

DISTRIBUTION AND RELATIVE ABUNDANCE OF THE GOLDEN MOUSE (*Ochrotomys nuttalli*) IN ILLINOIS

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ABSTRACT

Live-trapping was conducted from 12 April through 11 December 1985 at 18 sites in 15 southern Illinois counties to assess the status of the golden mouse, *Ochrotomys nuttalli*, currently considered to be threatened in the state. Thirty eight individuals were caught during 16,850 trap-nights. They were taken in Alexander, Gallatin, Jackson, Johnson, Pope, Union and Williamson counties. Size and successional stage of the habitat block, and dispersal ability of golden mice, probably affect their occurrence. Because current land management practices provide abundant brushy, second growth habitats beneficial to golden mice, this species most appropriately should be considered as rare in Illinois, not threatened.

INTRODUCTION

Golden mice occur throughout the southeastern United States, west to eastern Texas and Oklahoma, and north to Kentucky and Virginia (Hall, 1982). In the mid-west, the species reaches its northern geographic limit in Illinois. Within Illinois, as elsewhere, golden mice are closely associated with a dense understory of greenbrier (*Smilax* sp.), honeysuckle (*Lonicera japonica*), poison ivy (*Toxicodendron radicans*), cane (*Arundinaria gigantea*) and grape (*Vitis* sp.) (Lindzey and Packard, 1977). Within Illinois, thick tangles of this understory are largely restricted to the southern part of the state and may limit the distribution of the golden mouse (Blus, 1966). Golden mice have been reported from only six counties in Illinois. Layne (1958) collected two golden mice from Alexander County and three from Union County. Hoffmeister

and Mohr (1957) reported their occurrence in Union and Johnson counties. Andrews (1963) trapped eight golden mice in Pope county. The species also has been taken in Jackson (Blus 1966) and Perry counties (Klimstra and Roseberry, 1969). Because of its restricted distribution, the golden mouse currently is considered threatened in Illinois (Natural Land Institute, 1981), although Klimstra and Roseberry (1969) suggested that sufficient trapping effort in suitable habitat could extend the known range of the species to many of the southern 34 counties of the state. The objective of this study was to determine the current status and distribution of golden mice in the southern 16 counties of Illinois.

PROCEDURES

Suitable trapping sites were selected in habitats with heavy understories of honeysuckle, greenbriar, grape and cane in the 16 southern counties of Illinois using information from district foresters and through extensive vehicular searches along county roads. Trapping was conducted on at least one site per county (Appendix I), with the exception of White County where no potentially suitable habitat was found.

At each site, up to 200 Sherman live-traps were placed at approximately 10-m intervals. Two traps were placed at each station; when possible one trap was placed in vegetation above ground level. Number of stations, transect lines and placement at each site varied depending on habitat size and configuration. Traps were baited with corn and operated on most sites for consecutive periods of 5-9 days, or until there were at least 1,000 trap-nights. For each animal captured, the species, sex, weight, age and reproductive condition were recorded. Each animal was toe-clipped and released at the point of capture. The relative abundance (RA) of each species on each site was calculated as:

$$RA = [\text{number individuals captured} / \text{number of trap nights}] \times 100$$

At each station a visual estimate of canopy closure was made, and the species, diameter at breast height (DBH) and distance from the station to the nearest tree greater than 8 cm DBH were recorded.

RESULTS

In a total of 16,850 trap-nights (excluding traps sprung without a capture) between 12 April and 11 December 1985, 553 individual small mammals representing 8 species, were captured a total of 988 times (Table 1). White-footed mice (*Peromyscus leucopus*) and deer mice (*P. maniculatus*) made up 66.9% ($n = 370$) of the individuals captured. Thirty eight golden mice, 6.9% of the total, were captured. They were taken in Alexander, Gallatin, Jackson, Johnson, Pope, Union and Williamson counties. Those from Gallatin and Williamson counties represent new county distributional records. No golden mice were taken in Perry County, from which historical records exist. Sites in Alexander and Union counties represented areas from which golden mice were taken over 20 years ago (Layne, 1958).

The relative abundance of golden mice varied from a high in Alexander (RA = 2.52), and Johnson counties (RA = 1.01) to the Williamson County site, where the relative abundance (0.09) of golden mice was lowest. Specific trapping data for each site are given in Appendix I.

No significant differences ($P > 0.05$) were found between vegetation parameters of sites from which golden mice were captured and sites from which they were not. Golden mice were caught significantly more often than expected in traps placed above ground ($\chi^2 = 11.09$, $P < 0.05$). *P. leucopus* were not trapped more often than expected above ground ($\chi^2 = 0.79$, $P > 0.10$). There was no significant correlation between the relative abundance of *Peromyscus* and golden mice on each site ($r = 0.286$, $P > 0.05$).

Considering the natural divisions of Illinois (Schwegman, 1973), golden mice were captured primarily in the Shawnee Hills division of southern Jackson, Williamson, Gallatin, Johnson and Pope counties (Figure 1). Golden mice also were captured in the Bottomlands section of the Coastal Plain division in Alexander County and on the edge of the Ozark division in Union County. No golden mice were captured in the northern counties of the study area, within the Southern Till Plain division.

Most captures of golden mice occurred at sites on or adjoining the Shawnee National Forest. The only exception was the Williamson County site on Crab Orchard National Wildlife Refuge. Golden mice were captured at 65% of the trap sites within the Shawnee forest. Examination of data from historical capture sites of golden mice further illustrates the importance of Shawnee National Forest to this species (Figure 2). They have been reported in Illinois from only four sites outside the borders of the forest; sites in Jackson, Johnson, and Williamson counties, and one site in Perry County (Klimstra and Roseberry, 1969), the exact location of which is uncertain.

DISCUSSION

Failure to capture golden mice at a site obviously is not definitive "proof" that they do not occur there or in the county. On sites in Hardin, Alexander, Pulaski and Saline counties, trapping success (total number of individuals trapped / total number of trap nights) was 1.9% or less (see Appendix I) despite considerable trapping effort. It is possible that golden mice occurred on these sites, especially in Saline and Hardin counties, which were the only two sites within the Shawnee Hills division where no golden mice were taken. Trapping success also was very low (2.9%) at the Pyramid State Park site in Perry County. However, Smith (1986) also trapped there extensively in a variety of habitats from 1977-1979 and found no golden mice. It is likely that the species is absent from the area. The trapping sites in Massac and Randolph counties also had fairly low success rates. Sites in Franklin and Hamilton counties had extremely high success rates, and it is unlikely that golden mice could have occurred in either area and not have been taken.

Golden mice could be absent from a trapping site for a number of reasons. First, the habitat may not have been suitable. Only sites with heavy understory of honey-suckle, greenbriar and other vines were considered for establishment of trap sites, consistent with the known descriptions of golden mice habitat. However, microhabitat factors important to golden mice, such as those noted by Dueser and Shugart (1979) and Seagle (1985) may not have been suitable.

Second, golden mice may be absent from suitable habitats because of lack of dispersal time. The species often is associated with disturbed, subclimax sites (Jindzey and Packard, 1977), either old fields or forested stands with openings in the canopy. Such sites are transitional. In order for golden mice to occur at these sites, they must colonize them within a relatively short period of time. In many counties otherwise

suitable sites are essentially "island" habitats, surrounded by farmland, away from contiguous forest and without dispersal corridors. Trapping sites such as those in Randolph, Franklin, Massac and Hamilton counties probably did not provide large enough habitat blocks and/or dispersal corridors. Lack of extensive forested areas in many counties and the scattered distribution of suitable habitat may not allow movement of golden mice from established populations to new, suitable habitat.

Finally, interspecific competition may affect the local distribution of golden mice. Although in this study no correlation was found between the relative abundance indices of golden mice and white-footed mice, this was not a very sensitive measure. Seagle (1985), using multivariate analyses of numerous microhabitat variables, demonstrated significant niche overlap between these two species, and a "dramatic" shift in microhabitat use by golden mice upon removal of white-footed mice.

The relatively large, contiguous blocks of habitat, often with disturbed areas, provided by Shawnee National Forest may be essential for maintenance of golden mouse populations in Illinois. Outside the Shawnee Hills division there probably are few golden mouse populations, due either to lack of habitat, dispersal corridors or other factors. However, throughout the counties in the Shawnee Hills division, current land management activities provide a great deal of brushy, second growth habitat beneficial to the golden mouse, and the species is relatively abundant in certain areas. Given the continued creation of disturbed forest areas, we suggest the golden mouse should be considered rare in Illinois, but currently does not appear to be threatened.

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Table 1. Individual captures, number of recaptures, and relative abundances of small mammals taken from trapping sites in southern Illinois between April and December, 1985.

Species	Individual Captures	Recaptures	Relative Abundance ^a
<i>Peromyscus leucopus</i>	182	129	1.08
<i>Peromyscus</i> sp.	134	190	0.79
<i>Blarina carolinensis</i>	92	1	0.55
<i>Peromyscus maniculatus</i>	54	53	0.32
<i>Ochrotomys nuttalli</i>	38	31	0.22
<i>Microtus pinetorum</i>	27	31	0.16
<i>Tamias striatus</i>	22	— ^b	—
<i>Zapus hudsonius</i>	2	0	0.01
<i>Glaucomys volans</i>	2	0	0.01
TOTALS	553	435	

^aRelative Abundance = (Individual Captures / Total Trap-nights) x 100

^bIndividuals not toe-clipped

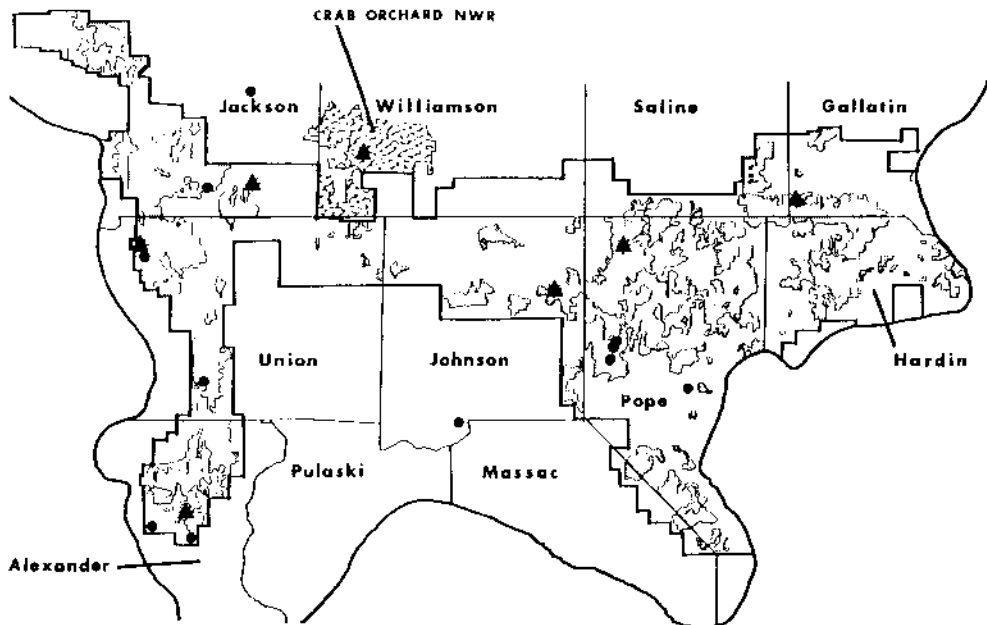


Fig. 1. Distribution of golden mouse trap sites (▲ golden mice caught; • golden mice not caught) during trapping from April through December, 1985 in relation to the natural divisions (from Schwegnau, 1973) of southern Illinois.

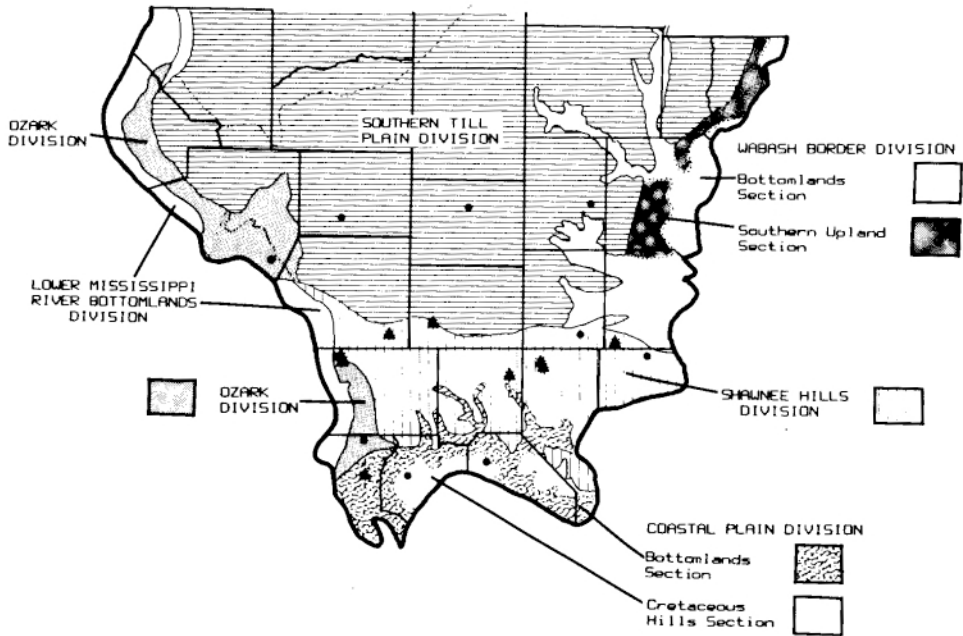


Fig. 2. Distribution of known golden mouse capture sites (historic records • and current study ▲) in relation to Shawnee National Forest land, southern Illinois.

Appendix I. Place name, location, inclusive trapping dates, trap-nights (total trap-nights minus sprung traps), and total captures for each site investigated for occurrence of golden mice in 15 counties of southern Illinois from April through December, 1985.

Jackson County

Place: near Makanda Township

Location: T10S, R1W, S19, NE 1/4

Dates: 12-20 April 1985

Trap-nights: 1,008

Total captures: 113 (11.2% success rate)

Individual golden mice: 10

Williamson County

Place: Crab Orchard National Wildlife Refuge (three different sites)

Site #1

Location: T10S, R1E, S10, NW 1/4

Dates: 25-30 April, 8-12 May 1985

Trap-nights: 1,445

Total captures: 220 (15.2% success rate)

Individual golden mice: 1

Site #2

Location: T9S, R2E, S29, NE 1/4

Dates: 8-12 May 1985

Trap-nights: 198

Total captures: 13 (6.6% success rate)

Individual golden mice: 0

Site #3

Location: T10S, R1E, S18, SE 1/4

Dates: 3-8 November 1985

Trap-nights: 245

Total captures: 4 (1.6% success rate)

Individual golden mice: 0

Union County

Place: LaRue-Pine Hills

Locations: T11S, R3W, S9, SE 1/4

S16, NE 1/4

S21, NW 1/4

Dates: 21-26 May 1985

Trap-nights: 1,053

Total captures: 119 (11.3% success rate)

Individual golden mice: 5

Pope County

Place: Bell Smith Springs Area

Location: T11S, R5E, S22, NE 1/4

S15, SW 1/4

Dates: 7-12 June 1985

Trap-nights: 983

Total captures: 16 (1.6% success rate)

Individual golden mice: 2

Johnson County

Place: 1/2 mile N. Cedar Creek Trail

Location: T12S, R4E, S3, NW 1/4

SW 1/4

Dates: 16-21 June 1985

Trap-nights: 992

Total captures: 37 (3.7% success rate)

Individual golden mice: 10

Saline County

Place: Shawnee National Forest

Location: T10S, R7E, S20, NE 1/4

Dates: 3-8 July 1985

Trap-nights: 1,017

Total captures: 19 (1.9% success rate)

Individual golden mice: 0

Hardin County

Place: Shawnee National Forest

Location: T11S, R9E, S7, SW 1/4

Dates: 24-29 July 1985

Trap-nights: 1,027

Total captures: 9 (0.9% success rate)

Individual golden mice: 0

Gallatin County

Place: Shawnee National Forest

Location: T10S, R8E, S32, NW 1/4

Dates: 24-29 July 1985

Trap-nights: 1,010

Total captures: 23 (2.3% success rate)

Individual golden mice: 2

Alexander County (2 sites)

Place: Shawnee National Forest

Locations: T14S, R2E, S9, SE 1/4
S16 NE 1/4

Dates: 19-24 August 1985

Trap-nights: 1,011

Total captures: 11 (1.1% success rate)

Individual golden mice: 0

Place: 3 mi. NNW Olive Branch

Location: T15S, R2E, S18, NE 1/4

Dates: 8-11 December 1985

Trap-nights: 317

Total captures: 15

Individual golden mice: 8

Pulaski County

Place: Bankstons property (private ownership)

Location: T15S, R1E, S7, NW 1/4

Dates: 2-10 September 1985

Trap-nights: 1,498

Total captures: 19 (1.3% success rate)

Individual golden mice: 0

Massac County

Place: D.W. Helm property (private ownership)

Location: T15S, R3E, S2, SE 1/4

Dates: 20-25 September 1985

Trap-nights: 1,015

Total captures: 41 (4.0% success rate)

Individual golden mice: 0

Randolph County

Place: Turkey Bluffs

Location: T7S, R6E, S34, SW 1/4
S38, NW 1/4

Dates: 11-16 October 1985

Trap-nights: 1,031

Total captures: 51 (4.9% success rate)

Individual golden mice: 0

Perry County

Place: Pyramid State Park, Chain Lake Trail

Location: T6S, R3E, S10, SE 1/4

Dates: 29 October - 3 November 1985

Trap-nights: 1,008

Total captures: 29 (2.9% success rate)

Individual golden mice: 0

Franklin County

Place: Army Corps Engineers land S. Rend Lake Dam

Location: T6S, R2E, S2, NE 1/4

Dates: 7-12 November 1985

Trap-nights: 1,000

Total captures: 111 (11.1% success rate)

Individual golden mice: 0

Hamilton County

Place: Dolan Lake Conservation Area

Location: T5S, R7E, S26, NE 1/4

Dates: 22-26 November 1985

Trap-nights: 992

Total captures: 160 (16.1% success rate)

Individual golden mice: 0