NORTHEAST REGIONAL CONSERVATION NEED GRANT QUARTERLY REPORT

Grant Number: **2010-01**
Grant Title: ***"Laboratory and Field Testing of Treatments for White Nose Syndrome: Immediate Funding Need for the Northeast Region"***
Grant Receipt**: Bucknell University**
Grant Contact Name: **DeeAnn M. Reeder, Department of Biology**

This project is in support of RCN topic#12 "Identify and Address Factors Contributing to the Regional Decline of Populations of SGCN". Hibernating bats in the NE USA have experienced sudden and dramatic declines over the past three winters due to an emerging infectious disease dubbed "White Nose Syndrome" (WNS). As of January, 2012, new estimates of the number of bats that have died thus far range from 5.7 to 7.7 million, and the causative agent is now known to be the cold-loving fungus *Geomyces destructans* (Gd). This proposal aims to address these declines by developing and implementing methodologies to combat WNS, which was specifically referenced in the call for proposals. Specific goals include: (1) testing potential treatments for efficacy against cultured Gd (the fungal pathogen associated with WNS) under laboratory conditions, (2) testing potential treatments for safety in healthy bats, and (3) testing potential treatments for efficacy against Gd in hibernating bats. Trials are currently being conducted under strictly controlled conditions in a captive setting, in which microclimate is tightly controlled and in which each bat's behavior can be tracked. Limited, highly selective field trials will also be conducted. Studies of the anti-Gd activity of terbinafine, voriconazole, and other anti-fungal compounds are ongoing, but were definitive enough for drug testing of terbinafine and voriconazole to begin in November, 2011, with final analyses completed by December, 2012. During the 2011-2012 hibernation season (November to March), both safety and efficacy trials of selected compounds are being performed on control and Gd-infected bats under controlled laboratory conditions. This will work be completed by April 2012, with analyses of results (including immunological assays) completed by December, 2012. Field testing of candidate treatments (as determined by the captive bat treatment trial) will take place in the hibernation season of 2012-2013, with completion by April, 2013.

NORTHEAST REGIONAL CONSERVATION NEED GRANT QUARTERLY REPORT

Grant Number: **2010-01**
Grant Title: ***"Laboratory and Field Testing of Treatments for White Nose Syndrome: Immediate Funding Need for the Northeast Region"***
Grant Receipt**: Bucknell University**
Grant Contact Name: **DeeAnn M. Reeder, Department of Biology**
Report #- **4th quarter (October 1, 2011 to December 31, 2011)**

Were planned goals/objectives achieved last quarter? **For the quarter, yes.**

Regional Conservation Need Addressed:

Priority RCN Topic number 12 " Identify and Address Factors Contributing to the Regional Decline of Populations of SGCN". Hibernating bats in the NE USA have experienced sudden and dramatic declines over the past three winters due to an emerging infectious disease dubbed "White Nose Syndrome" (WNS). As of January, 2012, new estimates of the number of bats that have died thus far range from 5.7 to 7.7 million, and the causative agent is now known to be the cold-loving fungus *Geomyces destructans* (Gd). **This proposal seeks to address these declines by developing and implementing methodologies to combat WNS, which was specifically referenced in the call for proposals.**

Progress Achieved: (For each Goal/Objective, list Planned and Actual Accomplishments)

The overall goal of this project is to develop and test potential treatments for WNS and, if possible, to optimize field treatment protocols. Tasks include:

1. **Testing potential treatments for efficacy against cultured Gd (the fungal pathogen associated with WNS) under laboratory conditions.**
2. **Testing potential treatments for safety in healthy bats.**
3. **Testing potential treatments for efficacy against Gd in hibernating bats. Trials will primarily be conducted under strictly controlled conditions in a captive setting, in which microclimate is tightly controlled and in which each bat's behavior can be tracked. Limited, highly selective field trials will also be conducted.**

Planned and Actual Accomplishments:

1. **Formulations of terbinafine and other anti-fungal compounds are being tested for activity against Gd in the Ghannoum and Barton laboratories**
2. **Safety testing of treatments in healthy bats will occur during the active season in 2012, using bats from the Reeder lab captive colony.**
3. **Efficacy and safety testing of treatments in bats both naturally infected with Gd and inoculated with a known dose of Gd (using methods developed by the National Wildlife Heath Center) is currently underway - during the 2011-2012 hibernation season (beginning in November, 2011), using bats collected from TN. Field trials will occur in 2012-2013. Development of assays that will be used to assess overall health in control and treated bats is ongoing.**

Difficulties Encountered:

Obtaining bats for drug treatment trials (and any other kind of study) is becoming increasingly difficult. Thankfully, with the assistance of the technical coordinator for this project and other US FWS personnel (including the regional WNS coordinators), 91 bats were obtained from TN in November, 2011. These bats were inoculated with Gd in December 2011, and terbinafine implants were administered. We experienced significant difficulties

culturing sufficient quantities of Gd for these experiments. Thankfully, Dr. Kevin Keel of the Southeastern Cooperative Wildlife Disease Study (SCWDS) was able to supply Gd conidia for our experiments. Additionally, half of our bats were naturally infected (and were split across all treatments), providing natural exposure to Gd for all bats, with supplemental inoculation with Gd.

Activities Anticipated Next Quarter:

During the next quarter we will continue to hibernate our treated bats in the Reeder Lab's environmental chambers. We will also be removing ~ 40 bats from the chambers for 5 days of voriconazole injections (and feeding), to test the efficacy of a loading dose of this drug after infections have begun. At the end of March, 2012, bats will be removed from hibernation, and wing biopsies, PCR swabs (for detection of Gd fungal load), UV photos (for detection of active infection), and blood samples (for detection of immune up or down-regulation and potentially anti-Gd antibodies) will be collected. Surviving bats will most likely NOT be euthanized but will continue to be studied as they clear the fungal infection in the summer (in the captive colony). Assay development will continue.

Costs:

Are you within the approved budget plan? **Yes – although we are underspent to date in most budget categories - some of the funds budgeted for 2011 will be spent in early 2012.**

Are you within approved budget categories? **yes**

Signature:

Date: 1/18/2012