

# **Evaluation of Screening Techniques for Woody Plant Herbicide Development**

By

Mitchell Blair

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Dr. Shepard Zedaker  
Committee Chair

Dr. John Seiler  
Academic Committee Member

Perry L. Hipkins  
Academic Committee Member

Patrick Burch  
Industry Committee Member

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# **Evaluation of Screening Techniques for Woody Plant Herbicide Development**

**Mitchell P. Blair**

## **Abstract**

Woody plant herbicide screening techniques were evaluated in an attempt to expedite the screening process and decrease amounts of herbicide active ingredient required. Rapid greenhouse screening of woody plant seedlings was performed in less than six months while rapid seed screening was performed in less than twenty days. A traditional field screen, requiring ten months, was performed for comparison purposes. Leaf area – biomass ratios were also examined for their influence on herbicide efficacy. Linear regressions were performed using traditional field screen data as the dependent variable and rapid screening technique data as the independent data.

Rapid screens using triclopyr produced more statistically significant regressions compared to those involving imazapyr. Significant regressions were produced that could predict field response of several species using both herbicides and either rapid screening technique. This indicated that rapid screening techniques could determine herbicide efficacy and/or species spectrum of control in much less time with much less herbicide. Rapid seed screens could estimate species spectrum within five days after treatment. The rapid greenhouse screen and rapid seed screen techniques can provide woody plant herbicide developers initial efficacy and spectrum of control data in a cost and time effective manner.

Testing showed that as woody plants mature from seedling to sapling, there is a decrease in the leaf area – total aboveground biomass ratio. The decrease in this ratio consistently decreased efficacy of both imazapyr and triclopyr at the lower active ingredient rates. Seedlings with the higher leaf area – biomass ratio had, on the average, higher efficacy response rates to herbicide treatments.

## **Dedication**

This research and subsequent publications are dedicated to my sisters, Shannon (Cookie) and Kim (Pebbles). Growing up in the same household taught me persistence, stubbornness, awareness, patience, and, most importantly, the importance of humor and laughter.

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## **Table of Contents**

	<b><u>Page</u></b>
<b>Dedication .....</b>	<b>iii</b>
<b>Acknowledgments .....</b>	<b>iv</b>
<b>List of Tables .....</b>	<b>vii</b>
<b>List of Figures.....</b>	<b>ix</b>
<b>List of Abbreviations .....</b>	<b>xiv</b>
<b>Chapter 1: Introduction / Justification.....</b>	<b>1</b>
<b>Chapter 2: Literature Review .....</b>	<b>5</b>
<u>Section 1: Overview of Agricultural Pesticide Regulation and Development .....</u>	<u>5</u>
<u>Section 2: Herbicide Development Screening Techniques.....</u>	<u>7</u>
Herbaceous Plant Herbicide Screening.....	7
Conventional Woody Plant Herbicide Screening .....	9
Rapid Screening for Woody Plants.....	11
<u>Section 3: Leaf Area / Aboveground Biomass Relationships.....</u>	<u>15</u>
<u>Section 4: Herbicide Classification by Mode of Action .....</u>	<u>16</u>
Imazapyr .....	17
Triclopyr .....	19
Summary of usage of imazapyr and triclopyr in this study .....	22
<b>Chapter 3: Methods and Materials .....</b>	<b>24</b>
<u>Study Sites .....</u>	<u>24</u>
<u>Section 1: Traditional Field Screening .....</u>	<u>25</u>
<u>Section 2: Rapid Greenhouse Screen Herbicide Application and Seedling Handling.....</u>	<u>27</u>
<u>Section 3: Rapid Seed Screening .....</u>	<u>31</u>
<u>Section 4: Data Analysis of Field, Rapid Greenhouse, and Rapid Seed Screenings.....</u>	<u>34</u>
Field versus rapid greenhouse screens.....	34
Field versus rapid seed screens .....	35
<u>Section 5: Establishment of Leaf Area – Biomass Ratios and their Effect on Herbicide Efficacy .....</u>	<u>35</u>
Leaf Area – Biomass Ratios .....	35
Hand Defoliation Screening.....	37
<u>Section 6: Data Analysis for Leaf Area – Biomass Ratios and Hand Defoliation .....</u>	<u>38</u>
Leaf Area – Biomass Ratios .....	38
Hand Defoliation.....	39
<b>Chapter 4: Results .....</b>	<b>40</b>
<u>Section 1: Prediction of Field Response using Rapid Greenhouse Screens .....</u>	<u>40</u>
Predicting Three-Year-Old Species Efficacy.....	40
Green Ash .....	41
Sweetgum.....	42

Loblolly Pine.....	44
Predicting Two-Year-Old Species Efficacy.....	44
Yellow-poplar .....	44
Sweetgum.....	50
Loblolly Pine.....	55
Section 2: Rapid Seed Screening .....	61
Overall Response of Rapid Seed Screen.....	61
Green Ash .....	61
Yellow-poplar .....	63
Sweetgum.....	65
Loblolly Pine.....	67
Prediction of Field Response of Two-Year-Old Saplings Using Rapid Seed Screen.....	70
Yellow-poplar .....	70
Sweetgum.....	71
Loblolly Pine.....	75
Section 3: Leaf Area – Biomass Ratios and Dose Response Curves.....	79
Three-Year-Old Plantation.....	79
Two-Year-Old Plantation versus One-Year-Old Seedlings from Rapid Greenhouse Screen 2.....	79
Yellow-poplar .....	79
Sweetgum.....	81
Loblolly Pine.....	83
Comparison of Dose Response across Species.....	85
Section 4: Hand Defoliation Screen.....	87
Sweetgum.....	87
Yellow-poplar .....	89
<b>Chapter 5: Discussion.....</b>	<b>92</b>
Section 1: Using Rapid Greenhouse Screen to Predict Field Response .....	92
Three-Year-Old Plantation.....	92
Two-Year-Old Plantation.....	94
Section 2: Effective Woody Plant Seed Screening Techniques and Prediction of Field Response Using Rapid Seed Screen .....	97
Green Ash .....	98
Yellow-poplar .....	99
Sweetgum.....	100
Loblolly Pine.....	102
Section 3: Leaf Area – Biomass Ratios and Their Effect on Herbicide Efficacy .....	104
<b>Chapter 6: Conclusions, Applications, and Future Research .....</b>	<b>111</b>
<b>Literature Cited .....</b>	<b>115</b>
<b>Appendix A .....</b>	<b>120</b>

## List of Tables

	<u>Page</u>
Table 2.1: Rapid Screening Timetable (Zedaker and Seiler 1988).....	12
Table 2.2: R-Squared Values for simple linear regression of seed screened and rapid screened seedlings for triclopyr and imazapyr. Regressions predict the level of control in the field (two-year old plantation saplings (Bunn et al 1995)) .....	14
Table 3.1: Summary of field application rates for imazapyr (Arsenal AC) and triclopyr (Garlon 4) .....	26
Table 3.2: Effect Code Rating System for Treated Seedlings and Saplings.....	27
Table 3.3: Rapid Greenhouse Screen 2 Application Rates .....	30
Table 3.4: Published Stratification Periods (Young and Young 1992) .....	31
Table 3.5: Tested Rates for Screening Trials.....	32
Table 4.1: Days to Significant Treatment Effect for Rapid Seed Screens (DAT = Days After Treatment).....	70
Table 4.2: Leaf Area – Biomass Ratios (sq cm / g) for Yellow-poplar, Sweetgum, and Loblolly Pine as influenced by age (t values for paired t test for significant difference within species).....	79
Table 4.3: Parameter Estimates and t Statistics for Comparing Slopes of Dose Response Models for Yellow-poplar Treated with Imazapyr .....	80
Table 4.4: Parameter Estimates and t Statistics for Comparing Slopes of Dose Response Models for Yellow-poplar Treated with Triclopyr .....	81
Table 4.5: Parameter Estimates and t Statistics for Comparing Slopes of Dose Response Models for Sweetgum Treated with Imazapyr.....	82
Table 4.6: Parameter Estimates and t Statistics for Comparing Slopes of Dose Response Models for Sweetgum Treated with Triclopyr.....	83
Table 4.7: Parameter Estimates and t Statistics for Comparing Slopes of Dose Response Models for Loblolly Pine Treated with Imazapyr.....	84
Table 4.8: Parameter Estimates and t Statistics for Comparing Slopes of Dose Response Models for Loblolly Pine Treated with Triclopyr.....	85

Table 4.9: ANOVA for Testing Interaction of Defoliation and Herbicide Rate for Sweetgum Treated with Imazapyr .....	88
Table 4.10: ANOVA for Testing Interaction of Defoliation and Herbicide Rate for Sweetgum Treated with Triclopyr .....	89
Table 4.11: ANOVA for Testing Interaction of Defoliation and Herbicide Rate for Yellow-poplar Treated with Imazapyr .....	90
Table 4.12: ANOVA for Testing Interaction of Defoliation and Herbicide Rate for Yellow-poplar Treated with Triclopyr .....	91
Table 5.1: Comparison of Efficacy of Imazapyr and Triclopyr for Three Species of Interest ....	107
Table 5.2: Comparison of Efficacy Data between Rapid Greenhouse Screen 2 and ChESS .....	107
Table 6.1: Total Active Ingredient (milligrams) Used for Screening Techniques .....	113



## List of Figures

	<u>Page</u>
Figure 4.1: Linear Model for Predicting Field Response of Three-Year-Old Green Ash Treated with Imazapyr Using Rapid Greenhouse Screen 1 Percent Mortality .....	41
Figure 4.2: Linear Model for Predicting Field Response of Three-Year-Old Sweetgum Treated with Imazapyr Using Rapid Greenhouse Screen 1 Effect Code .....	42
Figure 4.3: Linear Model for Predicting Field Response of Three-Year-Old Sweetgum Treated with Imazapyr Using Rapid Greenhouse Screen 1 Percent Control of Height.....	43
Figure 4.4: Linear Model for Predicting Field Response of Three-Year-Old Sweetgum Treated with Imazapyr Using Rapid Greenhouse Screen 1 Percent Mortality .....	43
Figure 4.5: Log Model for Predicting Field Response of Two-Year-Old Yellow-poplar Treated with Imazapyr using Rapid Greenhouse Screen 1 Percent Control of Height.....	45
Figure 4.6: Log Model for Predicting Field Response of Two-Year-Old Yellow-poplar Treated with Imazapyr using Rapid Greenhouse Screen 1 Effect Code .....	45
Figure 4.7: Log Model for Predicting Field Response of Two-Year-Old Yellow-poplar Treated with Imazapyr using Rapid Greenhouse Screen 1 Effect Code .....	46
Figure 4.8: Log Model for Predicting Field Response of Two-Year-Old Yellow-poplar Treated with Imazapyr using Rapid Greenhouse Screen 2 Percent Leaf Necrosis.....	47
Figure 4.9: Log Model for Predicting Field Response of Two-Year-Old Yellow-poplar Treated with Imazapyr using Rapid Greenhouse Screen 2 Percent Control of Height.....	47
Figure 4.10: Linear Model for Predicting Field Response of Two-Year-Old Yellow-poplar Treated with Triclopyr using Rapid Greenhouse Screen 1 Percent Control of Height .....	48
Figure 4.11: Linear Model for Predicting Field Response of Two-Year-Old Yellow-poplar Treated with Triclopyr using Rapid Greenhouse Screen 1 Effect Code.....	49
Figure 4.12: Linear Model for Predicting Field Response of Two-Year-Old Yellow-poplar Treated with Triclopyr using Rapid Greenhouse Screen 1 Effect Code.....	49
Figure 4.13: Linear Model for Predicting Field Response of Two-Year-Old Sweetgum Treated with Imazapyr using Rapid Greenhouse Screen 1 Percent Control of Height.....	50
Figure 4.14: Linear Model for Predicting Field Response of Two-Year-Old Sweetgum Treated with Imazapyr using Rapid Greenhouse Screen 1 Percent Control of Height.....	51

Figure 4.15: Log Model for Predicting Field Response of Two-Year-Old Sweetgum Treated with Imazapyr using Rapid Greenhouse Screen 2 Percent Mortality .....	52
Figure 4.16: Log Model for Predicting Field Response of Two-Year-Old Sweetgum Treated with Imazapyr using Rapid Greenhouse Screen 2 Percent Leaf Necrosis .....	52
Figure 4.17: Log Model for Predicting Field Response of Two-Year-Old Sweetgum Treated with Imazapyr using Rapid Greenhouse Screen 2 Effect Code .....	53
Figure 4.18: Log Model for Predicting Field Response of Two-Year-Old Sweetgum Treated with Triclopyr using Rapid Greenhouse Screen 1 Percent Control of Height.....	54
Figure 4.19: Log Model for Predicting Field Response of Two-Year-Old Sweetgum Treated with Triclopyr using Rapid Greenhouse Screen 1 Effect Code .....	54
Figure 4.20: Log Model for Predicting Field Response of Two-Year-Old Sweetgum Treated with Triclopyr using Rapid Greenhouse Screen 1 Effect Code .....	55
Figure 4.21: Log Model for Predicting Field Response of Two-Year-Old Loblolly Pine Treated with Imazapyr using Rapid Greenhouse Screen 2 Effect Code .....	56
Figure 4.22: Linear Model for Predicting Field Response of Two-Year-Old Loblolly Pine Treated with Triclopyr using Rapid Greenhouse Screen 1 Effect Code.....	57
Figure 4.23: Linear Model for Predicting Field Response of Two-Year-Old Loblolly Pine Treated with Triclopyr using Rapid Greenhouse Screen 1 Percent Mortality .....	57
Figure 4.24: Linear Model for Predicting Field Response of Two-Year-Old Loblolly Pine Treated with Triclopyr using Rapid Greenhouse Screen 1 Effect Code.....	58
Figure 4.25: Linear Model for Predicting Field Response of Two-Year-Old Loblolly Pine Treated with Triclopyr using Rapid Greenhouse Screen 2 Percent Leaf Necrosis.....	59
Figure 4.26: Linear Model for Predicting Field Response of Two-Year-Old Loblolly Pine Treated with Triclopyr using Rapid Greenhouse Screen 2 Effect Code.....	59
Figure 4.27: Linear Model for Predicting Field Response of Two-Year-Old Loblolly Pine Treated with Triclopyr using Rapid Greenhouse Screen 2 Percent Control of Height .....	60
Figure 4.28: Mean Tissue Length for Green Ash Seeds Treated with Imazapyr (A) and Triclopyr (B) Over Entire Length of Seed Screen .....	62
Figure 4.29: Mean Percent Germination of Green Ash Seeds Treated with Imazapyr (A) and Triclopyr (B) Over Entire Length of Seed Screen .....	63

Figure 4.30: Mean Tissue Length for Yellow-poplar Seeds Treated with Imazapyr (A) and Triclopyr (B) Over Entire Length of Seed Screen .....	64
Figure 4.31: Mean Percent Germination for Yellow-poplar Seeds Treated with Imazapyr (A) and Triclopyr (B) Over Entire Length of Seed Screen .....	65
Figure 4.32: Mean Tissue Length for Sweetgum Seeds Treated with Imazapyr (A) and Triclopyr (B) Over Entire Length of Seed Screen .....	66
Figure 4.33: Mean Percent Germination for Sweetgum Treated with Imazapyr (A) and Triclopyr (B) Over Entire Length of Seed Screen .....	67
Figure 4.34: Mean Tissue Length for Loblolly Pine Seeds Treated with Imazapyr (A) and Triclopyr (B) Over Entire Length of Seed Screen .....	68
Figure 4.35: Mean Percent Germination for Loblolly Pine Seeds Treated with Imazapyr (A) and Triclopyr (B) Over Entire Length of Seed Screen .....	69
Figure 4.36: R Square Values for Linear Regressions Predicting Percent Control of Height for Two-Year-Old Sweetgum Treated with Imazapyr .....	71
Figure 4.37: Linear Model for Prediction of Field Response of Two-Year-Old Sweetgum Treated with Imazapyr using Rapid Seed Screen Percent Control of Seed Tissue.....	72
Figure 4.38: Linear Model for Prediction of Field Response of Two-Year-Old Sweetgum Treated with Imazapyr using Rapid Seed Screen Percent Control of Seed Germination.....	72
Figure 4.39: R Square Values for Linear Regressions Predicting Effect Code for Two-Year-Old Sweetgum Treated with Imazapyr .....	73
Figure 4.40: Linear Model for Prediction of Field Response of Two-Year-Old Sweetgum Treated with Imazapyr using Rapid Seed Screen Percent Control of Seed Tissue.....	74
Figure 4.41: Linear Model for Prediction of Field Response of Two-Year-Old Sweetgum Treated with Imazapyr using Rapid Seed Screen Percent Control of Seed Germination.....	74
Figure 4.42: R Square Values for Linear Regressions Predicting Effect Code for Two-Year-Old Loblolly Pine Treated with Imazapyr .....	75
Figure 4.43: Linear Model for Prediction of Field Response of Two-Year-Old Loblolly Pine Treated with Imazapyr using Rapid Seed Screen Percent Control of Seed Tissue .....	76
Figure 4.44: R Square Values for Linear Regressions Predicting Percent Control of Height for Two-Year-Old Loblolly Pine Treated with Triclopyr .....	76

Figure 4.45: Linear Model for Prediction of Field Response of Two-Year-Old Loblolly Pine Treated with Triclopyr using Rapid Seed Screen Percent Control of Seed Germination.....	77
Figure 4.46: R Square Values for Linear Regressions Predicting Field Effect Code for Two-Year-Old Loblolly Pine Treated with Triclopyr .....	78
Figure 4.47: Linear Model for Prediction of Field Response of Two-Year-Old Loblolly Pine Treated with Triclopyr using Rapid Seed Screen Percent Control of Seed Germination.....	78
Figure 4.48: Linearized Dose Response Curve for One Year Old (square) and Two Year Old (triangle) Yellow-poplar Treated with Imazapyr .....	80
Figure 4.49: Linearized Dose Response Curve for One Year Old (square) and Two Year Old (triangle) Yellow-poplar Treated with Triclopyr .....	81
Figure 4.50: Linearized Dose Response Curve for One Year Old (square) and Two Year Old (triangle) Sweetgum Treated with Imazapyr .....	82
Figure 4.51: Linearized Dose Response Curve for One Year Old (square) and Two Year Old (triangle) Sweetgum Treated with Triclopyr .....	83
Figure 4.52: Linearized Dose Response Curve for One Year Old (square) and Two Year Old (triangle) Loblolly Pine Treated with Imazapyr .....	84
Figure 4.53: Linearized Dose Response Curve for One Year Old (square) and Two Year Old (triangle) Loblolly Pine Treated with Triclopyr .....	85
Figure 4.54: Linearized Dose Response Curves for Loblolly Pine, Yellow-poplar, and Sweetgum at One and Two Years Old Treated with Imazapyr .....	86
Figure 4.55: Linearized Dose Response Curves for Loblolly Pine, Yellow-poplar, and Sweetgum at One and Two Years Old Treated with Triclopyr .....	87
Figure 4.56: Profile Plot for Defoliation versus Herbicide Treatment for One Year Old Sweetgum Treated with Imazapyr .....	88
Figure 4.57: Profile Plot for Defoliation versus Herbicide Treatment for One Year Old Sweetgum Treated with Triclopyr .....	89
Figure 4.58: Profile Plot for Defoliation versus Herbicide Treatment for One Year Old Yellow-poplar Treated with Imazapyr .....	90
Figure 4.59: Profile Plot for Defoliation versus Herbicide Treatment for One Year Old Yellow-poplar Treated with Triclopyr .....	91

Appendix Figure 1: Log Model for Predicting Field Response of Two-Year-Old Yellow-poplar  
Treated with Triclopyr using Rapid Greenhouse Screen 2 Leaf Necrosis.....120

Appendix Figure 2: Log Model for Predicting Field Response of Two-Year-Old Yellow-poplar  
Treated with Triclopyr using Rapid Greenhouse Screen 2 Leaf Necrosis.....120

### **List of Abbreviations**

- a.i. = active ingredient
- a.e. = acid equivalent
- ac = acre
- C = Celsius
- F = Fahrenheit
- gpa = gallons per acre
- ha = hectare
- kg = kilogram
- mg = milligram
- R1 = rapid greenhouse screen 1
- RGS1 = rapid greenhouse screen 1
- R2 = rapid greenhouse screen 2
- RGS2 = rapid greenhouse screen 2
- RSS = rapid seed screen
- $\mu\text{E} / \text{m}^2 / \text{sec}$  = micro - Einstein per square meter per second
- WAT = week(s) after treatment
- YAT = year(s) after treatment