Effects of Various Methods of Deer Browse Deterrence and Exclusion on Survival of Planted Northern Red Oak Seedlings

Josiah McLean, Research Advisor: Eli Anoszko

Logistic Regression Model Results for 2023 Survival Rates (alpha = 0.05)

| Treatment | Estimate STD. | Error | z value | Pr(>|z|) |
|-----------|---------------|-------|---------|----------|
| Tree Shelter | 0.89 | 0.36 | 2.5 | 0.014* |
| Bud Cap | -0.56 | 0.28 | -2.2 | 0.031* |
| Spray Deterrent | -0.36 | 0.28 | -1.4 | 0.16 |

McFadden’s Pseudo R2: 0.084
Model p-value: 0.0000332

*Statistically significant with a p-value below 0.05.

- Tree shelters demonstrated significantly higher rates of survival compared to all other treatments including control.
- Bud caps demonstrated a slight negative relationship with survival that was significantly different from the control, but not the spray deterrent.
- Both initial root collar diameter (IRCD) and initial seedling height had no significant relationship to seedling survival.

Discussion

- Paper bud caps may decrease survival rates of planted seedlings, so silviculturists should consider other browse deterrent alternatives.
- Previous research from this project demonstrated that tree shelters substantially reduced browse damage relative to other treatments and that sheltered seedlings had the greatest height growth of any treatment.
- This dataset demonstrated that IRCD may not have a correlation with survival. One study found that higher red oak IRCD had better future height and diameter, and another found that higher seedling IRCD had a strong correlation to survival.
- Before implementing shelters, land managers should consider the greater cost and time to install them. While potentially cost effective for a few trees that experience high browse pressure, shelters may prove unprofitable in large scale forestry operations.

Acknowledgments

Special thanks to Gavin Meyer, and Theodore Rickman for conducting past research, the NRES students/alumni for collecting data, Living Lands and Waters for the seedling donation, and the Dorothy Kopmeier Vallier Foundation for funding the project.