

**Journal:** Ecosphere

**Title:** Dicamba drift impacts plant-herbivore interactions at the agro-ecological interface

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Appendix S1

Herbivory Response	Chewing Damage (2018)		Whitefly Abundance (2018)		Whitefly Abundance (2019)	
	F	p	F	p	F	p
Fixed Effects:						
Treatment (df = 2)	0.906	0.410	<b>12.014</b>	<b>&lt; 0.001</b>	<b>5.300</b>	<b>0.006</b>
Block 2018 (df = 1) 2019 (df = 2)	1.236	0.270	1.656	0.201	1.356	0.261
Treatment X Block 2018 (df = 2) 2019 (df = 4)	0.109	0.897	0.363	0.697	1.076	0.370
Random Effects:	$\chi^2$	p	$\chi^2$	p	$\chi^2$	p
Population (df = 1)					0.000	1.000
Maternal Line (df = 1)	0.498	0.480	0.000	1.000	0.535	0.464
Maternal Line X Treatment (df = 1)	0.000	1.000	0.000	1.000	0.000	1.000

**Table S1.** Influence of herbicide treatment on chewing damage for 2018 and whitefly abundance for both years, analyzed using *F*-statistics values showing effects of treatment, block, treatment by block interactions, and likelihood ratio test statistics ( $\chi^2$ ) showing maternal line variation on herbivory measurements. In 2019 maternal lines are nested within populations. Significant values are expressed in boldface.

2018								
Trait	Height		Leaf Count		Leaf Width		Flower Count	
Fixed Effects:	F	P	F	P	F	P	F	P
Treatment (df = 2)	<b>220.555</b>	<b>&lt; 0.001</b>	<b>28.012</b>	<b>&lt; 0.001</b>	<b>8.246</b>	<b>0.001</b>	<b>7.284</b>	<b>0.001</b>
Block (df = 1)	0.278	0.599	<b>7.627</b>	<b>0.007</b>	<b>6.151</b>	<b>0.014</b>	<b>5.421</b>	<b>0.022</b>
Treatment X Block (df = 2)	<b>60.804</b>	<b>&lt; 0.001</b>	<b>15.714</b>	<b>&lt; 0.001</b>	<b>3.554</b>	<b>0.032</b>	<b>4.287</b>	<b>0.016</b>
Random Effects:	$\chi^2$	P	$\chi^2$	P	$\chi^2$	P	$\chi^2$	P
Maternal Line (df = 1)	0.000	1.000	0.000	1.000	0.000	1.000	0.000	1.000
Maternal Line X Treatment (df = 1)	0.000	1.000	1.986	0.159	0.000	1.000	0.054	0.816

**Table S2.** 2018 influence of herbicide treatment on velvetleaf traits, analyzed using F-statistics values showing the effects of treatment, block, treatment by block interactions, and likelihood ratio test statistics ( $\chi^2$ ) maternal line and maternal line by treatment interactions on variation of plant phenotypes. Significant values are expressed in boldface.

**2019**

Trait	Height		Leaf Count		Leaf Width		Flower Count	
	F	P	F	P	F	P	F	P
Fixed Effects:								
Treatment (df = 2)	2.844	0.061	<b>5.113</b>	<b>0.007</b>	0.791	0.458	<b>6.916</b>	<b>0.001</b>
Block (df = 2)	0.144	0.866	0.700	0.498	2.398	0.096	1.313	0.271
Treatment X Block (df = 4)	0.551	0.699	0.506	1.697	1.763	0.188	0.470	0.758
Random Effects:	$\chi^2$	P	$\chi^2$	P	$\chi^2$	P	$\chi^2$	P
Population (df = 1)	0.000	1.000	0.632	0.427	<b>5.112</b>	<b>0.024</b>	0.397	0.528
Maternal Line (df = 1)	0.000	1.000	0.000	1.000	0.000	1.000	0.166	0.684
Maternal Line X Treatment (df = 1)	0.000	1.000	0.000	1.000	0.000	1.000	0.000	0.986

**Table S3.** Influence of herbicide treatment on velvetleaf traits, analyzed using F-statistics values showing the effects of treatment, block, treatment by block interactions, and likelihood ratio test statistics ( $\chi^2$ ) showing population, maternal line, population by treatment interactions, and maternal line by treatment interactions on variation of plant phenotypes. Maternal lines were nested within populations. Significant values are expressed in boldface.

2018								
Trait	$\beta$	SE	P	$\gamma$	SE	P	r	P
Whitefly Resistance	0.081	0.077	0.299	-0.191	0.055	0.087	0.060	0.622
Herbicide Resistance	-0.191	0.330	0.565	3.464	1.056	0.107	-0.123	0.174
Relative Growth	<b>1.715</b>	<b>0.218</b>	<b>&lt; 0.001</b>	<b>3.912</b>	<b>0.558</b>	<b>&lt; 0.001</b>	<b>0.750</b>	<b>&lt; 0.001</b>
Whitefly Resistance X Herbicide Resistance				0.712	0.334	0.291		
Whitefly Resistance X Relative Growth				0.816	0.222	0.072		
Herbicide Resistance X Relative Growth				3.364	1.109	0.136		

**Table S4.** 2018 Selection analysis showing direct selection on focal traits: whitefly resistance, herbicide resistance, and relative growth rate. Linear ( $\beta$ ) ( $R^2 = 0.510$ ;  $p < 0.001$ ) and quadratic ( $\gamma$ ) ( $R^2 = 0.609$ ;  $p < 0.001$ ) selection gradients with associated standard errors (SE) and  $P$ -values ( $P$ ). The (r) column represents correlation coefficients between trait and fitness, estimated as Pearson product-moment correlations. Significant values are expressed in boldface.

2019								
Trait	$\beta$	SE	P	Y	SE	P	r	P
Whitefly Resistance	0.002	0.190	0.990	0.232	0.230	0.526	-1.56	0.098
Herbicide Resistance	0.052	0.147	0.722	-0.133	0.116	0.759	-0.004	0.955
Relative Growth	<b>2.169</b>	<b>0.245</b>	<b>&lt; 0.001</b>	0.774	0.353	0.363	<b>0.694</b>	<b>&lt; 0.001</b>
Whitefly Resistance X Herbicide Resistance				0.285	0.190	0.455		
Whitefly Resistance X Relative Growth				-0.818	0.390	0.297		
Herbicide Resistance X Relative Growth				1.328	0.373	0.078		

**Table S5.** 2019 Selection analysis showing direct selection on focal traits: whitefly resistance, herbicide resistance, and relative growth rate. Linear ( $\beta$ ) ( $R^2 = 0.453$ ;  $p < 0.001$ ) and quadratic ( $\gamma$ ) ( $R^2 = 0.466$ ;  $p < 0.001$ ) selection gradients, and total selection with associated standard errors (SE) and  $P$ -values ( $P$ ). The (r) column represents correlation coefficients between trait and fitness, estimated as Pearson product-moment correlations. Significant values are expressed in boldface.

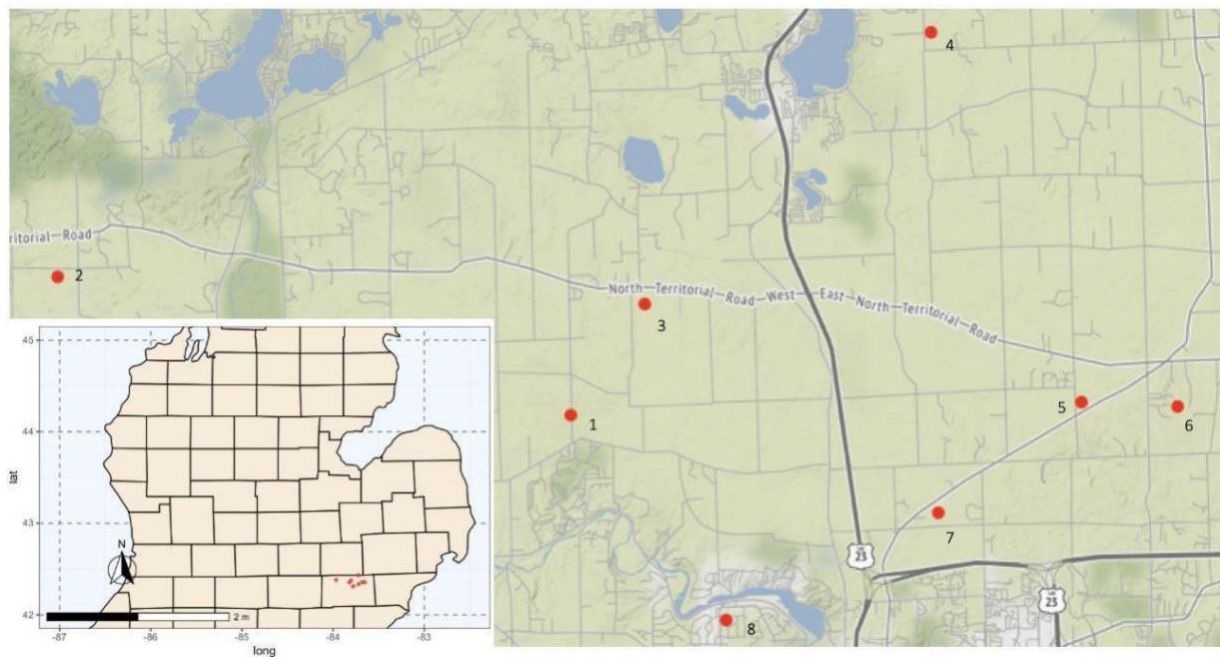
Trait	Relative Growth Rate		Herbicide Damage	
	F	P	F	P
Fixed Effects:				
Treatment (df = 2)	<b>2.431</b>	<b>0.10</b>	<b>76.464</b>	<b>&lt; 0.001</b>
Block 2018 (df = 1)	7.971	0.005	107.667	1.000
Treatment X Block 2018 (df = 2)	<b>5.239</b>	<b>0.007</b>	100.918	0.340
Random Effects:	$\chi^2$	P	$\chi^2$	P
Maternal Line (df = 1)	0.000	1.000	0.000	1.000
Maternal Line X Treatment (df = 1)	0.000	1.000	0.000	1.000

**Table S6.** 2018 Influence of treatment and block on relative growth, and herbicide damage, analyzed using F-statistics values showing the effects of treatment, block, treatment by block interactions, and likelihood ratio test statistics ( $\chi^2$ ) showing, maternal line, and maternal line by treatment interactions on variation of plant phenotypes. Significant values are expressed in boldface.

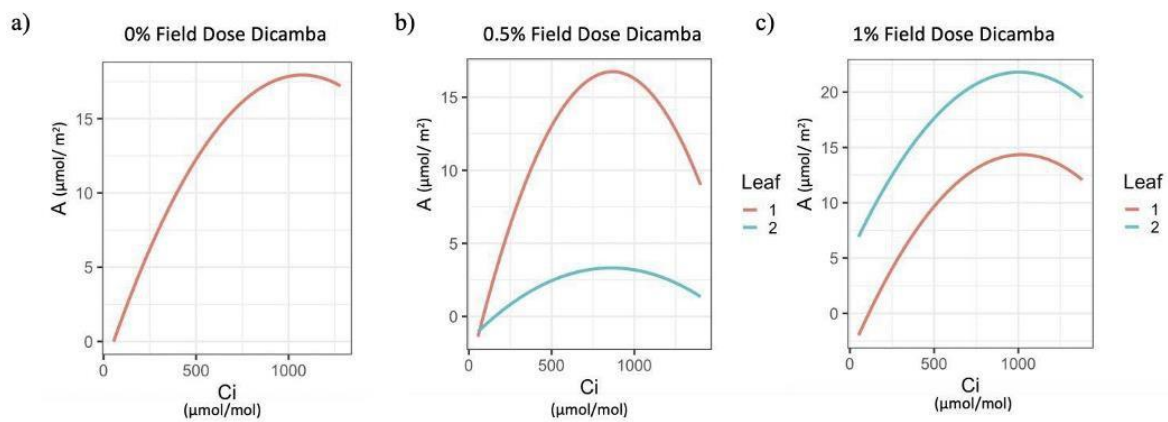
Trait	Relative Growth Rate		Herbicide Damage	
	F	P	F	P
Fixed Effects:				
Treatment (df = 2)	0.031	0.969	<b>46.730</b>	<b>&lt; 0.001</b>
Block (df = 2)	0.323	0.724	0.006	0.994
Treatment X Block (df = 4)	0.259	0.904	<b>5.982</b>	<b>&lt; 0.001</b>
Random Effects:				
Population (df = 1)	$\chi^2$	P	$\chi^2$	P
Population (df = 1)	0.000	1.000	0.190	0.663
Population X Treatment (df = 1)	0.479	0.488	2.300	0.129
Maternal Line (df = 1)	0.000	1.000	0.000	1.000
Maternal Line X Treatment (df = 1)	0.000	1.000	0.000	1.000

**Table S7.** 2019 Influence of treatment and block on relative growth, and herbicide damage, analyzed using F-statistics values showing the effects of treatment, block, treatment by block interactions, and likelihood ratio test statistics ( $\chi^2$ ) showing population, maternal line, population by treatment interactions, and maternal line by treatment interactions on variation of plant phenotypes. Significant values are expressed in boldface.





**Figure S1.** Locations of velvetleaf populations sampled and used for this study. In 2018, the field experiment was conducted with only population one, while in 2019 the sample size was increased to all eight populations. Populations 3, 4, 6, 7, and 8 were used in the 2021 greenhouse experiment.



**Figure S2.** Photosynthetic carbon dioxide response curves by drift environment. a)  $A$ - $C_i$  curves measured on leaves grown without drift exposure b) Comparison of  $A$ - $C_i$  curves measured on leaves that developed before drift exposure (Leaf 1) and after drift exposure (Leaf 2) at 0.5% field dose. c) and at 1% field dose.