# UW – Madison Weed Science Renz Lab

## Does application timing or adding other herbicides influence control of box elder with TerraVue and Vastlan?

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## Objective:

Determine if timing of application or the addition of herbicides to TerraVue and Vastlan improves control of box elder.

## Summary:

Box elder is a common native woody plant in many ecosystems. TerraVue (aminopyralid + florpyrauxifen) and Vastlan (triclopyr) are common herbicides used to control box elder, but control can be difficult. Application timing (spring vs fall) or addition of other herbicides may improve control. An experiment was established to evaluate these factors. in late August of 2024 Vastlan and TerraVue alone or mixed with Method (aminocyclopyrachlor), Cimmaron (metsulfuron) and Arsenal (imazapyr) were applied. The same treatments will be applied in the spring of 2025. Initial results 38 days after treatment (DAT) showed high levels of foliar injury (>85%) but low levels of defoliation (<25%) for all treatments. Evaluation of control in the summer of 2025 will be needed to determine if application timing or addition of herbicides improve control of box elder.

# Herbicide Treatments

| Treatment Number | Treatment | Rate | Application Timing |
|---|---|---|---|
| 1 | Nontreated Control (NTC) | - | - |
| 2 | TerraVue<br>Vastlan<br>LIBERATE | 0.18 oz /gal<br>2% v/v<br>0.5% v/v | A |
| 3 | TerraVue<br>Vastlan<br>MSO | 0.18 oz /gal<br>2% v/v<br>0.1% v/v | A |
| 4 | TerraVue<br>Vastlan<br>Arsenal<br>LIBERATE | 0.18 oz/gal<br>2% v/v<br>0.5% v/v<br>0.5% v/v | A |
| 5 | TerraVue<br>Vastlan<br>CIMARRON<br>LIBERATE | 0.18 oz/gal<br>2% v/v<br>0.04 oz/ gal<br>0.5% v/v | A |
| 6 | TerraVue<br>Vastlan<br>Method 240 SL<br>LIBERATE | 0.18 oz/gal<br>2% v/v<br>0.25% v/v<br>0.5% v/v | A |
| 7 | TerraVue<br>Vastlan<br>LIBERATE | 0.18 oz /gal<br>2% v/v<br>0.5% v/v | B |
| 8 | TerraVue<br>Vastlan<br>MSO | 0.18 oz /gal<br>2% v/v<br>0.1% v/v | B |
| 9 | TerraVue<br>Vastlan<br>Arsenal<br>LIBERATE | 0.18 oz/gal<br>2% v/v<br>0.5% v/v<br>0.5% v/v | B |
| 10 | TerraVue<br>Vastlan<br>CIMARRON<br>LIBERATE | 0.18 oz/gal<br>2% v/v<br>0.04 oz/ gal<br>0.5% v/v | B |
| 11 | TerraVue<br>Vastlan<br>Method 240 SL<br>LIBERATE | 0.18 oz/gal<br>2% v/v<br>0.25% v/v<br>0.5% v/v | B |

## Notes

The second application timing will be done in spring of 2025.

Experiment was done along walking path with mostly undesirable plants (elm spp., burdock, and Canada goldenrod) making up the plant community with minimal native cover (bergamot).

## Herbicide Application

| Application Timing | A | B |
|---|---|---|
| Date | August 31, 2024 1:36 pm | Spring 2025 |
| Equipment | $CO_2$ single nozzle sprayer (50 GPA) | |
| Nozzles & spacing | One TeeJet 8002 nozzle | |
| Regulator PSI | 36 | |

## Application Notes

Each tree received a foliar application as an individual plant treatment approach, applying herbicide to all leaves to the point of runoff.

## Weather Data

| Application Timing | A | B |
|---|---|---|
| Weather Station | KWIMADIS233 | |
| Temperature | 83.6°F | - |
| Wind Speed and Direction | 2.3 mph NNW | - |
| Relative Humidity | 50% | - |
| Cloud Cover | 5% | - |
| Previous Rain Event Within 48 Hours | 0.84 inches – August 30, 2024 3:00 am | - |
| When $\geq$ 0.25 inches of precipitation occurred after treatment | 0.30 Inches – September 20, 2024 1:30 am | - |

## Research Plot Information

| | |
|---|---|
| **Plot Dimensions** | Single Tree |
| **Design** | Randomized Complete Block, 6 blocks |
| **Soil Type** | Sable silty clay loam |
| **Soil Characteristics** | 29 % clay, 1.96 % organic matter, 7.0 pH, 5 % slope |

## Plants Present at Application – Developmental Stage

| Species | Average Height (in) | Phenological Stage |
|---|---|---|
| Box Elder (*Acer negundo*) | 5 feet | Vegetative (leafed out) |

Pictures above show the same box elder plant treated with TerraVue+Vastlan. The picture on the left shows one day before application and the picture on the right is 38 days after application.
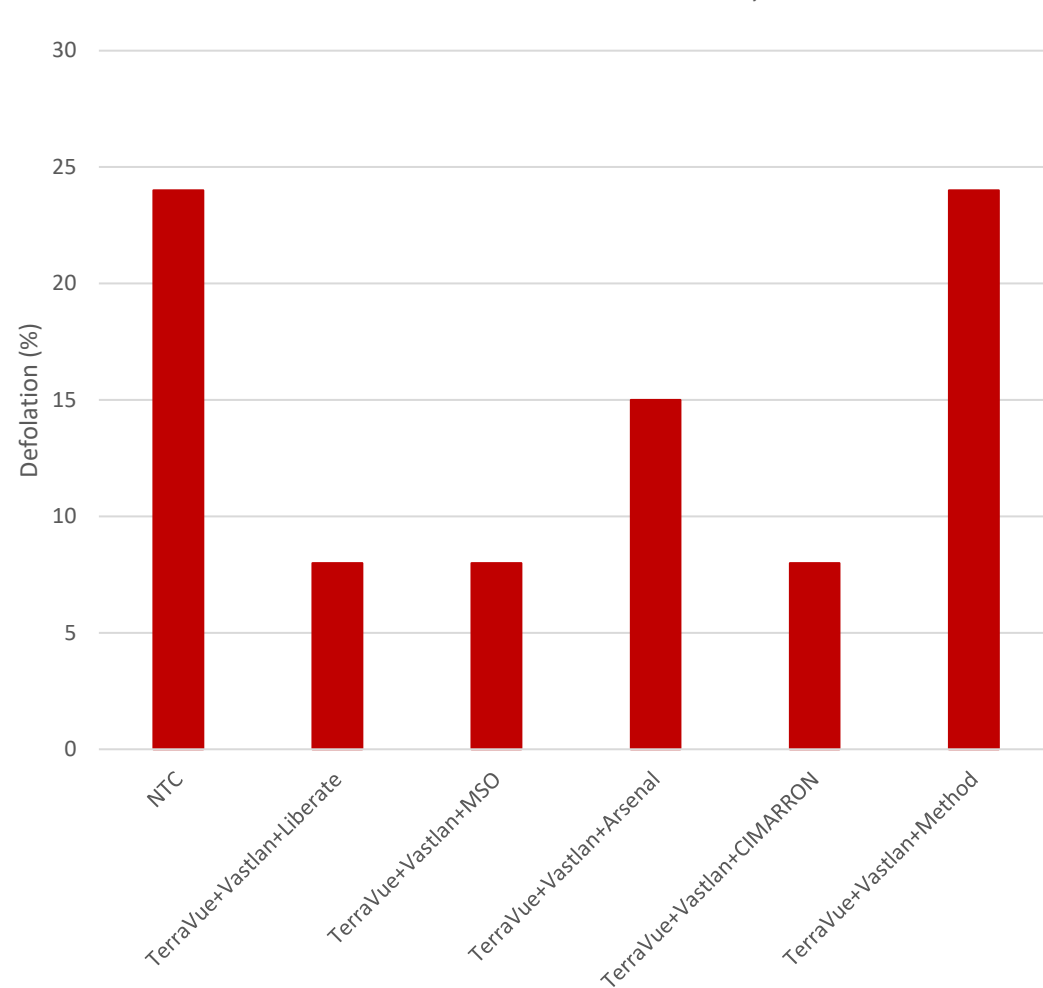
# Index of Ratings and Results

## Graphs only show data from application timing A.



Leaf Injury 38 DAT - October 8, 2024
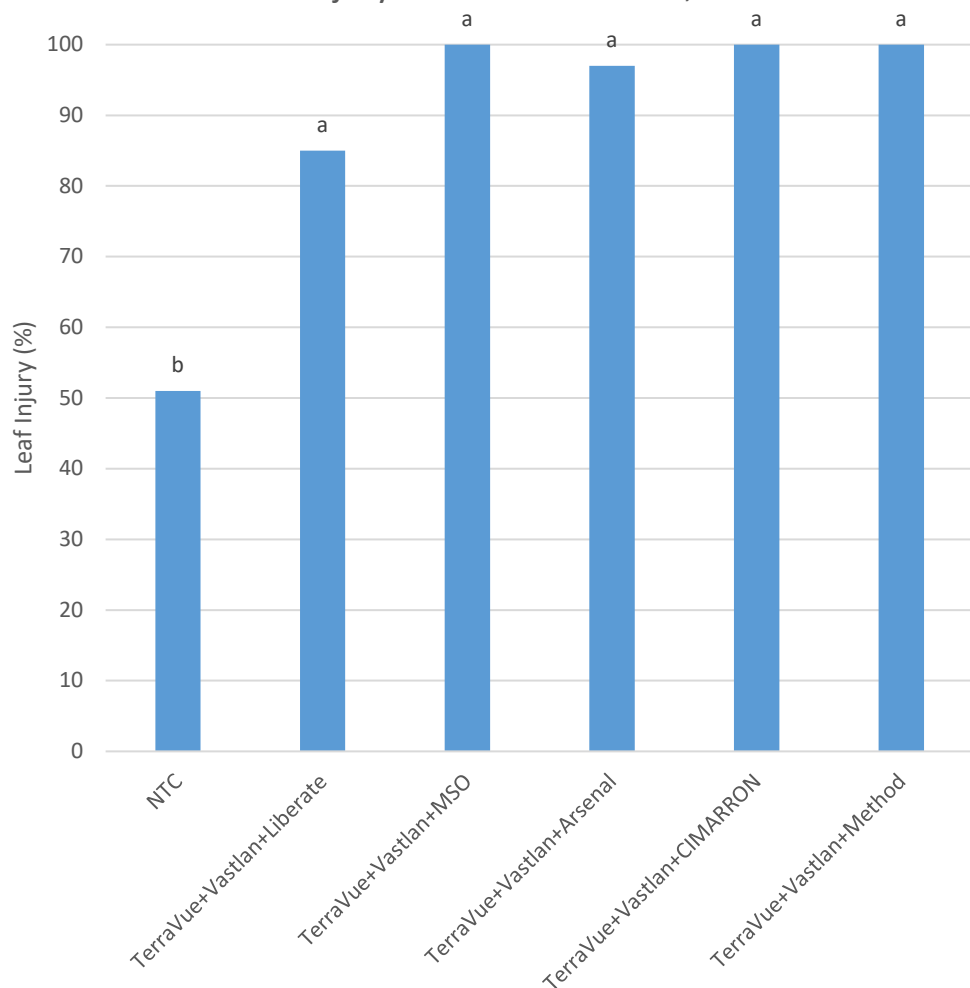
Defoliation 38 DAT - October 8, 2024

Bars labeled with the same letter do not significantly differ (P=0.05, LSD)

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## Results:

| Pre-treatment rating – August 30, 2024 | | | | | |
|---|---|---|---|---|---|
| Trt. No. | Treatment | Rate | Application Timing | Box Elder Height Category (1-3)[1] | Box Elder Stem Type Category (1-2)[2] |
| 1 | NTC | - | - | 1.7 - | 1.7 - |
| 2 | TerraVue<br>Vastlan<br>LIBERATE | 0.18 oz /gal<br>2% v/v<br>0.5% v/v | A | 2.3 - | 2 - |
| 3 | TerraVue<br>Vastlan<br>MSO | 0.18 oz /gal<br>2% v/v<br>0.1% v/v | A | 2.8 - | 2 - |
| 4 | TerraVue<br>Vastlan<br>Arsenal<br>LIBERATE | 0.18 oz/gal<br>2% v/v<br>0.5% v/v<br>0.5% v/v | A | 2 - | 1.7 - |
| 5 | TerraVue<br>Vastlan<br>CIMARRON<br>LIBERATE | 0.18 oz/gal<br>2% v/v<br>0.04 oz/ gal<br>0.5% v/v | A | 2.7 - | 2 - |
| 6 | TerraVue<br>Vastlan<br>Method 240 SL<br>LIBERATE | 0.18 oz/gal<br>2% v/v<br>0.25% v/v<br>0.5% v/v | A | 2.2 - | 1.8 - |
| Statistics [3] | | | | | |
| Least Significant Difference (LSD) P=.05 | | | | 0.70 | 0.40 |
| Standard Deviation | | | | 0.61 | 0.34 |
| Coefficient of Variation (CV) | | | | 26.04 | 18.76 |
| Treatment Prob(F) | | | | 0.0678 | 0.1458 |

| Pre-treatment rating – August 30, 2024 Continuted | | | | | |
|---|---|---|---|---|---|
| Trt. No. | Treatment | Rate | Application Timing | Box Elder Height Category (1-3)[4] | Box Elder Stem Type Category (1-2)[5] |
| 7 | TerraVue Vastlan LIBERATE | 0.18 oz /gal 2% v/v 0.5% v/v | B | 2.5 - | 1.8 - |
| 8 | TerraVue Vastlan MSO | 0.18 oz /gal 2% v/v 0.1% v/v | B | 2.5 - | 2 - |
| 9 | TerraVue Vastlan Arsenal LIBERATE | 0.18 oz/gal 2% v/v 0.5% v/v 0.5% v/v | B | 2.2 - | 1.5 - |
| 10 | TerraVue Vastlan CIMARRON LIBERATE | 0.18 oz/gal 2% v/v 0.04 oz/ gal 0.5% v/v | B | 2.7 - | 1.7 - |
| 11 | TerraVue Vastlan Method 240 SL LIBERATE | 0.18 oz/gal 2% v/v 0.25% v/v 0.5% v/v | B | 2.2 - | 1.8 - |
| Statistics [6] | | | | | |
| Least Significant Difference (LSD) P=.05 | | | | 0.70 | 0.40 |
| Standard Deviation | | | | 0.61 | 0.34 |
| Coefficient of Variation (CV) | | | | 26.04 | 18.76 |
| Treatment Prob(F) | | | | 0.0678 | 0.1458 |

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[4] For box elder heights a scale of 1-3 was used, with 1 being for plants 1-3 ft tall, 2 being 3-6 ft and 3 being taller than 6 ft

[5] Box elder was split into two stem types: single and multi. A scale of 1-2 was used with 1 being for single stem and 2 for multi-stem

[6] All statistical analyses were conducted in ARM software and assumptions of ANOVA were not evaluated.

| 38 Day after treatment (DAT) – October 8, 2024 | | | | | |
|---|---|---|---|---|---|
| Trt. No. | Treatment | Rate | Application Timing | Visual leaf injury (%) | Defoliation (%) |
| 1 | NTC | - | - | 51 b | 24 - |
| 2 | TerraVue Vastlan LIBERATE | 0.18 oz /gal 2% v/v 0.5% v/v | A | 85 a | 8 - |
| 3 | TerraVue Vastlan MSO | 0.18 oz /gal 2% v/v 0.1% v/v | A | 100 a | 8 - |
| 4 | TerraVue Vastlan Arsenal LIBERATE | 0.18 oz/gal 2% v/v 0.5% v/v 0.5% v/v | A | 97 a | 15 - |
| 5 | TerraVue Vastlan CIMARRON LIBERATE | 0.18 oz/gal 2% v/v 0.04 oz/ gal 0.5% v/v | A | 100 a | 8 - |
| 6 | TerraVue Vastlan Method 240 SL LIBERATE | 0.18 oz/gal 2% v/v 0.25% v/v 0.5% v/v | A | 100 a | 24 - |
| Statistics [7] | | | | | |
| Least Significant Difference (LSD) P=.05 | | | | 27.93 | 21.76 |
| Standard Deviation | | | | 23.49 | 18.30 |
| Coefficient of Variation (CV) | | | | 26.46 | 126.67 |
| Treatment Prob(F) | | | | 0.0072 | 0.3569 |

[7] All statistical analyses were conducted in ARM software and assumptions of ANOVA were not evaluated.