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A Comparison of Bottles and Snap Traps for Short-term Small Mammal Sampling

ABSTRACT.—Bottles were tested as traps for small mammals. Used in conjunction with three types of snap traps over 30,240 trap nights, bottles captured eight (2%) of the total 421 mammals taken. Bottles were inefficient in capturing small mammals compared to snap traps.

A recent report presented the first account in North America of large numbers of shrews and lesser numbers of other small mammals becoming entrapped in discarded bottles along roadsides (Pagels and French, 1987). As many as 17 southern shorttailed shrews (*Blarina carolinensis*) were found in 1, 10-ounce soft drink bottle in Virginia. Pagels and French pointed out that roadside bottle surveys can be used to augment standard trapping techniques and provide data on species distribution that can be obtained in a relatively short period of time over a broad geographical range. No subsequent studies have been published in which bottles were used to gather data on small mammal populations. This report presents data on the comparative effectiveness of bottles and snap traps in capturing small mammals in a controlled trapping regime.

As part of a cooperative study of wildlife communities in managed forest lands in central Arkansas, small mammals were trapped for 10 consecutive days from 9 February to 18 February 1990. Our 18 study areas were each 80 × 200 m and included a centrally located stream surrounded by pine plantation. Most study areas also contained a streamside management zone (SMZ) or natural pine-hardwood riparian forest strip from 20–160 m wide. The 84 trap lines with nine stations each at 20-m intervals ran parallel to the creeks; 540 stations in SMZs, 162 in plantation, and 54 in a natural forest site.

At each of the 756 trap stations four traps were set: 1 Victor mouse trap, 1 Museum Special, 1 Victor rat trap, and 1 16-ounce disposable glass soft drink bottle. Snap traps were baited with a mixture of rolled oats, peanut butter and vegetable oil. We placed each bottle in a slight depression and slanted it upward at about a 30° angle so that the mouth was at ground level. Bottles were baited with molasses and oat horse feed pellets which were used for their ease of insertion into the bottles and for their similarity in composition to our snap trap bait. Frequent rains during the sampling period caused most bottles to collect some water, which we poured out before adding fresh bait. At each station traps were placed beside down wood or other natural runs and were generally spaced less than 2 m apart.

A total of 421 mammals representing 13 species were collected in 30,240 (26,574 after subtracting sprung empty traps) trap nights (one trap set for 24 h = 1 trap night). The 14 specimens of four large species captured in rat traps were not included in the comparative totals data (Table 1). Based on a chi-square test, there was no difference ($P > 0.05$) in the proportion of catches in any of the snap traps for each of the three most commonly captured species. However, trapping success for bottles was significantly less ($P < 0.001$) than for snap traps. We assume that the species included in the table which were not actually captured in bottles could have become entrapped, since Pagels and French (1987) reported finding deer mice (*Peromyscus maniculatus*), least shrews (*Cryptotis parva*) and white-footed mice (*P. leucopus*) in roadside bottles.

In addition to comparing capture success between bottles and snap traps, we also wanted to determine if bottles would sample mammals not readily taken in snap traps, such as the least shrew (Mengak and Guynn, 1987). Although discarded bottles along roadsides have been shown to be a valuable source of information on the distribution of certain small mammals (Glegg, 1966; Morris and Harper, 1965; Pagels and French, 1987), our results indicate that bottles are ineffective as a technique for capturing small mammals in a short-term trapping regime and offer no advantage over snap traps in sampling very small mammals. It is possible that, though both baits were a sweetened oat mixture, the difference in the bait used in bottles accounted for the low capture rate. More probably, the small orifice (20 mm diam) of the bottle prevented the aroma of the bait from dispersing as widely as that on an exposed snap trap paddle, thereby greatly reducing the comparative attraction of bottle bait to nearby mammals.

TABLE 1.—Numbers of each species captured by trap type. Chi-square tests compare differences in the proportions of captures between snap traps (2 df) and between bottles and snap traps (3 df), using the null hypothesis in both cases that no difference exists in the capture rates for any trap type

Species	Total captures	Museum special	Mouse	Rat	χ^2 w/2 df $\chi^2_{0.05} = 5.992$	Bottles	χ^2 w/3 df $\chi^2_{0.001} = 16.270$
Blarina carolinensis, southern shorttailed shrew	90	29	38	20	$\chi^2 = 5.586$	3	$\chi^2 = 29.733$
Ochrotomys nuttalli, golden mouse	152	46	57	47	$\chi^2 = 1.480$	2	$\chi^2 = 47.421$
Reithrodontomys fulvescens, fulvous harvest mouse	78	22	26	28	$\chi^2 = 0.737$	2	$\chi^2 = 21.897$
Microtus pinetorum, pine vole	16	5	8	2		1	
Peromyscus gossypinus, cotton mouse	24	8	3	13		0	
Peromyscus leucopus, white-footed mouse	17	6	9	2		0	
Peromyscus attwateri, brush mouse	12	2	6	4		0	
Peromyscus maniculatus, deer mouse	11	4	4	3		0	
Cryptotis parva, least shrew	7	0	6	1		0	
Totals	407	122	157	120		8	
%	100%	30%	38.5%	29.5%		2%	
[1]Other mammals				14			
[2]Birds		4	3	4			

[1] *Sigmodon hispidus,* hispid cotton rat, 2; *Neotoma floridana,* eastern woodrat, 6; *Glaucomys volans,* southern flying squirrel, 2; *Sylvilagus floridanus,* eastern cottontail, 4

[2] MS: *Hylocichla guttata,* hermit thrush, 3; *Richmondena cardinalis,* cardinal, 1. M: cardinal, 1; *Thryothorus ludovicianus,* Carolina wren, 2. R: hermit thrush, 1; cardinal, 2; *Dendroica pinus,* pine warbler, 1

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