

**ANNUAL REPORT: June 1, 2013 – May 31, 2014**  
**(i.e., Summer 2013, AY 2013-2014)**  
**DEPARTMENT OF ENVIRONMENTAL AND FOREST BIOLOGY**  
**SUNY-ESF**

**NAME:** Tom Horton

**I. INSTRUCTIONAL ACTIVITIES**

1. Regular Course Offerings

	<u>Course No.</u>	<u>Title</u>	<u>Credit Hrs.</u>	<u>No. Students</u>	<u>No. of Lab. Sections</u>
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SUMMER:

FALL:	EFB 320	General Ecology	4	235	10
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SPRING:

**NOTE: PLEASE INDICATE WHICH COURSE(S) HAD A SERVICE-LEARNING COMPONENT AND BRIEFLY EXPLAIN THE NATURE OF THIS COMPONENT.** For examples of service-learning in courses, see: <http://www.esf.edu/students/service/courses.htm>. Service-learning is a form of structured experiential education in which students engage with the community to be active learners, to enrich their sense of civic responsibility, and to explore practical application for course content. Faculty oversight, reflective thinking, and reciprocity are key components of service-learning.

EFB 898 Professional Experience: This was a successful project by my MPS student (finished Fall 2013) dedicated to designing and installing new interpretive displays at Baltimore Woods.

2. Non-Scheduled Course Offerings (e.g., 496, 899, 999)

	<u>Course No.</u>	<u>Title</u>	<u>Credit Hrs.</u>	<u>No. Students</u>
FALL 2013				
	EFB 298	Research Internship/Env Bio	1	2
	EFB 420	Prof Internship/Env Bio	1	1
	EFB 495	Undergrad Exp/Coll Teach	1	1
	EFB 496	Adv Mycology/Basidiomycetes	2	5
	EFB 498	Independent Research/Env Bio	2-3	2
	EFB 796	Adv Mycology/Basidiomycetes	2	2
	EFB 797	Ecosystem Thought	1	9
	EFB 898	Professional Experience	7	1
	EFB 999	Masters Thesis Research	8	1
	ESF 499	Honors Thesis/Project	4	1

SPRING 2014

EFB 298	Research Internships/Envrn Biology	1	1
EFB 420	Prof Internship/Env Bio	3	1
EFB 498	Independent Research/Envrn Bio	2-4	2
EFB 899	Masters Experience	1	2
EFB 999	Doctoral Thesis Research	1	1
ESF 499	Honors Thesis/Project	1	1

3. Continuing Education and Extension (short courses, workshops, etc.)

4. Guest Lecture Activities

<u>Course No.</u>	<u>Title</u>	<u>No. of Lectures</u>
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## II. STUDENT ADVISING

A. Number of undergraduates for whom you are the student's official advisor \_21\_ and unofficial advisor \_3\_

B. Graduate Students: (list name, degree sought, starting date, month & year; if a degree was completed, please give date and full citation for the thesis or dissertation).

### MAJOR PROFESSOR

Hayward, Jeremy, PhD, August 2010. Specificity and facilitation in the ectomycorrhizal symbiosis: implications for biological invasions and isolated islands. April 2014.

Holmes, Elisabeth, MPS, January 2011. Finished December 2013.

Walling, Rebecca, MS, January 2011. Effects of earthworm invasions on soil properties, plant communities, and ectomycorrhizal fungi. May 2014.

### CO-MAJOR PROFESSOR

Haynes, Brandon MS (Daley), August 2013.

Tomes, Andrew MS (Kimmerer), August 2013.

### MEMBER, STEERING COMMITTEE (other than those listed above)

Arrigoni, Jim, PhD (Gibbs)

Diggs, Franklin, MS (Yanai)

Dowie, Nicholas, PhD (Miller) elevated to candidacy Spring 2012, University of Wyoming

Funmi, Afeluma, MS (Lee Newman)

Gray, Amnada, MS (Briggs)

Oakes, Allison, PhD (Maynard)

Smith, Sara, MS, (Kimmerer)

Soka, Geoffrey, PhD (Ritchie) elevated to candidacy Spring 2012, Syracuse University

Walling, Dale, MS (Powell)

### CHAIRMAN OR READER ON THESIS EXAMS, ETC.

Turner, Sara PhD (Limburg) Successfully defended Spring 2014

Bullock, Michael, MS (Kuehn)

Bader, Grete MS (Leopold)

### III. RESEARCH COMPLETED OR UNDERWAY

#### A. Departmental Research (unsupported, boot-legged; title - % time spent)

Evaluating the Potential of Mycorrhizae for Increasing Chestnut (*Castanea dentata* [Marsh.] Borkh.) Restoration Success and Modeling Distributions of Ethnobotanically Significant Species Sensitive to Climate Change – 5%. Andrew Tomes MS student.

Use of a soil bioassay technique as bait for locally adapted ectomycorrhizal fungi for pine establishment at the Albany Pine Bush Preserve. – 1%. Gabriel Smith, Mason Clark undergraduate students on project.

#### B. 1. Grant-supported Research (source, subject, amount - total award and current year, award period starting and ending dates; list graduate research assistants supported by each grant)

Simberloff D, Nuñez MA, Horton TR. 2010 – 2015. Collaborative Research: Determinants of ectomycorrhizal fungal spread and its relation to Pinaceae invasion. NSF Population and Community Ecology panel. The total award is \$571,637, with \$242,040 to Horton as a Collaborative award. No-cost Extension to 2015. Jeremy Hayward.

Horton TR. 2012-2015. The effects of invasive earthworms on soil microbes and nutrient cycling in hemlock forests. Mianus River Gorge Preserve, \$21,000. \$7,000 for 2013/14. Rebecca Walling

#### 2. Research Proposals pending (include information as in B.1., above).

Green M, Asbjornsen H, Horton TR, Yanai R. Preliminary Proposal: RUI: Causes of Nutrient-Enhanced Transpiration in Northern Hardwoods: Leaves, Stems, Roots, or Mycorrhizal Fungi? Preproposal reviewed, full proposal invited April 2014.

Hobbie EA, Rowe R, Epps, CW, Horton TR. Stable isotope and radiocarbon analyses link fungivory in small mammals to organic nitrogen cycling. Preproposal reviewed, full proposal invited April 2014.

#### 3. Research Proposals submitted, but rejected (include information as in B.1., above)

### IV. PUBLICATIONS (Full bibliographic citation, i.e., do not use "with Jones," or "Jones, et al."; please list only publications published, in press, or actually submitted during this reporting period --- **do not list manuscripts in preparation**).

#### A. Refereed Publications

Note graduate students are shown in bold. Note also new species named after Annette Kretzer in the last pub.

The following were in revision or in press for the 2011-2012 annual report. They are now published.

**Dulmer KM**, LeDuc SD, Horton TR (2014) Ectomycorrhizal inoculum potential of northeastern US forest soils for American chestnut restoration: results from field and laboratory bioassays. *Mycorrhiza* 24 (1), 65-74.

Horton TR, **Hayward J**, **Tourtellot SG**, Taylor DL (2013) Uncommon ectomycorrhizal networks: richness and distribution of Alnus- associating ectomycorrhizal fungal communities. *New Phytologist* 198: 978-980

Nuñez MA, **Hayward J**, Horton TR, Amico GC, Dimarco RD, Barrios-Garcia MN, Simberloff D. (2013) Exotic Mammals Disperse Exotic Fungi That Promote Invasion by Exotic Trees. *PLoS ONE* 8(6): e66832.

The following are new and in various stages of revision after review to a journal as indicated.

**Rivera Y**, Kretzer AM, Horton TR (reviewer comments addressed and MS returned) New microsatellite markers for the ectomycorrhizal fungus *Pisolithus tinctorius sensu stricto* reveal the genetic structure of US and Puerto Rican populations. *Fungal Ecology*.

**Hayward J**, **Tourtellot S**, Horton TR (In press) A revision of the *Alpova diplophloeus* complex in North America. *Mycologia*. Grubisha LC, Dowie NJ, Miller SL, **Hazard C**, Trowbridge SM, Horton TR, Klooster MR (In press) *Rhizopogon kretzeriae* sp. nov.: the rare fungal symbiont in the tripartite system with *Pterospora andromedea* and *Pinus strobus*. *Botany*.

Horton TR, Swaney DP, Galante TE (2013) Dispersal of ectomycorrhizal basidiospores: the long and short of it. *Mycologia* 105: 1623-1626.

## B. Non-refereed Publications

### C. Papers Presented at Science Meetings (give title, date, occasion, and location)

Alteio LV, Walling RL, Horton TR. 2014. Hungry, hungry earthworms: how invasions affect decompositional enzyme activity. Rochester Academy of Sciences.

\*This poster was selected for the biannual symposium highlighting undergraduate research at CUNY and SUNY campuses entitled: "Boosting Innovative Exploration Forum: Undergraduate Research in New York State's Public Higher Education System." It was on display April 1, 2014 in the Legislative Office Building in Albany, NY.

Walling R, Horton TR The effects of invasive earthworms on soil properties and ectomycorrhizal fungi. Ecological Society of America annual meeting, August 2013. University of Minnesota, Minneapolis.

### D. Public Service Presentations (lectures, seminars, etc. to and for the public; give group or occasion, date(s), and attendance)

Horton TR. Ectomycorrhizal ecology under primary succession on coastal sand dunes: interactions involving *Pinus contorta*, suilloid fungi and deer. Asa Gray Seminar Series. Utica College. February 10. 50 attended.

Horton TR. Ectomycorrhizal ecology under primary succession on coastal sand dunes: interactions involving *Pinus contorta*, suilloid fungi and deer. Mid-York Mycological Society monthly meeting. September 16. ~20 attended.

Horton TR. *Epipactis helleborine* - An invasive orchid that is probably in your garden. Syracuse Botanical Garden club meeting. November 4. ~15 attended

Vincent Neil Mushroom Festival at Beaver Lake. Faculty advisor with members of the CNYMS, Mid-York Mycological Society and Beaver Lake Nature Center. September 15. ~100 attendees.

## V. PUBLIC SERVICE

### A. Funded Service (include consulting activities)

#### 1. Government Agencies (Federal, State, Local):

Initiated project at Albany Pine Bush Preserved to pine stands to areas where invasive locust trees have been removed.

#### 2. Industrial and Commercial Groups, etc.

### B. Unfunded Service to Governmental Agencies, Public Interest Groups, etc.

Scientific advisor – Central New York Mycological Society

Scientific advisory board – Mianus River Gorge Preserve

Mushroom Poisoning: I had several calls this past fall from Poison Control centers in Syracuse and New York City. Only one proved to be a case of destroying angel ingestion. The patient recovered after several days in the hospital.

## VI. PROFESSIONAL DEVELOPMENT

### A. Professional Honors and Awards (for teaching, research, outreach, etc.)

William H. Weston Award for Excellence in Teaching, Mycological Society of America, March 2014.

### B. 1. Activities in Professional Organizations (offices held, service as chairman, member, participant or consultant)

Student Awards Committee, Mycological Society of America. 2013-2017.

## 2. Professional Society Membership

Botanical Society of America  
Mycological Society of America  
International Mycorrhiza Society

## 3. Other Professional Activities

### a. Editorial activity

<u>Journal (s)</u>	<u>Responsibility</u>
Mycorrhiza	Editorial Board

#### Other (books, symposia, etc.)

Mycorrhizal Networks: Springer Ecological Studies Series

I am sole editor for this contributed author volume.

The manuscript is nearly complete and ready for submission to the publisher this summer.

### b. Reviewer

<u>Journal(s)</u>	<u>No. of manuscripts</u>
Ecological Engineering	1
Fungal Ecology	1
Mycorrhiza	1
Molecular Ecology 1	
Journal of Ecology	1

<u>Agency</u>	<u>No. of proposals</u>
DEB - Biodiversity: Discov & Analysis	1
US Forest Service	1 (friendly MS review)

#### Other

### c. Participation (workshops, symposia, etc.)

<u>Name of workshop, etc.</u>	<u>Date</u>	<u>Place</u>
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## C. Further Education/Re-training Undertaken, Leaves, Workshops, etc.

## D. Foreign Travel (Where, When, Purpose)

## **VII. ADMINISTRATIVE AND SERVICE RESPONSIBILITIES (include committee participation)**

### A. Department-level

Faculty mentoring committees: Martin Dovciak, Melissa Fierke, Sadie Ryan, Gordon Paterson

Promotion and Tenure Committee

Environmental Microbiologist Search Committee

B. College-level  
Academic Research Building Committee

C. University-wide, including Research Foundation

### **VIII. SUMMARY OF SIGNIFICANT ACTIVITIES AND ACCOMPLISHMENTS DURING THIS REPORTING PERIOD, ESPECIALLY THOSE MOST NOTEWORTHY AND RELATIVE TO THE COLLEGE'S AND DEPARTMENT'S MISSION.**

**One** paragraph on each of the following (**i.e., three paragraphs total**) would be most helpful: this past year, what have you done for our students, department/college, and self professionally? NOTE: The information in this section (along with the supporting specific information elsewhere in this report) should be your strongest case for being considered for a discretionary raise (when available), which I'll continue to award based on your contributions to the department and college this reporting period.

#### Students

Teaching continues to be a joy. I again had a great cohort in General Ecology. I also facilitated EFB 496/796, Advance Mycology: Basidiomycetes, an EFB 797 seminar, A History of Ecosystem Thought, which were led by very capable graduate students and the students in these classes were very positive. The Ecosystem Thought seminar was particularly helpful for students in several of our graduate disciplines as they prepared for their exams. This was also a great year for student research in my lab. It was fantastic working with one of this year's recipient of the SUNY-ESF Chancellor's Award for Excellent. This student is starting a funded PhD program in the fall. Further, this student and one other also conducted successful research under the SUNY-ESF Honors Program. These and other students were part of an army of undergraduates' working under the wing of my graduate students and myself, earning credit towards their degrees (EFB 298, 420 and 498). It was a very active year and it was a pleasure working with such capable students. I also had successful graduate level research in the lab. One student finished a PhD that has already included three publications and several more ready for submission in the next month. A second student finished an MS degree and a third finished a MPS degree. I also chaired the awards committee for the Lowe-Wilcox, Zabel, Morrell and Silverborg scholarship awards. The awards ceremony and graduation is probably the best day of the year for me.

#### Department/College

General Ecology course is an incredibly important course at ESF -- the topic encompasses what most of us do in EFB and at ESF in one form or another. I am also on the P & T committee, which had a full slate this year that included reviewing dossiers of several colleagues up for promotion and tenure. The P & T committee also spent a considerable amount of time taking a serious look at our criteria for promotion and tenure decisions and we are making good progress in coming up with new guidelines to help everyone navigate this incredibly important aspect of our jobs. Related to this effort is my engagement in helping young faculty navigate their first years in EFB as a faculty mentor and I am thoroughly committed to this task. Just as important as the P&T process is the hiring of excellent new faculty and to this end I also served on the Environmental Microbiologist search committee. I also attended the job interview seminars for our new president in the fall. Both new hires were part of a great slate of candidates and I am excited about how the new hires will contribute to EFB and ESF.

#### Self

I was awarded the Mycological Society of America Weston Excellence in Teaching award this spring. This is a national award that former graduate and undergraduate students initiate and submit the nomination documents on a recipient's behalf. As I said to several students during the process, I am humbled by their effort and feel it demonstrates what excellent and engaged students I have had the pleasure of mentoring in EFB at ESF. I was also invited to give two seminars, one at Utica College as part of their Asa Gray seminar series in February. The other invitation is for a symposium on spore dispersal in early August at the International Mycological Congress in Bangkok, Thailand. This is especially nice in that the organizers recognized recent publications of my colleagues and I on ectomycorrhizal spore

dispersal, especially with respect to animal dispersal and pine invasions in South America (see PlosOne article). I was also invited to write a commentary for the New Phytologist on host specificity and mycelial networks. This too is meaningful given the recognition by this important international journal and it gives a nod to the book I am putting out shortly on Mycorrhizal Networks. The book is very near completion. All chapters are in except one, which is in the final stages of revision. In total, I have four papers now published and three additional papers in press or in review following revision. Two more papers from my recently minted PhD student will likely be submitted by the end of June as they have been fully vetted by the steering committee and are ready for submission. Finally, I am very happy to report that NSF invited both preproposals I co-authored for full proposal submission this round. The one with the highest recommendation (“High Priority Invite”) specifically addressed the mycorrhizal component of our ideas. I keep my fingers crossed that one or both of these full proposals will lead to funding in the fall. I have also initiated an exciting project at the Albany Pine Bush that incorporates lessons I have learned about the role of ectomycorrhizal fungi in pine establishment following fire. I am particularly excited about this project as it is New York center and has a strong fire ecology component. I am also working with colleagues in Chile and Argentina who will continue work we started on Pinaceae invasions, mycorrhizal fungi, and spore dispersal. This project has been awarded funding through the Chilean government. In summary, this has been a VERY productive year and my efforts in teaching and research were acknowledged.

#### **IX. A. FUTURE PLANS, AMBITIONS, AND POTENTIAL CONTRIBUTIONS FOR YOUR OWN PROFESSIONAL DEVELOPMENT AND THE ENHANCEMENT OF THE PROGRAM IN ENVIRONMENTAL AND FOREST BIOLOGY (brief summary)**

##### **B. PROJECTED ACTIVITIES FOR NEXT YEAR**

###### 1. Summer 2013

###### a. Course(s) to be offered

###### b. Proposed research activity

Finish book on Mycorrhizal Ecology

Full proposals:

Green M, Asbjornsen H, Horton TR, Yanai R. Preliminary Proposal: RUI: Causes of Nutrient-Enhanced Transpiration in Northern Hardwoods: Leaves, Stems, Roots, or Mycorrhizal Fungi? Preproposal reviewed, full proposal invited April 2014.

Hobbie EA, Rowe R, Epps, CW, Horton TR. Stable isotope and radiocarbon analyses link fungivory in small mammals to organic nitrogen cycling. Preproposal reviewed, full proposal invited April 2014.

Parker VT, Burge D, Dawson T, Horton TR, de la Torre J, Simonin K Is there a phylogenetic signal in species interactions shaping community and ecosystem responses. For NSF Dimensions in Biodiversity call for proposals. Due April 2015.

Bootlegged projects

Do nonnative mammals modify the invasion of nonnative trees: an analysis of mechanisms based on lake island of Andean Patagonia National agency of promotion of science and technology, with Nuñez (Argentina) and Kitzberger (Chile) Received news of the award to Kitzberger 5/28/2014

Assessment of Removal of *E. coli* in Water using *Pleurotus ostreatus* Spent Mushroom Waste, with Doug Daley and Brandon Haynes

Horton TR. Use of mycorrhizal fungi to restore pine stands at Albany Pine Bush following removal of invasive locust.

c. University, professional society, and public service

Attend Mycological Society of America annual meeting where I will pick up the Weston award  
P&T work on new guidelines.

2. Fall Semester 2013

a. Course(s) to be offered

EFB 320, General Ecology  
EFB 428/628, Mycorrhizal Ecology  
EFB 797, History of Ecosystem Thought

b. Proposed research activity

Revise and submit chapters as manuscripts with recent graduates.  
Guide current co-advised MS students on their projects as well as several students as a steering member.  
Parker VT, Burge D, Dawson T, Horton TR, de la Torre J, Simonin K Is there a phylogenetic signal in species interactions shaping community and ecosystem responses. For NSF Dimensions in Biodiversity call for proposals. Due April 2015.

Bootlegged projects

Do nonnative mammals modify the invasion of nonnative trees: an analysis of mechanisms based on lake island of Andean Patagonia National agency of promotion of science and technology, with Nuñez (Argentina) and Kitzberger (Chile) Received news of the award to Kitzberger 5/28/2014  
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Horton TR. Use of mycorrhizal fungi to restore pine stands at Albany Pine Bush following removal of invasive locust.

c. University, Professional society, and public service

P&T work.  
Undergraduate advising.

3. Spring Semester 2014

a. Course(s) to be offered

b. Proposed research activity

Revise and submit chapters as manuscripts with recent graduates.  
Guide current co-advised MS students on their projects as well as several students as a steering member  
Parker VT, Burge D, Dawson T, Horton TR, de la Torre J, Simonin K Is there a phylogenetic signal in species interactions shaping community and ecosystem responses. For NSF Dimensions in Biodiversity call for proposals. Due April 2015.

Bootlegged projects

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Horton TR. Use of mycorrhizal fungi to restore pine stands at Albany Pine Bush following invasive locust removal.

c. University, professional society, and public service

P&T work



Undergraduate advising.