of our fertilizers (Ammonium nitrate) may become more difficult to obtain and store following the West, TX plant explosion. If necessary, ESF will become either a 'registered' user (preferred) or substitute urea.

Changes that have a significant impact on expenditures

Technician left the program, and there has been a delay in replacing her. By hiring well qualified advanced graduate students for the summer season, we concentrated their effort to when it was most needed at lower fringe costs.

Significant changes in use or care of human subjects

Nothing to report.

Significant changes in use or care of vertebrate animals
Nothing to report.

Significant changes in use or care of biohazards
Nothing to report.