

SUPPLEMENTARY DATA

ERF-VII transcription factors induce ethanol fermentation in response to amino acid biosynthesis-inhibiting herbicides

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Table S1. Expression stability of the reference genes calculated by geNorm and BestKeeper softwares.

Gene	Accession Number	geNorm	BestKeeper	
		M-value	CV±SD	r (p-value)
<i>Actin2</i>	At3g18780	0.052	2.36 ± 0.43	0.815 (0.001)
<i>B-Tubuline8</i>	At5g23860	0.050	1.78 ± 0.45	0.652 (0.001)
<i>PP2AA3</i>	At1g13320	0.051	1.58 ± 0.38	0.393 (0.058)

Table S2. Gene specific primers used in the qRT-PCRs.

Accession Number	Gene name	Forward primer (5' – 3')	Reverse primer (5' – 3')
At4g33070	<i>PYRUVATE DECARBOXYLASE 1 (PDC1)</i>	cacagaatcttcaatgttcttacc	ccatgataaagcgtacatggaa
At5g54960	<i>PYRUVATE DECARBOXYLASE 2 (PDC2)</i>	cccaaatccgcagtagagt	cctcaaggggacacacattt
At5g01320	<i>PYRUVATE DECARBOXYLASE 4 (PDC4)</i>	tgtgactcaagcatctctcgtt	acaccatcaatggtaatggtaca
At1g77120	<i>ALCOHOL DEHYDROGENASE 1 (ADH1)</i>	tattcgatgcaaagctgctgtg	cgaactctgtgtttctcggt
At2g16060	<i>HEMOGLOBIN1 (HB1)</i>	tttgaggtggccaagtatgca	tgatcataagcctgaccccaa
At4g17260	<i>LACTATE DEHYDROGENASE (LDH)</i>	tccaccgggttactgttcttgc	aagcaaagccggaagactgagg
At1g43800	<i>STEAROYL-ACYL CARRIER PROTEIN Δ9-DESATURASE6 (SAD6)</i>	accaatgttgcaaccgcttc	ttccctcagctcacgaacctg
At5g49450	<i>BASIC LEUCINE-ZIPPER 1 (BZIP1)</i>	tcagcgttaaactcgtcgtagcaa	aacgcggtcttagatcggagaag
At3g62420	<i>BASIC LEUCINE-ZIPPER 53 (BZIP53)</i>	tggggtcgttgaatgcaaacia	ccgtggcgtacctcggatcattat
At3g59410	<i>GENERAL CONTROL NON-REPRESSIBLE 2 (GCN2)</i>	agcatagacgaaaggttcagagc	tcagatgactgaggacgcaagg
At3g18780	<i>ACTIN 2 (ACT2)</i>	tcttcctctttcttccaagc	accattgtcacacacgattggtg
At5g23860	<i>B-TUBULINE8 (B-TUB8)</i>	agggtgctgagcttatcgattccg	agtgcacacttgaatccttgc
At1g13320	<i>PROTEIN PHOSPHATASE 2A SUBUNIT A3 (PP2AA3)</i>	ttggtgctcagatgaggagag	ttcaccagctgaaagtcgcttag

Table S3. Results of the two-way analysis of variance. Significance level $p < 0.05$ (* = $p < 0.05$; ns = not significant).

FIGURE	Parameter	Genotype	Herbicide treatment	Interaction (Genotype x Herbicide treatment)
Fig. 3	Chlorophyll content	ns	*	ns
	MDA content	ns	*	*
Fig. 4	PDC activity	*	*	ns
	ADH activity	*	*	*
Fig. 5	PDC protein level	*	*	ns
	ADH protein level	*	*	ns
Fig. 6	<i>PDC1</i> relative mRNA level	*	*	ns
	<i>PDC2</i> relative mRNA level	ns	*	ns
	<i>PDC4</i> relative mRNA level	ns	*	*
	<i>ADH1</i> relative mRNA level	*	*	ns
Fig. 7	<i>HB1</i> relative mRNA level	*	*	ns
	<i>LDH</i> relative mRNA level	*	*	ns
	<i>SAD6</i> relative mRNA level	*	*	*
	<i>bZIP1</i> relative mRNA level	*	*	*
	<i>bZIP53</i> relative mRNA level	ns	*	ns
	<i>GCN2</i> relative mRNA level	*	*	*
Fig. 9B	Root length	ns	*	*
Supp. Fig. 3B	Root length	ns	*	*

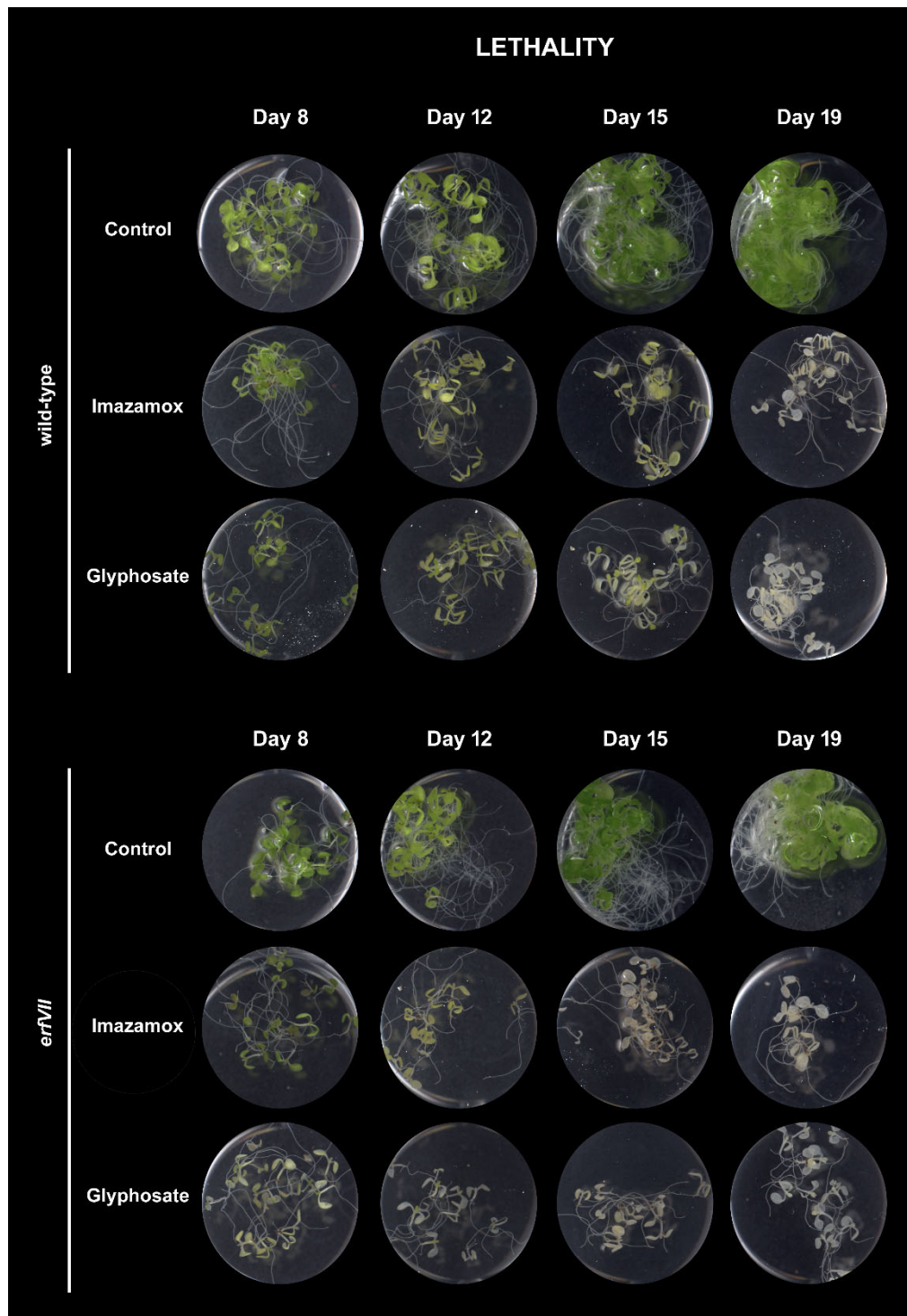


Fig. S1. Survival of Arabidopsis seedlings to herbicide application. Arabidopsis wild-type and *erfVII* mutant seedlings grown in 6-well plates were untreated or treated with imazamox (1.5 mg L⁻¹) or glyphosate (50 mg L⁻¹). Pictures were taken 8 days, 12 days, 15 days, and 19 days after treatment application.

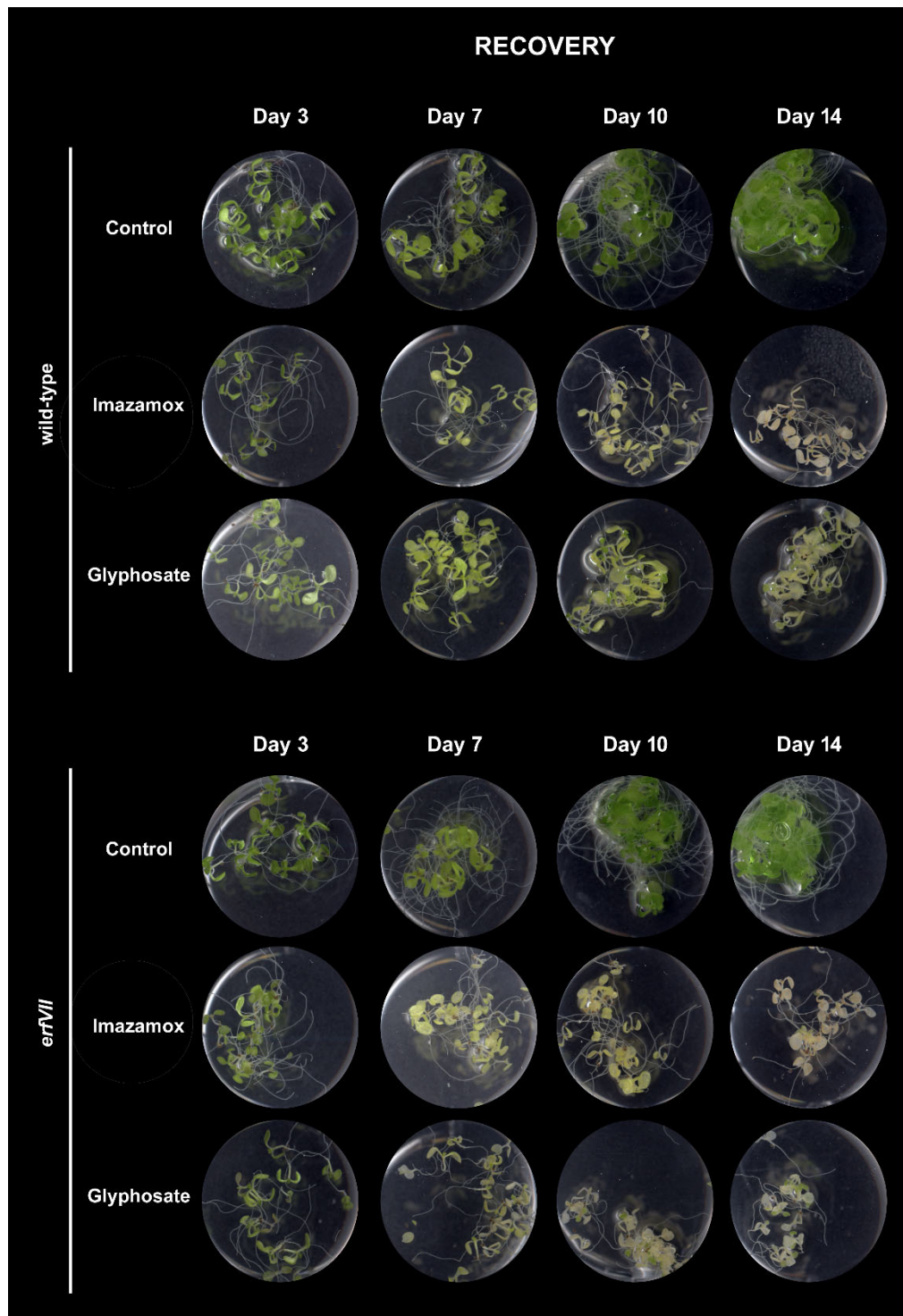


Fig. S2. Recovery of Arabidopsis seedlings from herbicide application. Arabidopsis wild-type and *erfVII* mutant seedlings grown in 6-well plates were untreated or treated with imazamox (1.5 mg L⁻¹) or glyphosate (50 mg L⁻¹). Five-days after treatment application, seedlings were transferred to herbicide-free medium to evaluate recovery. Photographs were taken after 3 days, 7 days, 10 days, and 14 days of recovery.

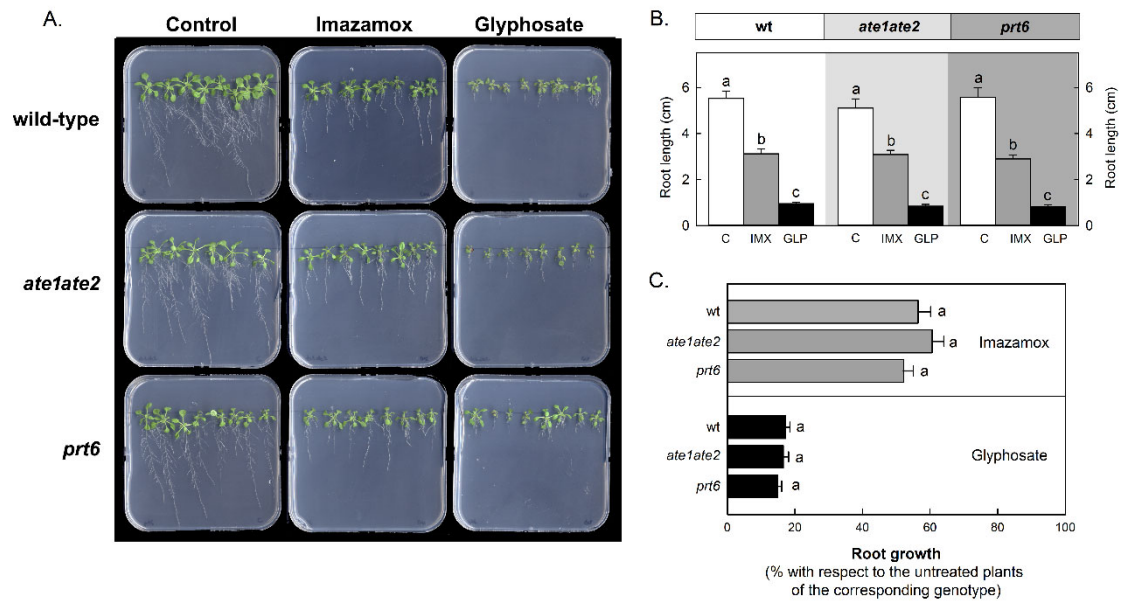


Fig. S3. Herbicide toxicity in seedlings with enhanced ethanol fermentation pathway.

As a marker of sensitivity to the herbicide, root length of seedlings was monitored in wild-type *Arabidopsis* Col-0 and in *ate1ate2* and *prt6* mutants, untreated (control) or treated with imazamox (0.005mg L^{-1}) or glyphosate (0.25 mg L^{-1}) A. Photographs shown are representative examples of the treatments. B. Root length was measured in seedlings of wild-type (wt) *Arabidopsis* Col-0, *ate1ate2* and *prt6* mutant plants, untreated (C) or treated with IMX or GLP. C. Comparison of the inhibitory effect of each herbicide with respect to the untreated seedlings of each genotype. Values represent the mean \pm SE ($n=24$, biological replicates). Different letters refer to statistically significant differences between treatments (two-way ANOVA (B) or one-way ANOVA (C) followed by the Bonferroni posthoc test ($p < 0.05$)). C, control; GLP, glyphosate; IMX, imazamox.