ElectroBraid J FENCE CONFIGURATION PLOTS TO TEST EFFICACY OF WHITE-TAILED DEER EXCLUSION ON AN UPPER PENINSULA (MICHIGAN) AGRICULTURAL FIELD

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Abstract

Herbivory by white-tailed deer is an increasing problem in many landscapes, affecting a variety of natural resources. Agricultural crop damage has long been a recognized and documented effect of high deer population densities. This study is designed to test the efficacy of various configurations of *ElectroBraid* **J** fence in preventing white-tailed deer from accessing and eating agricultural crops. The study area is a small agricultural field located in northern Michigan. The study is designed as a trial to determine relative efficacy of four fence configurations relative to unfenced controls. Tracking was selected as a measurement of deer presence, allowing cumulation of deer presence through time and at night. Although tracks are ill-suited to provide information about numbers of individuals, our interest in this study is not numbers of deer, but rather, deer presence inside and outside the fence. To quantify tracks, each plot=s inside and outside perimeter was divided into tracking blocks. The observer walks along the outside perimeter, marking presence or absence of tracks in each inside and outside block. Frequency of deer tracks per plot ,with 32 blocks inside and 32 blocks outside, is the metric that will be tested using chi-square. After each survey bout, tracks are Aerased@ by dragging the outside perimeter of the plots and by raking the inside tracking surface. Analysis will rely on r x c contingency tables testing all treatments and control simultaneously, with subdividing techniques applied to elucidate causes of change. We will also be able to test treatments directly against the control.

Introduction

Herbivory by white-tailed deer is an increasing problem in many landscapes, affecting a variety of natural resources. Agricultural crop damage has long been a recognized and documented effect of high deer population densities. Increasingly, there is an awareness of damage to forest lands, gardens, parks, and landscaped property. Information is needed on cost-effective ways to limit or prevent access by deer. An analysis of cost-effectiveness needs to include a statistical assessment of efficacy. It is easy enough to calculate the cost of fence installation and maintenance. That cost needs to be coupled with information on the efficacy of the fence in deterring access by deer.

This study is designed to test the efficacy of four configurations of *ElectroBraid* **J** fence in preventing white-tailed deer from accessing and eating agricultural crops. Specifically, we wish to test whether any of the four configurations are significantly effective in preventing incursions by deer. No previous statistical tests have been conducted to assess *ElectroBraid* **J** fence efficacy against white-tailed deer. Available information to date is anecdotal. The goals of this study are to assess cost-effective configurations for limiting herbivory by white-tailed deer on agricultural crops and gardens. Each plot was laid out as a 50 foot x 50 foot square. This was intended to create a large enough space for deer to enter while still allowing placement of multiple plots in the field. Before fence placement, the ground around the inside and outside perimeter of the fence was roughened with a commercial drag pulled behind a four-wheeler to create a tracking surface.

Study Area

The study area is located in Iron County of Michigan=s Upper Peninsula. A small field (approximately 5 acres) surrounded by woods and shrubs was selected for the study. The larger landscape is dominated by potato fields, fields planted to cover crops, wetlands, and woods. The study field has been planted in the past several years in crops that are attractive to deer (annual rye, winter peas, etc.) with the hope of decoying deer away from adjacent potato and other crop fields. Deer have been regularly observed feeding in the field, particularly in the fall. Before the study began, the field had been disked to turn under a clover crop and planted to annual rye and winter peas to attract deer. Deer have access to the field from all sides through the wooded fringe with more incursions occurring on the west end of the field.

Methods

Fence design can be varied in several attributes that can be combined to form an even greater variety of fence configurations. Attributes that can be varied include (1) height of fence, (2) spacing of lines, (3) number of lines, and (4) voltage of fence. For this study we elected to vary the number of lines of the fence and fence height, while holding constant line spacing and voltage.

The study is designed as a trial to determine relative efficacy of 4 fence configurations relative to unfenced controls. We elected to test four fence configurations of increasing height and complexity - 1 line, 2 lines, 3 lines, and 4 lines. The 1 line fence was strung at 36 inches, the height of the second wire of a two-strand fence. The multi-line configurations were spaced at 18 inches apart. Space prevented the use of replicates, thus limiting statistical testing to goodness of fit using contingency tables. For this initial phase of the research, it was deemed more important to examine several configurations simultaneously than to create the more statistically powerful replicated study. In the future, a replicated study could focus on specific fence configurations with differences between configurations examined statistically.

Each plot was laid out as a 50 foot x 50 foot square. This was intended to create a large enough space for deer to enter while still allowing placement of multiple plots in the field. Before fence placement, the ground around the inside and outside perimeter of the fence was roughened with a commercial drag pulled behind a four-wheeler to create a tracking surface.

Plots were arrayed in a line from east to west with a 50 foot buffer area between plots (see drawing). Plots were placed at least 50 feet from the wooded edges of the field. Because we suspected a difference in deer usage in the east and west ends of the field, based on prior observations by the owner, a control plot was placed at each end of the array. This will allow us to standardize our findings across plots if it seems necessary. Prior to deployment of plots, deer tracks were seen in all parts of the field assuring us of deer use of the entire field. Fence configurations were randomly placed within the linear array by drawing numbered slips of paper.

The field was pre-baited with scattered field corn prior to deployment and energizing of the fence to get the deer accustomed to finding corn in this area. Corn represents a fairly novel food item in the immediate landscape and it therefore anticipated to be attractive to deer.

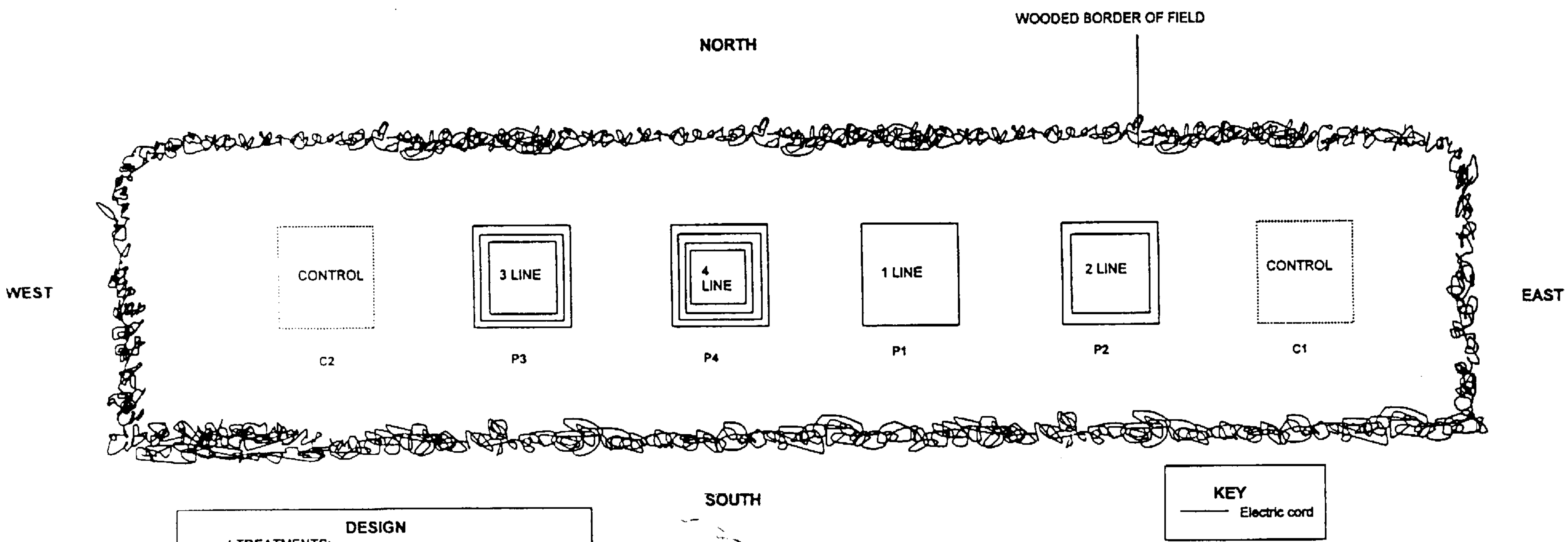
Once the fence is running, corn will be scattered in small amounts on the inside tracking surface of each plot to act as an enticement to the deer to get inside the fence. This mimics the dilemma in agricultural landscapes of deer being attracted to crops and pasture land. The center of each plot will also be growing annual rye and quack grass. Fences were energized with 9000 Volts of power generated by a solar-powered battery. An insulated wire strung was laid in the ground between plots to connect the plots.

Assessing efficacy of a fence for deer exclusion can be accomplished by direct observation, automatic camera systems, assessment of browse damage inside and outside the fence, and track surveys. Direct observation works best in a setting where observers can make regular and frequent observations. For deer, observations are hampered by the species= nocturnal activity. Camera surveys are expensive, particularly as multiple cameras would likely be required for each treatment plot. Assessment of damage, such as is used to make crop damage evaluations, might be used in some settings. This would be particularly useful for large scale treatments such as entire fields or orchards.

Tracking was selected as a measurement of deer presence for this relatively small scale study. Tracks would allow for cumulation of deer presence through time and at night. Although tracks are ill-suited to provide information about numbers of individuals, our interest in this study is not numbers of deer, but rather, deer presence inside and outside the fence.

In order to quantify tracks, each plot=s inside and outside perimeter was divided into 32 tracking blocks, each approximately 5 ft. x 5 ft (see drawing of plot). These were marked on the ground with white flagging on plastic stakes so as not to interfere with the electric fence. The observer will walk along the outside perimeter, marking presence or absence of tracks in each inside and outside block (see data sheet). Frequency of deer tracks per plot, with 32 blocks inside and 32 blocks outside, is the metric that will be tested using chi-square. Tracking will be conducted at least twice a week from September through mid-October. After a survey bout, tracks will be Aerased@ by dragging the outside perimeter of the plots and by raking the inside tracking surface.

Analysis will rely on r x c contingency tables testing all treatments and control simultaneously, with subdividing techniques applied to elucidate causes of change. We will also be able to test treatments directly against the control.



DESIGN

4 TREATMENTS:
1 LINE (36 inches off ground)
2 LINE (18 inches apart with lowest wire at 18 inches)
3 LINE (18 inches apart with lowest wire at 18 inches)
4 LINE (18 inches apart with lowest wire at 18 inches)
2 CONTROLS, unfenced, one at each end of the field

50' X 50' plots
50' buffer between plots and at least 50 feet between plots and wooded edges of field.

ElectroBraid™ DEER EXLUSION TEST PLOTS
Iron County, Michigan (Western Upper Peninsula)

White-tailed Deer Exclusion Test Using *ElectroBraid*™

White Water Associates, Inc., PO Box 27, Amasa, MI 49903 (906-822-7373)

Begin in northeast corner and proceed clockwise. Two steps takes you to the next 5 ft block. Blocks marked in 10 ft. intervals. √ means one or more tracks present in block. 0 means no tracks visible. Write down pertinent observations.

PLOT______ DATE____________________ OBSERVER____________________

Estimated time of last precip.____________________ *rain snow* **Current conditions____________________**

BLOCK	TRACK PRESENCE? √ or 0		BEHAVIORAL NOTES (note whether "zapped" - Z - or any other common sense observations)
	OUT	IN	
1			
2			
3			
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