

# Niche Comparative Analysis of Southern Short-tailed Shrew and Northern American least Shrew

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## Introduction

This study focuses on two species of shrew: the Southern Short-tailed shrew (*Blarina carolinensis*) and the Northern American least shrew (*Cryptotis parva*). Shrews are very small, secretive, mouse-like mammals that inhabit moist, shady woodland areas (McAllister). The species of shrews that we studied are both carnivorous and prefer to eat insects, arachnids, and occasionally small animals (North American Least Shrew, *Cryptotis-Parva*) (Southern Short-Tailed Shrew, *Blarina-carolinensis*). Additionally, shrews have an extremely high metabolic rate and are often in a frenetic search of food (Musser). The purpose of this study is to observe the distribution and abundance of the Southern Short-tailed shrew and the Northern American least shrew, in order to determine the niche pattern of the two species. We hypothesize that the Southern Short-tailed shrew and the Northern American least shrew will have a very similar ecological niche as a result of their shared lifestyle and diet. We were able to test this hypothesis by mapping the current distribution of occurrences of both shrews.



Fig. 1 *Blarina carolinensis*



Fig. 2 *Cryptotis parva*

## Methods

To begin this series of experiments, we collected data from the Global Biodiversity Information Facility (GBIF). We compiled the number of Southern Short-tailed shrew occurrences and the Northern American least shrew occurrences in the United States country during the years 2010-2019. With the resulting data, we created a data set for each species which included the species name, latitude, longitude, and species ID. Using these species location data sets, we used the DIVA-GIS system to examine the location of each *B. carolinensis* and *C. parva* in relation to political boundaries and current climate regions. The current climate data was provided for us through WorldClim (Hijmans et al 2005). The comparisons of occurrences with political boundaries and climate patterns allowed us to predict and compare the current niche of *B. carolinensis* and *C. parva*. We used the Maxent program to predict the niche distribution. Next, we used the DIVA-GIS program to produce an image of distributions for both species. We analyzed these maps to determine if they supported our hypothesis.

## Results:



Fig 3. *B. carolinensis* distribution in the United States



Fig 4. *C. parva* distribution in the United States

## Discussion

Our hypothesis was supported by the results of our study. *B. carolinensis* and *C. parva* share the niche of the southeast region of the United States. Overall, there is significant overlap in the niche distribution of *B. carolinensis* and *C. parva* (Fig 3 and 4). There is, however, a wider distribution of *C. parva*. *C. parva* can thrive in grassy fields, brushy areas, weedy fields, and fencerows (North American Least Shrew, *Cryptotis-Parva*), while *B. carolinensis* prefers moist, well-drained hardwood forests (Southern Short-Tailed Shrew, *Blarina-carolinensis*). This is perhaps because *C. parva* can better adapt to dryer environments (as they extend further north and west than *B. carolinensis*). There may be slight discrepancies in the map distributions, due to either human error or an error in data collection. During the course of these experiments and our further research, we did not find any specific relationship between *B. carolinensis* and *C. parva*. However, we would predict that these species compete with each other for food resources in areas of overlapping niches. This prediction merits further research into the relationship between these two kinds of shrews.

## Sources

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## Conclusions

- *B. carolinensis* and *C. parva* are two similar species of shrews, with a similar diet and adaptations to the southeast region of the United States.
- There is significant overlap of the niche distribution of *B. carolinensis* and *C. parva*
- *C. parva* is more widely distributed than *B. carolinensis*
- Interspecies competition could factor into the niche distribution