

MOVING FORWARD WITH BULK DEER REPELLENTS



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After seven years of conducting deer repellent research, our results have translated into real savings for Fraser fir Christmas tree growers. One bulk repellent product we have used, fifty pound bags of spray-dried red blood cells, is already being carried by CPS, a local agricultural supplier. Several tons of another product, putrescent or inedible egg powder, have been purchased directly from the supplier by growers and applied to hundreds of acres of young trees this past winter. Even with shipping and handling, these materials cost less than 10% of their commercial counter parts.

Over the last two years, we have identified several bulk materials that can be used in place of expensive commercial products. We tested slaughterhouse blood treated with anti-coagulant, spray-dried red blood cells, hydrolyzed casein (a powdered cheese ingredient), food-grade egg powder, and inedible egg powder. The inedible egg powder and spray-dried red blood cells are both processed for pet and livestock feeds. Once the spray-dried red blood cell product was found that mixed like Plantskydd, use of the slaughterhouse blood was discontinued. The costs of different commercial and bulk materials are listed below in Table 1.

Table 1. Comparative cost of commercial and bulk deer repellants.

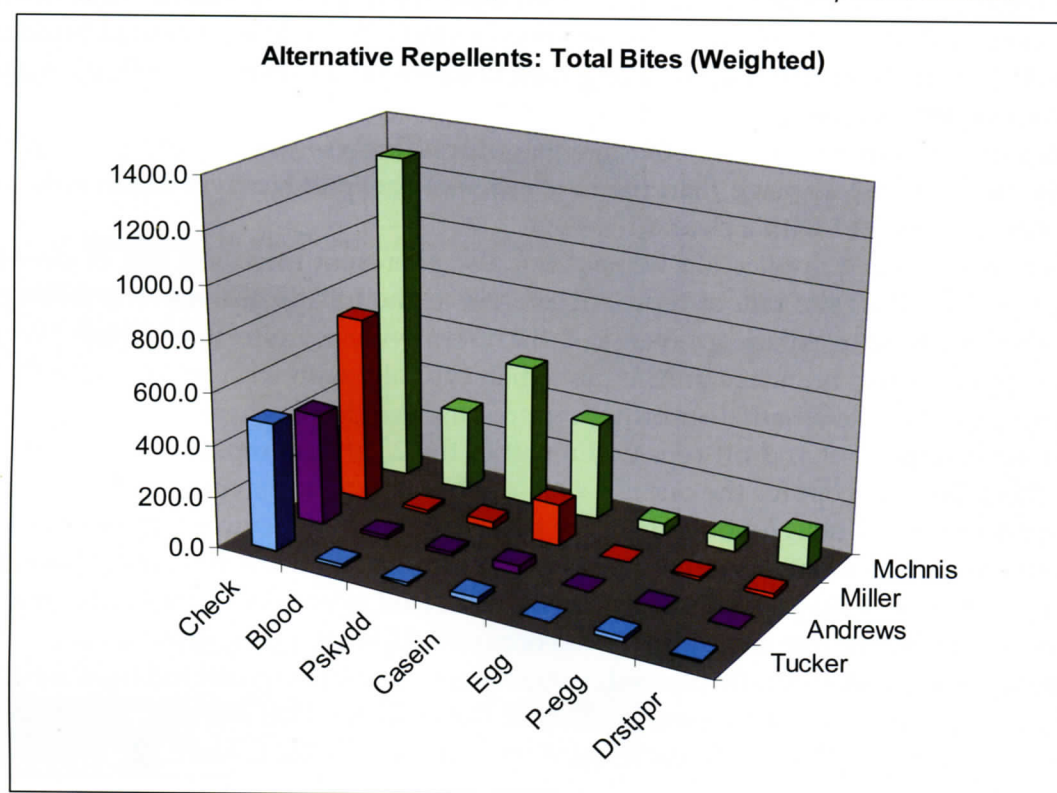
Repellent	Cost	Unit	Rate	\$/acre	#/yr	\$/yr	\$/rtn
Plantskydd (half rate)	\$34.95	2.2 lb.	1.5	\$52	2	\$105	\$315
Plantskydd (full rate)	\$34.95	2.2 lb.	3	\$105	2	\$210	\$630
DeerStopper	\$100.00	1 gal.	1	\$100	2	\$200	\$600
Deer Off	\$117.00	1 gal.	1	\$117	2	\$234	\$702
Deer Away BGR	\$20.30	1 gal.	2	\$41	2	\$82	\$246
Liquid Fence	\$108.50	1 gal.	1	\$109	2	\$218	\$652
Treeguard	\$29.80	1 gal.	9	\$268	2	\$537	\$1,611
Repellex pellets	\$0.90	1 tab.	1750	\$1,575	1	\$1,575	\$1,575
Egg Powder	\$6.00	1 lb.	5	\$30	2	\$60	\$180
Casien	\$10.00	1 lb.	5	\$50	2	\$100	\$300
Inedible egg powder	\$1.30**	1 lb.	5	\$6.50	2	\$13	\$39
Spray-dried blood cells	\$1.20**	1 lb.	5	\$6	2	\$12	\$36

In 2007, these bulk repellent materials were tested on 3 different farms and on five farms in 2008. Deer did not browse trees at one study site in 2008 leaving four from which data was collected.

These alternative deer repellent studies successfully answered the question of substituting bulk materials for commercial materials. The bulk deer repellents performed as well or better than their commercial counterparts. Figure 1 shows the total number of deer bites counted per treatment weighted for different block

sizes across the four 2008 studies. Total bites are calculated by multiplying the percent of trees browsed by the average bites per tree. The two bulk egg products worked as well as Deerstopper. The spray dried red blood cells and slaughter house blood worked as well as Plantskydd. Any blood product including Plantskydd failed to provide full control at the McInnis farm (green bars) under severe browsing pressure even as the egg products worked. Relying more on taste than odor, the hydrolyzed casein incurred more bites than either the blood or egg products but still provided a vast improvement over the check plots.

Figure 1. Total deer bites counted at four 2008 alternative deer repellent studies.



These studies failed to substantially answer the more complex question of identifying the optimum rate for each of these bulk materials. High, medium, and low rates of bulk and commercial repellents were applied at 4 of the 5 studies with medium and high rates applied at the fifth. Only at the Tucker farm did the amount of browsing increase slightly across repellents as the rate of repellent decreased. At the other farms, repellent rates ranked inconsistently.

While additional research will be needed to satisfactorily identify optimum rates, we do have more than one year's evidence that these materials work. With the low cost of both the bulk blood and egg materials, a grower could use the high rate (9-10 pounds per acre) and still save most of the cost of commercial equivalents. While the lighter rates may work in most places, the higher rates represent less risk of deer becoming accustomed to the product.

Another question we sought to answer in 2008 was the importance of spreader-stickers. Currently, we use 6 ounces of Clearspray per gallon of repellent mix to help glue the repellent to the foliage. If 10 gallons of repellent are applied per acre, about half a gallon of Clearspray would be used at a cost of about \$13. It isn't that expensive across a handful of research studies, but the cost certainly accumulates where a grower has to protect all his or her one- and two-year-old trees. Using less or a cheaper sticker could make repellent application more affordable.

To address this, we conducted both Clearspray rate trials and alternative spreader-sticker trials. We implemented two of each study design in 2008. With the generous donation of Deerstopper repellent from Messina Wildlife, we used it as the uniform repellent in these sticker studies.

To identify the optimum rate of Clearspray, 0, 1.5, 3, 6, and 12 oz were added to the labeled rate of Deerstopper and sprayed on adjacent blocks. No trend is visible among the rates of Clearspray despite extensive browsing in the check plots. The plot treated with Deerstopper with no Clearspray did as well as those treated with different rates of sticker.


Four alternative stickers were evaluated including Clearspray, Croplife, Bond, and Plyac. Check plots at both farms were heavily browsed. At the Tom Miller site, all spreader-sticker treatments worked very well. At the Lovern site, Bond, Clearspray, and Croplife performed slightly better than Plyac. Unfortunately, treatments of Deerstopper alone were not included in either of these studies. Further work is needed to definitively identify the need for and choice of spreader-stickers.

Mechanization studies were repeated on new sites in 2008 to follow up on work done in the previous two years. Bryan Davis and I conducted an ATV sprayer study at R.L. Lovern's farm in Ashe County. Treatments included conventional backpack sprayer, ATV over-the-row spray, and ATV paint-roller wick applications. Jamie Vestal worked with us to do the mistblower sprayer study. Treatments included broadcast, perimeter, and 6-row-repeated mistblower applications along with conventional backpack application and a block protected by Plotsaver repellent fence.

Both the ATV and Mistblower sprayer treatments reduced browse damage compared to the checks but incurred slightly more browse damage than the conventional backpack sprayer treatments. Once again, no mistblower treatment stood out with a clear advantage.

Both forms of mechanized application worked but also represent increased risk of deer browsing. The mistblower applications dilute the rate of repellent applied to the foliage of trees. The ATV sprayer applications put out a similar rate to backpack sprayers but did not provide as uniform coverage. We observed more deer browse damage on lower branches in ATV plots than typically seen with backpack applications. Mechanized sprayers may have a role where deer browsing pressure is light or where manual labor is unavailable.

Perhaps the most important and oft repeated result of the 2008 deer repellent research is the consistent damage in our check plots. Except for the one site deer did not touch, every check plot incurred greater damage than our repellent treatments. Not only were the percentage of trees browsed approaching 100% at many check plots, but many trees had few terminal branches or buds left. With few remaining buds, these trees will take several years to recover if they survive at all. Often, untreated trees outside the study areas were browsed just as heavily as the checks despite any hunting that occurred. Ultimately, the question arises, how can growers leave genetically improved, carefully planted, valuable young trees unprotected from the ravages of deer?

Special thanks to our 2008 Farmer Cooperators: Don & David Tucker, Dan McInnis, Tom Miller, Mitch & Paul Poe, Seth Andrews, R.L. Lovern, Jamie & Phillip Vestal, Kevin Thompson, Dale Cornett. 

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