



## Tools and Technology

# Evaluation of Continuous-Catch Doors for Trapping Wild Pigs

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**ABSTRACT** Lethal removal by trapping is frequently the most cost- and time-effective means for managing wild pigs (*Sus scrofa*); however, the effectiveness of continuous-catch trap doors, which allow the entry of additional pigs into the trap after the door closes, remains unstudied. Our objective was to determine entry of wild pigs through closed root, saloon, and trainer continuous-catch doors. We constructed 26 corral traps on 4 study areas in east-central and southwest Alabama, USA, during the summer of 2011. We pre-baited each trap for  $\geq 1$  week to condition wild pigs to freely enter and exit traps and used game cameras to verify conditioning and to identify individuals and sounders. We then randomly assigned a trap door to each trap, set the trigger to capture only part of each sounder, and used game cameras to record the behavior of non-captured individuals. We observed 239 individuals from 24 sounders. Non-captured sounder members made 2.9 additional visits/trial (SE = 0.45) to traps after the door had closed, with each visit averaging 57.8 minutes (SE = 14.55) in duration. Of 222 opportunities (non-captured pigs observed after trap door had closed) only 9 (16%), 1 (1.9%), and 1 (0.9%) wild pigs entered through closed root, trainer, and saloon doors, respectively. Continuous-catch doors were ineffective at capturing substantial numbers of additional pigs after the door had closed. Given the comparatively greater expense of continuous-catch doors, landowners and wildlife managers should weigh the relative cost and benefits of these doors when developing wild pig removal programs. © 2013 The Wildlife Society

**KEY WORDS** Alabama, continuous-catch, corral trap, root door, saloon door, *Sus scrofa*, wild pigs.

Wild pigs (*Sus scrofa*) are arguably one of the greatest wildlife management challenges facing natural resource professionals and landowners in the United States. Because of their relatively high rate of reproduction (Dzieciolowski et al. 1992, Ditchkoff et al. 2012) and the illegal (in most states) trap and transport by hunting enthusiasts, wild pig population density and range in the United States has increased dramatically during the past 30 years (Ditchkoff and West 2007) with free-ranging populations now found in 47 states. Wild pigs are responsible for an estimated US\$1.5 billion/year in agricultural damage through consumption, rooting, and trampling of crops, and rooting in pastures resulting in loss of forage or damage to machinery (Engeman et al. 2007, Pimental 2007). Moreover, wild pigs are capable of carrying numerous diseases and parasites that may affect livestock (Corn et al. 2004, Hartin et al. 2007, Wyckoff et al. 2009) and humans (Davidson 2006), and may also serve as agents for bioterrorism (Ditchkoff and West 2007).

In addition to impacts on agriculture, wild pigs negatively impact ecosystem structure, composition, and function (Wood and Barrett 1979, Campbell and Long 2009). For example, wild pigs may facilitate colonization of invasive plant species (Cushman et al. 2004), alter microbial composition in streams (Kaller and Kelso 2006), suppress local reptile and amphibian populations (Jolley et al. 2010), compete with native wildlife for food resources (e.g., acorns; Henry and Conley 1972), and displace recreationally important wildlife species such as white-tailed deer (*Odocoileus virginianus*) and turkeys (*Meleagris gallopavo*; R. W. Holtfreter, Auburn University, unpublished data). In forested landscapes, wild pigs may depredate hardwood seedlings (Mayer et al. 2000), suppress regeneration and re-sprouting of saplings (Ickes et al. 2003), and uproot seedlings (Lipscomb 1989) in addition to rooting and trampling of recreational food plots. Given the diversity of damage and potential severity of impacts posed by wild pigs, agricultural producers, landowners, and natural resource managers frequently undertake removal programs to lessen damage caused by wild pigs.

Lethal removal is frequently the most cost-effective, and often most practical, means for managing wild pig populations to abate environmental and agricultural damage. Shooting (Geisser and Reyer 2004, Sparklin et al. 2009),

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hunting with dogs (Caley and Ottley 1995), toxicants (Cowled et al. 2006), and trapping (Choquenot et al. 1993, Sweitzer et al. 1997, Williams et al. 2011a) are commonly used methods for removing wild pigs with varying degrees of success, time, and cost. However, in densely vegetated landscapes, trapping is the most cost-effective means for managing wild pig populations. Many studies have examined trapping methodologies and the use of baits and/or attractants. For example, Williams et al. (2011a) reported corral traps have 4 times greater capture rates than box traps. A corral trap incorporating a corridor leading pigs into the trap was designed by Sweitzer et al. (1997) to minimize stress and injury of captured pigs for research studies. Choquenot et al. (1993) observed that an estrous female pig was ineffective at enticing trap-shy adult males to traps. Likewise, Williams et al. (2011b) reported greater duration of feeding bouts of wild pigs at sites baited with dry whole-kernel corn than soured corn or a mix of soured and dry corn. Considering the many aspects of trapping that have been evaluated, it is surprising that no studies have examined the effectiveness of frequently recommended continuous-catch doors for trapping wild pigs.

Whole sounder removal, whereby all individuals in a sounder are captured in 1–2 trapping attempts over a short period of time (<1–2 weeks), may provide longer term reduction in damage because no individuals remain at the site to reproduce and colonization of unoccupied territories by adjacent sounders may take 1–2 years (R.W. Holtfreter, unpublished data). It has been assumed that continuous-catch doors (trap doors that allow additional animals to enter the trap after the door closes; e.g., rooting or saloon doors), result in greater capture rates than do single-catch (guillotine type) doors, thereby increasing the probability of entire sounder removal. However, this assumption rests solely on intuition because no studies have been conducted to determine entry rates of wild pigs through closed continuous-catch doors. Therefore, our objective was to determine the entry rates of wild pigs through closed root, saloon, and trainer continuous-catch doors.

## STUDY AREA

Our study was conducted on 2 private land ownerships in central Alabama, USA (SHORTER, HARDAWAY), 1 private land ownership in Baldwin County (CROWDER), and the state-owned Upper State Game Sanctuary (SANCTUARY) in Clarke County, Alabama. The central Alabama study areas, separated by 16.7 km, were 931 and 1,716 ha in size, respectively, and consisted predominantly of loblolly pine (*Pinus taeda*) plantations and bottomland hardwood forests of various oaks (*Quercus* spp.) and bald cypress (*Taxodium distichum*). Non-forested areas consisted mainly of recreational food plots with a few small agricultural crop and idle grass fields scattered throughout each property. Situated along the Tensaw River, the CROWDER study area (809 ha) consisted of bottomland hardwood forests and bald cypress swamps. Owners of all 3 properties were required not to hunt, trap, or otherwise harass pigs during the course of this study. The SANCTUARY (777 ha) was a

state-managed wildlife area where hunting was not permitted. Land cover consisted of upland, mixed pine–hardwood forests with food-plot openings and lowland hardwood forests with palmetto (*Sabal minor*) understories. CROWDER and SANCTUARY were located 39.8 km apart.

## METHODS

### Trap-Site Selection and Pre-Baiting

During May–June 2011 we selected trap sites using wild pig capture histories of traps erected previously ( $n = 4$ ) and by establishing new trap sites ( $n = 22$ ) where abundant wild pig sign was present. We identified new trap sites using observations of wild pig activity (rooting, wallows, tracks, tree rubs, and scat) and proximity to water sources and shade. At each site with recent wild pig sign we placed a 19-L plastic bucket containing 3.2 kg of dry whole-kernel corn mixed with water to monitor the frequency of wild pig activity. We used this scouting approach as a quick and effective means of determining pig activity because white-tailed deer do not commonly consume soured corn and most raccoons (*Procyon lotor*) are not able to tip the bucket. We visited buckets 2–3 times/week to determine the presence of pigs (bait consumed and bucket tipped over) and further verified pig visitation using tracks and scat. We arbitrarily selected trap sites  $\geq 0.8$  km from each other to minimize the potential of sounders visiting multiple traps.

Once we detected pig activity at a trap site, we erected a circular corral trap consisting of 3, 1.5-m  $\times$  4.9-m livestock panels fastened securely with fencing ties to 11–13 equally spaced  $t$ -posts. We secured the ends of the corral to the  $t$ -posts using fencing wire, leaving a 0.8 m opening for placement of the trap door. We then spread 11 L of soured or dry corn within the trap, placed a bucket in the trap filled with dry corn and water, and hung an automatic feeder (Moultrie, 5 Gallon All in One Feeder with Timer; EBSCO Industries, Inc., Birmingham, AL) from a tree within the trap to dispense dry whole-kernel corn daily for 30 seconds at approximately 0600 Central Standard Time. We also placed one infrared motion-sensitive game camera (RECONYX Rapidfire Pro<sup>TM</sup>, Model# PC85, Covert<sup>TM</sup> Model # RC60, or Hyperfire<sup>TM</sup>, Model # HC500; Reconyx LLP, Holmen, WI) 4.6 m from the front of the door opening on a  $t$ -post or tree outside of the trap at a height of 0.8 m to record sounder size and composition and to verify that individuals entered and exited the open trap. Cameras were set to capture one image/triggering event with a 1-minute delay. We deposited fresh bait within the trap, replenished the automatic feeder, and changed out the camera storage card every 3–4 days until we determined sounder size and composition and verified that each individual within a sounder, or solitary male pig, entered and exited the trap at least once.

Because wild pigs on our study areas exhibited significant variation in pelage color and pattern we were able to identify unique sounders using combinations of number of individuals within a sounder, sex and size (age) distribution of sounder members, and pelage color and pattern of distinct individuals within the sounder (Sweitzer et al. 2000, Hanson

et al. 2008, Holtfreter et al. 2008). We used images from game cameras at trap sites to identify as many unique individuals within sounders as possible and then cross-referenced these observations with daytime field observations of captured individuals obtained throughout the study, and inspection of euthanized individuals at the end of the study. Nakatani and Ono (1995) reported stability in group association between post- and pre-farrowing seasons; therefore, we assumed sounder size, in terms of adults and juveniles, did not change during the study. We assigned age (ad or juv) based on the size of wild pigs using visual estimation, with those weighing  $\leq 22.7$  kg considered as juveniles (Williams et al. 2011a). Adult male pigs regularly observed visiting trap sites with a sounder were considered part of the sounder. All other adult males were considered solitary.

### Trap-Door Construction

All trap doors were manufactured by students at J. F. Ingram State Technical College, Deatsville, Alabama, with a standard opening width and height of 76 cm  $\times$  91 cm, respectively. Doors were constructed using 14-gauge angle-iron and 2.5-cm square steel-tubing attached to an 81-cm  $\times$  152-cm rectangular steel frame. An expanded metal panel was welded to the frame above each door to prevent pigs from escaping over the top of the door. Door frames had 2 square guides welded on each side that were used to slide the door over *t*-posts securing the ends of the corral. Fencing ties were used to further secure the door frame to the *t*-posts.

Saloon doors consisted of 2, 36-cm  $\times$  91-cm vertically hinged (hinges on the side of each upright panel) panels attached to each side of the door frame (Fig. 1a). The frame of each panel was constructed of 2.5-cm steel tubing with a vertical support in the middle of each panel to which 5-cm  $\times$  10-cm heavy-gauge wire fencing was spot welded. Door springs or bungee cords attached to the outside of the door were used to supply tension to each panel so they would close once the triggering mechanism was displaced. A wooden dowel was used to hold the panels in the open position with the trip line attached to it. Springs and bungee cords were adjusted to provide sufficient tension to rapidly shut both panels, but also to minimize resistance for pigs attempting to push through the panels once closed. The

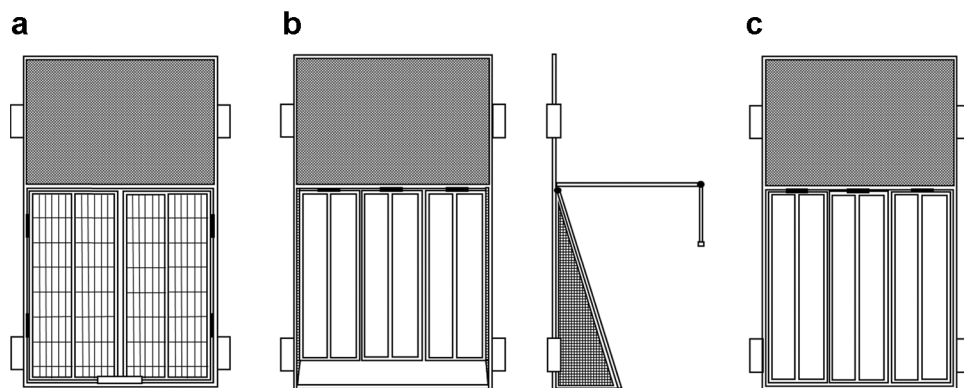
bottom portion of the angle-iron door frame prevented the panels from swinging outward (i.e., panels could only open inward).

Root doors were similar in design to the Kerrville Hog Rooter Gate Panel (Mapston 2010) and consisted of 3 25-cm  $\times$  101-cm panels horizontally hinged at the top of the door frame (Fig. 1b). Similar to the saloon panels, root panels were constructed of 2.5-cm steel tubing with a vertical support in the middle of each panel; however, because support members were situated closer together on these narrower panels, and to reduce the weight of each panel, wire fencing was not welded to the door panels. Root door panels, when closed, produced a 65° angle inset from the ground to guide pigs to enter the trap (hence, total panel length was 10 cm greater than door opening height). Two 0.2-m<sup>2</sup> triangular, steel-tube panel frames lined with expanded metal were welded to the door frame to prevent pigs from escaping through the gap created by the inset (Fig. 1b). A *t*-shaped pivot bar attached to the end of a 91-cm piece of steel tubing welded to the topside of the door frame extending toward the inside of the trap supported all 3 panels in the open position and served as the trigger mechanism to which the trip line was attached. When the trigger was displaced, all 3 panels dropped simultaneous by gravity.

Trainer doors consisted of 3 25-cm  $\times$  91-cm panels horizontally hinged at the top of the door frame, which swung freely in both directions and conditioned pigs to pushing against sections of the 3-panel door while entering and exiting the trap (Fig. 1c). After pigs became conditioned to pushing through the door panels, a steel cross-piece was placed at the bottom of the trap to prevent panels from swinging outward when pigs attempted to exit the trap. During the pre-baiting period, the middle panel was placed in the down position to condition pigs to enter the trap by pushing against the panel. This conditioning was conducted for 1 week or until the entire sounder had entered the trap with the middle panel down.

### Capture Trials

Once we verified all individuals within a sounder had entered and exited the trap at least once during the pre-baiting period, we began our capture trials. A capture trial



**Figure 1.** Saloon (a), root (b, and side profile), and trainer (c) continuous-catch trap-door styles used to examine wild pig entrance through closed trap doors in Alabama, USA, during June through August 2011.

was a trap-night which began in the late afternoon after bait was replenished, cameras were activated, and the trap was set to capture pigs, and continued until the trap was checked the following day (approx. 16 hr later). This trapping scenario is typical of most wild pig removal programs.

We conducted 1 capture trial/door type/sounder; however, for 7 traps we changed the door type after the first trial and conducted another trial with the same sounder using a different door. When multiple doors were used for the same sounder, we randomly assigned doors to traps (sounders were conditioned to a specific trap) and randomized the door sequence. Although we tried to distance traps to prevent multiple sounders from visiting the same trap, we had several instances where 2 sounders visited the same trap during a capture trial. In all instances, some members from the first sounder were captured in the trap when the second sounder visited. For instances where a second sounder approached a trap triggered by another sounder earlier in the capture trial, we considered this as a new observation given that wild pigs had been conditioned to entering and exiting the trap irrespective of sounder membership. However, we report results for each type (same sounder capture trial, second sounder visiting with members of the first sounder in the trap) of capture trial separately. We had one instance where the door was tripped by a raccoon and subsequently visited by a sounder, but no members from another sounder were captured inside the trap.

We used trip lines for saloon and root doors and root sticks for the trainer doors, attached to the triggering mechanism of each trap door. Because our intent was to capture only a few members of each sounder, leaving the remaining sounder members outside of the closed trap to push through the trap door in order to enter the trap, we set the trip line parallel to the door about 1 m inside the trap and 15–20 cm above the ground. Dry or soured corn was placed on both sides of the trip line. For trainer doors, nylon rope was secured to the middle panel of the door, which also held up the left panel when set (the right panel stayed down). The rope was then run through a pulley at the top of the door and then angled back toward the ground to 1 m inside the trap and secured to a stick or wooden dowel between 2 pieces of 30-cm rebar driven into the ground angled 45° away from the door. The dowel was held in place by the tension of the supported panels. We placed soured or dry corn only at the base of the rebar supports.

We used 2 game cameras at each trap during all capture trials to monitor wild pig behavior before and after the trap door closed. One camera was placed 3 m to the side of the door and set to capture 5 sequential images with no delay per triggering event to record pigs making physical contact with the door and entries. The second game camera was placed 4.6 m from the rear panel of the trap to determine the total number of pigs inside and outside of the trap when the door closed (pigs frequently circled the trap looking for another entrance). This camera was set to capture 1 image/triggering event with a 1-minute delay. Both cameras were mounted on *t*-posts at a height of 0.7–0.8 m.

For traps that caught wild pigs, we recorded the number, relative age, and pelage characteristics of each pig, and then immediately released the captured individuals. We then compared these field recordings with our previously determined measures of sounder characteristics (no. of individuals, sex and age distributions of members, etc.) obtained during the pre-baiting period. We then used the downloaded game camera images to further verify the number of captures and non-captures and determine the number of entry attempts, number of successful entries, and number and duration of visits by non-captured individuals of the sounder. We defined an entry attempt as any image depicting a pig making physical contact with a closed door. We measured visit duration (in min) by sounders beginning when the door closed and continuing until the last pig of the sounder was observed leaving the trap. Subsequent sounder visits to traps began when the first pig of a sounder was recorded on camera until after the last pig of the same sounder was observed leaving. Repeated trap visits were segregated by  $\geq 1$ -hour absence of pigs between image recordings. If a sounder left the trap immediately after the door closed (i.e., pigs were scared by the door) we did not count these observations as visits. Although we used the sounder as the experimental unit for estimating number of re-visits to the trap and duration of re-visits, we calculated entry rate as the number of individual pigs entering through closed doors divided by the number of unique individual pigs observed via game camera images outside of the trap after the door had closed (a pig-opportunity) during a capture trial, summed across all capture trials by door type. Although non-captured pigs may have made repeated visits to the trap during a capture trial, we took a conservative approach and calculated pig opportunity by capture trial rather than by number of visits within a capture trial. We used an analysis of variance (ANOVA) in PROC MIXED (SAS Institute, Inc., Cary, NC) to test differences in number of visits and duration of visits among sites and door types. Because of relatively few entries overall, we did not test for differences among doors and therefore report only the number of entries by door type. Camera surveillance of wild pigs was approved by the Auburn University Institutional Animal Care and Use Committee (IACUC no. 2011–1957); whereas, capture and handling of pigs was consistent with USDA Wildlife Services animal care protocols.

## RESULTS

Overall, we observed 239 unique individuals from 24 sounders and 27 solitary adult males from >40,000 game camera images obtained during the study. Mean sounder size was 8.8 individuals (SE = 1.02) consisting on average of 2.9 adult females (SE = 0.32), 1.3 adult males (SE = 0.30), and 4.6 juveniles (SE = 0.87). We conducted 34 capture trials (SANCTUARY [ $n = 9$ ], CROWDER [ $n = 10$ ], HARD-AWAY [ $n = 10$ ], SHORTER [ $n = 5$ ]) where the wild pigs inside the trap had members from the same sounder outside the trap. Percentage of each sounder captured/trial (56.3%) did not differ among sites ( $F_{3,30} = 0.69$ ,  $P = 0.564$ ) or door types ( $F_{2,31} = 0.46$ ,  $P = 0.638$ ). Of 27 capture trials (root

**Table 1.** Mean number of wild pigs observed outside of traps after door closure, number of visits by non-captured sounder members/capture trial night, mean visit duration (min) of non-captured sounder members, total entry attempts made by individual wild pigs, and total number of entries of wild pigs during capture trials where wild pig activity was recorded after trap doors closed with members from the same sounder inside traps with root ( $n=9$ ), saloon ( $n=15$ ), and trainer ( $n=3$ ) continuous catch doors in Alabama, USA, during June through August 2011.

Door	Pigs outside trap		Visits		Duration		Total attempts	Total entries
	Mean	SE	Mean	SE	Mean	SE		
Root	2.8	0.70	1.8	0.32	31.6	20.49	6	3
Saloon	3.3	0.71	3.3	0.69	62.9	15.37	51	0
Trainer	5.7	2.91	4.0	1.73	110.7	94.76	23	0
Total	3.4	0.55	2.9	0.45	57.8	14.55	80	3

[ $n=9$ ], saloon [ $n=15$ ], trainer [ $n=3$ ]) where pigs were recorded after the door closed, we observed similar numbers of pigs outside of the trap among door types ( $\bar{x}=3.4$  pigs/capture trial,  $SE=0.55$ ; range = 1–11 pigs;  $F_{2,24}=1.20$ ,  $P=0.318$ ; Table 1). Number of visits to traps ( $\bar{x}=2.9$  visits/capture trial,  $SE=0.45$ ;  $F_{2,24}=1.71$ ,  $P=0.203$ ) and duration of visit ( $\bar{x}=57.8$  min/visit,  $SE=14.55$ ;  $F_{2,24}=1.34$ ,  $P=0.280$ ) did not differ among door types (Table 1). Of 91 pigs observed outside of traps after the door closed with members of their sounder inside the trap, we recorded 6, 51, and 23 attempts to enter closed root, saloon, and trainer doors, respectively, resulting in 3 wild pigs entering through closed root doors (Table 1).

We recorded 40 instances of solitary males ( $n=23$ ) or sounders ( $n=17$ ) visiting traps during a capture trial when pigs ( $\bar{x}=4.6$  pigs,  $SE=0.54$ ) from another sounder were already captured in the trap. Number of visits/capture trial did not differ between solitary males ( $\bar{x}=1.5$  visits/trial,  $SE=0.21$ ) and sounders ( $\bar{x}=1.8$  visits/trial,  $SE=0.24$ ;  $F_{1,34}=0.38$ ,  $P=0.540$ ) or among door types ( $F_{2,34}=0.33$ ,  $P=0.723$ ; Table 2). Likewise, duration of visit/capture trial did not differ between solitary males and sounders ( $F_{1,34}=0.97$ ,  $P=0.332$ ) or among door types ( $F_{2,34}=0.39$ ,  $P=0.679$ ) to traps where wild pigs from a different sounder were already captured in a trap (Table 2). Overall, wild pigs made on average 1.6 visits/trial ( $SE=0.16$ ) of 58.0 minutes/visit ( $SE=17.68$ ). Of 131 pigs observed outside of traps after the door closed with members from a different sounder inside the trap, we recorded 30, 59, and 8 attempts to enter closed root, saloon, and trainer doors, respectively, resulting in 6 pigs entering through closed root doors and 1 pig entering through a closed saloon door (Table 2). One pig entered through a trainer door tripped closed with no other pigs in the trap. Collectively, we observed 222 pig-opportunities (pigs outside of the trap once

the door had closed with pigs inside the trap; root [ $n=55$ ], saloon [ $n=115$ ], trainer [ $n=52$ ]) resulting in entry rates of 16.4% ( $n=9$  entries), 0.9% ( $n=1$  entry), and 1.9% ( $n=1$  entry) for root, saloon, and trainer doors, respectively.

## DISCUSSION

Although our study was conducted during only one season within 1 year, we contend that our results provide evidence suggesting that continuous-catch doors do not substantially (e.g., >25% additional captures) increase captures by allowing additional pigs to enter the trap after the door closes. All wild pigs, except one adult female, were conditioned to entering and exiting open traps to obtain bait prior to the capture trials, were not harassed (e.g., subjected to opportunistic shooting) on our study areas, and therefore had less fear of humans than would otherwise occur on other properties. Wild pigs made consistent daily visits to trap sites, which suggests that they may have also been nutritionally stressed because of the lack of pulse resources, agricultural crops and acorns, during the summer months. Moreover, wild pigs had ample opportunity to enter through closed doors, making several visits to traps sites during a capture trial averaging nearly 1 hour in duration (double the feeding bout times observed by Williams et al. (2011b)), with some sounders in our study spending  $\geq 6$  hours outside of closed traps. Wild pigs were frequently observed via game-camera images circling traps after the door had closed, foraging on residual corn dispersed by automatic feeders outside of the trap or at times bedding next to the trap. On several occasions, wild pigs remaining at the trap at the conclusion of a capture trial would leave the area upon the approach of field technicians. Collectively, wild pigs in our study developed a positive association with, and likely a dependency on, trap sites and the food contained within, therefore leading to a high likelihood of entrance through

**Table 2.** Mean number wild pig visits/capture trial and visit duration (min) of sounders and solitary adult males visiting traps with root, saloon, and trainer doors triggered closed by, and containing members of, a different sounder in Alabama, USA, during June through August 2011.

Door	<i>n</i>	Sounder				<i>n</i>	Solitary males				Total attempts	Total entries
		Visits		Duration			Visits		Duration			
		Mean	SE	Mean	SE		Mean	SE	Mean	SE		
Root	6	1.8	0.48	81.0	61.19	11	1.7	0.38	41.5	15.59	30	6
Saloon	9	1.8	0.32	117.7	62.86	7	1.3	0.18	21.2	7.99	59	1
Trainer	2	1.5	0.50	14.3	3.25	5	1.4	0.40	28.1	16.25	8	1
Total	17	1.8	0.24	92.6	39.09	23	1.5	0.21	32.4	8.50	97	8

closed trap doors than would otherwise have been observed under different circumstances (i.e., time of year, removal activities, etc.). Given the relatively low entrance rates through closed continuous-catch doors we observed in the context above, we contend that continuous-catch doors were ineffective at capturing substantial numbers of additional wild pigs after initial door closure.

Although entry attempts were greatest for saloon doors, the number of entries for root doors was greatest among door types and was likely due to the door's inset panels, which guided pigs into the trap and may have also increased their willingness to commit to entering through a closed door. However, we observed only 9 wild pig entries through root doors, with 3 pigs entering during 1 capture trial and 2 pigs during another capture trial. All other entries were made by a single pig during a capture trial while in the presence of other pigs. Contrastingly, on one occasion we observed a wild pig manipulating a closed root door from inside a trap, allowing 3 pigs to exit. It is imperative in wildlife studies to ensure independence of observations; therefore, the intent of this study was to estimate reentry rates into traps that already held wild pigs. Because reentry rates when trapping wild pigs are influenced by the desire of related individuals in a sounder to remain with their counterparts (which technically violates independence during sampling in a scientific study), it was essential that the same conditions were observed during our study.

It could be argued that greater entry rates through closed continuous-catch doors may be obtained by systematically conditioning pigs to enter through partially closed doors (e.g., closing a saloon door only half way), thereby inuring wild pigs to manipulate the door to gain entry. Although we allowed an additional 7–10 days during the pre-baiting period to habituate wild pigs to enter trainer doors, wild pigs remained reluctant to push through when all 3 panels were in the down position, as was the case for completely closed saloon and root doors. Wild pigs nudged closed doors and then backed away, or more frequently walked parallel to closed doors without making contact while circling the trap, presumably searching for an entrance. It may be possible to increase entry rates through closed, continuous-catch doors by prolonging door habituation prior to trapping; however, this process would likely entail a significant amount of additional time and financial resources, extending well beyond those commonly allocated to removal efforts.

Whereas continuous-catch doors captured wild pigs upon initial door closure, the ability of root doors to allow additional pigs to enter the trap was marginal, and near negligible for saloon and trainer doors. Within the context of whole-sounder removal, we suggest greater emphasis be placed on other aspects of the trapping process, including the proper placement of bait within the trap, persistence in trapping efforts, or the use of multiple traps at each trapping site rather than a sole reliance upon trap-door effectiveness. Moreover, the cost differential in materials and labor between continuous-catch doors (steel) and wooden guillotine-style single-catch doors is nearly equivalent to an entire 3-panel corral trap with a wooden single-catch door. For

example, a saloon-style steel door will require approximately US\$109 in materials and 3 hours of labor associated preparing materials and welding (approx. US\$65/hr). Simple, wooden single-catch doors may be constructed with common hand tools (e.g., drill, saw) in <1-hour with US\$36 of materials. Given this cost differential, it is imperative for land owners and natural resource managers to weigh the potential benefits (in terms of no. of additional pigs captured) of continuous-catch doors when allocating resources to removal programs.

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