

Is Trapping Success of Feral Hogs Dependent upon Weather Conditions?

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ABSTRACT: Research interests in feral hogs typically involve their negative impacts on ecosystems or their potential as a disease reservoir, especially with disease transmission to domestic swine. Authors within scientific literature state that feral hogs were captured as part of their research, but usually fail to mention specific conditions in which hogs were captured. Novice researchers of feral hogs must rely on 'word-of-mouth' to acquire this information or learn it by trial and error. Our objective was to place this knowledge into the scientific literature as an aid to future researchers of feral hogs.

Feral hogs were captured in box traps or corral-style traps baited with sour corn in eastern and southern Texas during April 2004 - June 2005. Daily weather conditions (i.e., high and low temperatures, humidity, average wind speed, and precipitation) were obtained from the nearest weather station for each trapping location. A predictive model using logistic regression was developed from data collected in eastern Texas to predict the success of feral hog trapping on a given night based on significant weather variables and then tested on data collected from southern Texas. A successful night of trapping was defined as ≥ 1 hog being captured. A total of 212 feral hogs were captured during 166 nights of trapping (1,558 trap-nights). The threshold of 22°C for the daily minimum temperature was the only significant (Chi-square = 26.5, df = 1, $P < 0.0001$) weather variable found. The majority of hogs (97%) were captured when the daily minimum temperature was below 22°C. The model could correctly predict (95%) when trapping success of feral hogs was unlikely (daily minimum temperature $\geq 22^\circ\text{C}$), but it was less accurate (50%) in predicting the success of feral hog trapping when the daily minimum temperatures were $< 22^\circ\text{C}$. Because the majority of feral hogs live in areas with hot, humid climates during the summer (i.e., southeastern United States), trapping success, especially during July and August, would be unlikely. Research schedules and budgets should be planned to avoid such periods of extreme heat.

KEY WORDS: feral hogs, *Sus scrofa*, temperature, trapping, weather conditions

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INTRODUCTION

Management of feral hogs (*Sus scrofa*) in the United States is becoming a national concern. The research focus on feral hogs typically involves their negative impacts on ecosystems (Wood and Barrett 1979, Singer *et al.* 1984), damage to property (Miller 1993), agricultural losses (Lipscomb 1989, Whitehouse 1999), competition with native game species (Taylor and Hellgren 1997, Gabor *et al.* 2001), and as a disease reservoir to wildlife and livestock (Miller 1993, Romero *et al.* 1997, Williams and Barker 2001). Although specific census information is difficult to obtain, there is a general consensus that feral hog numbers are increasing and that the population is expanding into areas previously thought to be unsuitable (e.g., arid regions such as western Texas). Feral hog populations are now reported in 32 states (Romero *et al.* 2003) and their distribution is ever increasing. The national population of feral hogs has been estimated at 4 million animals, with the population in Texas constituting about 25% of the national population (Pimentel 2001).

Even with their wide distribution and their abundant population, feral hogs can be elusive prey. Researchers of feral hogs often state in the scientific literature that feral hogs were captured as part of the research, but they fail to mention the specific conditions in which hogs were

captured. Such casual statements imply that capture can be accomplished with little effort; however, rarely is this the case. Novice researchers of feral hogs must rely on 'word-of-mouth' to acquire capture techniques or learn it by trial and error. After experiencing difficulty in capturing an adequate sample of feral hogs in a timely manner for a telemetry study, we decided to document our capture techniques, baits, trap styles, and weather conditions to determine efficacies of capture. Our objective was to place this knowledge into the scientific literature as an aid for future researchers of feral hogs.

METHODS

Southern and eastern Texas were selected as collection sites, because feral hogs are more abundant in these regions of Texas. Specific locations in eastern Texas included Gus Engeling Wildlife Management Area; Big Lake Bottom Wildlife Management Area in Anderson County, Texas; and Temple Inland forestry land located in Angelina County, Texas. Collection locations in southern Texas included private lands in Kleberg and Nueces Counties, LaCopita Research Area in Jim Wells County, and the Texas A&M University-Kingsville farm facility located in Kleberg County, Texas. Each trapping area had neighboring domestic

swine facilities that ranged from large-scale pork production (>100 pigs) to backyard show and feeder pig operations.

Feral hog trap sites were chosen in areas with habitat that appeared suitable for hogs, which typically included areas of dense brush cover located near water sources, or in areas where sign of recent use by hogs (i.e., rooting, scat, and tracks) was present. Traps consisted of corral (circular pens 3 to 5 m in diameter and constructed of cattle fencing with fence posts as support structures) and box traps (2.5 × 1 × 1 m, constructed with hog panel wire). Traps were placed in shaded areas to prevent trapped animals from over-heating (a common problem in Texas during summer months). Trap sites were baited with soured corn. Traps were checked at least once per day, just after sunrise, to reduce heat exposure, and traps were re-baited each morning. A successful night of trapping was defined as ≥1 hog being captured.

Trapped hogs were anesthetized via a dart gun equipped with a Telazol and xylazine combination dart, according to the methods and dosages of Sweitzer *et al.* (1996). In brief, threshold dosages for 16-170 kg hogs were 2.8-3.2 mg/kg for Telazol and 1.4-1.6 mg/kg for xylazine. Weight of captured hogs initially was estimated to administer the Telazol:xylazine combination. Captured hogs were monitored for body temperature using a rectal thermometer, and for heart rate and respiration rate using a stethoscope, during immobilization as a measure of stress. If rectal body temperature was >39°C, ice compresses were placed directly on the hog's body to reduce the probability of over-heating caused by immobilization drugs. We later added a cool water enema to our treatment regime. Captured hogs were marked with a numbered ear tag for individual identification.

Daily weather conditions (i.e., high and low temperatures, humidity, average wind speed, and precipitation) were obtained from the nearest weather station for each trapping location. Weather stations were located within 8 km of each trapping location.

Differences in the number of feral hogs caught per trap-night between trap styles (i.e., box vs. corral style) in southern Texas locations only were analyzed using Student's t-test (Steel and Torrie 1980). A predictive model using logistic regression was developed from data collected in eastern Texas to predict the success of feral hog trapping on a given night based on significant weather variables and then tested on data collected from southern Texas (SAS Institute 1989). The amount of variation explained by the model (r^2) was adjusted according to Nagelkerke (1991).

RESULTS

A total of 193 feral hogs were captured 212 times during 166 nights of trapping (1,558 trap-nights) (Table 1). Trapping success was 13.6% for capturing hogs overall and constituted 12.4% when assessing the capture of individual animals. Non-target species that were captured in box traps included cattle, white-tailed deer (*Odocoileus virginianus*), raccoon (*Procyon lotor*), javelina (*Tayassu tajacu*), and turkey (*Meleagris gallapavo*). No differences ($t = 1.27$, $df = 1$, $P = 0.47$) were observed in the number of feral hogs captured per

trap-night between box and corral-style traps.

The threshold of 22°C for the daily minimum temperature was the only significant (Chi-square = 26.5, $df = 1$, $P < 0.0001$) weather variable found. A significant relationship ($P = 0.001$, adjusted $r^2 = 0.46$) was obtained for a logistic regression model predicting the probability of capturing a feral hog on a given night using a threshold of 22°C for the daily minimum temperature. The resulting estimated probability was:

$$P(\text{Hog captured}) = 1 / [1 + e^{f(x)}]$$

where $f(x) = -1.3948(\text{temperature } ^\circ\text{C}) - 1.6006$. The majority of hogs (97%) were captured when the daily minimum temperature was below 22°C. The model could correctly predict (95%) when trapping success of feral hogs was unlikely (daily minimum temperature $\geq 22^\circ\text{C}$), but it was less accurate (50%) in predicting the success of feral hog trapping during occasions when the daily minimum temperatures were $< 22^\circ\text{C}$.

Eight feral hogs died within 24 hours of capture, which was most likely due to capture myopathy and stress from overheating. Valid analysis of the deaths cannot be conducted because procedures were performed to counter the effects of stress. However, 6 of the 8 deaths occurred when ambient temperatures were $\geq 34^\circ\text{C}$. The remaining deaths occurred at ambient temperatures of 31°C and 27°C.

DISCUSSION

Several styles of traps occur for capturing feral hogs, and all styles exhibit some success, with no trap style clearly superior. Corral-style traps are designed to capture entire sounder groups; however, box traps on occasion also caught multiple (3+) hogs. Box traps have the benefit of being mobile and can be transported to where sign of feral hog activity is recent, whereas corral traps are permanent structures and feral hogs must be enticed to the area with bait.

Although we did not statistically analyze capture differences between baits, the effects of recommended baits were not always observed. Trappers suggested that we soak corn in diesel fuel to reduce the probability of capturing non-target species. However, use of the bait by javelina and raccoon did not diminish with the addition of diesel fuel. Fruit-flavored powdered Jell-O was suggested as an additive to corn bait. The concept was that the fruity smell and flavor would attract hogs to the bait.

Table 1. Trapping success of feral hogs between eastern and southern Texas locations.

Parameter	Trapping Locations		Total
	Easter Texas	Southern Texas	
Trapping nights	86	80	166
Trap-nights	1,193	365	1,558
Hogs captured	153	59	212
Hogs recaptured	6	13	19
Hogs/trap-night	0.128	0.162	0.136
Nights with hog captures	39	21	60
Percent nights with captures	45.3%	26.2%	36.1%

Unfortunately, our capture results did not improve with Jell-O. Also, non-soured corn was used as a bait. However, the frequency of non-target species attracted to the bait seemed heightened.

Although our model could not accurately predict nights when it would be likely to capture feral hogs, the model was successful in determining when efforts would most likely be fruitless. Because the majority of feral hogs live in areas with hot, humid climates during the summer (i.e., southeastern United States), trapping success, especially during July and August, would be unlikely. Research schedules and budgets should be planned to avoid such periods of extreme heat. In addition, times of extreme heat resulted in the greatest heat-stressed mortality rates. If feral hogs are being live captured for research, such as for telemetry studies, then times when the ambient temperature is cool has the added benefit of reduced mortality rates caused by heat stress.

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