Rethinking Our Approach to Wild Pig Control Data and Field Tasks

Rod Pinkston
Hog Control Academy, Fortson, Georgia

ABSTRACT: Traps are one of the most commonly used products for controlling wild pig populations, but every trapping product and process produces different results. Early sexual maturity, extraordinary reproduction rate, and high piglet survivability gives feral pigs the capacity to recover quickly from inferior control efforts which do not target all age classes at the same time. Many trapping efforts fail to accomplish whole-sounder success, creating an industry need to evaluate efficiency and effectiveness. The 2018 Farm Bill provided funding for pilot projects in 10 states to collect feral swine harvest data. Researchers did not collect data points to measure work production or product efficiency and missed an important opportunity to numerically analyze Best Management Practices (BMPs). Our research compared four different trap products using their individual trapping processes to determine which, if any, was more efficient. This project eliminated the total wild pig population from a 20.23 km² (5,000-acre) Flint River property in Reynolds, Georgia. A total of 771 wild pigs were removed by one 57-year-old operator from 70 miles away while working only weekends (two days per week). Four different trapping products were tested and the best capture success rate over 32 months was 97.18% while using a mobile corral trap coupled with an automatic feeder with digital timer set to disburse bait at dusk. This method resulted in an average capture time of 29.65 minutes after sunset by incorporating an innovative conditioning process whereas the population dynamics and education level of each individual sounder dictated the time period between feeder conditioning and trap building. We continually observed several different sounder behaviors change, including predictable dusk feeding times, compared to the remaining three trapping products and methods tested.

KEY WORDS: control methods, control strategies, population control, *Sus scrofa*, trapping, traps, wild pigs

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INTRODUCTION

Estimated costs associated with managing wild pig-related issues in the United States were conservatively estimated to exceed US$1 billion/year (Pimentel 2007, Stankus 2012). More effective methods or modifications to existing methods are needed (Campbell and Long 2009, Mayer and Brisbin 2009). The 2018 Farm Bill provided funding for pilot projects in 10 states to collect feral pig harvest data. Each pilot project measured their work by reporting that "X" amount of money was spent to remove "Y" number of pigs from "Z" number of acres. This equation only quantifies data and does not measure work production or efficiency. A more productive and valuable approach is to record the exact number of pigs in the sounder at a bait site first and then compare these data to the actual number of pigs removed from the trap site to determine removal efficiency per event. Only then can we numerically analyze BMPs to accurately compare people, processes, and products against each other to measure efficiency and effectiveness.

Land managers and organizations fail to accomplish whole sounder removal because: 1) they do not invest in resources needed to identify the total number of pigs present prior to performing their primary removal event, 2) they do not implement an alternate, secondary removal effort on adaptive survivors, and 3) they do not document removal percentages to effectively analyze data from the method or technology utilized. We attempted to objectively compare four different trap products and processes to determine which, if any, was more efficient.

The definition of Integrated Wild Pig Control® is "a strategic approach using a series of innovative lethal control methods and technologies, implemented in a specific sequence, based on seasonal food sources. Emphasis is placed on efficient whole-sounder removal at one time to eliminate escapes, method education, and future reproduction. The control strategies continually change throughout the various seasons to effectively target adaptive survivors" (Foster and Pinkston 2019).

Trained people must execute an effective work process using efficient products capable of achieving the stated performance standard. The performance standard determines whether the mission, goal, or objective is being met and must be quantifiable and measurable. It must be established first because all variables are measured from the mission's success or failure. The performance standard of "whole-sounder removal spending the least amount of fuel, time, labor and money" is quantifiable and measurable. Mission failure can be isolated to either untrained people, an ineffective process, an inefficient product, or a combination of these variables. Operators making performance-based decisions must implement the needed changes necessary to accomplish the mission.

STUDY AREA

We conducted our research on approximately 20.23 km² (5,000 acres) of private property owned by a single landowner located along the Flint River between Reynolds and Fort Valley, Georgia. Terrain consisted mainly of low, sandy hills, with planted stands of longleaf pine, separated by stretches of hardwood bottoms along the Flint River with 46 food plots (64 ha, 158.6 acres) planted in native grasses, wheat, oats, and rye.

METHODS

We installed 10 spin-cast feeders with digital timers set to disburse approximately 2.7 kg (6 pounds) of whole kernel corn daily at dusk. Feeders were installed approx-

imately 1600 m apart to create bait sites throughout the entire property. We evaluated the removal efficiency of one net trap (6 m, 20 ft in diameter), one suspended trap (7 m, 23 ft in diameter), and four double gate corral traps (11 m, 35 ft in diameter). No trap was erected until feral pigs had conditioned to an automatic feeder at least 5 consecutive days except for one permanently erected double gate corral trap (11 m, 35 ft in diameter) used as our control. All heights and distances of cameras (JAGER PRO I.C.E.™ motion-triggered cellular cameras, JAGER PRO, Inc, Fortson, GA) were standardized from the automatic feeder to maximize viewing area and document sounder populations.

Once sounder size was determined and pigs were conditioned to the feeder, our bait site would convert to a trap site and the trap conditioning process could begin. Net trap installation consisted of driving 10 T-posts and 10 ground anchors into the ground then installing 10 T-post mounts with 10 hooked cam straps prior to installing a 6-m (20-foot) diameter net around the automatic feeder. The entire net was raised off the ground by looping hooked cam straps under the net bottom and connecting it to the adjacent T-post mount to begin conditioning pigs. The net trap required an additional field trip after pigs were conditioned to lower the net to the ground and secure with 5 anchor stakes to begin passive captures.

The suspended trap installation consisted of erecting three support arms to four support legs and bolting 9 rigid panels together onto three lifting brackets. The entire 7-m (23-foot) diameter structure was then winched into an upright position, creating at least 81 cm (32 inches) of open area between the ground and trap enclosure. All three lifting bracket cables were secured into an electronic latch controlled by a wireless receiver inside the control box. The trap was closed by a human remotely viewing the trap site through a live video camera (JAGER PRO M.I.N.E.™ cellular camera, JAGER PRO, Inc.) by triggering the live video camera's wireless transmitter through a cellular phone app. A suspended trap could be closed during the first trap night without any additional field trips if the entire sounder was present.

The mobile, double gate corral trap installation consisted of erecting 12, 2.4-m-long (8 feet) rigid panels and two, 2.4-m-long (8 feet)) gates secured together by 14, 1.5-m-long (5 feet) connecting rods. This process incorporated an innovative conditioning process (confidential intellectual property) whereas the population dynamics and education level of each individual sounder dictated the time

Table 1. Removal efficiency by quarter by method (trapping vs. shooting).

	Trapping Events	Removal Efficiency			Labor Hours
		# Killed	# Sounder	%	
2021 3rd Qtr Trapping	16	120	131	91.60	14.50
2021 4th Qtr Trapping	1	1	1	100.00	0.50
2022 1st Qtr Trapping	19	160	164	97.56	17.50
2022 2nd Qtr Trapping	12	75	79	94.94	13.00
2022 3rd Qtr Trapping	2	10	10	100.00	0.95
2022 4th Qtr Trapping	2	22	22	100.00	1.45
2023 1st Qtr Trapping	5	30	32	93.75	13.00
2023 2nd Qtr Trapping	7	48	57	85.71	10.75
2023 3rd Qtr Trapping	5	42	43	97.67	8.75
2023 4th Qtr Trapping	6	42	48	88.00	10.00
2024 1st Qtr Trapping	6	14	20	70.00	8.20
Trapping Totals	**81**	**564**	**607**	**92.92**	**98.60**
	Shooting Events	**Removal Efficiency**			**Labor Hours**
		# Killed	**# Sounder**	**%**	
2021 3rd Qtr Shooting	42	52	77	67.53	87.50
2021 4th Qtr Shooting	13	20	20	100.00	28.25
2022 1st Qtr Shooting	19	42	57	73.68	23.45
2022 2nd Qtr Shooting	11	16	23	69.57	14.75
2022 3rd Qtr Shooting	14	15	20	75.00	30.30
2022 4th Qtr Shooting	5	5	5	100.00	14.25
2023 1st Qtr Shooting	1	1	1	100.00	7.00
2023 2nd Qtr Shooting	11	20	27	74.07	33.25
2023 3rd Qtr Shooting	5	6	9	66.67	15.25
2023 4th Qtr Shooting	8	10	21	48.00	27.75
2024 1st Qtr Shooting	10	20	23	86.96	26.75
Shooting Totals	**139**	**207**	**283**	**73.14**	**308.50**

Table 2. Age class totals removed by quarter by method.

	Juveniles		SubAdults		Adults		Pregnancies	
	Boars	Gilts	Boars	Gilts	Boars	Sows	Sows	Fetus
2021 3rd Qtr Trapping	18	9	26	27	18	22	4	29
2021 4th Qtr Trapping	0	0	0	0	1	0	0	0
2022 1st Qtr Trapping	19	21	35	40	20	26	8	33
2022 2nd Qtr Trapping	10	12	19	11	7	16	4	13
2022 3rd Qtr Trapping	3	4	0	0	1	2	1	6
2022 4th Qtr Trapping	0	0	8	9	0	5	4	33
2023 1st Qtr Trapping	0	0	13	6	6	5	3	15
2023 2nd Qtr Trapping	11	5	10	17	1	4	1	7
2023 3rd Qtr Trapping	5	10	1	8	12	6	0	5
2023 4th Qtr Trapping	1	1	9	7	8	16	9	71
2024 1st Qtr Trapping	0	0	5	2	5	2	2	11
Trapping Totals	**67**	**62**	**126**	**127**	**79**	**104**	**36**	**223**
	Juveniles		**SubAdults**		**Adults**		**Pregnancies**	
	Boars	**Gilts**	**Boars**	**Gilts**	**Boars**	**Sows**	**Sows**	**Fetus**
2021 3rd Qtr Shooting	1	0	2	3	31	15	6	36
2021 4th Qtr Shooting	0	0	0	1	11	8	1	0
2022 1st Qtr Shooting	2	3	2	5	13	17	9	38
2022 2nd Qtr Shooting	0	0	0	1	13	2	0	0
2022 3rd Qtr Shooting	0	0	0	0	12	3	0	0
2022 4th Qtr Shooting	0	0	0	0	3	2	0	0
2023 1st Qtr Shooting	0	0	0	0	1	0	0	0
2023 2nd Qtr Shooting	3	2	1	3	7	4	0	0
2023 3rd Qtr Shooting	0	0	2	1	1	1	0	0
2023 4th Qtr Shooting	0	0	1	2	6	1	0	0
2024 1st Qtr Shooting	0	0	2	3	8	7	6	39
Shooting Totals	**6**	**5**	**10**	**19**	**106**	**60**	**22**	**113**

period between feeder conditioning and trap building. The trap was closed by a human remotely viewing the trap site through a live video camera (JAGER PRO M.I.N.E.™ cellular camera) by triggering the live video camera's wireless transmitter through a cellular phone app. A mobile, double gate corral trap could be closed during the first trap night without any additional field trips if the entire sounder was present.

The permanent, double gate corral trap installation also consisted of erecting 12, 2.4-m-long (8 feet) rigid panels and two, 2.4-m-long (8 feet) gates secured together by 14, 1.5-m-long (5 feet) connecting rods. However, the permanent trap was only built once and remained in place for the entire research project. The trap was closed by a human remotely viewing the trap site through a live video camera (JAGER PRO M.I.N.E.™ cellular camera) by triggering the live video camera's wireless transmitter through a cellular phone app. A permanent, double gate corral trap could be closed during the first trap night without any additional field trips if the entire sounder was present.

We also utilized thermal shooting operations at night when single adults patterned to a feeder or when seasonal food source availability was abundant. Pigs had less desire to consume corn at an automatic feeder when wheat, oats, and rye were mature in food plots or mast crops such as acorns and hickory nuts were falling. Open field reconnaissance equipment consisted of a 640 × 480 resolution thermal monocular for scanning and stalking. Shooting equipment consisted of a 640 × 480 resolution thermal scope with laser range finder mounted on a .308 caliber, semi-automatic rifle for rapid follow-up shots on multiple targets. Wild pigs were captured and shot between 01 July 2021 and 29 February 2024 (32 months).

RESULTS

One private industry Hog Control Operator™ removed 771 pigs [trapping: 564 (73.15%); shooting: 207 (26.85%)] in 220 events [trapping: 81 (36.82%); shooting: 139 (63.18%)] expending 407.10 hours of labor [trapping: 98.60 (24.22%); shooting: 308.50 (75.78%)] during the 32-month research window (Tables 1 and 2). Prioritizing high value targets eliminated 57 pregnant sows [trapping: 36 (63.16%); shooting: 21 (36.84%)] carrying 336 fetuses [trapping: 223 (66.37%); shooting: 113 (33.63%)] with 41 of 57 pregnant sows (71.93%) and 240 of 336 fetuses (71.43%) removed during 4th and 1st Quarter events (Tables 1 and 2).

Table 3. Removal efficiency by trapping product.

Trapping Product	Diameter (Feet)	Trap Events	Removal Efficiency # Killed	# Sounder	%	Labor Hours	Average Capture Minutes from Sunset
Net	20	12	43	66	65.15	21.10	Passive (N/A)
Suspended	23	7	55	61	90.16	11.95	256.00
Mobile Corral	35	40	345	355	97.18	50.50	29.65
Permanent Corral	35	23	121	140	86.43	15.30	132.36

We observed 61 different sounders on the property from more than 200,000 camera images and 4TB of video. Our mission was whole-sounder success emphasizing the use of trapping products first. Our overall average during 81 trapping events using all four trapping products was 92.92% by capturing 564 of 607 pigs. (Tables 1 and 2).

The passive net trap was least efficient, capturing only 43 of 66 for a 65.15% success rate (Table 3). It was utilized throughout the entire research project but was only used 12 times in sandy soil environments. This product could not perform in clay soil during heavy rain as muddy conditions prevented it from working properly. The net trap produced a zero capture at two different events after the net was lowered to the ground. We often-captured juveniles while adult sows avoided the net.

The suspended trap captured 55 of 61 for a 90.16% success rate (Table 3) during 7 events. This product was only used during the final 7 months of research by staying true to the Integrated Wild Pig Control® strategic approach. We continually changed our control strategies using different trapping products to effectively target adaptive survivors migrating into our research area from neighboring properties. Even though pigs may enter this product from 360 degrees, we did not experience a capture during the first trap night. It took several days for pigs to condition to this product after it was installed and experienced an average capture time of 256 minutes after dusk.

The mobile corral trap was most efficient capturing 345 of 355 for a 97.18% success rate (Table 3) during 40 different events. This product was used most often as it resulted in an average capture time of 29.65 minutes after dusk by incorporating an innovative conditioning process whereby the population dynamics and education level of each individual sounder dictated the time period between feeder conditioning and trap building. We continually experienced whole sounder captures on the first trap night using this product and innovative process.

The permanent corral trap captured 121 of 140 for an 86.43% success rate (Table 3) during 23 different events. This approach documented the least amount of labor per pig since the trap remained in place after it was built. Labor was only expended to fill the feeder monthly and change camera, control box, and feeder batteries. The major drawback to this approach was verifying the exact sounder populations prior to capture. It also took an extended amount of time to condition pigs to the permanent trap enclosure since they were not conditioned to a bait site first compared to the other three trapping products and methods tested. Additional cellular cameras were needed to collect sounder intelligence using this approach. Sometimes, pigs would randomly appear at the permanent trap enclosure for one photo with no bait on the ground. Then, they would condition to another feeder on the property and eventually be captured at the other location. It sometimes took weeks for pigs to condition to this trap site and resulted in an average capture time of 132.36 minutes after dusk. Single boars accounted for 9 of 22 captures (40.91%) at the permanent corral trap.

DISCUSSION

Our mission was to eliminate the entire wild pig population from a 20.23 km² (5,000-acre) property and evaluate the efficiency of four different trap products using their individual trapping processes. Our data suggest that using spin-cast feeders with digital timers at least 1600 apart, set to disburse bait daily at dusk, is a very efficient method to locate and condition pigs to a bait site. We conclude that large diameter corral traps consistently captured more pigs in a shorter amount of time than did smaller diameter net traps, and human-activated, cellular triggers were more efficient than passive captures. The 97.18% capture rate during the first trap night within 29.65 minutes of sunset is record-breaking efficiency for the industry and should create the template for modern hog control performance standards.

We recommend emphasis be placed on recording the exact number of pigs in every sounder at a bait site first, then comparing this information to the actual harvest data to determine removal efficiency per event. Thermal shooting should be used as an alternate, secondary removal effort on adaptive survivors who will not enter a trap enclosure. The secondary shooting methodology is necessary to ensure whole sounder success and prevent reproduction of trap shy adults.

We conclude that adult pregnant sows should be targeted first, adult nursing sows second, and adult boars third, when multiple pigs are feeding in food plots or under oak trees. Pregnant sows are high value targets as one bullet will remove the entire litter before birth, especially when this task is performed heavily during 4th and 1st Quarter events (Table 2). This strategic approach was responsible for removing an additional 336 pigs from 57 pregnant sows (5.89 unborn pigs per sow) raising the total

pigs removed to 1,107 which is a 43.58% increase in work efficiency (Table 2). Nursing sows are the second highest value targets as remaining juveniles can be trapped more easily without adult leadership after natural food sources are consumed. Seasonal food source availability should determine whether pigs are trapped or shot.

It is unlikely an organization will operate efficiently when they cannot or will not document the sounder population at a bait site prior to a removal method being implemented. Without obtaining this important variable, leaders cannot assess their people's training or skill level, their product's effectiveness or their process' efficiency when compared to the actual number of pigs removed during each event. Even worse, there are state program managers and government supervisors who still believe that sounder population data is unobtainable or impractical to collect prior to the removal event. Our research project demonstrates this data is easily obtainable when properly gathering intelligence at bait site automatic feeders.

Focusing efforts to reduce entire feral pig populations, one sounder at a time, will predictably reduce the damage caused to agriculture, natural resources, and property. Implementing the most efficient methods and technologies to accomplish whole-sounder removal will also reduce fuel, time, labor, and resource expenses. A measurable performance standard must focus on efficiently controlling feral pig populations; not simply managing their damage. This approach applies leadership, field data, and performance-based decisions to utilize the most efficient people, processes, and products while targeting all age classes at the same time.

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