Use of Dogs Contained within Off-Limits Crop Protection System for Reducing Deer Damage to Orchards and Horticultural Crops

Introduction:

Deer damage to apple trees in commercial orchards is a major problem for growers in Maryland and surrounding states. The use of dogs contained within *Off-Limits Crop Protection Systems* has been shown to be an effective way to reduce deer damage in orchards in New York State *(Rieckenberg and Curtis, 1996).* Demonstration studies at a Maryland nursery using this fencing system have been effective (*Kays, 1996),* but there is no study in Maryland orchards to document the effect of dogs contained within Off-Limits Crop Protection System. The use of this system provides the added benefit of protection from damage by fox and groundhogs.

To test this system in a controlled research environment this fencing system was installed around the 30-acre main orchard areas at the Western Maryland Research and Education Center. The project had the dual objectives of:

1) Reducing deer damage to assure that credible research can be completed; and
2) Demonstrating to agricultural producers the effectiveness and utility of this type of fencing system.

Study Design:

Four groups of five Gala apple saplings were planted on November 20, 2000 at the Western Maryland Research and Education Center. The saplings were purchased from Adams Nursery in Pennsylvania. Two groups of five trees were planted in two separate areas within the protected area, and two groups of five trees were planted outside the fenced area. Browsing and seedling damage were assessed in November 2001 and in January 2002 using three measures:

- Visual qualitative assessment;
- Physical measurements such as basal diameter, seedling height, and crown area, at the time of planting and after one growing season; and

- A quantitative assessment to measure seedling coverage area against a white board from a digital photograph taken from a fixed point at the time of planting and after one growing season.

Results:

In general, trees protected by the fencing system resulted in significantly lower mortality, increased height growth, increased basal diameter growth, increased tree volume, and better form, compared to trees that were unprotected (Table 1).

The pair of dogs in the fencing system also controlled other problem wildlife species. Between July 25, 2000 and August 31, 2001, the dogs killed approximately 45 groundhogs and 17 raccoons, as well as unknown number of voles.

The site was visited again in late January 2002 and the 100% of the unprotected trees were dead. The only deer damage visible to the protected trees was one stem that had a branch removed due to a buck rub.

Table 1. Growth of Protected and Unprotected Gala Apple Trees After One Growing Season - November 2001

Tree Measure	Protected Trees	Unprotected Trees	Difference between Protected & Unprotected Trees
Tree Survival	100%	80%	20%
Terminal Leader Survival	100%	30%	70%
Trees with Apples (%)	30%	0%	30%
Basal Diameter (cm)	2.10	1.69	0.41 (20%)
Total Height (m)	1.70	1.23	0.47 (28%)
Height Growth (m)	0.31	- 0.21	0.52

Tree Volume (m3)	1.38	0.56	0.82 (59%)

Conclusions:

The use of this fencing system is very effective. Some browsing of fruit trees and vines were found around the perimeter of the protected orchard, but it was minor. In our demonstration, the trees outside the fence were all dead due to browsing and rubbing. In a larger orchard more trees would likely survive, but the results reinforce the effectiveness of this fencing system.

When compared to the long-term cost (20-years) of a conventional 8-foot wire mesh fence, the cost is significantly less (See Appendix A). Access to a conventional fencing system is also very complicated due to the need for gates. The initial cost of the Off-Limits Fencing System is relatively low, with annual costs of about $750 per year incurred for feeding and medical care of the dogs. This is in contrast to a conventional fencing system where all the cost must be incurred up front.

The control of groundhogs, raccoons, and voles is a significant advantage for fruit growers that have problems with these species of wildlife.

A disadvantage of the Off-Limits Crop Protection System is that constant care of the dogs is necessary and some tinkering with the system is needed. If the landowner is not fond of dogs and their care, this may not be the system for them. Over the first year, one dog did escape three times and kill a few chickens of another landowner. The installation of a more powerful collar solved the problem for many months but the dog did escape once more. Initially, two automatic feeder stations were installed, but the dogs tended to frequent only one, so one was removed, and moved around the orchard to encourage movement to more remote sections. Water was provided by an automatic waterer that was heated during the winter so that it would remain in working order.

Comparison Cost for Dogs Contained By Buried Electric Fence and Conventional Wire Mesh Fence

Area Protected: 33 acres		
COSTS FOR DOG SYSTEM OVER YEARS		
Initial Cost:		
	Unit with collars & dogs	$2,300
	9,000 feet fence wire ($0.26 per foot)	$960
	Dog house, automatic waterer & feeder, misc.	$500
	Total	$4,490
Annual Costs: food & vet care		$730
Total Cost over 20 years: Initial plus annual costs		$19,090
Cost per Acre:		$578
COSTS FOR 8-FOOT WIRE MESH FENCE		
Initial Cost:		
	1,200 linear feet on each side = 4,800 linear feet	
	$6 per linear foot installed.	
	Gates, maintenance, and other items would add cost	$28,800
Cost per Acre:		$873
Difference in cost per acre:		**$295**

For more information on deer fencing options and other management techniques contact your local Maryland cooperative extension office and purchase a copy of Managing Deer Damage in Maryland (EB354) Cost $2. The information is also available online at www.naturalresources.umd.edu .

For more information on Off-Limits Crop Protection System contact the manufacturer at 800-875-8071.

References:

- Rieckenberg, R. and P. Curtis. 1996. Use of dogs contained within Off-Limits Crop Protection Systems for reducing deer damage to apple orchards. Preliminary program report. Cornell Cooperative Extension, Ithaca, NY.
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- Kays, J. S. (2000). Managing Deer Damage in Maryland. (Extension Bulletin 354). College Park, MD: UMCP, MCE. 20 pp. Cost $2.

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