P. Alexander Burnham

Samantha Alger

21, October 2016

Mini Grant App.

Do migratory honeybee operations have higher disease loads than stationary ones?

**Title:**

**Abstract:**

**Budget:**

**Budget Summary:** why do we need these items, what will they be used for etc.

**Project Context:** what do we know about subject, paper etc.

**Project significance:** the big so what?

**Project goals:**

The objective of this study is to determine whether or not migratory honeybee operations are more diseased than stationary ones. To answer this question, we will sample 32 North Carolina colonies for diseases (RNA viruses, *Nosema*, Varroa Mites and American Foul Brood) in January of 2017 before they are sent to California to pollinate Almonds. Sixteen of the colonies (stationary group) will remain behind in North Carolina, while the 16 (migratory group) will be shipped to California for 1 month of almond pollination between February and March. The migratory colonies will then be shipped back to North Carolina where both groups will again be tested for diseases. The results of this study will be submitted for publication in a peer reviewed, scientific journal, adding to the current body of knowledge on bee disease.

**Banner Image:** 1280 pixels x 720 pixels

**Research Team:**

**Samantha Alger (Ph.D. Candidate), Department of Biology, UVM**

The goal of her research is to examine the prevalence, means of transmission, and effects of RNA viruses on bumble bees. She also leads Vermont’s involvement in the National Honey Bee Survey (NHBS), a comprehensive survey of honeybee pathogens and parasites throughout apiaries in the United States.

**Alex Burnham (M.S. student), Department of Biology, UVM**

Alex Burnham is a Masters student at the University of Vermont in the Department of Biology. His work focuses on experimental and mathematical model-based approaches to looking at disease prevalence, interactions and co-infection using bumblebees as a model organism. In addition, he is a sample collector for the National Honeybee Survey (NHBS) in the state of Vermont.

**Zac Lamas**

Zac Lamas is a commercial beekeeper and owner of Sun Hill Farm. He overwinters hives in New England and on the coast of North Carolina where he produces queens and nucleus colonies for both commercial and hobbyist beekeepers before returning to New England.

**Dr. Leif Richardson (postdoctoral fellow), Gund Institute for Ecological Economics  
Rubenstein School of Environment & Natural Resources, UVM**

Dr. Leif Richardson is a USDA National Institute of Food and Agriculture postdoctoral research fellow in the lab of Dr. Taylor Ricketts at the University of Vermont. He was previously a graduate student at Dartmouth College in the lab of Dr. Rebecca Irwin, and served as State Lands Ecologist with the Vermont Agency of Natural Resources. His work focuses on interactions among species, in particular those involving bees, their parasites and the plants they pollinate. He also studies the causes and consequences of bee species declines.

**Video?:** optional but 60% higher chance of funding

**Sources:**

Runckel, C., Flenniken, M. L., Engel, J. C., Ruby, J. G., Ganem, D., Andino, R., & DeRisi, J. L. (2011). Temporal analysis of the honey bee microbiome reveals four novel viruses and seasonal prevalence of known viruses, Nosema, and Crithidia. *PloS One*, *6*(6), e20656.

Stats on migratory operations and talks about 4 novel RNA viruses in honeybees

Traynor, K. S., Rennich, K., Forsgren, E., Rose, R., Pettis, J., Kunkel, G., … vanEngelsdorp, D. (2016). Multiyear survey targeting disease incidence in US honey bees. *Apidologie*, *47*(3), 325–347.

NHBS mentions higher varroa in stationary yards with higher nosema in migratory yards (no viruses)

Welch, A., Drummond, F., Tewari, S., Averill, A., & Burand, J. P. (2009). Presence and prevalence of viruses in local and migratory honeybees (Apis mellifera) in Massachusetts. *Applied and Environmental Microbiology*, *75*(24), 7862–7865.

Higher BQCV and SBV in migratory yards compared to stationary