Exclusion Fencing for Feral Hogs at White-tailed Deer Feeders

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ABSTRACT

Management programs aimed at white-tailed deer (*Odocoileus virginianus*) production often include the use of feeders, either to deliver supplemental feed or bait. However, much of the feed placed into deer feeders is consumed by non-target species, such as feral hogs (*Sus scrofa*). Our objectives were to compare three exclusion fence designs at deer feeders for their ability to restrict feral hog visitation and enable white-tailed deer visitation. Our high fence design consisted of 86 cm high graduated paneling. Our medium fence design consisted of 76 cm high, 10×10 cm paneling. Our low height design consisted of 51 cm high, 10×10 cm paneling. We placed deer feeders >1.5 km apart and monitored feeders with motion-sensing digital photography during the summer and winter. We compared the percent change in visitation index by fence design and season. We found feral hog percent change in visitation index varied by treatment, with our low fence design restricting feral hog visitation less than the medium and high fence designs. Given the cost of materials and the effectiveness of the exclusion fences, we recommend using an 86 cm high exclusion fence for feral hogs around deer feeders. However, we caution that our data and recommendations are from short-term seasonal trials.

KEY WORDS: boar, exclusion fencing, feeder, feral hog, *Sus scrofa*, white-tailed deer

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We thank the Welder Wildlife Refuge for providing access to conduct research. We are grateful to A. Barajas, C. Brown, B. Campion, D. Campion, C. Nedbalek, S. Rabe, and R. Sinclair for field assistance. Financial support was provided by the Renewable Resources Extension Act. We appreciate logistical support provided by the Caesar Kleberg Wildlife Research Institute at Texas A&M University-Kingsville. Our mention of commercial products herein is for identification purposes and does not constitute endorsement or censure by the United States Department of Agriculture.

INTRODUCTION

White-tailed deer (*Odocoileus virginianus*) and invasive feral hogs (*Sus scrofa*) coexist on millions of hectares throughout Texas (Adams et al., 2005). Management programs aimed at white-tailed deer production often include the use of feeders, either to deliver supplemental feed or bait (Webb et al., 2008). In fact, Texas landowners feed approximately 136 million kg of corn annually (R.N. Wilkins, Texas AgriLife Extension Service, unpublished data). However, much of the feed placed into deer feeders is consumed by non-target species (Lambert and Demarais 2001). Feral hogs and raccoons (*Procyon lotor*) are the primary non-target species causing damage through feed loss at deer feeders (Cooper and Ginnett 2000).

Biologists and land managers are seeking solutions to reduce damage at deer feeders by feral hogs (e.g., consuming feed, turning feeders over, and creating wallows at feeders). For example, biologists have determined that feral hog activity at deer feeders may be reduced by using feed types that are unpalatable to feral hogs as deer feed (Cooper 2006). Additionally, land managers often use fencing to exclude feral hogs from deer feeders (e.g., see Webb et al., 2008). However, little data exist regarding the effectiveness of different fence designs for feral hog exclusion at deer feeders. For example, both woven-wire (Hone and Atkinson 1983, Doupé et al., 2009) and electric (Reidy et al., 2008, Vidrih and Trdan 2008, Honda et al., 2009) fence designs have been found effective at reducing feral hog movements in various field applications, but have not been evaluated at a focal resource, such as deer feeders. Furthermore, the optimum height of exclusion fencing for deer feeders has not been determined.

Our objectives were to compare three exclusion fence designs at deer feeders for their ability to restrict feral hog visitation and enable white-tailed deer visitation during the summer and winter. Given previous reports that woven-wire fencing ≥80 cm restricted feral hog movement in captivity (Hone and Atkinson 1983), we hypothesized that our treatment 86 cm in height would restrict feral hog visitation to deer feeders. Furthermore, we hypothesized that white-tailed deer visitation to deer feeders would not be inhibited by our treatment fence designs because they were ≤86 cm in height (VerCauteren et al., 2006).

MATERIALS AND METHODS

We conducted our study during 2009 on the 3,157-ha Rob and Bessie Welder Wildlife Refuge (28°06'N, 97°22'W) in San Patricio County, which received an average of 79 cm of rainfall annually. The property was dominated by live oak (*Quercus virginiana*), honey mesquite (*Prosopis glandulosa*), and huisache (*Acacia farnesiana*). Primary non-target species at deer feeders were feral hogs, raccoons, and collared peccaries (*Pecari tajacu*). Feeding of deer and other wildlife did not occur on the property prior to our study. All animal use procedures were approved by the National Wildlife Research Center's Animal Care and Use Committee (Number QA-1702).

We evaluated three exclusion fence designs at deer feeders from 29 June–28 July (summer) and from 5 November–3 December (winter). Our fence designs used six 4.9-m livestock panels constructed into a 9.4 m diameter perimeter circle around deer feeders with the aid of 12 t-posts (Figure 1). Our high fence design consisted of 86 cm

Figure 1. Exclusion fencing using 6 1.9-m livestock panels constructed into 9.4 m diameter perimeter circle around deer feeders with the aid of 12 t-posts in San Patricio County, Texas during the summer (29 June–28 July) and winter (5 November–3 December) of 2009.

high graduated paneling (Feedlot Panel, Hog; Tractor Supply Company, Brentwood, Tennessee). Our medium fence design consisted of 152 cm high 10×10 cm paneling (Utility Panel, 5 ft × 16 ft; Tractor Supply Company, Brentwood, Tennessee) cut in half, yielding a 76 cm high exclusion fence. Our low height design consisted of the same 152 cm high 10×10 cm paneling cut into thirds, yielding a 51 cm high exclusion fence. We used 2.4 m high tripod deer feeders with a 102 kg capacity (R225 Pro VB Tripod Feeder Kit; American Hunter Outdoor Products, Grand Prairie, Texas) during our trials. Throughout our seasonal trials, we programmed deer feeders to release corn for 10 seconds daily at 0600 and 1700 hours.

At the beginning of our summer and winter trials we identified locations with fresh signs of white-tailed deer and feral hog activity and from these we selected locations to place deer feeders (n = 6 per trial and n = 2 per treatment). For each trial we placed deer feeders >1.5 km apart and monitored feeders with motion-sensing digital photography (Silent Image Professional; Reconyx, LaCrosse, Wisconsin). We placed camera systems 5 m from deer feeders and programmed systems to “high sensitivity” to capture 5 digital images every 5 seconds at a 2-minute trip interval. We revisited deer feeders, checked camera systems, and downloaded digital images every 3 to 5 days. From day 1 to 14 of each trial we maintained and monitored deer feeders without construction of exclusion fencing, the before fence construction period. On day 15 of each trial, we used a random number generator to assign deer feeder locations to an exclusion fencing treatment (n = 2 for high, medium, and low treatments) and constructed exclusion fencing treatment. From day 15 to 28 of each trial, we maintained and monitored deer feeders with exclusion fencing treatments, the after fence construction period.

We determined species-specific visitation rates through examination of digital images. As an index to visitation, we recorded the maximum number of individuals consuming corn by species captured on any one image within any hour on a daily basis. We report these data as the maximum number of visits by species per hour. We calculated the percent change in visitation index before and after fence construction for each location by dividing the after index by the before index and multiplying by 100. Percent values were square root transformed prior to analysis (Steel and Torrie 1980). For each species, we used PROC ANOVA (SAS Institute, Inc., Cary, North Carolina) to compare the percent change in visitation index by fence design (high, medium, and low) and season (summer and winter) in a 2 × 3 factorial design (Littell et al., 2006). We reported means ± SE.

RESULTS AND DISCUSSION

We examined and recorded data from 111,769 digital images during our summer trial and 75,630 digital images during our winter trial. For feral hog percent change in visitation index, we found no interaction between fence design and season ($F_{2,11}$ = 0.54, P = 0.61) and no season effect ($F_{1,11}$ = 0.54, P = 0.49). However, feral hog percent change in visitation index varied by treatment ($F_{2,11}$ = 3.92, P = 0.08), with our low fence design (51 cm) restricting feral hog visitation to deer feeders less than the medium (76 cm) and high (86 cm) fence designs. In fact, after construction of the medium and high exclusion fencing treatments, no feral hogs gained access to the deer feeders (Figure 2). This was consistent with our hypothesis that our high exclusion fence would restrict feral hog visitation to deer feeders. For white-tailed deer percent change in visitation index, we found no interaction between fence design and season ($F_{2,11}$ = 0.08, P = 0.92) and no treatment effect ($F_{2,11}$ = 0.44, P = 0.66). This was consistent with our hypothesis that visitation by deer would not be inhibited by our exclusion fencing. After construction of the high, medium, and low exclusion fencing treatments, deer continued to gain access to the feeders (Figure 3). However, deer percent change in visitation index varied by season ($F_{1,11}$ = 6.89, P = 0.04), with a greater percent change in visitation index occurring during the summer (4 ± 23%) than winter (–74 ± 9%).

Our observation of greater deer visitation during the summer compared to the winter trial may be due to severe drought conditions observed during the summer. For example, from January–July 2009 our study site received only 28% of its average normal precipitation for the period (NOAA 2009) and available deer forage was reduced, which may have prompted deer to visit feeders at a greater rate. Near average normal monthly precipitation occurred from September–December 2009 on our study site, which increased available forage during our winter trial. Another explanation for this observation is that deer in our winter trial may have been more interested in breeding activities than foraging activities and visited feeders at a lesser rate. A final explanation is that during our winter trial heavy rainfall occurred after exclusion fence construction. This may have further reduced deer activity and visitation to feeders.

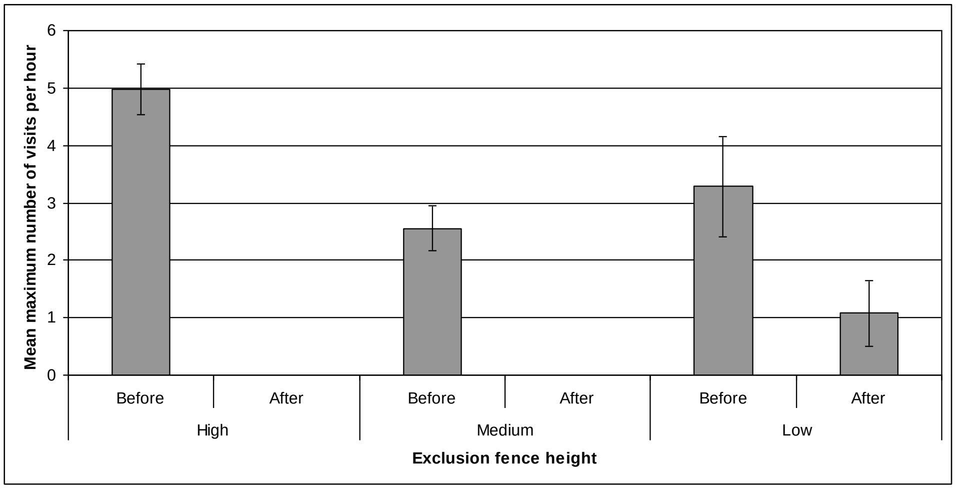

Figure 2. Mean (±SE) maximum number of visits by feral swine per hour 14 days before and 14 days after construction of exclusion fencing at high (86 cm, *n* = 4), medium (76 cm, *n* = 4), and low (51 cm, *n* = 4) heights around deer feeders in San Patricio County, Texas during the summer (29 June–28 July) and winter (5 November–3 December) of 2009.

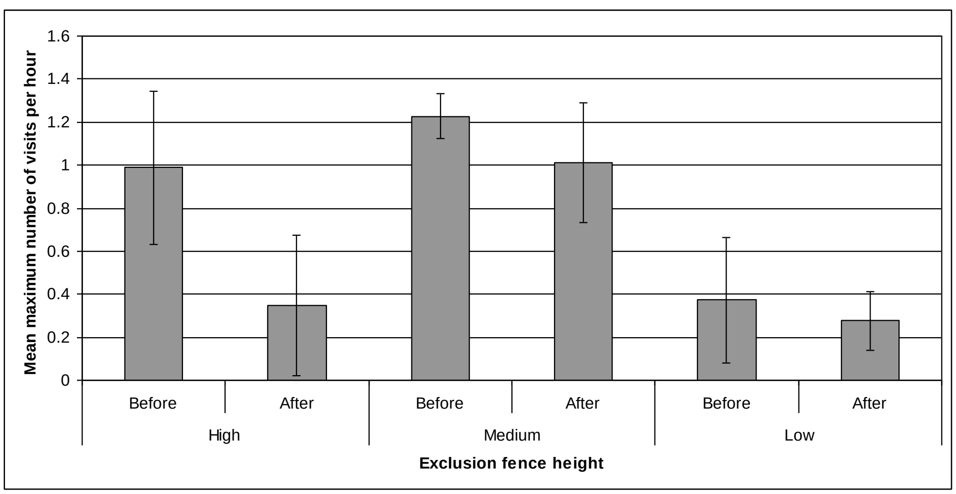

Figure 3. Mean (±SE) maximum number of visits by white-tailed deer per hour 14 days before and 14 days after construction of exclusion fencing at high (86 cm, *n* = 4), medium (76 cm, *n* = 4), and low (51 cm, *n* = 4) heights around deer feeders in San Patricio County, Texas during the summer (29 June–28 July) and winter (5 November–3 December) seasons of 2009.

Researchers from southern Texas have noted few fawns using deer feeders with feral hog exclusion fencing (VanBogelen et al., 2009). Our digital image data support this observation. During our summer trial we observed fawns with does, but on no occasion did they consume corn at feeders either before or after fence construction.

During our winter trial fewer fawns were observed, perhaps due to mortality caused by the abovementioned drought conditions. Again, we did not observe these animals consuming corn at feeders before or after fence construction, even at our low exclusion fence locations. In addition to exclusion fencing restricting access of fawns to deer feeders, VanBogelen et al., (2009) suggest that social interactions with adult deer may also restrict fawns from visiting feeders. This explanation appears plausible given our observations.

Our data suggest that feral hog exclusion fencing at deer feeders should be >51 cm and that fencing 76 cm and 86 cm were equally effective at excluding feral hogs. Including t-posts and t-post clips, our high, medium, and low exclusion fence material costs were $190, $187, $142 per deer feeder, respectively. If managers cut t-posts in half, then these costs would be reduced. Additionally, our 3-person fence construction crews were able to build one exclusion fence in approximately 45 minutes and this was consistent among fence designs. Furthermore, preparation time was needed to cut the medium fence in half. As such, our medium fence cost slightly less than our high fence to construct, but this may depend on local supplies available, vendors, and markets. Given the cost of materials that we encountered and the effectiveness of the exclusion fences, we recommend using an 86 cm high exclusion fence for feral hogs around deer feeders. However, we caution that our data and recommendations are from short-term seasonal trials and may not apply to situations in which year round supplemental feeding is practiced. With time, over longer durations, and depending upon other available forages, feral hogs will likely challenge even the 86 cm high exclusion fencing. Additional study is needed to formulate management appropriate recommendations in these situations.

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