

## DIFFERENTIAL HABITAT USAGE BY THE EASTERN COTTONTAIL (*SYLVILAGUS FLORIDANUS*) AS ESTIMATED BY FECAL COUNTS

Eric M. Butler, Gaia R. Eirich, Mark P. Barnsley and Karl W. Justice

### ABSTRACT

We conducted a study to determine if Eastern cottontails differentially utilized scrub and field microhabitats within a mixed woodland/field habitat. Previous studies conducted by others led us to hypothesize that the rabbits should spend more time in the scrub, thereby depositing more feces in that area. Relative usage of the microhabitats by the rabbits was determined by counting fecal piles within predetermined areas. There was no statistically significant evidence to support the hypothesis. This leads to the conclusion that rabbits utilize both of the microhabitats with approximately the same frequency.

*Keywords: Eastern cottontail, fecal droppings, field, microhabitat use, woodland*

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### INTRODUCTION

Mixed woodland/field habitat, accompanied by heavy shrub growth, has become increasingly important in many Northeastern states following the regrowth of significant portions of cleared woodlands. Analyzing the interactions of the species inhabiting these habitats can be complex, however, due to the patchy nature of the mixing. While a species may be present in all microhabitats in the mixed zone, its use of these microhabitats may not be equal. If a species prefers one microhabitat, it is quite likely that its effect on that microhabitat will be more significant than its effect on other microhabitats in the mixed zone.

The Eastern cottontail rabbit (*Sylvilagus floridanus*) is one species found in mixed woodland/field habitat. Previous research has shown that cottontails show microhabitat preferences in mixed shelterbelt habitats in the Midwest, making it likely that they would show microhabitat preference in Northeastern mixed woodland/field habitat (Swihart and Yahner 1982). Cottontails are opportunistic herbivores, and are fed upon by many species of carnivore, suggesting that they can play an important role in the mixed habitat ecosystem (Hockman and Chapman 1983) (Hamilton and Neill 1981).

Previous studies (Swihart and Yahner 1982) have indicated that *S. floridanus* shows a preference for scrub microhabitats in the Midwest. We hypothesized that this preference for scrub microhabitats would be the same in the Northeastern mixed woodland/field habitat.

### FIELD SITE

The field site is located in the Baker-Henry Nature Preserve of the Juniata College campus in Huntingdon, Pennsylvania. The field microhabitat is dominated by a mix of grasses and a small amount of

greenbrier, with a random scatter of Autumn Olive and one or two small trees. The small amount of bush and tree provide approximately 10-15% cover. The scrub microhabitat is similar in that the ground cover is the same mix of grasses, but with a much greater concentration of greenbrier. However, there are large numbers of Autumn Olive, Viburnum, and Auburn Honey Suckle, with a swath of Hawthorn near the fringe. These bushes provide a 50-60% cover. There is an extensive network of rabbit trails in the area, both in the field areas and the scrub. Rabbit feces are abundant in both microhabitats. Visual sightings confirmed that the rabbit species in the area was the Eastern cottontail.

## MATERIALS AND METHODS

To estimate the amount of feces in each respective microhabitat, we first measured out five 3 x 3 m squares in both the field and the brush microhabitats. Side lengths were measured with a pre-measured string, and the four corners marked with orange flagging tape. Locations for the sampling squares were chosen at random as representative of cover for each microhabitat. The number of individual piles of feces was then recorded during the period March 15-21, 2003. The number of piles was recorded every two days noting the number of additional piles. In addition, a medium mammal trap was used, baited with a variety of vegetables, to attempt to trap a rabbit and confirm the specific species.

## RESULTS

The data were collected, organized (Table 1), and then analyzed using the Chi-Square test, which tests for significance within the data range. The Chi-Square test was used on both the total increase of scat in each area (Table 2) and the total density of scat for each area (Table 3). No significant differences between microhabitats were observed for either increase of scat or scat density.

*Table 1. Total density and total increase of scat in each microhabitat at the end of the study.*

Summary Table of Scat Data		
	Total Density	Total Increase
Field	24	14
Scrub	30	16

*Table 2. Chi-squared test comparing the frequency of additional fecal piles of cottontail rabbits in field (1) and scrub (2). ( $P > 0.05$ ).*

Chi-Square Test for Total Increase			
Expected counts are printed below observed counts			
	C1	C2	Total
1	14	15	29
	14.50	14.50	
2	16	15	31
	15.50	15.50	
Total	30	30	60
Chi-Sq = 0.017 + 0.017 +			
0.016 + 0.016 = 0.067			
DF = 1, P-Value = 0.796			

Table 2. Chi-squared test comparing the frequency of fecal piles of cottontail rabbits in field (1) and scrub (2). ( $P > 0.05$ ).

<b>Chi-Square Test for Total Density</b>			
Expected counts are printed below observed counts			
	C1	C2	Total
1	24	27	51
	25.50	25.50	
2	30	27	57
	28.50	28.50	
Total	54	54	108
Chi-Sq =	0.088	+ 0.088	
	0.079	+ 0.079	= 0.334
DF = 1,	P-Value = 0.563		

## DISCUSSION

We hypothesized that the rabbits should utilize the scrub microhabitat more than the field microhabitat. Our results suggest that eastern cottontails utilize both microhabitats equally. Thus, our hypothesis is not supported.

Possible sources of error include both human and natural factors. We visually confirmed the count of feces and relied entirely on our own perception to determine the number of scat piles. In addition, a judgment call was required to determine what constituted separate piles. Some scats may have also been concealed under vegetation. A final source of error was the relatively short time span over which the study was conducted. There were three counts over six days. The duration of the study was short enough that abnormal weather patterns or other short-term factors, not common to the area, could have affected the rabbits' behavior.

This study, while brief, presents the possibility for several related studies. This would include further testing over a longer period of time; testing sites along rabbit trails and comparing to sites away from trails; testing of a larger microhabitat size; testing of a broader range of microhabitats; and testing comparisons of pure and mixed habitats.

While our data do not indicate preferred utilization of scrub habitat, Swihart and Yahner's data indicate that cottontails do, in fact, prefer habitats with significant areas of scrub (Swihart and Yahner, 1982). It is possible that cottontails in the northeast show similar preferences, but do not display increased utilization of the scrub habitat. Testing rabbit densities in scrub habitats, field habitats, and mixed habitats would help determine the effect of scrub on rabbits' use of the habitat as a whole.

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