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# An Artificial Latrine Log for Swamp Rabbit Studies

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8 RH: Artificial latrine log for swamp rabbits • *Schauber et al.*

9 **An Artificial Latrine Log for Swamp Rabbit Studies**

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18 **ABSTRACT** Managers use latrine surveys to monitor swamp rabbit (*Sylvilagus aquaticus*)  
19 populations, but may miss rabbits in sites lacking suitable latrine logs. We tested artificial latrine  
20 logs in logless thickets in southern Illinois, generally detecting swamp rabbits in fewer visits than  
21 by live trapping. Artificial logs can aid swamp rabbit monitoring, especially in logless habitats.

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23 **KEY WORDS** defecation, habitat, latrine, monitoring, presence-absence, survey, swamp rabbit,  
24 *Sylvilagus aquaticus*

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26 The swamp rabbit (*Sylvilagus aquaticus*) is endemic to the southeastern United States and  
27 typically inhabits bottomland hardwood forests with dense understory (Chapman and Feldhamer  
28 1981, McCollum and Holler 1994). Swamp rabbits are legal game animals in much of their  
29 range, but their abundance and distribution have declined in some areas along the historic  
30 northern range limit (Korte and Fredrickson 1977, Whitaker, Jr. and Abrell 1986, Kjolhaug et al.  
31 1987). Managers require information about abundance, distribution, and habitat associations of  
32 the swamp rabbit for conservation purposes, but swamp rabbits are cryptic, inhabit dense cover,  
33 and are difficult to live-trap. Fortunately, swamp rabbits habitually defecate on elevated  
34 substrates (especially logs), producing conspicuous latrines. Zollner et al. (1996) found that  
35 swamp rabbits deposited 91% of fecal pellets on logs and appeared to select broad, moss-covered  
36 logs in advanced decay. Latrines likely serve a social signaling function associated with  
37 reproduction, although swamp rabbits may also defecate while using logs as elevated lookouts  
38 (Whitaker, Jr. and Abrell 1986, Zollner et al. 1996). Because pellet groups on elevated  
39 substrates are visually obvious, surveying for latrines is easy, inexpensive, and frequently used to  
40 monitor the local presence and abundance of swamp rabbits (Terrel 1972, Heuer, Jr. and Perry,  
41 Jr. 1976, Wolff and Barbour 2002, Scheibe and Henson 2003).

42         Although latrine surveys are easy and inexpensive, they may fail to detect swamp rabbits  
43 inhabiting areas that lack suitable latrine substrates. Zollner et al. (2000) found that distribution  
44 of latrines in areas inhabited by swamp rabbits was strongly correlated with presence of downed  
45 logs. Recently afforested areas (e.g., retired agricultural fields), however, likely provide dense  
46 understory suitable for swamp rabbits' habitation but lack logs or stumps suitable for fecal  
47 deposition. Our objective was to develop and field-test an artificial latrine log (ALL) to facilitate  
48 latrine surveys for swamp rabbits in habitats lacking suitable latrine substrates.

## 49 **STUDY AREA**

50 Southern Illinois constitutes part of the northern limit of the swamp rabbit's historic range  
51 (Kjolhaug et al. 1987). Suitable swamp rabbit habitat comprised approximately 56,000 ha in  
52 southern Illinois, mostly along the Mississippi, Ohio, Big Muddy, and Cache rivers (Woolf and  
53 Barbour 2002). We conducted research in selected patches of early-successional habitat in  
54 Alexander, Pulaski, Johnson, and Union counties in southern Illinois. We chose sites near  
55 bottomland hardwood forest patches known to currently or historically maintain swamp rabbit  
56 populations. These sites had all been recently (i.e., within 15 yr) reverted from agricultural  
57 production to federal farm programs (i.e., Wetlands Reserve Program) or otherwise managed for  
58 early-successional habitat. Given the recent agricultural use of these sites, no downed logs were  
59 present for swamp rabbits to defecate upon. Dominant overstory species were swamp white oak  
60 (*Quercus bicolor*), pin oak (*Q. palustris*), red oak (*Q. rubra*), bald Cypress (*Taxodium*  
61 *distichum*), sweetgum (*Liquidambar styraciflua*), and American sycamore (*Platanus*  
62 *occidentalis*). Understory species present included Allegheny blackberry (*Rubus allegheniensis*),  
63 poison ivy (*Toxicodendron radicans*), broom sedge (*Andropogon virginicus*), goldenrod  
64 (*Solidago spp.*), and various sedges (*Carex spp.* and *Cyperus spp.*).

65

## 66 **METHODS**

67 We constructed each ALL as a frame of 0.95-cm plywood with a rectangular piece of carpet  
68 covering the top (Fig. 1A, B). Carpet provided an absorbent substrate for scents, mimicking  
69 moss, and also was springy because it was only supported by the perimeter of the frame over  
70 most of its length. The ALLs had flat tops, based on swamp rabbits' preference for large-  
71 diameter logs that provide relatively flat platforms. To facilitate transport, we skeletonized the

72 frame to reduce weight and bound it loosely together with nylon cable ties (zip ties) looped  
73 through holes in the plywood, allowing the frame to fold flat (Fig 1B). Each ALL weighed  
74 approximately 1.2 kg and measured 96 × 19 cm when collapsed. In the field, we tightened and  
75 trimmed the zip ties to make the frame rigid, then stapled the carpet on top.

76 We deployed 404 ALLs at 29 early-successional sites in southern Illinois (10-20  
77 ALLs/site, 0.2-6.2 ALLs/ha) in November-December 2006. These sites had dense woody  
78 vegetation <10 cm diameter at breast height and were <2 km from sites where we had detected  
79 swamp rabbit presence via surveying for latrines on existing logs. We distributed ALLs within  
80 each site to maximize coverage of suitable habitat but also placed them near obvious runways or  
81 suspected swamp rabbit fecal pellets. We examined ALLs for the appearance of swamp rabbit  
82 fecal pellets 3-4 times between 26 January and 30 April 2007 at intervals of 12-45 days. We  
83 identified round fecal pellets on ALLs as swamp rabbit pellets based on size comparison with  
84 eastern cottontail (*S. floridanus*) pellets (which are rarely found on natural logs) in sites inhabited  
85 by both species.

86 We also set 8-20 Tomahawk live traps (1.5 kg, Model 205 Collapsible, Tomahawk Live  
87 Trap Co., Tomahawk, WI) at each site (0.2-6.7 traps/ha) and checked them each morning for  
88 periods of 8-14 days (sometimes shortened by flooding). We baited each trap with apple,  
89 covered it with burlap, and surrounded it with leaves and woody debris. We identified captured  
90 rabbits as swamp rabbits or eastern cottontails based on size and pelage coloration and marked  
91 each rabbit with uniquely numbered ear tags (Model 1005-3, National Band and Tag Co.,  
92 Newport, KY; Southern Illinois University Institutional Animal Care and Use Committee  
93 Protocol no. 06-035). We compared efficiency of ALLs and live trapping for detecting swamp

94 rabbits by effort required for first detection (Foresman and Pearson 1998), measured in number  
95 of visits to each site.

96

## 97 **RESULTS**

98 We captured swamp rabbits at 11 of 29 sites (38%) and swamp rabbits established latrines on  
99 ALLs in 7 sites (24%), all sites where we captured swamp rabbits. We captured 23 individual  
100 swamp rabbits ( $\leq 4$  individuals/site) a total of 34 times in 4,741 trap-nights. Percentage of ALLs  
101 with swamp rabbit latrines increased over time (Fig. 2A), indicating that once swamp rabbits  
102 began using a log they continued using it. We detected swamp rabbits at more sites and in less  
103 time (in days) via live trapping than via ALLs, because we trapped for  $\leq 14$  consecutive days per  
104 site, but ALLs yielded lower effort to detection in terms of site visits (Fig. 2B) in all but 2 sites.  
105 At the end of our study, latrine size ranged as high as 649 pellets on one ALL (median = 59  
106 pellets/used ALL). Our ALLs cost \$1.62/ALL (approx. \$700 total) in materials (we acquired  
107 discarded carpet from installers at no cost) compared with \$49/trap ( $> \$3,000$  total). The ALLs  
108 were still in good condition in April 2007, after  $> 4$  months in place, with the only apparent  
109 problems being rodent damage to zip ties and some disruption by humans.

110

## 111 **DISCUSSION**

112 Managers monitoring cryptic species can benefit from methods that are inexpensive, efficient,  
113 and convenient. The ALLs we tested were less expensive and generally detected swamp rabbits  
114 with less effort than live traps, although ALLs required more time for detection. We also found  
115 ALLs much more convenient to use because live traps must be checked at least daily (Animal

116 Care and Use Committee 1998), whereas ALLs can be checked months after deployment, with  
117 greater detection probability the longer left in place.

118 Zollner et al. (2000) described swamp rabbits as one of the least-studied lagomorphs,  
119 despite their abundance in many areas. The paucity of research stems in part from swamp  
120 rabbits' cryptic behavior and low trappability (Woolf and Barbour 2002, Watland et al. 2007).  
121 Visual surveys for latrines have provided a useful tool for assessing status of swamp rabbit  
122 populations and potential responses to habitat manipulation and other management actions, and  
123 ALLs are likely to aid detecting swamp rabbits in habitats where latrine substrates are lacking.

#### 124 **Management Implications**

125 Artificial latrine logs may expand the scope and flexibility of latrine surveys by increasing  
126 sensitivity in areas lacking logs or other suitable latrine substrates, such as lands recently retired  
127 from agricultural production. Such lands can be a substantial component of potential habitat for  
128 swamp rabbits. Managers seeking to quickly detect swamp rabbit presence in latrine-lacking  
129 habitats should use intensive live trapping if money and person-power permit. However,  
130 managers may benefit by using artificial latrine logs when person-power or funds are limited, in  
131 long-term monitoring, or when surveying a large number of sites. To maximize swamp rabbit  
132 detection, managers should place ALLs in areas of cover, especially near evidence of rabbit  
133 activity, and leave them in place for several months to allow time for rabbits to establish latrines.

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141

142 **LITERATURE CITED**

143 Animal Care and Use Committee. 1998. Guidelines for the capture, handling, and care of  
144 mammals as approved by the American Society of Mammalogists. *Journal of*  
145 *Mammalogy* 79:1416-1431.

146 Chapman, J. A. and G. A. Feldhamer. 1981. *Sylvilagus aquaticus*. *Mammalian Species* 151:1-4.

147 Foresman, K. R., and D. E. Pearson. 1998. Comparison of proposed survey procedures for  
148 detection of forest carnivores. *Journal of Wildlife Management* 62:1217-1226.

149 Heuer, E. T., Jr. and H. R. Perry, Jr. 1976. Squirrel and rabbit abundances in the Atchafalaya  
150 Basin, Louisiana. *Proceedings of the Annual Conference of Southeastern Association of*  
151 *Fish and Wildlife Agencies* 30:552-559.

152 Kjolhaug, M. S., A. Woolf, and W. D. Klimstra. 1987. Current status and distribution of swamp  
153 rabbits in Illinois. *Transactions of the Illinois State Academy of Science* 80:299-308.

154 Korte, P. A. and L. H. Fredrickson. 1977. Swamp rabbit distribution in Missouri. *Transactions of*  
155 *the Missouri Academy of Science* 10:72-77.

156 McCollum, R. C. and N. R. Holler. 1994. Comparative use of floodplains by swamp rabbits.  
157 *Journal of the Alabama Academy of Science* 10-11:72-77.

158 Scheibe, J. S. and R. Henson. 2003. The distribution of swamp rabbits in Southeast Missouri.  
159 *Southeastern Naturalist* 2:327-334.

160 Terrel, T. L. 1972. The swamp rabbit (*Sylvilagus aquaticus*) in Indiana. *American Midland*  
161 *Naturalist* 87:283-295.



- 162 Watland, A. M., E. M. Schauber, and A. Woolf. 2007. Translocation of swamp rabbits in  
163 southern Illinois. *Southeastern Naturalist* 6:259-270.
- 164 Whitaker, J. O., Jr. and B. Abrell. 1986. The swamp rabbit, *Sylvilagus aquaticus*, in Indiana.  
165 *Proceedings of the Indiana Academy of Science* 95:563-570.
- 166 Woolf, A. and M. S. Barbour. 2002. Population dynamics and status of the swamp rabbit in  
167 Illinois. Final Report. Illinois Federal Aid Project W-106-R-12. Southern Illinois  
168 University, Carbondale, Illinois, USA.
- 169 Zollner, P. A., W. P. Smith, and L. A. Brennan. 1996. Characteristics and adaptive significance  
170 of latrines of swamp rabbits (*Sylvilagus aquaticus*). *Journal of Mammalogy* 77:1049-  
171 1058.
- 172 Zollner, P. A., W. P. Smith, and L. A. Brennan. 2000. Microhabitat characteristics of sites used  
173 by swamp rabbits. *Wildlife Society Bulletin* 28:1003-1011.
- 174 *Associate Editor: McCleery.*
- 175

176 Figure captions

177 Fig. 1. Artificial latrine log (ALL). (A) Swamp rabbits readily established fecal latrines on  
178 many ALLs deployed in the early-successional habitat in southern Illinois, 2006-07. (B)  
179 Schematic of the ALL frame (without carpet top) showing collapsed and deployed  
180 configurations. For simplicity, the frame is not shown skeletonized.

181

182 Fig. 2. Effectiveness of artificial latrine logs (ALLs) deployed in early successional sites in  
183 southern Illinois, 2007. (A) Increasing percent use of ALLs over time (in 2007) since  
184 deployment. Each line represents data from one site where swamp rabbits used ALLs. (B)  
185 Number of visits until initial detection for ALLs and live trapping on the basis of visits to each of  
186 11 sites with known swamp rabbits. For live trapping, visits reflect consecutive daily visits.  
187 Horizontal line indicates the maximum number of ALL checks for a site.

188



