



CAPTIVE PROPAGATION OF ALLEGHENY WOODRATS



Male woodrat emerging from nest box; spinning wheel in foreground.

Current Status

First year of three-year project

Funding Sources and Partners

DNR Division of Fish and Wildlife, Diversity Section;
and Purdue University

Project Personnel

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Research Technicians:

Brandon Haslick, Live-trapping population monitoring,
Aug.–Oct. 2009

Jennifer Hoffman, Collection of woodrats from
Pennsylvania, Oct. 2009

Kristen Bahleda, Captive woodrat husbandry, Oct.
2009–present

Background and Objective(s)

Allegheny woodrats (*Neotoma magister*) are a species of conservation concern throughout their range with population declines attributed to habitat fragmentation, loss of hard mast resources, mortality as a result of infection by raccoon roundworm (*Baylisascaris procyonis*), and loss of genetic diversity and inbreeding depression.

Recently, extensive management efforts have been taken through a partnership between Purdue University and the Indiana Department of Natural Resources to address some of these concerns within Indiana woodrat populations. Specifically, during the last three years, medicated deworming baits have been dispersed at monthly intervals throughout the areas surrounding woodrat habitats in order to passively deworm the associated raccoon populations, thereby reducing or eliminating the threat of mortality for woodrats associated with raccoon roundworm infection. Additionally, in spring 2007 and 2008, woodrat translocations were conducted in which individuals were captured from genetically diverse populations in Kentucky and Tennessee, and released into suitable



Daily provision of rodent block, acorns, mixed seeds, lettuce, mixed vegetables, and mealworms along with water ad lib. Timothy hay disbursed throughout the enclosure provides a valuable source of fiber and nesting material. Eastern red cedar also provides nesting material and physical structure, and a spinning wheel (left, foreground) provides a opportunity for exercise.

habitats in Indiana.

During these translocation efforts, woodrats were either released into previously occupied habitats that were currently vacant (reintroduction) in order to reestablish populations; or, woodrats were released into genetically and numerically depressed populations (supplementation) in order to improve levels of genetic diversity and the likelihood of population persistence.

Despite the use of genetically diverse individuals in the establishment of reintroduced populations and improvements in levels of genetic diversity in supplemented populations, the loss of genetic diversity as a result of isolation of woodrat populations from one another continues to threaten the persistence of these populations. Therefore, we seek to establish an Allegheny woodrat captive breeding program in order to:

- 1) Facilitate the retention of genetic diversity present within core Indiana woodrat populations as well as that introduced into Indiana woodrat populations through recent translocation efforts
- 2) Restore levels of genetic diversity among wild populations. Specifically, we will use optimized mate pairings among individuals collected across Indiana's woodrat populations as well as those collected from genetically diverse populations from out-of-state in order to produce genetically diverse offspring in captivity. In a manner that simulates natural levels of gene flow, these genetically diverse individuals will be returned to wild populations. Subsequent breeding of captively raised individuals

with members of the wild populations will restore healthy levels of genetic diversity and provide for the long-term persistence of woodrat populations.

Methods

Coinciding with annual live-trap population monitoring conducted in fall 2009, eight individuals (one male and seven females) were collected from Indiana woodrat populations. To increase levels of genetic diversity within the captive population, four additional individuals (three males and one female) were collected from genetically diverse populations in southwestern Pennsylvania.

In a climate-controlled environment at Purdue, captive woodrats are being housed independently in wire mesh enclosures (3'x2'x2') with an external nestbox (9"x9"x9") on campus. Woodrats are provisioned daily with a mixed diet consisting of lettuce, frozen mixed vegetables, a seed mix, acorns, mealworms gut-loaded with a high calcium diet, and rodent block in addition to water and timothy hay being provided ad lib.

Male and female enclosures are stacked vertically and joined with wire mesh tubes for pairings. Females have unrestricted access to the tube system, which allows them to initiate interactions with the male at the interface of the tube structure and his enclosure. When interactions indicate the female is sexually receptive, under the supervision of managers, a wire grate will be lifted, allowing the woodrats to mate. After parturition, females will be housed socially with their pups until the pups reach a state of independence at 65 days.

Progress to Date

After the collection period and temporary housing at the Bloomington DNR office, the woodrats were transferred to Purdue's Wildlife Animal Care Facility (WACF) on Oct. 22, 2009. Upon the arrival of the woodrats at Purdue, with the assistance of DNR personnel, we began constructing nest boxes and infrastructure for pairings, both of which are needed for the long-term maintenance and reproduction of woodrats in captivity.

Upon completion, nest boxes were attached externally to the wire mesh enclosures. These structures provide a secluded, secure environment where woodrats can build a nest and cache food items, but also allow managers to remove woodrats from their enclosures without confining the individual woodrats in a trap. After introductions, the woodrats transitioned immediately into the nest boxes.

Initial designs for the breeding apparatus were based on those used in Disney Animal Kingdom's Key Largo woodrat captive breeding program employing horizontal connections between adjacent males and females. Repeated failures of the climate control system at WACF required that we find alternative housing options on Purdue's campus. On Dec. 16, 2009, woodrats were moved from the WACF to Biomedical Engineering's Potter Facility. The spatial constraints of this new facility prohibited us from using a horizontal pairing system similar to that employed at Disney; therefore, we have begun construction of a new pairing infrastructure employing vertical connections. The vertical design under construction will have a breeding group arranged within a tower in which the male is in the middle position with females housed above and below.

Challenges Encountered

The male woodrat collected from Indiana manifested a fatal intestinal intussusception. Consumption of polyfil which had been introduced into the woodrat enclosure for bedding may have contributed to the intussusception. Accordingly, polyfil was removed from woodrat enclosures and replaced with only natural nest materials (aspens shavings, timothy hay, Eastern red cedar bark).

During the transfer of woodrats from the Bloomington DNR office to Purdue, traps were introduced into enclosures in order to constrain the individuals, which then would allow the enclosures to be moved in the absence of woodrats. One of the males collected from Pennsylvania was injured in the trap during this transfer. Radiographs collected at Purdue's veterinary hospital revealed that the individual suffered a fracture of the roof of the nasal sinus, resulting in instability within the fracture and a malocclusion. Due to the malocclusion, this woodrat will require continued veterinarian care throughout his life in order to maintain a healthy tooth length. Given that the level of care needed is beyond our capacity, the woodrat was transferred to Brookfield Zoo in Chicago on Jan. 11, 2010. Initial exams by their team of veterinarians were favorable, and they will continue to provide the tooth maintenance he requires.



Tower of enclosures in which the male is in the middle position with potential female mates above and below.



Close-up view of an enclosure in which the external nest box is visible in the back right corner and portions of the woodrats' "concealed" cache is visible in the back left corner.