Renz Weed Science
COLLEGE OF AGRICULTURAL & LIFE SCIENCES
UNIVERSITY OF WISCONSIN-MADISON

Extension
UNIVERSITY OF WISCONSIN-MADISON

UW – Madison Weed Science Renz Lab

Impact of herbicide applications to recently planted desirable trees

Dr. Mark Renz, Professor and Extension Weed Specialist

mrenz@wisc.edu – 357 Moore Hall, 1575 Linden Drive, Madison, WI, 53706

Travis Wilson, Research Specialist

tjwilson9@wisc.edu – 236 Moore Hall, 1575 Linden Drive, Madison, WI, 53706

Objective:

Determine which herbicide provides the best weed control around desirable trees recently planted and if residual herbicides injure establishing trees.

Summary:

Weed control remained visible 70 days after application. All treatments displayed similar amounts of herbaceous vegetation control ranging from 64-74%. We expected to see higher control with the treatments containing Oust and Esplanade as they both have significant residual activity and prevent emergences of annual species. The drought likely impacted this result as no rainfall occurred for 28 days after application. Herbicides were left on the surface and likely degraded substantially during this timeframe reducing effectiveness.

Despite the drought and lack of rainfall all plants were displaying injury by 70 days after application. The non treated controls had injury from 5-35% depending on species, highlighting the impact of drought conditions on the new tree saplings. Additionally heavy deer browsing occurred, adding additional injury to these trees. Despite these issues, some species still showed higher injury from herbicide applications than others. Black walnut was injured 35% with Oust+Roundup, 13-18% when Roundup alone or mixed with Esplanade was used, which were both higher than the non treated trees. Black cherry appeared to be more sensitive to the Esplanade as the 7 fl oz/a treatment was injured the most (46%) while other treatments were similar to the non treated control (12-23%). Both quaking aspen and hackberry saw no differences among treatments when compared to the nontreated control.

While the drought and deer browsing severely impacted results, this information suggests that injury from high rates of Esplanade and Oust can injure tree species planted that spring, but the response is species specific. Glyphosate alone or mixed with low rates of Esplanade can reduce but not eliminate potential injury.

Notes

Drought conditions impacted the area and may be influencing some results.
Evidence of deer browse on young trees was seen throughout the trial and may be impacting results.

Herbicide Treatments

Treatment Number	Treatment	Rate
1	Nontreated Control (NTC)	-
2	Roundup	43 fl oz/a
3	Esplanade Roundup	7 fl oz/a 43 fl oz/a
4	Esplanade Roundup	5 fl oz/a 43 fl oz/a
5	Oust Roundup	1 fl oz/a 43 fl oz/a

Tree Species

Species Number	Scientific Name	Common Name
1	*Juglans nigra*	Black Walnut
2	*Prunus serotina*	Black Cherry
3	*Populus tremuloides*	Quaking Aspen
4	*Celtis occidentalis*	Hackberry

Planting Notes

100 trees saplings were hand planted for each species on April 22nd and 23rd, in rows of unmixed species. Not all saplings survived to the time of application (black walnut, black cherry and quaking aspen had 98 individuals, while hackberry had 86).

Herbicide Application	
Date	May 22, 2023, 3:30 pm – 6:30 pm
Equipment	CO_2 pressurized single nozzle sprayer (20 GPA)
Nozzles & spacing	1 nozzle, TeeJet VS11002
Regulator PSI	25
Application	Herbicide was directed at the base of the tree and surrounding vegetation in a 1 m^2 area

Weather Data	
Weather Station	KWICASHT12
Temperature	77.4°F
Wind Speed and Direction	1.5 mph S – 4.1 mph S
Relative Humidity	30%
Cloud Cover	55%
Previous Rain Event Within 48 Hours	None
When $\geq$ 0.25 inches of precipitation occurred after treatment	June 19, 2023, 12:31 am – 1.2 inches

Research Plot Information	
Plot Dimensions	1 m^2 area around individual tree
Design	Randomized Complete Block, blocks
Soil Type	Valton silk loam
Soil Characteristics	44.6% clay, 0.55% organic matter, 5.3 pH, 16% slope

Plants Present at Application – Developmental Stage

Species	Phenological Stage
Black Walnut (*Juglans nigra*)	Leaves forming
Black Cherry (*Prunus serotina*)	Leafed out
Quaking Aspen (Populus tremuloides)	Leafed out
Hackberry (*Celtis occidentalis*)	Leaves forming

Index of Ratings and Results

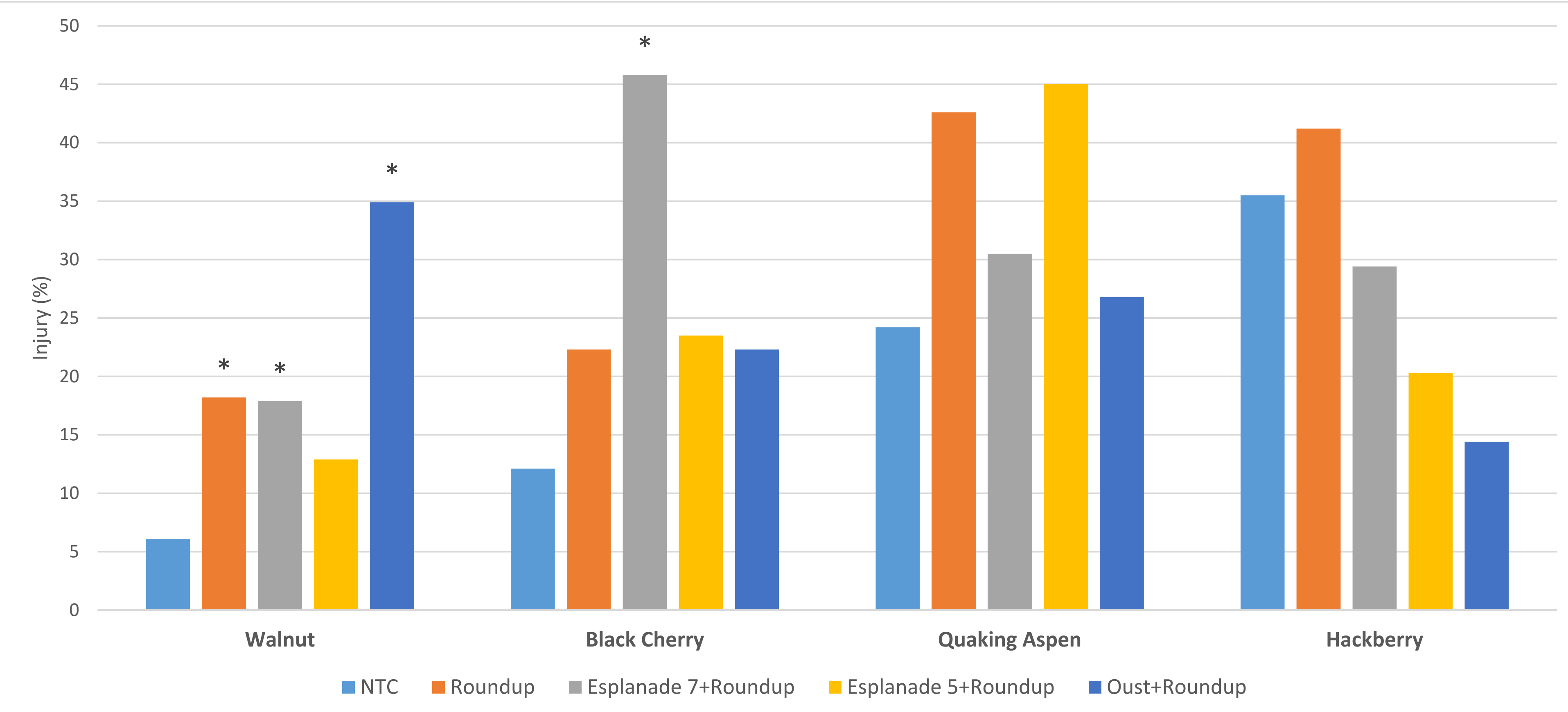
Picture on the top left shows an example of a line of black walnut trees.

Top right shows a young walnut tree circled in red, prior to herbicide application.

Bottom right shows an aspen stem 70 days after application that has been completely defoliated, likely by herbivore browse.

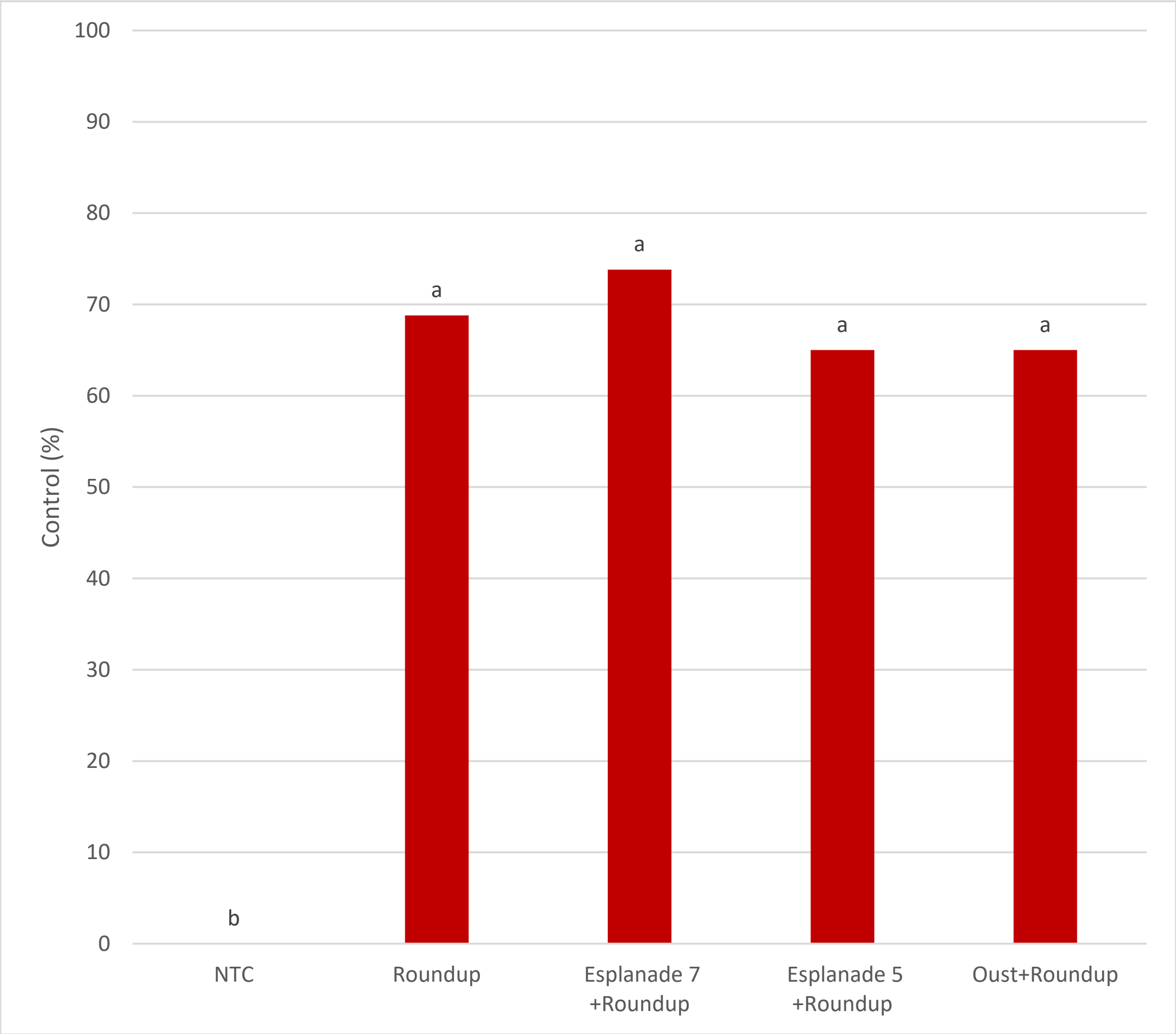
Results:

Tree Injuries by species 70 DAT – July 31, 2023



* Indicates differences from corresponding control (P<0.05)

Weed Control 70 DAT – July 31, 2023



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

70 Days After Treatment (DAT) – July 31, 2023							
Trt. No.	**Treatment**	**Rate**	**Walnut Injury (%)**	**Black Cherry Injury (%)**	**Quaking Aspen Injury (%)**	**Hackberry Injury (%)**	**Weed Control (%)**
1	NTC	-	6.1 c	12.1 b	24.2 -	35.5 -	0 b
2	Roundup	43 fl oz/a	18.2 b	22.3 b	42.6 -	41.2 -	68.8 a
3	Esplanade Roundup	7 fl oz/a 43 fl oz/a	17.9 b	45.8 a	30.5 -	29.4 -	73.8 a
4	Esplanade Roundup	5 fl oz/a 43 fl oz/a	12.9 b	23.5 b	45 -	20.3 -	65 a
5	Oust Roundup	1 fl oz/a 43 fl oz/a	34.9 a	22.3 b	26.8 -	14.1 -	65 a
Statistics[1]							
Least Significant Difference (LSD) P=.05			10.50	13.83	20.41	22.70	13.58
Standard Deviation			16.24	21.95	31.56	33.12	8.82
Coefficient of Variation (CV)			90.26	87.22	93.26	117.85	16.17
Treatment Prob(F)			0.0001	0.0002	0.1615	0.1254	0.0001

Note: Means followed by same letter or symbol do not significantly differ (P=.05, LSD).

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