

Title

Rodent Research and Education

Project Leaders

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Abstract

In cooperation with researchers from the Center for Infection and Immunity at Columbia University, a survey of Norway rat ectoparasites and pathogens was conducted from October 2012 to June 2013 in New York City. Two manuscripts detailing the results of this work are in preparation. During the course of this research, images and videos were taken of rodents, their requirements to survive and evidence of an infestation. These resources were used to create a series of four videos on rodent biology and management. A proposal submitted to the Northeast IPM Center would support the development of guidelines to manage mice in multifamily housing and reduce health risks associated infestations.

Background and Justification

Rodents, including Norway rats (*Rattus norvegicus*) and house mice (*Mus musculus*) are commensal organisms that harbor zoonotic pathogens and live in close proximity to humans, especially in urban environments. Rodents damage and contaminate food items, resulting in billions of dollars of damage to stored grains each year. Allergens associated with rodent feces, urine and hair can cause asthma symptoms in both children and adults, while rodent-borne diseases can affect humans through direct contact with rodents (bites, feces) or indirectly via arthropod vectors. Surveys that examine the pathogens and parasites associated with Norway rats are important to assess potential threats to human health. Furthermore, education about the importance of rodent exclusion in multifamily housing is needed to mitigate health risks associated with mice.

YouTube videos can be used as educational tools to reach individuals with a computer, tablet or handheld device. With the opportunity to photograph rodents, the conditions that favor their development, and evidence of rodent infestations, this material could be used for picture-based videos detailing rodent biology and management.

Objectives

- Survey Norway rats for ectoparasites and pathogens to document potential threats to human health in Manhattan, NY
- Create YouTube videos to educate individuals about the biology and management of rodents from an IPM perspective

- Apply for funding to educate residents, building maintenance personnel, building owners/agents and pest management professionals about the health risks associated with mice and how to achieve building-wide suppression of pests.

Procedures

To characterize the pathogens and ectoparasites present in Manhattan, NY, we live-trapped 133 Norway rats during a 9-month period from October 2012 to June 2013. Traps were set in areas representative of human-rodent interaction, including indoor belowground spaces (to represent public transportation), indoor aboveground (working and living spaces), and outdoor areas (recreation spaces). Rats were trapped and sacrificed according to Columbia University IACUC Protocol No. AC-AAAE6805. Rats were brushed with a fine-toothed comb and thoroughly examined with a pair of forceps for ectoparasites. Arthropods were sorted on site and identified using standard taxonomic keys. Insect identifications were later confirmed at the Cornell University Insect Museum, whereas arachnids were identified at the University of Alberta.

NYS IPM staff met with stakeholders at the New York City Department of Health and Mental Hygiene to discuss a collaborative project on managing mice in multifamily housing. During this meeting, DOHMH members identified the need for IPM programs to address mouse infestations at the whole-building level, rather than 'harvesting' mice on glue boards from individual apartments. Additional stakeholders, including representatives from Boston Housing Authority, StopPests in Housing, New York City Department of Health, the Pennsylvania IPM Program, and several pest management companies were contacted to determine their interest in collaborating on this project.

YouTube video scripts were written to address four topics: I. Conditions that Favor a Rodent Infestation, II. Signs of an Infestation, III. Trap selection and Placement, and IV. How to Keep Them Out. Images were added to a blank project in iMovie on a MacBook Pro, introduction and ending credits were recorded using the computers built-in camera, and the script was read as a voiceover for the images.

Results and Discussion

Ectoparasites were recovered from all sites and nearly all rodent hosts (132 out of 133 rats). In total, we recovered five ectoparasite species, all of which have a global distribution and are recorded as ectoparasites of Norway rats. We observed differences in the distribution of ectoparasites, as one species was found entirely aboveground, while 99.96 % of a second ectoparasite species was found belowground. Additional information about the species collected will be presented in the forthcoming manuscript in preparation for the Journal of Medical Entomology.

A grant proposal was written and submitted to the Northeast IPM Center. Requested funds would support the development of guidelines to manage mice in multifamily housing and to demonstrate techniques at one site in each city: Boston, New York City, Philadelphia, and Washington, D.C. Stakeholders were interested in the project and submitted letters of support to be included with the proposal. Funding decisions will be made in February 2014.

A total of four videos were created and posted to the NYS IPM YouTube site. Below is a list of the videos, including the number of times each has been viewed (as of 17 January 2014). YouTube videos have been promoted on the NYS IPM Program's Facebook and Twitter pages, and have been demonstrated during meetings of the Community IPM Coordinating Council and during a Webinar as part of the "Building Campus-County Connections Webinar Series" at Cornell University.

- I. Conditions that Favor a Rodent Infestation – 127 views
- II. Signs of an Infestation – 145 views
- III. Trap selection and Placement – 57 views
- IV. How to Keep Them Out – 85 views

Project Location

Manhattan, New York; Statewide and nation-wide (internet resources); Boston,.

Samples of Resources Developed

YouTube Video Series

[Rodent Management I: Why do I have Rodents?](#)

[Rodent Management II: Signs of a Rodent Infestation](#)

[Rodent Management III: Trap Selection and Placement](#)

[Rodent Management IV: How to Keep them Out](#)