

The Eastern Chipmunk, *Tamias striatus*, in Southwestern Minnesota, U.S.A.

Abstract. A population of the eastern chipmunk, *Tamias striatus*, occurs at Lake Shetek State Park, Murray County, Minnesota. Report of this population fills in an important gap in the overall range of the species. The chipmunks are sympatric with *Spermophilus tridecemlineatus*, which show marked contrast in burrow preferences.

The eastern chipmunk, *Tamias striatus*, has not been reported from southwestern Minnesota. Gunderson and Beer (1953) state that it is found in all but the southwestern counties of the state. Hall and Kelson (1959) do not include southwestern Minnesota within the range of this species, but instead show the range looping around southwestern Minnesota from northcentral Iowa to northeastern South Dakota.

A population of *Tamias striatus* has been observed on a number of occasions during field work at Lake Shetek State Park, Murray County, Minnesota. Because of state regulations, no specimens have been collected from the park. The chipmunks are most common in the woodland between the bathing beach and main picnic grounds and the boat dock. In this area they are sympatric with a larger colony of *Spermophilus tridecemlineatus*. The *Spermophilus* occur in the open picnic grounds and in the open spaces along the pathways and roads surrounding the woodland in which the *Tamias* occur. There is a marked contrast in the selection of burrow sites by the two squirrels. The burrows of *Tamias* are located in hollow trees and logs, while those of *Spermophilus* are dug in the ground. No direct competition has been observed between these species, but the chipmunk population is decidedly smaller and more restricted in total area.

Literature Cited

- Gunderson, H. L. and J. R. Beer. 1953. The mammals of Minnesota. University of Minnesota Press, Minneapolis.
- Hall, E. R. and K. R. Kelson. 1959. The mammals of North America. Volume I. Ronald Press Company, New York.

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A Comparison of Populations of Boreal Red-backed Vole (*Clethrionomys gapperi*) in Tornado Blowdown and Standing Forest

Abstract. Comparison of *Clethrionomys gapperi* populations in tornado blowdown and standing forest were made one year after a tornado struck Basswood Lake, Lake County, Minnesota. Three times as many mice were captured in the blowdown areas as in the standing forest. Standing forest mice were more sexually active than blowdown mice. It is concluded that adult mice drive the juveniles into the blowdown.

In early August, 1969, a tornado blew down several acres of forest on Basswood Lake, Lake County, Minnesota. This report concerns the status of *Clethrionomys gapperi* (Boreal Red-backed Vole) on blowdown and standing forest during a study conducted on the mainland north of State Island between 4 and 16 August, 1970. The weather was hot and dry; temperatures ranged from a maximum of 97°F to a minimum of 54°F (the normal is 73°F to 51°F) and there was only ¼ inch of rain during the 13-day period.

Trap lines were run for three-day periods in three similar habitat pairs of blowdown and adjacent standing forest. Two trap lines of 40 four-inch Victor snap traps baited with peanut butter were placed in each habitat of a pair. All animals captured were measured for total, tail, hind foot, and ear lengths as described in Gunderson and Beer (1953) and sexed by dissection. Sexual activity was determined by descent of testes or presence of embryos or placental scars.

Forest composition was similar in the blowdown and the standing forest and was estimated by the point-central quarter method of Cottam and Curtis (1956) at 90-foot intervals. Estimates of percent trees fallen in the blowdown were made visually. Ground cover was estimated by taking m² plots at 200-foot intervals along the traplines in both habitats; estimates for percent of ground covered were made for less than two inches, two to ten inches, and over ten inches above the ground.

A Chi-square test was used to test the significance of the results. Blowdown and standing forest results were tested against an average over the two habitats.

Results

One hundred and eighty-one *C. gapperi* were captured in the blowdown (Table 1) and 51 in the standing forest (difference significant at the 0.01 level). A significantly higher percent (0.01 level) of the mice in the standing forest were sexually active. Standing forest animals also averaged larger.

TABLE 1. — Summary of *C. gapperi* Data

	Blowdown	Standing Forest
Number <i>C. gapperi</i> captured*	181	51
Number males	73 (43.5% **)	19 (38.0% **)
Number females	95 (56.5% **)	31 (62.0% **)
Number unidentified sex	13	1
Number sexually active males	16 (20.9%)	14 (73.7%)
Number sexually active females	22 (27.0%)	15 (48.7%)
Average number scars or embryos	5.3 (s=1.6)	5.9 (s=0.6)
Total number sexually active*	38 (22.6% **)	29 (58.0% **)
Average total length (mm)	124.2 (s=12.3)	127.8 (s=15.5)
Total number species captured	5	7
Total number animals captured of all species	187	67

*Difference significant at the 0.01 level.
**Percent of total *C. gapperi* of identified sex.

The forest composition and ground cover are summarized in Table 2 and Figure 1 respectively.

Discussion

Moist forest is the preferred habitat of *C. gapperi* (Burt, 1957; Burt and Grossenheider, 1952). If dominant mice drive young mice into the blowdown to maintain normal population levels in the standing forest, the blowdown populations will have a high proportion of sexually inactive, juvenile mice. The trapping results conform to this pattern. High population density might depress sexual activity in the blowdown. Calhoun (1962), however, found that high population densities of wild *Rattus norvegicus* did not affect sexual activity but affected maternal behavior and mortality rates. Calhoun also found that dominant *R. norvegicus*

were able to maintain normal population densities within their territories despite population pressure from other areas. Saldeir (1965) found similar behavior in *Peromyscus maniculatus* which also support the hypothesis. The trapping results indicate that *C. gapperi* may be affected in a similar manner and that the low level of sexual activity in the blowdown mice is not caused by high populations but by a preponderance of juvenile mice.

Data on the number of embryos and placental scars per uterus in females show no significant differences between habitats. This does not contradict the hypothesis because litter sizes may not differ between habitats if population density does not affect sexual activity.

The large difference in *C. gapperi* populations between the two habitats clearly indicates a habitat preference, a behavioral response, or both. The most likely explanation at present is that the standing forest is preferred habitat for the species

TABLE 2. — Forest Composition Estimates

Tree	IV*	% Down in Blowdown
Paper Birch (<i>Betula papyrifera</i>)	0.919	57
Balsam Fir (<i>Abies balsamea</i>)	0.515	98
Aspen (Quaking and Bigtooth) (<i>Populus tremuloides</i> , <i>P. grandidentata</i>)	0.487	85
White Spruce (<i>Picea glauca</i>)	0.343	85
White Pine (<i>Pinus strobus</i>)	0.288	97
Red Pine (<i>Pinus resinosa</i>)	0.267	92
Basswood (<i>Tilia americana</i>)	0.051	
Ash (<i>Fraxinus</i> spp.)	0.047	
Red Maple (<i>Acer rubrum</i>)	0.031	
Bur Oak (<i>Quercus macrocarpa</i>)	0.023	
Mountain Maple (<i>Acer spicatum</i>)	0.014	
Jack Pine (<i>Pinus banksiana</i>)	0.013	
Red Oak (<i>Quercus rubra</i>)	0.013	

*Importance Value (IV) = relative frequency + relative density + relative basal area.

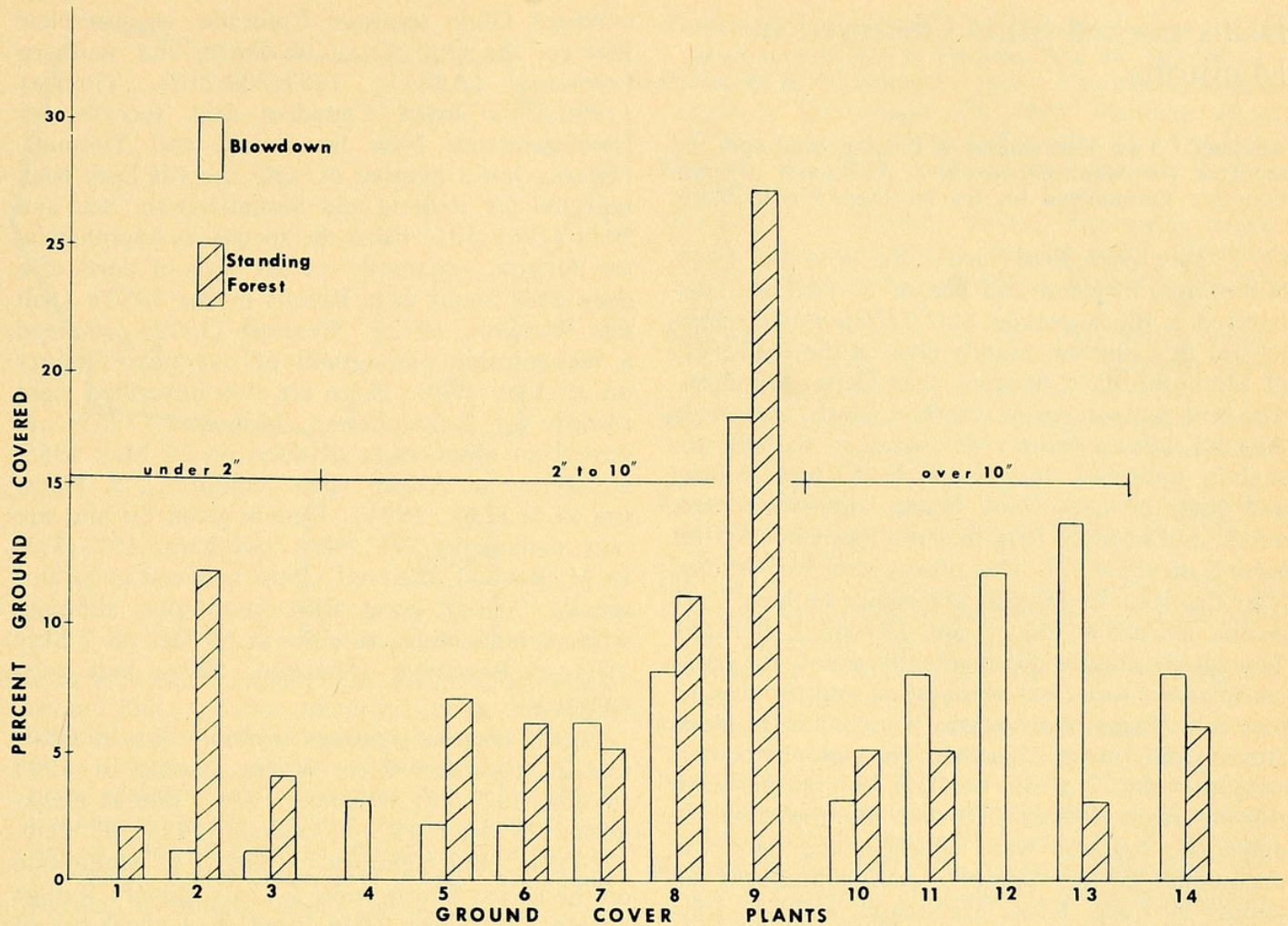


FIGURE 1. Ground Cover Estimates. The ground cover plants are 1-Lichens, 2-Mosses, 3-Ground Pine (*Lycopodium* spp.), 4-Horsetail (*Equisetum* spp.), 5-Blueberry (*Vaccinium angustifolium*), 6-Sarsaparilla (*Aralia nudicaulis*), 7-Bunchberry (*Cornus canadensis*), 8-Grasses (*Gramineae*), 9-Aster (*Aster macrophyllus*), 10-Bracken fern (*Pteridium aquilinum*), 11-Shrubs and seedlings, 12-Fallen green trees, 13-Raspberry (*Rubus strigosus*), 14-Miscellaneous.

and that the juveniles are driven into the less preferred blowdown.

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Literature Cited

- Burt, W. H. 1957. Mammals of the Great Lakes Region. The University of Michigan Press, Ann Arbor. 246 pp.
- Burt, W. H. and R. Grossenheider. 1952. A Field Guide to Mammals. Houghton Mifflin Company, Boston. 284 pp.
- Calhoun, J. B. 1962. Population density and social pathology. *Sci. Am.* 206, 139-48.
- Cottam, C. and J. T. Curtis. 1956. The use of distance measures in phytosociological sampling. *Ecology*, 37, 451-60.
- Gunderson, H. L. and J. R. Beer. 1953. The Mammals of Minnesota. University of Minnesota Press, Minneapolis. 190 pp.
- Saldier, R. M. F. S. 1965. The relationship between agonistic behavior and population changes in the deer mouse *Peromyscus maniculatus* (Wagner). *J. Anim. Ecol.* 34, 331-52.

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