# COTTONTAIL RABBIT HABITAT UTILIZATION OF A SEEDED AND MECHANICALLY MAINTAINED POWER LINE RIGHT-OF-WAY

CARL W. BETSILL, [a]Entomology and Economic Zoology, Clemson University, Clemson, SC 29631.
WILLIAM L. MATTHEWS, [b]Entomology and Economic Zoology, Clemson University, Clemson, SC 29631
LLOYD G. WEBB, South Carolina Wildlife and Marine Resources Department, Clemson, SC 29631.

*Abstract:* Habitat preference of cottontail rabbits (*Sylvilagus floridanus*) on a seeded and mechanically maintained power line right-of-way was studied in 1974-76. Trap data and locations obtained by telemetry were used to determine habitat preference. Both techniques showed that cottontails avoided large honogenous stands of sericea (*Lespedeza cuneata*) and preferred areas dominated by native vegetation. Management techniques encouraging native vegetation and reducing the large stands of sericea should have a beneficial effect on rabbit populations.

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An enormous amount of land in the United States is presently in utility rights-of-way. Grove (1956) estimated that the eastern United States will eventually have 4 million ha of these lands with a considerable proportion of these rights-of-way through forested areas. Lancia and McConnell (1976) revealed that 40% of rights-of-way, nationwide, are through forested areas. Because of the obvious edge effect, it is these rights-of-way through forested areas that are the most important for wildlife management purposes.

Although several previous studies were conducted on rights-of-way, vegetation control techniques for these areas were their primary emphasis (Arner 1951, 1960, Egler 1952, Grove 1956). Other than Foster (1956) and Gysel (1962), few studies were conducted on the actual utilization of rights-of-way by wildlife species in an evaluation of these vegetation management techniques.

Duke Power Company, 1970 discontinued the use of herbicides and switched to mechanical means of maintenance of the rights-of-way. They now seed all new rights-of-way with a fescue-sericea (*Festuca elatior-Lespedeza cuneata*) mixture and maintain by periodic mowing. In order to evaluate the effect of this type of practice, a species with a small home range and the capacity to be quickly affected by changes within its habitat should be studied. The cottontail rabbit meets these qualifications. The objective of this paper is to describe the habitat utilization on a seeded and mechanically maintained right-of-way by cottontail rabbits.

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## MATERIALS AND METHODS

The study area was located on the North Division of Clemson University's Experimental Forest in the piedmont region of South Carolina. This area was closed to all hunting. Topography consisted of moderately rolling hills with soils comprised of

[a]Present address: North Carolina Wildlife Resources Commission, Route 3, Box 498, Elm City, North Carolina 27822.
[b]Present address: Bureau of Land Management, P.O. Box 940, Miles City, Montana 59301.

Cecil clay-loam, Hayesville-Madison loam and Madison gravelly sandy loam (Shearin et al. 1943). The study area included a power line right-of-way, 97 m wide and 1725 m long, through a wooded area. The woodland borders were 78.3% mixed hardwood, 18.5% loblolly pine (*Pinus taeda*), and 3.2% mixed pine and hardwood. The right-of-way was bulldozed, fertilized and seeded with a fescue-sericea mixture in 1970. Except for annual mowing of the access roads, no additional maintenance was conducted on the area prior to or during the study.

Vegetation cover maps were constructed for the right-of-way and adjacent wooded areas. A detailed vegetation analysis, using the canopy coverage method described by Daubenmire (1959), was completed for all vegetation types and is presented in detail in a Master's thesis by Betsill (1976).

Box-type live traps were set on a 46 m grid pattern, allowing some deviation in the spacing for rough terrain or nearby active trails. Traps were checked daily and captured rabbits were aged, sexed, ear-tagged and released at the trap site. Pre-winter trapping was conducted in late October and early November, winter trapping in mid-December, and post-winter trapping in late February and early March from fall of 1974 until spring of 1976. Selected rabbits, during the 1974-75 season, were equipped with telemetric transmitters in the 150.850 MHz - 151.150 MHz range.

Rabbits were located at least once daily throughout the life of the transmitters. Although a strict monitoring schedule was not adhered to, rabbits were monitored at varying times of the day and night in order to avoid having the locations lumped around any 1 period. Periodically rabbits were monitored every 2 hours for 24-hour periods. Locations for transmitter-equipped rabbits were obtained by triangulation with a portable receiver and a hand-held antenna from 2 or more locations. Most locations were obtained 27-45 m from the rabbits and the locations were plotted on study area maps.

Cottontail habitat utilization was determined by 2 different techniques. For telemetry data, the observed number of locations in each vegetation type was compared with expected values based on the proportion of area in each vegetation type. For trapping data, the number of captures in each vegetation type was recorded. To obtain an adequate sample size, total captures in each trapping period for both years of the study were combined. The expected number of captures in each vegetation type was derived by multiplying the proportion of traps in a particular vegetation type by the total number of captures for that year. These expected values for both technques were compared with observed values by utilizing chi-square analysis.

## RESULTS

### Vegetation Analysis

Three basic vegetation types on the right-of-way were classified. They are referered to as "sericea," "blackberry-sericea," and "shrub" composing 53.5 34.9 and 11.6% of the right-of-way, respectively. The "sericea" vegetation type was almost completely dominated by sericea and fescue. The native vegetation was out-competing the sericea in the "blackberry-sericea" vegetation type leaving a dominance of blackberry (*Rubus* spp.), fescue, and broomsedge (*Andropogon virginicus*). Sericea was still present in both vegetation types, but showed only an 18% coverage in the "blackberry-sericea" type versus a 60% coverage in the "sericea"type. The "shrub" vegetation type, found on terrain too steep for bulldozing, was primarily made up of small hardwoods from stump sprouts, honeysuckle (*Lonicera japonica*), sumac (*Rhus glabra*) and blackberries. This was very similar in species composition to the adjacent woods along the right-of-way.

### Telemetry

Telemetry data (Tables 1 and 2) indicated that both nocturnal and diurnal locations were not distributed randomly throughout the 3 rights-of-way vegetation types ($p<.005$).

TABLE 1. Chi-square analysis of diurnal telemetry locations of cottontail rabbits along a seeded and mechanically maintained right-of-way. (Expected values based on a relative size of each vegetation type.)

| Vegetation Type | Observed No. of locations | Expected No. of locations | Chi-square value |
|---|---|---|---|
| Sericea | 10 | 56 | 37.79 |
| Blackberry-sericea | 34 | 23 | 5.26 |
| Shrub | 46 | 11 | 111.36 |
| Total | | | 154.41 |

TABLE 2. Chi-square analysis of nocturnal telemetry locations of cottontail rabbits along a seeded and mechanically maintained right-of-way. (Expected values based on a relative size of each vegetation type.)

| Vegetation Type | Observed No. of locations | Expected No. of locations | Chi-square value |
|---|---|---|---|
| Sericea | 108 | 421 | 232.71 |
| Blackberry-sericea | 388 | 171 | 275.37 |
| Shrub | 178 | 82 | 112.39 |
| Total | | | 620.47 |

Comparisons of observed versus expected number of locations seemed to indicate that there was an avoidance of the "sericea" vegetation type and a preference for the "shrub" and the "blackberry-sericea." The preference for the "blackberry-sericea" was especially evident during the night. A comparison, using telemetry data, of off-right-of-way versus on-right-of-way observations was more difficult to make since the expected values were not computable. It was possible, however, to use chi-square analysis to determine if there were differences between night and day utilization of the right-of-way (Table 3). Increased use of the right-of-way during the night was indicated ($p<.01$).

TABLE 3. Contingency table showing number of telemetry locations for cottontail rabbits on and off the right-of-way for both day and night.

| Area | Night | Day |
|---|---|---|
| On the right-of-way | 674 | 90 |
| Off the right-of-way | 479 | 97 |

Trapping

Similar results concerning an avoidance of "sericea" were obtained when using trapping data. Table 4 shows chi-square analysis of the number of captures in each vegetation type. Again, captures were not distributed randomly throughout the vegetation types ($p<.005$). In comparing observed and expected number of captures, an avoidance of the "sericea" vegetation type seemed evident. Trapping data also indicated

TABLE 4. Chi-square analysis of capture locatons of cottontail rabbits along a seeded and mechanically maintained right-of-way. (Expected values based on number of traps in each vegetation type.)

| Vegetation Type | Observed No. of captures | Expected No. of captures | Chi-square value |
|---|---|---|---|
| Sericea | 13 | 32 | 11.28 |
| Blackberry-sericea | 26 | 21 | 1.19 |
| Hardwood edges | 57 | 39 | 8.31 |
| Pine edges | 7 | 14 | 3.50 |
| Other | 47 | 44 | .20 |
| Total | | | 24.48 |

that hardwood edges seemed to be preferred by cottontails. Hardwood edges were not possible to include in the analysis of telemetry data because expected values were based on relative size of the vegetation type and the hardwood edges had no definite boundaries. Since hardwood edges and the "shrub" vegetation type were similar in species composition, this same preference may have been shown in the telemetry data by the apparent preference for the "shrub" vegetation type. Unfortunately, due to the steep topography (slopes up to 47%) traps were not functional in the "shrub" vegetation type; therefore, no trapping data for "shrub" are available.

## DISCUSSION

A definite avoidance of well established stands of sericea and fescue seemed to be very evident. The rabbits seemed to prefer areas dominated by native vegetation. Telemetry data showed rabbits moving from daytime bedding sites in adjacent woods to "blackberry-sericea" for foraging during the night. Management techniques on established rights-of-way which would reduce these large homogenous stands of sericea and fescue should have a beneficial effect on rabbit populations. The practice of seeding newly established rights-of-way is of questionable value in providing food and cover for rabbits if the goal of this practice is to establish and maintain this sericea-fescue ground cover. The appearance of these rights-of-way does indicate that the practice does have merit in stopping soil erosion and maintaining a ground cover long enough for native vegetation to become established. The right-of-way in question was established 3 years prior to the initiation of this study. During the 2 years of the study, much of the vegetation originally classified as "sericea" changed through natural succession into the "blackberry-sericea" type. Therefore, it would seem that as these rights-of-way get older, they should provide increased quality habitat for rabbits. Additional work is needed on plant succession along older seeded and mechanically maintained rights-of-way.

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