

Table S1. Three-way ANOVA results for effect of the species (*Arabidopsis thaliana*, *Silene vulgaris* subsp. *humilis*, *Viola x wittrockiana*, *V. tricolor*, Sychta et al 2018 [11], and *V. philippica*).

	d.f.	MS	F-value	P-value
Zinc treatment				
Species	4	76730	142.38	0.00000
Time	2	24133	44.78	0.00000
Concentration	3	35138	65.20	0.00000
Species*Time	8	10429	19.35	0.00000
Species*Concentration	12	37397	69.39	0.00000
Time*Concentration	6	5595	10.38	0.00000
Species*Time*Concentration	24	9612	17.84	0.00000
Error	120	539		
Lead treatment				
Species	4	30281	370.23	0.00000
Time	2	121	1.47	0.232
Concentration	3	16986	207.68	0.00000
Species*Time	8	859	10.50	0.00000
Species*Concentration	12	2542	31.08	0.00000
Time*Concentration	6	616	7.52	0.00000
Species*Time*Concentration	24	348	4.26	0.00000
Error	120	82		

Concentration (0 μ M, 200 μ M, 500 μ M, 1000 μ M) and time of treatment (24 h, 48 h, 72 h) zinc and lead on cell viability. d.f., degrees of freedom; MS, mean square; F-value, value of F distribution; P-value, probability value.

Table S2. Tukey's HSD test results for effect of species (*Arabidopsis thaliana*, *Silene vulgaris* subsp. *humilis*, *Viola x wittrockiana*, *V. tricolor*, Sychta et al 2018 [11], and *V. philippica*) on cell viability for zinc in each concentration and time combination.

Concentration [μ M]	Time [h]	Species				
		<i>A. thaliana</i>	<i>S. vulgaris</i> subsp. <i>humilis</i>	<i>V. x wittrockiana</i>	<i>V. tricolor</i>	<i>V. philippica</i>
0	24	104.1 ^{BC}	73.0 ^A	116.0 ^{CD}	88.5 ^{AB}	140.7 ^D
	48	106.6 ^B	61.8 ^A	154.1 ^C	90.3 ^B	144.2 ^C
	72	124.9 ^B	77.4 ^A	153.9 ^C	74.8 ^A	137.3 ^B
200	24	168.0 ^{BC}	57.6 ^A	198.4 ^C	67.6 ^A	125.2 ^B
	48	126.4 ^B	50.8 ^A	230.1 ^C	51.5 ^A	126.8 ^B
	72	446.8 ^D	62.1 ^A	259.7 ^C	47.2 ^A	143.1 ^B
500	24	57.7 ^A	72.4 ^A	124.9 ^B	55.2 ^A	126.1 ^B
	48	34.3 ^A	60.4 ^A	146.9 ^B	45.6 ^A	293.5 ^C
	72	24.5 ^A	65.5 ^A	122.5 ^A	43.1 ^A	376.4 ^B
1000	24	15.5 ^A	92.0 ^B	78.1 ^B	85.6 ^B	101.2 ^B
	48	9.9 ^A	72.1 ^{BC}	68.5 ^B	76.3 ^{BC}	93.0 ^C
	72	4.7 ^A	72.7 ^B	54.8 ^B	82.0 ^B	213.2 ^C

Different letters indicate significant differences ($p < 0.05$).

Table S3. Tukey's HSD test results for effect of species (*Arabidopsis thaliana*, *Silene vulgaris* subsp. *humilis*, *Viola x wittrockiana*, *V. tricolor* Sychta et al 2018 [11], and *V. philippica*) on cell viability for lead in each concentration and time combination.

Concentration [μM]	Time [h]	Species				
		<i>A. thaliana</i>	<i>S. vulgaris</i> subsp. <i>humilis</i>	<i>V. x wittrockiana</i>	<i>V. tricolor</i>	<i>V. philippica</i>
0	24	104.1 ^B	69.4 ^A	116.0 ^B	88.5 ^{AB}	140.7 ^C
	48	106.6 ^B	58.1 ^A	154.1 ^C	90.3 ^B	144.2 ^C
	72	124.9 ^B	63.8 ^A	153.9 ^C	74.8 ^A	137.3 ^{BC}
200	24	118.8 ^B	72.0 ^A	113.1 ^B	65.7 ^A	113.0 ^B
	48	100.6 ^C	69.3 ^B	120.7 ^D	45.6 ^A	107.1 ^{CD}
	72	78.0 ^{AB}	75.9 ^A	115.5 ^B	75.5 ^A	127.1 ^B
500	24	42.0 ^A	67.8 ^B	114.4 ^C	67.4 ^B	102.0 ^C
	48	49.4 ^A	89.8 ^B	131.2 ^C	53.2 ^A	106.1 ^B
	72	10.0 ^A	58.4 ^B	106.7 ^C	64.3 ^B	116.2 ^C
1000	24	59.8 ^B	33.4 ^A	99.2 ^C	57.8 ^B	101.5 ^C
	48	43.7 ^B	21.1 ^A	112.6 ^D	42.7 ^B	86.2 ^C
	72	11.3 ^A	18.9 ^A	102.9 ^C	67.3 ^B	94.0 ^C

Different letters indicate significant differences ($p < 0.05$).

Table S4. Dunn's test results for effect of treatment (0, 200 μM lead, 200 μM zinc) on metabolite content in cells of *Arabidopsis thaliana*, *Viola x wittrockiana*, *V. tricolor*, and *V. philippica*.

Metabolite	Species	Treatment [μM]		
		0	200 Pb	200 Zn
Alla	<i>A. thaliana</i>	0.024 ^{AB}	0.024 ^A	0.017 ^B
	<i>V. x wittrockiana</i>	0.015 ^A	0.018 ^A	0.016 ^A
	<i>V. tricolor</i>	ND	ND	ND
	<i>V. philippica</i>	0.019 ^A	0.025 ^B	0.023 ^{AB}
L-AA	<i>A. thaliana</i>	0.293 ^A	0.108 ^B	0.096 ^B
	<i>V. x wittrockiana</i>	0.124 ^A	0.075 ^{AB}	0.045 ^B
	<i>V. tricolor</i>	0.133 ^A	0.316 ^B	0.293 ^B
	<i>V. philippica</i>	0.214 ^A	0.290 ^A	0.279 ^A
GSH	<i>A. thaliana</i>	16.437 ^A	8.216 ^{AB}	5.330 ^B
	<i>V. x wittrockiana</i>	173.353 ^A	203.789 ^A	212.254 ^A
	<i>V. tricolor</i>	479.745 ^A	407.607 ^B	432.550 ^{AB}
	<i>V. philippica</i>	202.427 ^A	234.810 ^A	342.980 ^B
PC2	<i>A. thaliana</i>	ND ^A	3.741 ^B	3.377 ^B
	<i>V. x wittrockiana</i>	ND ^A	3.246 ^B	3.649 ^B
	<i>V. tricolor</i>	ND ^A	2.169 ^{AB}	5.386 ^B
	<i>V. philippica</i>	ND ^A	82.744 ^B	56.363 ^B
PC3	<i>A. thaliana</i>	ND	ND	ND
	<i>V. x wittrockiana</i>	ND ^A	2.098 ^B	ND ^A
	<i>V. tricolor</i>	ND ^A	ND ^A	2.312 ^B
	<i>V. philippica</i>	ND ^A	141.209 ^B	13.034 ^{AB}
PC4	<i>A. thaliana</i>	ND	ND	ND
	<i>V. x wittrockiana</i>	ND	ND	ND
	<i>V. tricolor</i>	ND	ND	ND
	<i>V. philippica</i>	ND ^A	63.546 ^B	ND ^A
Tartrate	<i>A. thaliana</i>	0.024 ^A	0.027 ^A	0.027 ^A
	<i>V. x wittrockiana</i>	0.024 ^A	0.021 ^A	0.022 ^A
	<i>V. tricolor</i>	0.025 ^A	0.075 ^B	0.065 ^{AB}
	<i>V. philippica</i>	0.045 ^A	0.083 ^B	0.075 ^B
Malate	<i>A. thaliana</i>	0.113 ^A	0.177 ^B	0.131 ^{AB}
	<i>V. x wittrockiana</i>	0.057 ^A	0.083 ^A	0.108 ^A
	<i>V. tricolor</i>	0.006 ^A	0.012 ^B	0.013 ^B
	<i>V. philippica</i>	0.431 ^A	0.696 ^B	0.678 ^B
Citrate	<i>A. thaliana</i>	0.007 ^A	0.083 ^B	0.036 ^{AB}
	<i>V. philippica</i>	0.465 ^A	1.046 ^B	0.751 ^{AB}
	<i>V. x wittrockiana</i>	0.001 ^A	0.005 ^B	0.003 ^{AB}
	<i>V. tricolor</i>	0.020 ^A	0.038 ^{AB}	0.055 ^B

Different letters indicate significant differences ($p < 0.05$); ALLA – allantoin; L-AA – ascorbic acid; GSH – glutathione; PC2-4 – phytochelatins; ND – not detected. Not detected values were treated as 0.

Table S5. Dunn's test results for effect of species (*Arabidopsis thaliana*, *Viola x wittrockiana*, and *V. tricolor*, *V. philippica*) on metabolite contents in cell suspension culture for each treatment (0, 200 μ M lead, 200 μ M zinc).

Metabolite	Treatment [μ M]	Species			
		<i>A. thaliana</i>	<i>V. x wittrockiana</i>	<i>V. tricolor</i>	<i>V. philippica</i>
ALLA	0	0.024 ^A	0.015 ^{AB}	ND ^B	0.019 ^A
	200 Pb	0.024 ^A	0.018 ^{AB}	ND ^B	0.025 ^A
	200 Zn	0.017 ^A	0.016 ^{AB}	ND ^B	0.023 ^A
L-AA	0	0.293 ^A	0.124 ^B	0.133 ^B	0.214 ^{AB}
	200 Pb	0.108 ^{AB}	0.075 ^B	0.316 ^C	0.290 ^{AC}
	200 Zn	0.096 ^{AB}	0.0456 ^B	0.293 ^A	0.279 ^{AC}
GSH	0	16.437 ^A	173.353 ^{AC}	479.745 ^B	202.427 ^{BC}
	200 Pb	8.216 ^A	203.789 ^{AB}	407.607 ^B	234.810 ^{AB}
	200 Zn	5.330 ^A	212.254 ^{AC}	432.550 ^B	342.980 ^{BC}
PC2	0	ND	ND	ND	ND
	200 Pb	3.741 ^{AB}	3.246 ^{BC}	2.169 ^C	82.744 ^A
	200 Zn	3.377 ^A	3.649 ^A	5.386 ^{AB}	56.363 ^B
PC3	0	ND	ND	ND	ND
	200 Pb	ND ^A	2.098 ^{AB}	ND ^A	141.209 ^B
	200 Zn	ND ^A	ND ^A	2.312 ^{AB}	13.034 ^B
PC4	0	ND	ND	ND	ND
	200 Pb	ND ^A	ND ^A	ND ^A	63.546 ^B
	200 Zn	ND	ND	ND	ND
Tartrate	0	0.024 ^A	0.024 ^A	0.025 ^{AB}	0.045 ^B
	200 Pb	0.027 ^{AB}	0.021 ^B	0.075 ^A	0.083 ^A
	200 Zn	0.027 ^A	0.022 ^A	0.065 ^{AB}	0.075 ^B
Malate	0	0.113 ^{AB}	0.057 ^{BC}	0.006 ^C	0.431 ^A
	200 Pb	0.177 ^{AB}	0.083 ^{BC}	0.012 ^C	0.696 ^A
	200 Zn	0.131 ^{AB}	0.108 ^{BC}	0.013 ^C	0.678 ^A
Citrate	0	0.007 ^{AB}	0.001 ^B	0.020 ^{AC}	0.465 ^{AC}
	200 Pb	0.083 ^{AB}	0.005 ^C	0.038 ^{BC}	1.046 ^A
	200 Zn	0.036 ^{AB}	0.003 ^B	0.055 ^{AB}	0.751 ^A

Different letters indicate significant differences ($p < 0.05$); ALLA – allantoin; L-AA – ascorbic acid; GSH – glutathione; PC2-4 – phytochelatins; ND – not detected. Not detected values were treated as 0.

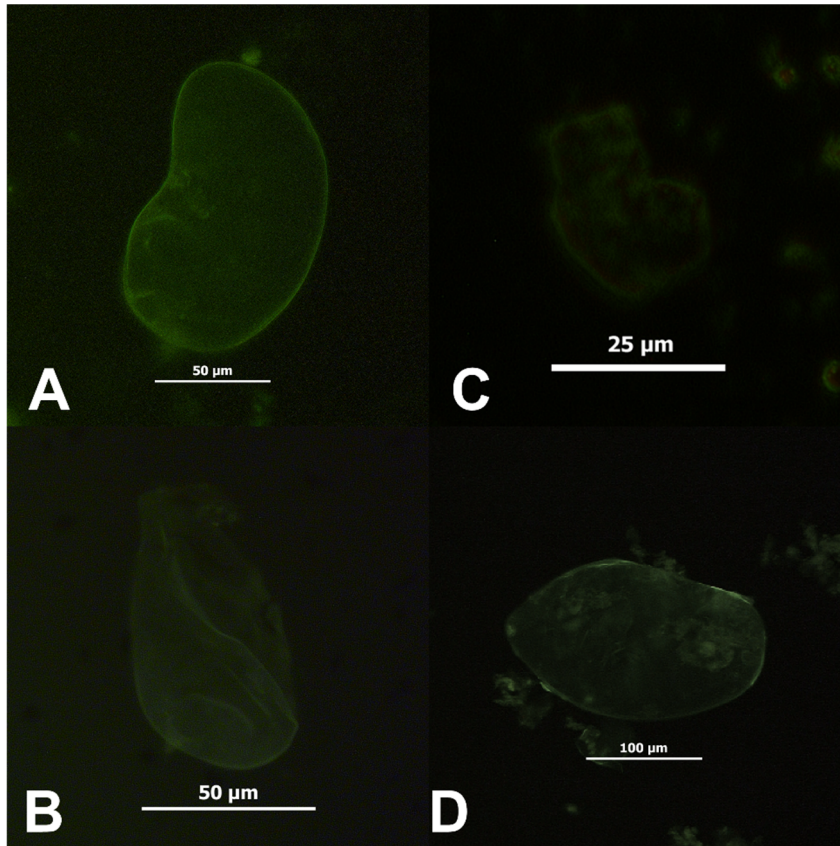


Figure S1. Intracellular lead detection after exposure to 200 µM of Pb using Leadmium Green staining (fluorescence microscopy); *Silene vulgaris* subsp. *humilis* (A), *Viola x wittrockiana* (B), *V. tricolor* (C), and *V. philippica* (D).