The Effect of Precipitation on Small Mammals in Panama

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Abstract

Darién and Soberanía national parks in Panama experience wet and dry seasons that can alter the behavior of animals within the parks. Their behavior during the dry season can help us determine their coping strategies as temperatures rise due to climate change and precipitation patterns are affected. The objectives of this study are to review camera traps in these two national parks and analyze and compare activity levels between the wet and dry seasons. My study will focus on small mammals because less is known about how they cope with the droughts. Understanding the difference in activity levels between the two seasons can help us determine which species will be most affected by climate change, and therefore on which animals we need to prioritize our conservation efforts. I hypothesize that we will see all-around less activity during the dry season as the more mobile mammals migrate to wetter areas, and as the smaller mammals lower their metabolism to conserve energy.

Objectives

My objective in this study is to review camera traps from both national parks to compare activity levels in different species between the wet and the dry season. This will allow me to analyze how much the dry season affects their behavior. Understanding their behavior during the dry season can help us understand how these animals will adapt with the changing climate and with potentially decreasing rainfall. And what protocols or efforts we would need to make in order to ensure that these small mammals endure to enrich this declining ecosystem.

Results

Analyzing the data of small mammals caught on the wild trail cams, I was able to create a box plot showing the number of sightings of each species during the wet and dry seasons. But with a p-value of 0.56172 for the difference in sightings for the two wet seasons for all species, the results aren't significant enough to draw any real conclusions. Looking at just the p-value for those species who msot showed a difference, namely the agouti, the spiny rat, and the tapir, the p-value, while lower, is still too large to be significant at 0.426.

Agouti. Credit: Wildcam Darién

Introduction

Soberanía and Darién national parks in Panama have been collecting camera trap data, providing a unique opportunity to be able to observe and study wildlife without actually being there. These two parks have similar climate, vegetation, and fauna, with the main differences being due to Soberanía being near urban areas and Darién containing mountainous habitats. Because they are a tropical climate, they have little variation in temperature year-round, but rainfall varies greatly. Most of the rain falls from May to December, where it can pour more than 300mm in a day. This is the wet season, where it can rain almost every day. The dry season lasts from January through April, during which they can receive no rain for weeks on end, drying up smaller rivers and streams. This lack of water, which can often be severe, is a challenge to many animals trying to acquire resources to survive. Strategies employed usually involve migrating to wetter locations in the case of more mobile species like ungulates or waterfowl, or aestivating in some amphibians and reptiles. But these activities have been little documented in smaller species (Doody et al. 2015). And because of this, I will be focusing on smaller mammals. Because of these motion capture camera traps, we have an opportunity to see how the level of activity is affected by the season. Knowing the times when species are more active can help in conservation efforts to find and track animals, in determining life cycles, and ultimately learning more about ecology and behavior

Camera Trap Sightings for Darién and Soberanía National Parks
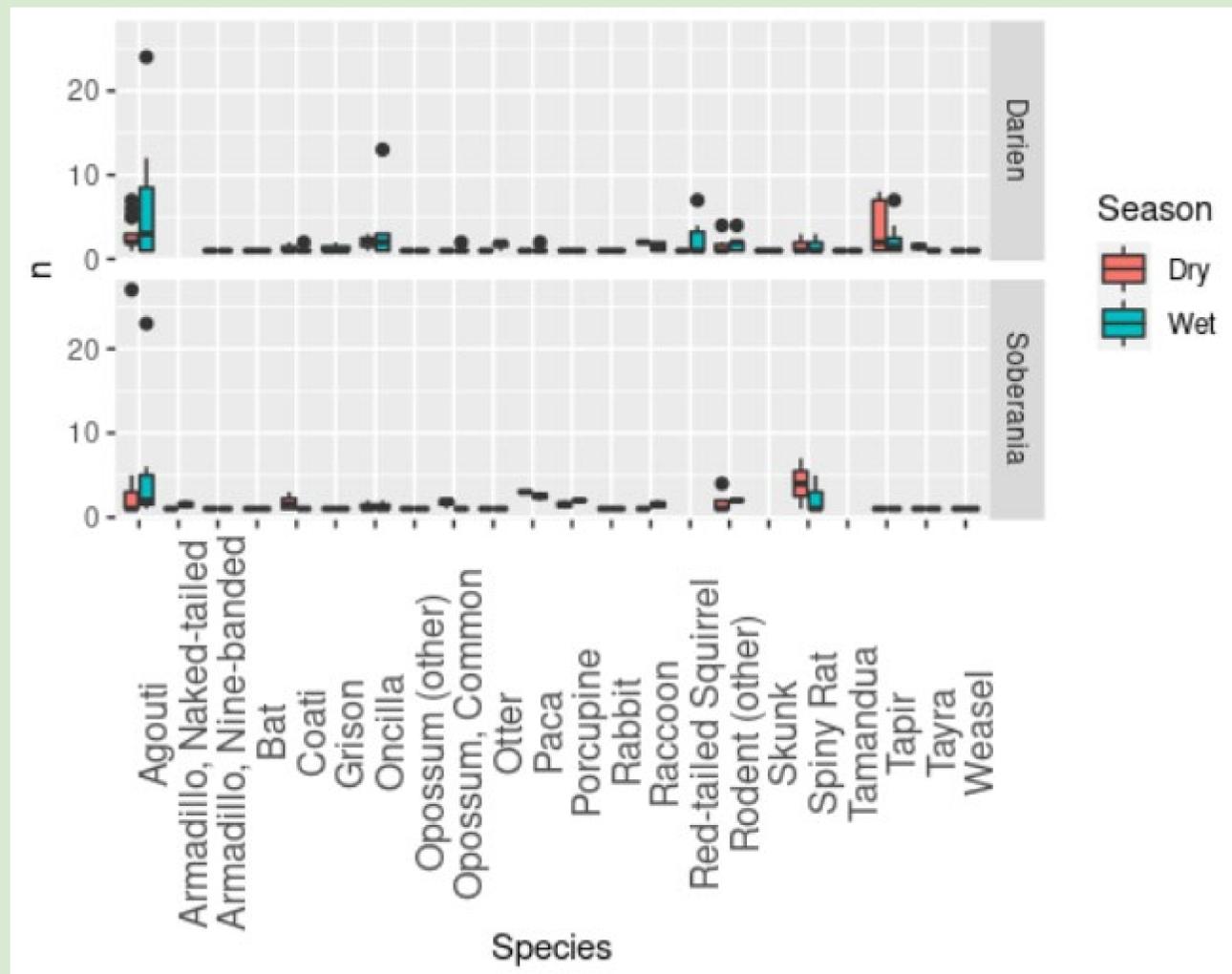
Methods

I will be using the camera traps already set up by the national reserves to look at activity patterns in the dry and wet seasons of smaller mammals. I will focus on these animals because less is known about their behavior, but they are also big enough to set off the traps. I will look at house cat-sized felines, small carnivores like raccoons and primates, rodentia and lagomorphs, and other small mammals that can't easily migrate due to size. Since it will be difficult to distinguish individual animals in a species, I will be looking at the number of times the traps went off and how many members of a species present to look at the amount of activity for each species as a whole instead of looking at individuals. I will be analyzing the data in R. I will look at detection histories, to determine whether or when an animal was detected.

Raccoon. Credit: Wildcam Darién

Conclusion

While camera traps can give us an idea of what species are affected by the precipitation levels in tropical rainforests in Panama, I suggest that we use data from more camera traps to get a larger population size to really determine whether behaviors change or stay the same. More research using different techniques will also need to be done to determine whether these animals are exhibiting different behaviors during their periods of activity or if they are not. Since they are only caught on camera, we don't know whether they are hunting, foraging, searching for water or a mate or anything else.

Citations and Acknowledgements

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