

Rodent Sampling at Archbold Tropical Research and Education Center

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Introduction

In 2003 a student from A&M conducted a survey of the rat population at Springfield with little success due to several factors. We felt enough time had passed to warrant another look into the rodent population at the Springfield Plantation. However, we not only wanted to conduct an updated survey on rats, mice, and opossums, but also affix radio transmitter collars to rats and use telemetry to observe their movements. House mice, Black and Brown rats and South American Opossums are all known to inhabit the areas around Springfield.

Materials and Methods

Twenty Sherman traps and one Have-a-Heart trap were used to catch rodents in the Springfield area. Each Sherman trap was baited with a mixture of peanut butter and honey roasted oats weighing between 5 and 6 grams, then placed strategically in areas that the rodents were expected to be. Our project concentrated on placing traps in the vicinity of the Plantation house, though for one night two traps were placed in the Stream house and four near the Check Hall River. (Figure 5) The main concentration of traps were placed in rooms 14 and 15 of the guesthouse, in the trash bin area outside the kitchen, in the laboratory, and in vegetation in the tiers of the gardens.

The Sherman traps we used measured 23cm x 7.5cm x 9cm. The Have-a-Heart trap measured 81cm x 23.5cm x 24.5cm. The traps were checked every morning around 0645 to see if anything had been caught. They were checked again around 1700 to ensure they were all baited and set.

When a rodent was captured in a trap, the location of the trap was noted and the trap was taken to the laboratory. There we would transfer the rodent from the trap to a plastic bag. Here we would sex it then measure its length of tail, overall length, and hind foot length. Depending on the weight of the rodent we used either a 30 gram or a 300 gram Pesola® balance. Then the animals were either marked, for a marked recapture assessment, or tagged with a radio transmitter collar to track movements. If in doubt about whether a specimen was a *M. musculus* or a *R. rattus*, we looked at the shape of the upper incisors, which is a defining characteristic.

Our first attempt to mark animal captures too small for the transmitter collars was to use red hair dye to color a portion of their fur. However, this method proved unsuccessful because the dye was difficult to see on the dark fur of the rodents. It was also water soluble and either came off in the rain or was groomed off. Our next method was to use a pair of clippers to clip away tufts of hair on their backs. (Figure 1) These were unique to each rodent. After the fur was clipped, it was released in the same area that it was caught. For rats deemed big enough to be fitted with transmitters, all the same measurements were taken but a transmitter collar was fitted instead of clipping fur. (Figure 2) The frequency of the transmitter was recorded and the rat was released. We used two radio receivers with antennas that tracked the signal strength of the transmitters, thereby giving us an idea of its location. Only one of the receivers would power-on reliably.

We first attempted to use the Have-a-Heart trap near the Check Hall River baited with sardines to catch a South American Opossum, *Didelphis marsupialis*. We then received advice from people with experience in catching them and made a “local” trap. This trap was located at the Bee House and consisted of a 55 gallon drum, bamboo poles, rocks, and bananas. (Figure 3) We filled the bottoms of the drum with rocks to keep anything that was captured from digging its

way out. Bamboo poles were then leaned against the drum to the edge. If an animal were to drop into the drum to reach the bananas, it would be unable to climb out.

Results

A summary of our trapped rodents is shown in Table 1. Besides the rats and mice, several Black Land Crabs were also caught. Rats were also routinely observed in Room 15, the Stream House, and near the porch on the wall of the garden. No opossums were encountered at Springfield, though several were photographed by students studying bats at Stinking Hole, Morne Trois Pitons National Park.

Discussion

As our table indicates, we were able to capture several specimens of *Mus musculus* and *Rattus rattus* around the Archbold Tropical Research and Education Center.

The mice were caught in grassy areas with high seed densities while the rats were caught or observed in every corner of the Station. Three of the five captured mice were caught in the garden, in an area around 20 square meters. The remaining two mice were caught within 30 meters of the garden. The mice that we caught in the gardens, though the exact locations of the traps differed, lead us to believe that after a few days of desensitization [to the traps] mice will allow themselves to be caught, and subsequently recaptured due to the “free food” in the traps. They do not appear to travel far for food. This is probably because the plants are producing an abundance of fruits and seeds, thereby diminishing foraging distances. It is also unclear from this study if mice remain in territories or family groups. *M. musculus* is well known to have complex systems of burrows and tunnels in grass. The areas in which we caught them are conducive to this tunneling.

We used the Schnabel method to analyze the data on *Mus musculus*. The formula is

$$N_0 = \frac{\sum_{t=1}^1 (C_t M_t)}{\sum_{t=1}^1 R_t}$$

, where M_t is the number of marked animals in the population just before the sample at time t is taken, C_t is the number of animals in the sample at time t , R_t is the number of animals in the sample at time t that had a mark, and N_0 is the estimated population. Using the data from Table 1, we derived $N_0 = 3$ animals. The reason the number is so small is likely due to our focusing on a small area, and placing many traps in that small area.

Rattus rattus, or Black Rats, live in groups and are known to be territorial. Our findings support this generalization. We caught three rats in Sherman traps, and noted other distinctive rats found around the station. The two rats to which we affixed transmitters were found within a few meters of the area in which they were captured [the garden] every time we tracked them. We released the first rat with a transmitter into the garden away from its point of capture in the laboratory. We tracked it that evening traveling from the bamboo, approximately 50 meters from the lab, as it traveled towards the stream by the base of the lab/guesthouse. We then tracked it every morning and evening, as well as various times throughout the day. Every subsequent time we tracked it, it was in extremely close vicinity to the laboratory, if not in the lab itself. The second rat was released near its point of capture outside the wall of the lower garden tier. It was found every time afterwards to be near that point, in or around the tall grass that had recently been cut. An inspection of the area revealed it to be ideal for rodents to hide beneath the layer of felled grasses.

Aside from the rats we captured, several others were observed around the Springfield area. The most frequently sighted were found in room 15. At least three different rats were observed. They were found to enter through the window leading to the roof in the restroom. It

can be assumed this area was their territory. Though they were never caught by one of our traps they were observed multiple times stealing food from the rooms, as well as taking food from the Have-a-Heart trap without it tripping. Several students reported having backpacks with holes chewed in them to reach food contained within.

Future studies

Modifications could be made to future studies to facilitate more accurate data. To better assess the population dynamics of rodents, more traps should be used to cover a much wider area. This would lend itself to a more representative sample. Larger Sherman traps could also be used because we noted some rats were able to enter traps and take the bait while still remaining enough on the door to keep it from tripping. Sighting led us to believe the rats here are arboreal. Traps could be securely placed in trees to expound upon this. It would be optimal to have at least three radio receivers to better triangulate the exact position of animals fitted with radio collars. It should also be noted that the opossum trap we used can also be used to catch agoutis (*Dasyprocta leporina*) with the exception that the barrel be placed under a ledge or overhang, instead of having a bamboo ramp since agoutis cannot climb.

Table 1

Note: Any missing data is due to the specimen escaping before it could be measured

Rodent	Date of Capture	Location of Capture	Sex	Tail Length	Overall Length	Hind foot Length	Weight	Recapture	Transmitter
<i>Mus musculus</i>									
Adult	Morning, May 28	Near Satellite	Male	71mm	146mm	16mm	15g	Y	
	Morning, May 30	Near Satellite						Y	
	Evening, June 1	Near Satellite						Y	
	Morning, June 6	Near Satellite						Y	
Juvenile	Morning, May 30	Trash bins near kitchen	Too young to sex	61mm	122mm	15mm	13g		
Adult	Morning, June 2	Lower tier in garden	Male	67mm	147mm	17mm		escaped in lab	
Adult	Morning, June 3	Lower tier in garden	Female	67mm	137mm	17mm	11g		
	Morning, June 6	Lower tier in garden						Y	
<i>Rattus rattus</i>									
Adult	Morning, May 26	Lower tier in garden	Male	170mm	340mm			escaped from porch	
Juvenile	Evening, May 30	Coconut trees north of station	Male	79mm	162mm	22mm	18.2g		
Adult	Morning, June 3	Laboratory	Male	282mm	427mm	34mm	130g		151.62
Juvenile	Afternoon, June 4	Cut grass outside lower tier of garden		140mm	240mm	30mm	50.8		151.74

Figures



Fig 1. A *Mus musculus* in a Sherman trap. Note the distinctive marking cut into the fur denoting this as a recapture.



Fig 2. A *Rattus rattus* having a transmitter collar placed around its neck.



Fig 3. The Opossum trap.



Fig. 4. A *Rattus rattus* with a transmitter collar.



Fig 5. The Springfield Estate. We concentrated on the Main Lodge and Butterfly Gardens for trapping rats and mice, though we placed traps at the River Bathing Pool and Stream House for short periods with no success. Our opossum trap was located near the Bee House on the upper right corner of the map.

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References

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