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 work will 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.

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Report #- **1st quarter (Jan 1, 2012 to March 31, 2012)**

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 is being tested in control animals in our experiments.**
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 using bats collected from TN [Field trials will occur in 2012-2013]. For most of this quarter, bats were hibernated in the Reeder Lab's environmental chambers. We also removed ~ 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 were 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) were collected.**
4. **Development of assays that will be used to assess overall health in control and treated bats is ongoing.**

Difficulties Encountered:

The ongoing examination of terbinafine implants and topical treatments have gone well. Unfortunately,

high mortality has been occurring in the group treated with the antifungal drug vorconizole, most likely due to its side effects (loss of appetite, lethargy). This drug will likely not be recommended for any further treatment experiments.

Activities Anticipated Next Quarter:

During the next quarter we begin detailed analysis of necropsy results, survivorship, and drug tissue levels. UV photos (for detection of active infection) will be examined and assay development will continue.

Costs:

Are you within the approved budget plan? **Yes – although we are underspent to date in most budget categories.**

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

Signature:

Date: 9/23/2012