

Proposal for the NATL \$500 minigrant

Title: Inventory of the common lichens of the Natural Area Teaching Laboratory

Proposer of Project:

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Experience or training related to proposed project: Five years of lichen identification and herbarium experience, co-author of published and unpublished taxonomic keys for Florida lichens (Kaminsky et al. 2013)

Project Advisors:

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Project summary: I propose to collect an estimated 35 common lichens present in the Natural Area Teaching Laboratory (NATL). I will take pictures of each species, and write a nontechnical field-oriented key for the common lichens at NATL. I will also collect preliminary sequence data on fungus and cyanobacteria diversity that form *Leptogium cyanescens*, a common nitrogen fixing lichen. The data will be used to assess whether the fungus genotype associates with one or multiple cyanobacteria genotypes. All field-oriented keys and results will be placed on the NATL website.

Starting date- January 6, 2015

Completion date- July 6, 2015

Description of project (objectives, procedures, lasting impacts on NATL)

I am a Biology graduate student and my research is focused on lichens. Lichens are a symbiosis between a fungus and alga or fungus and cyanobacterium. There are estimated to be approximately 28,000 species and these cryptic organisms are often studied as key bioindicators of ecosystem health (Nimis et al. 2002). Some lichens also have the ability to fix atmospheric nitrogen (Brodo et al. 2001). Lichens can be used to study pollution (Jovan & McCune 2005) and climate change (van Herk et al. 2002).

Amateur naturalists often avoid lichen identification because lichens are difficult to identify and there are not many resources for identifying local species. With online technology there is an increased ability to create nontechnical resources that can be utilized by members of the general public. The goal of this project is to increase awareness of lichens in the Natural Area Teaching Laboratory (NATL) on campus and create nontechnical lichen resources for students and amateur naturalists.

To accomplish this goal first I will collect the common lichens at NATL, an estimated 35 common species. I will create a species list, take pictures of each species, and write a non-technical field-oriented key to the common lichen species at NATL, including some unique and interesting facts about lichens. All of these resources will be made available to the general public

via the NATL website. These resources will offer a way for future outdoor enthusiasts and Mycology students to learn more about the biodiversity and ecological importance of lichens. Lastly, I will create 15 printed copies of the NATL lichen guide to be used by future students in the Fungal Biology course at UF (PLP 4653C/6656C).

Collections will be made in both the *Pinus* and deciduous hardwood forests at NATL because each may have slightly different lichen flora. I will collect at least one voucher specimen of each species at NATL. Most specimens will be collected from fallen branches. For specimens on live tree bark, it may be necessary to remove a couple of centimeters of bark but care will be taken to minimize harm to the trees. The specimens should be easily accessible to enable future research. Voucher specimens will be deposited at the herbarium of the Florida Museum of Natural History (FLAS). Pictures will be taken either in the field or in the laboratory depending on size and characteristics.

In addition to the lichen photos, collections, and key, I will sample the combined cyanobacteria and fungus diversity within one particular species of lichen, *Leptogium cyanescens*. The goal of this research is to make a preliminary assessment of whether a fungus in a population will associate with one or several cyanobacterial genotypes. This information is critical to understanding whether or not a species that reproduces primarily asexually is transmitted vertically (fungus and cyanobacteria are co-dispersed) or horizontally (fungus and cyanobacteria dispersed independently and then a lichen re-forms). I will sample 10 individuals from the NATL site and use up to 4 loci from the cyanobacteria and 4 four from the fungus for my analysis. Sanger sequencing will be used to determine nucleotide sequence.

In conclusion, this study will increase baseline knowledge of lichen diversity at NATL and increase education of both students and the wider community of naturalists in the Gainesville region. All results will be delivered digitally to NATL by July 6th, 2015.

LITERATURE CITED

Brodo IM, Sharnoff SD, Sharnoff S. 2001. Lichens of North America. Yale University Press.

Jovan S, McCune B. 2005. Air-quality bioindication in the greater central valley of California, with epiphytic macrolichen communities. *Ecol Appl* 15(5):1712-1726.

Kaminsky B, Rosentreter R, DeBolt A. 2013. Ecology and distribution of *Coccocarpia filiformis* and other new and uncommon Florida lichens. *Evansia* 30(3):79-89.

Nimis PL, Scheidegger C, Wolseley PA. 2002. Monitoring with lichens—monitoring lichens. Springer.

van Herk Cv, Aptroot A, Van Dobben H. 2002. Long-term monitoring in the Netherlands suggests that lichens respond to global warming. *The Lichenologist* 34(02):141-154

Budget

Collecting supplies (hand lens, collecting knife, collection bags):	\$75
Curation supplies (Archival paper, glue and other mounting supplies):	\$75
Microscope materials (slides and coverslips):	\$50
Copies of field keys to NATL lichens (15 copies at \$10):	\$150
Sequencing supplies: (\$2.65 per sample, total 56 wells of Sanger):	\$150
	Total: \$500

Provision for periodic communication with NAAC administration

I will provide monthly updates via email to the NAAC administration as well as Facebook. I will also upon completion notify various UF departments about the NATL lichen key.

Signatures

Only the paper copy needs to be signed.

Student _____ Date _____

Sponsor _____ Date _____

Sponsor _____ Date _____

