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Sensitizing Sherman Small-Mammal Live Traps To Improve Their Efficiency[1]

Abstract

Relative efficiencies of two models of Sherman live traps differed markedly when they were sensitized by trigger adjustment. Equating trap tripping force to body weights of mammals being captured reduced variation in total small-mammal catches between models.

There is considerable disagreement in reported efficiencies between two models of Sherman live traps (Quast and Howard, 1953; Kisiel, 1971) and efficiencies of Sherman and other traps (Wiener and Smith, 1972). Perhaps these conflicts reflect sensitivity differences among traps. Only Wiener and Smith (1972: 872) report sensitivity affecting relative efficiencies of traps. They reported their Museum Special snap traps were more sensitive—based on traps tripped without catches—and more efficient than Sherman live traps and others tested.

This paper describes a study I did to improve sensitivity and efficiencies of Sherman live traps reported faulty by Lindsey, Anthony, and Evans (1974: 276). The traps were standard 1967 and 1970 models of Sherman, advertised as "non-folding; 3 x 3 x 10 inches; galvanized iron (3310G); live animal traps" (product brochures, 1967 and 1970, H. B. Sherman, DeLand, Florida). During another study, the 1967 model repeatedly outperformed the 1970 model in catching deer mice (*Peromyscus maniculatus*) and other small forest-mammals. I believed the difference I observed could lead to erroneous study conclusions. Therefore, I decided to study relative efficiencies of the two models and correct any obvious deficiencies causing significant difference in total small-mammal catches between models.

Ten 1967 and ten 1970 model traps were randomly selected from about 100 of each model being used by the U.S. Fish and Wildlife Service (USFWS) in seed protection studies. A 4-ha stand of 40- to 50-year-old Douglas-fir (*Pseudotsuga menziesii*) 5 km south of Olympia, Washington served as the study area. Traps were placed at ten, randomly located, fixed trapping stations, the closest being 40 m apart. One 1967 and one 1970 model trap were placed side by side at each station. Each pair of traps was permanently assigned to a station, and in each pair the traps were exchanged each active day to reduce position bias. Traps were set for two consecutive days and left unset for five days. Traps were scraped clean and new bedding provided before each active period and after a catch was made. Each active day, traps were baited with fresh peanut butter and rolled oats. All trapped animals were removed from the study area to eliminate trap-proneness bias. Trapping was done from December 11, 1971 through January 30, 1972 in two equal test periods.

[1] Reprints may be obtained from U.S. Fish and Wildlife Service, Route 4, Box 500, Olympia, WA 98502.

In the first test, all traps were sensitized by a widely used method, that of trigger adjustment. This was done by adjusting the trigger-door catch until a light tap on the back of the trap sprung the trap. Sensitivity was checked each day by tapping the trap and further adjustment was not necessary during this test period. Results (Table 1) showed that the 1967 model was significantly more efficient than the 1970 model for total captures ($X^2=48.29$, df=1, $P<.01$).

TABLE 1. Results of a removal trapping study comparing relative efficiencies of 1967 and 1970 models of Sherman live traps by trigger adjustment sensitizing (Test I), and by standardizing the trap tripping force (Test II). Catch is expressed as individuals captured per 100 trap nights.

	Test I		Test II	
Species	1967 model	1970 model	1967 model	1970 model
Peromyscus maniculatus	24	1	20	17
Clethrionomys occidentalis	25	1	3	4
Sorex trowbridgii	5	0	8	14
Total all species	54	2	31	35
Expected trap nights	80	80	80	80
Traps tripped w/o catch	4	0	7	10
Observed trap nights	76	80	73	70

Traps tripped without a catch (Table 1) indicated that the 1967 model traps were more sensitive than the 1970 model traps. Examination of traps revealed a difference in tension springs and trigger-door catches between models. Treadle- and door-springs in 1970 model traps had 15 or 16 coils. Nine 1967 model traps had springs with 5 coils, the other trap had springs with 10 coils. The 1970 model traps also had a more secure trigger-door catch—a rolled metal edge compared to a smooth, slightly hooked edge in 1967 model traps. The combined effect of greater tension in both treadle and door springs and the more secure catch in 1970 model traps necessitated a greater weight on the treadle to trip traps—30.3 gm (range 21-35 gm) for 1970 model traps compared to 11.3 gm (range 2-55 gm) for 1967 model traps. Readjusting triggers did not significantly reduce this tripping force. Evidently body weight of the captured species affected trap efficiencies—deer mice averaged 17.1 gm (range 11.5-26.4 gm); red-backed voles (*Clethrionomys occidentalis*) averaged 18.0 gm (range 13.4-20.0 gm); Trowbridge shrews (*Sorex trowbridgii*) averaged 4.7 gm (range 4.3-5.8 gm).

For the second test, all traps that would not trip with a 15-gm weight on the distal end of the treadle were resensitized by bending the arm of the treadle-spring away from the treadle until 15 gm tripped the trap. The one 1967 model with the ten-coil treadle-spring and all 1970 model traps were resensitized by this method. After adjustment, the 1970 model traps tripped with 10.7 gm (range 3-15 gm) on the treadle and the 1967 traps with 7.3 gm (range 2-15 gm) on the treadle. Sensitivity was checked each active day with a 15-gm weight; readjustments were not necessary and pre- and post-test tripping force did not vary. In this test (Table 1) the difference in total catches between models was not significant ($X^2=0.24$, df=1, $P>.05$).

I believe these tests demonstrated the effect of sensitizing on efficiency of Sherman traps. Trigger adjustment did not adequately sensitize 1970 models and some 1967 models. Adjusting trap tripping force to body weight of mammals improved trap response, and uniform sensitivity resulted in more equable efficiencies of the two models.

After this demonstration, tripping force in all remaining USFWS traps needing resensitizing was reduced by affixing lead to the end of the treadle.. The lead facilitated readjustment to specific study needs (for example, 2-4 gm for total species sampling; 11 gm for winter deer-mouse tagging studies) more than bending springs. Lindsey (personal communication) wrote: "Both our galvanized and aluminum (Sherman 3310A, 1970 design) models required resensitizing. The aluminum model required 45 to 75 grams to trip the treadle after using the trigger adjustment method and before lead was added to resensitize the traps. After resensitizing, the reliability and capture success for all trap models and designs was similar in later field studies."

Various trigger release mechanisms have been devised for greater sensitivity and reliability of live traps (Fitch, 1950; Howard, 1953). Highly sensitive Sherman and Sherman-type traps can be specially ordered. I believe that the trigger mechanism in standard design Sherman traps is reliable and, as pointed out, can be highly sensitized by reducing trap tripping force.

There is general agreement that several types of traps should be used to improve accuracy of sampling small-mammal populations (Wiener and Smith, 1972; Nellis, Terry, and Taber, 1974). Where live trapping is required, however, other investigators may find it desirable to check and sensitize their traps as described herein to improve their reliability.

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Literature Cited

Fitch, H. S. 1950. A new style live-trap for small mammals. J. Mammal. 31(3): 364-365.

Howard, W. E. 1953. A trigger mechanism for small-mammal live traps. J. Mammal. 34(4): 513-514.

Kisiel, D. S. 1971. Effect of two sizes of Sherman traps on success of trapping Peromyscus and Reithrodontomys. Amer. Midland Nat. 87(2): 551-552.

Lindsey, G. D., R. M. Anthony, and J. Evans. 1974. Mestranol as a repellent to protect Douglas-fir seed from deer mice. Proc. 6th Vert. Pest Conf., Anaheim, CA., p. 272-279.

Nellis, C. H., C. J. Terry, and R. D. Taber. 1974. A conical pitfall trap for small mammals. Northwest Sci. 48(2): 102-104.

Quast, J. C., and W. E. Howard. 1953. Comparison of catch of two sizes of small-mammal live traps. J. Mammal. 34(4): 514-515.

Wiener, J. G., and M. H. Smith. 1972. Relative efficiencies of four small-mammal traps. J. Mammal. 53(4): 868-873.

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