

KROGER HILLS
SMALL MAMMAL SURVEY

V.

Submitted by


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November 30, 1990

INTRODUCTION

This is the fifth year of a small mammal population survey which was begun in the summer of 1986 in Kroger Hill Park. Prior to 1986 the park area had been undergoing old field succession for a number of years and basically was a broken woodland in many areas and tangled brushy areas in others. After the treatment imposed by Hamilton County (i.e. fall cutting and some with seeding), the area basically conforms to a grassy meadow, patches of other major plants.

The area is a meadow but there is apparently enough physical habitat diversity to cause patchy vegetation. The summer of 1990 showed a very apparent reduction in sweet clover, and increases in grass density. During 1989 the main small populations underwent a major change. The *Peromyscus* population decreased and the *Microtus* population peaked and became the major small mammal species in the field. During or immediately after the fall cutting *Peromyscus* and *Microtus* populations dropped to very low numbers.

This study is part of a land management study supported by the Hamilton County Park Administration and at one time was considered for Ohio's barn owl re-establishment program. The fifth or most recent portion of the survey was conducted during the summer and fall of 1990.

METHODS

Sherman live traps supplied by the Hamilton Park Board were utilized. Most of the sample sites were trapped employing 5 X 6 grids with 15 meter spacing. The bait utilized was peanut butter, oats, seed or a combination of these. A thirty trap grid was utilized for two main reasons. The first to minimize trap theft which can occur in areas near more urban populations, the second that thirty traps are about all this single worker can deal with at times of high trap success during his summer schedule.

Plots 3 and 4 were exceptions. These two areas were trapped intensively during the first years of this study with little success. Therefore, they are now trapped basically as a formality. These two areas were trapped employing 3 X 5 grids.

Population density was expressed by direct count, mice per 100 trap nights and when possible by the Schnabel modification of Peterson's 1896 method (Schnabel, 1938).

Relative areas covered by grid trapping were estimated as:

$$\text{Area} = (\text{rows} \times 15) (\text{columns} \times 15)$$

Mammal density was expressed as number per hectare (10,000 square meters).

The plots or grids employed in 1990 were exactly the same as 1989 plots. Six sample plots were employed made up of four summer plots numbered 1, 2, 3, 4 and two fall plots which covered the same area as summer plots 1 and 2. The four summer plots were chosen to include the main habitats representative of the patch habitats in Kroger Hills Park.

The following is a list and description of the various sample sites.

Plot 1 (0.3 mi from Terrace Park gate). This plot showed slightly different species distribution than in 1989. The species consisted mainly of mixed grasses, goldenrod, aster, milkweed, wild carrot and thistle. Some patches of bush honeysuckle was present, grass density was much greater than 1989, and sweet clover was almost absent.

Grid Size 6 X 5 (0.675 hectares)

Dates: June 19 to July 5

Trap nights 420

Plot 2

This is an area west of the barn approximately in the middle of the Kroger Hill property. Plants present in 1990 showed a great increase in grass density, some goldenrod, and milkweed.

Grid Size 6 X 5 (0.675 hectares)

Date: July 10 to July 20

Trap nights 300

Plot 3 Barn Plot

An area of mixed course grass (brome) at the barn. This field is also very deeply rutted with furrows left over from farming.

Grid Size 5 X 3 (0,338 hectares)

Date: July

Trap Nights

Plot 4

This area appears as a dried out pond. Very sparse grass and goldenrod. Some areas of clover and very light honeysuckle.

Grid size 5 X 3 (0.338 hectares)

Date: July

Trap nights 75

The fall plots were duplications of plots 1 and 2, however, fall plot 1 was cut and fall plot 2 still has the year's growth intact.

Fall Plot # 1

Grid size 6 X 5 (0.675 hectares)

Dates: Sept 20 to oct 26

Trap nights 420

Fall Plot # 2

Grid Size 6 X 5 (0.675 hectares)

Dates: Nov 12 to Nov 16

Trap nights 120

RESULTS

Table number one shows the numbers of mice trapped in the various plots. The numbers are expressed as total captures plus recaptures and as total marked.

Table two compares data from the previous years to that of 1990. The data utilized from previous years does not include all samples taken because some of the shorter time periods, or smaller numbers to obtain meaningful recapture numbers.

The data of Table two is graphed in Fig. one. Here we see that mouse numbers (i.e. *Peromyscus* and *Microtus*) were down from 1989.

During this sampling year the number of *Mus* became a significant factor (i.e. . . . increasing on plot one). Unfortunately, at least from the author's point of view, no *Zapus* or shrews were trapped.

No snakes or deer were observed during this interval of the study.

Catchable mouse numbers dropped after the fall cutting.

Plot	Trap nights	Peromyscus	Microtus	Mus
1	420	15(6)	1(1)	19(10)
2	300	16(8)	8(6)	0(0)
3	75	1(1)	0	0
4	75	0	1(1)	0
1(Fall)	420	6(4)	3(3)	1(1)
2(Fall)	120	2(2)	4(4)	0(0)
Total	1410	40(21)	17(15)	20(11)
Mice per 100 trap nights		2.84	1.21	1.42
Total Mice / 100		5.47		

TABLE I

TOTAL CATCHES PER SPECIES; number in parentheses is actual number marked

	1990	
Peromyscus		21
Microtus		15
Mus		11
Trap nights		1410
Peromyscus/100 trap nights		2.84
Microtus/100 trap nights		1.21
Mus/100 trap nights		1.42
Total mice/100 trap nights		5.47
	1989	
Peromyscus		47
Microtus		69
Mus		0
Trap nights		1530
Peromyscus/100 trap nights		3.07
Microtus/100 trap nights		4.50
Mus/100 trap nights		0
Total mice/100 trap nights		7.58
	1988	
Peromyscus		84
Microtus		38
Mus		0
Trap nights		1756
Peromyscus/100 trap nights		4.78
Microtus/100 trap nights		2.16
Mus/100 trap nights		0
Total mice/100 trap nights		6.94
	1987	
Peromyscus		58
Microtus		4
Mus		0
Trap nights		1374
Peromyscus/100 trap nights		4.22
Microtus/100 trap nights		0.29
Mus/100 trap nights		0
Total mice/100 trap nights		4.51
	1986	
Peromyscus		52
Microtus		6
Mus		0
Trap nights		1671
Peromyscus/100 trap nights		3.11
Microtus/100 trap nights		0.36
Mus/100 trap nights		0
Total mice/100 trap nights		3.47

TABLE 2

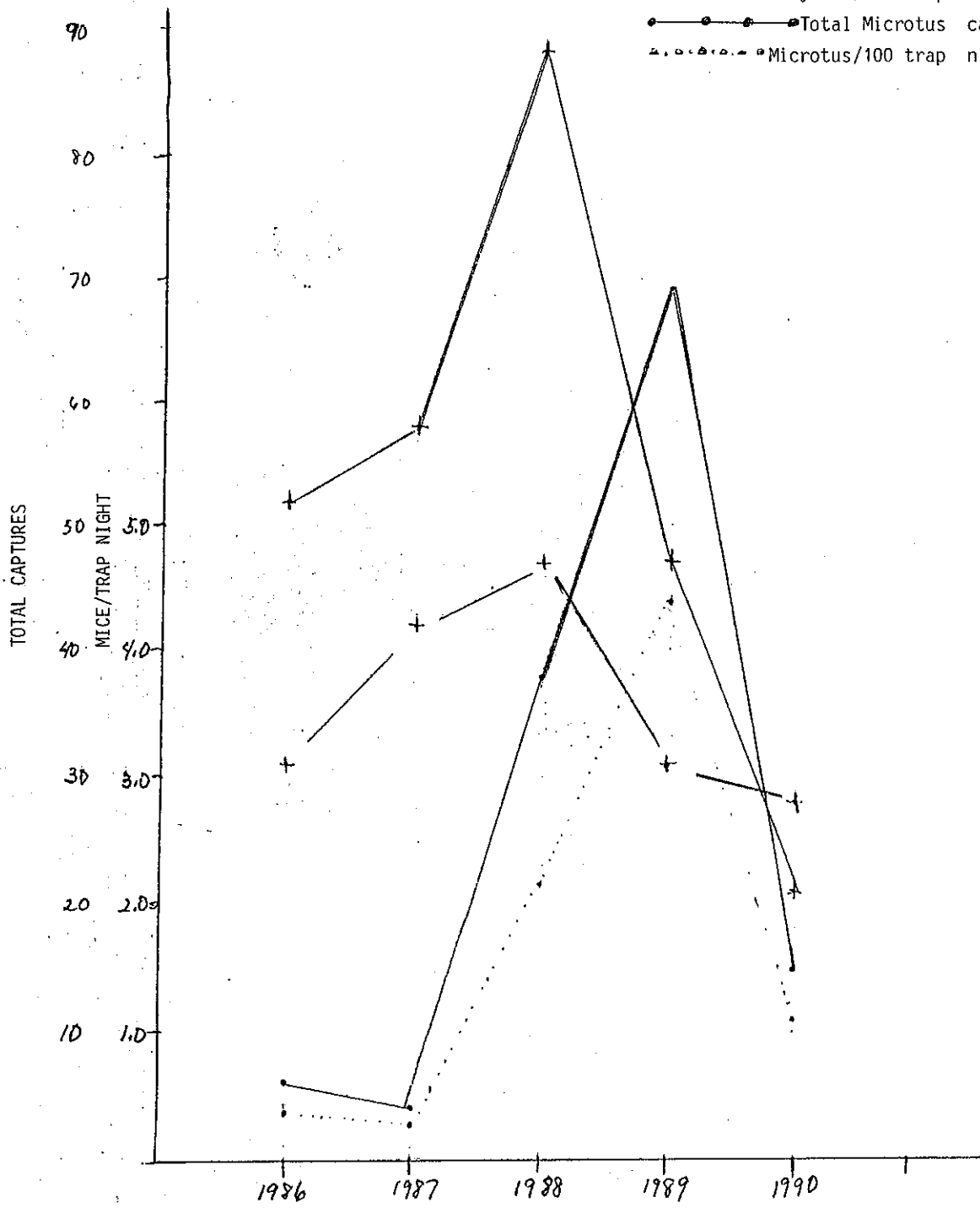
A comparison of yearly data

CONCLUSIONS

As can be seen, Fig. one, *Microtus* numbers peaked in 1989 and declined in 1990. The *Microtus* "cycle" as revealed by this study is basically of three or four years. There appears to be a lag from 1986 to 1987 which may indicate that the meadow habitat had not changed sufficiently to offer good *Microtus* habitat until 1988. *Microtus* numbers dropped after the fall cutting in 1989. This may have been part of a natural decline but the decline probably was hastened by the fall cutting since *Peromyscus* numbers fell off abruptly also. During the fall of 1989, the trappable numbers of *Peromyscus* decreased as *Microtus* increased. After the cutting neither mouse was very trappable and therefore a base or bottom number for the 1989 populations is hard to obtain. During late June or early July of 1990 *Microtus* numbers were very low as revealed by the data of plot one. We could interpret this plot as *Mus* replacing *Microtus* during the *Microtus* low, see Table 1. By July *Microtus* numbers were beginning to increase, but never attained near the 1989 numbers.

During this segment of the study *Peromyscus* is again the predominant small mammal in the meadow. However, as compared with all previous years except 1988, a peak or eruption year, *Peromyscus* is at the lowest it has been. Inspection of the previous years data reveals *Peromyscus* as a mouse that prefers a brushy diverse meadow with moderate amounts of grass, and although *Peromyscus* will readily cross a field reduced to bare ground and stubble by bushhogging or scarce grass, dense grass (Fall 1990) is almost prohibitive to *Peromyscus* movement

Fig. 1 +--+ Total Peromyscus Caught
 +--+ Peromyscus/100 trap nights
 ●—●— Total Microtus caught
 ▲...▲... Microtus/100 trap nights



If the present numbers of Peromyscus and Microtus are compared to the 1986 numbers table 1 and Fig 1 we see that the Peromyscus population is lower than it has ever been, and although Microtus is low it is not as low as in 1986 or 1987. Peromyscus numbers have been decreasing since the peak in 1988. I believe we can conclude that the Kroger Hill area at present is basically a meadow more supportive to meadow species than it was in the early years of this study.

Since Peromyscus numbers declined as Microtus peaked in 1989 and yet the animals are returned to the field after the Microtus decline we have support that there are behavioral interactions between these mouse species which cause Peromyscus to avoid Microtus.

It would be interesting to continue this study:

1. to further elaborate the Microtus cycle in the Cincinnati area.
2. to further investigate fluctuations, eruptions or cycles in Microtus populations
3. to in some way focus on the Microtus, Peromyscus interaction.
4. to study more closely the reason small mammals don't frequent the barn, meadow or lake meadow area.
5. to study the effect of burning and seeding

I would like to recommend that: (1) the county maintain the present meadow state of the park; (2) if areas are burned keep them in small patches so the animals have a safe area to retreat to; (3) try to eliminate dense stands of ragweed, and; (4) seed, or in some way stimulate the growth of sweet clover since it seems to be the refuge of Zapus.

I plan to continue trapping in the spring.

BUDGET

Gasoline
156 trips total
12 miles / trip ----> \$280.80
\$0.15 / mile

Oats	15.00
Peanut Butter	30.00
Secretary	30.00
Honorarium	100.00
	\$455.80

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