

DEER REPELLENT STUDY

At Illinois Walnut Council Butternut Plot

By Ken Konsis

The Illinois Walnut Council planted butternut seedlings in 1994 at the Tree Research Area, Forest Glen Preserve, Westville, IL. This is also the IWC Headquarters. Butternut (*Juglans cinerea*) were chosen in response to the declining butternut species due to the Butternut Canker fungus (*Sirococcus clavigignenti-juglandacearum*.) The butternut plots consisting of 14 rows of trees with 17 trees per row, or 238 total number of trees. Height measurements and herbicide treatments have been performed since the second year the seedlings were in the ground. Pruning of the trees was performed in the winter of 2001. Overall the plot was heavily browsed by deer and had several major buck scrapes. This seemed a perfect area for a deer repellent study, especially since the Walnut Council receives many inquiries about repellents.

The Vermilion County Conservation District has already conducted deer fencing studies and deer browse studies at the Tree Research Area. The fencing study Results were a part of the Walnut Council Annual Meeting tour in 1998. These results were very positive.

The products that were chosen to be part of this study are products that are readily available from nursery and garden catalogs. The Vermilion County Conservation District and the Illinois Walnut Council **do not endorse any of these products**. The attempt is to report on findings of this study. Also, some products recommend multiple applications (after rains, etc.) This was not done. All products were treated the same. They were applied on the same day and results were documented on the same day. It is quite possible that the results would be different if complete product directions were applied. This, however, was not feasible due to lack of manpower, time restraints, and everything else that enters into ones busy schedule. Therefore, this is not applied research but may be comparable to what a landowner would do.

The following is a listing of products tested using the brand name, active ingredient, quantity purchased, price paid, and general application and information on the product label.

PRODUCT TESTED

Repellent Name	Durapel
Active Ingredient	Benzyldiethyl (2, 6, xylyl carbamoyl) methyl; ammonium benzoate (also known as Denatonium Benzoate of Bitrex)
Unit purchased	1 gallon
Unit price	\$29.99
Application	Ready-to-use; pump spray or squeeze trigger; apply in fall after first frost or on foliage in spring
Repellent Name	Deer Away
Active Ingredient	Allyl isothiocyanate capsaicin and related compounds; oil of mustard; vegetable oil; lemon extract; oleoresin of capsicum

Unit purchased	1 gallon
Unit price	\$19.99
Application	Ready-to-use spray; repels by odor & taste
Repellent Name	Deer Away Powder
Active Ingredient	Putrascent whole egg solids
Unit purchased	8 oz.
Unit price	N/A
Application	Apply to browse areas when damp (after rain or dew)
Repellent Name	Deer Chaser
Active Ingredient	Citrus
Unit purchased	6 pouches
Unit price	\$29.95
Application	Hang citrus pouches at browse height; lasts up to 1 year
Repellent Name	Deer Off
Active Ingredient	Putrascent whole egg solids; capsaicin and related capsaicinoides; garlic
Unit purchased	16 oz
Unit price	\$29.99
Application	Concentrated liquid (mix 1 pint per gallon of water); treats 200 trees/shrubs 4 feet tall; treat leaves, stems, branches; also repels rabbits and squirrels
Repellent Name	Plantskydd Animal Repellent
Active Ingredient	Specially processed sterilized and dried Edible animal protein; 87% bloodmeal; 37% Vegetable fat, 5% salt, 5% water; Manufactured in Sweden
Units purchased	2.2 lbs. (dry powder units)
Unit price	\$37.00
Application	Can be applied during rain or snow; retention 6 months (winter); 4 months Can be applied during rain or snow; retention 6 months (winter); 4 months (spring or summer); considered minimum risk pesticide; works by emitting an odor

Repellent Name	Deer No No
Active Ingredient	Sodium salts of mixed fatty acids
Unit purchased	1 oz. packages
Unit price	N/A
Application	Draw net bag that is hung on tree at bud level every 2 feet
Repellent Name	Hinder Deer and Rabbit Repellent
Active Ingredient	Ammonium soaps of higher fatty acids
Unit purchased	32 oz. (liquid concentrate)
Unit price	N/A
Application	Mix at a rate of 6 oz. per gallon of water and use spray application; repels by ammonia odor
Repellent Name	Hot Pepper Wax Animal Repellent
Active Ingredient	Capsaicin and other capsaicinoids; hot cayenne peppers
Unit purchased	32 oz. (liquid concentrate)
Unit price	\$27.29
Application	Mix at a rate of 8 oz. per gallon of water and use spray application
Repellent Name	Garlic Clips
Active Ingredient	Oil of garlic; capsaicin and related Capsaicinoids
Unit purchased	25 clips
Unit price	\$19.95
Application	Place 3-4 clips per tree
Repellent Name	Repellex
Active Ingredient	Dried animal blood plasma; paprika resin concentrate; quaternary ammonium salts
Unit purchased	32 oz. (liquid)
Unit price	\$18.99
Application	Ready-to-use spray; 3-month retention; utilizes bad taste and offensive odors
Repellent Name	Coyote urine
Active Ingredient	100% coyote urine
Unit purchased	8 oz.
Unit price	\$12.35

Application	Apply to scent rags and place 10-12 feet apart, hanging from low branches
Repellent Name	Dial soap
Active Ingredient	N/A
Unit purchased	1 bar
Unit price	\$.50
Application	Drill hole through bar and hang 1 bar from each tree

MECHANICAL CONTROL TESTED

Type	Ross Protective Deer Netting
Application	Fine netting that contains inhibitors that prevent ultraviolet rays from damaging the netting; made from durable polypropylene; 7 ft. x 100 ft. roll; completely drape over small trees
Type	Woven Wire Fence
Application	48 inch high open-weave fencing Surrounding 6 trees on 10 foot spacing

PRODUCTS TO BE TESTED

Repellent Name	Bobbex Deer Repellent RTV
Active Ingredient	Garlic oil; acetic acid; cloves; gellatin; fish meal; edible fish oil; onions; eggs; vanillin; wintergreen oil; vitamins C and E
Unit purchased	32 oz.
Unit price	\$19.95
Application	Ready-to-use foliar spray; year-round use; also plant nutrient; apply every 7-14 days
Repellent Name	Not Tonight Deer Repellent
Active Ingredient	Dehydrated whole egg solids; white Pepper
Unit purchased	6 oz.
Unit price	\$11.50
Application	Powder; mix 1 tbs. with 1 quart water; use spray application; re-apply every 10 to 14

	days or after rain; apply on new shoots
Repellent Name	Deer and Rabbit Repellent
Active Ingredient	N/A
Unit purchased	32 oz.
Unit price	\$15.19
Application	N/A
Repellent Name	Get Away Animal Repellent
Active Ingredient	N/A
Unit purchased	N/A
Unit price	\$17.95
Application	N/A
Repellent Name	Repel Bye Deer
Active Ingredient	Sodium salts of mixed fatty acids
Unit purchased	2.5 oz (6 -.42 oz draw-string pouches)
Unit price	\$11.95
Application	Draw-string pouches; tie to trees at various heights at bud level (2-4 per tree)
Repellent Name	Tree Guard Deer Repellent
Active Ingredient	Exactly the same ingredients as Durapel (same product)
Unit purchased	1 gallon
Unit price	\$44.95
Application	Ready-to-use; squeeze trigger spray

Of the 238 total trees in the plot, at least 2 trees not affected by deer browse or scrapes were chosen for each product. Six (trees) were surrounded by 48-inch woven wire fencing. The average height of the trees is 5 feet 3 inches.

Product	Application	Assessment
Durapel	November 1999	July 2000
	October 2000	November 2000
	September 2001	June 2002
Deer Away (spray)	November 1999	July 2000
	October 2000	November 2000
	September 2001	June 2002
Deer Away (powder)	October 2000	November 2000

	September 2001	June 2002
Deer Chaser	November 1999	July 2000
	October 2000	November 2000
	September 2001	June 2002
Deer Off	October 2000	November 2000
	September 2001	June 2002
Plantskydd	November 2000	September 2001
	September 2001	June 2002
Dial Soap	October 2000	November 2000
	September 2001	June 2002
Woven Wire Fence	November 1999	July 2000
		November 2000
		June 2002
Product	Application	Assessment
Deer NO NO	September 2001	June 2002
Coyote Urine	September 2001	June 2002
Repellex	September 2001	June 2002
Hinder	September 2001	June 2002
Hot Pepper Wax	September 2001	June 2002
Deer Netting	September 2001	June 2002
Garlic Clips	September 2001	June 2002

GENERAL ASSESSMENTS AND OBSERVATIONS

Product	Results
Durapel	This is one of the most tracked repellents, having been applied 3 times and assessed 3 times. It has been applied to 3 trees. Two trees have had absolutely no damage during the 3 assessment periods. The third tree showed a deer rub on the last assessment period, but was unaffected on the previous two.

Deer Away (spray)	Also one of the original repellents, it was applied to two trees. One tree showed no damage on one tree, but the second tree had slight browsing. The second assessment period showed severe browsing. The third assessment period, treated stems from both trees were dead (multiple use of the repellent?)
Deer Away (powder)	This repellent was applied to two trees on two occasions. There was no deer damage on either of the trees on the 2 assessment periods.
Deer Chaser	Another original repellent, it was applied to two trees. There was no deer damage at any of the 3 assessment periods on either of the trees.
Deer Off	Applied to two trees, this repellent also had no deer damage on either tree or any of the two assessment periods.
Plantskydd	This was applied to two trees. One exhibited an old buck rub before the repellent was applied. During the first assessment period, there was no damage to either tree. The second assessment showed slight browsing to one tree and no damage to the other.
Dial Soap	Hung from two trees, there was no deer damage to either tree on either of the assessment periods.
Woven Wire Fence	Constructed one time, there was no visible deer damage to any of the 6 trees during any of the 3 assessment periods.
Deer No No	Only 1 application occurred to two trees with no damage to either tree.
Coyote Urine	This was applied once to two trees. One had no deer damage, the other had severe deer damage.
Repellex	Applied once to two trees, only one tree could be positively identified during the assessment period. It had no damage.
Hinder	There also was only one application to two trees. However, the tag was missing from the second tree and a positive identification could not be made. There was no damage on the other tree.
Hot Pepper Wax	Applied once to two trees, it too had only one tree that could be positively identified. It had severe deer damage.
Deer Netting	Applied once, deer netting had no effect. Applied to two trees, the netting was obviously invisible to the deer and was destroyed. Both trees had severe deer damage.

Garlic Clips	Applied once to two trees, one tree had average browse damage and the other had severe browse damage.
--------------	---

There were originally 238 butternut seedlings planted in 14 rows with 17 trees per row. Of these original trees, only 112 or 47% are currently surviving. This has not changed since the beginning of this study in 1999. Of the 112 surviving trees, 35 are a part of the deer repellent study. The remaining trees (77) can be considered control trees. Of these control trees, 71 trees were damaged by deer. Only 6 trees showed no damage. Of the 35 trees in the study, only 10 trees showed deer damage in some way. Therefore, it is probable that these repellents do work.

Conclusions

First and foremost, deer repellents are very expensive to use and are labor-intensive to apply. The results are not guaranteed and depend on many factors such as time of year applied, weather conditions, application rate, following exact label directions, suggested re-applications, and the total number of trees to be protected. Product active ingredients must be examined closely, but this is usually unknown when ordering from a garden or nursery catalog. An example of this is the product Tree Guard Deer Repellent which is yet to be tested in this study. It was purchased for \$44.95 per gallon. When examining the active ingredients, it is exactly the same as a product already tested, Durapel. The price for Durapel, however, was \$29.99 per gallon.

Before applying a deer repellent, ask yourself these questions:

1. How many trees do I wish to protect?
2. Is cost a factor?
3. Do I have the time to apply the repellents?
4. Will I be satisfied with mixed results?

It is better to try and understand the deer. Deer are basically lazy animals that often use the same trails or paths. Along these paths (deer runs) you usually notice the most deer damage on trees (buck rubs or browse damage.) It is also easy to notice if deer are bedding down in the plantation at night. Deer damage is usually severe here. Our experiment with deer fencing worked because deer did not bother to jump a 48-inch fence, although they could do so easily without any effort. It also worked because we fenced in a small area of trees. A larger area would be ineffective unless a taller fence would be installed (costly.) If you have a favorite tree to protect, we have had great success by enclosing the single tree with fence wire, forming a cylinder. This protects trees from deer rubs, but not browsing. If the tree branches reach 4 feet in height, this will be above the browse line and the problem is gone. The key is to get the tree above that height. Annual browsing forms bushy trees. Deer also tend to rub on smooth barked trees. Young trees of all species fall into this category. When trees mature and form rougher bark, buck rubbing usually stops, or if it does occur, it does not damage the inner bark.

Examining the results of this study, taking into consideration cost, time involved, and effectiveness, the old stand-by Dial soap would be recommended. One problem we often heard was that soap does not last long on the tree. Ours is still hanging after two years. All you need to do is drill a hole and hang it with fishing line.

Everyone has his/her favorite stand-by deer repellent. We have been told to use human hair bags, sulphur/egg mixtures, large cat feces from a zoo, and even human urine. If nothing else,

I hope this report will assist landowners with deer problems in their decisions if deer repellents are considered.

A special thanks to Tree World of Sechelt, British Columbia, who provided their product Plantskydd for free testing. Also, special thanks to Lorna Konsis and Amy Steeples for their assistance in compiling this data.