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SUPPLEMENTARY MATERIAL

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Supplementary material S1
Quality control/Quality assurance

Supplementary material S2
Differences (± standard deviation) between elements (Cd, Pb, Ni, As, Cr) contents in exposed plants to control plants in 2012 and 2013. (TABLE)

Supplementary material S3
Effect of interaction (series × sites) on mean contents (± standard deviation) of Na, K, Mg and Ca [mg g^{-1}] for 2012 and 2013. (TABLE)

Supplementary material S4
Chlorophyll *a* and *b* contents (± standard deviation) in *L. multiflorum* leaves in 2012 and 2013 growing seasons in relation to control values. Different letters denote significant differences at level $\alpha = 0.05$. (FIGURE)

S1

QUALITY CONTROL/QUALITY ASSURANCE

The methods of trace element measurement were validated and controlled by preparation and analyses of standard solutions, calibration of the instrument, daily runs of method blanks, duplicates and replicates and certified materials (CRMs) with each analytical cycle. The analytical accuracy was checked using by measuring standard reference material 1515 Apple Leaves National Institute of Standard Reference Material (USA). The Quality Control (QC) data of obtained and certified values in brackets were: 2691 ± 40 [$\mu g g^{-1}$] for Mg (2710 ± 120 [$\mu g g^{-1}$]); 15361 ± 72 [$\mu g g^{-1}$] for Ca (15250 ± 100 [$\mu g g^{-1}$]); 0.0127 ± 0.0025 [$\mu g g^{-1}$] for Cd (0.0132 ± 0.0015 [$\mu g g^{-1}$]); 0.386 ± 0.027 [$\mu g g^{-1}$] for Pb (0.407 ± 0.024 [$\mu g g^{-1}$]) and 223 ±14 [$\mu g g^{-1}$] for Ni (0.936 ± 0.094 [$\mu g g^{-1}$]); 0.282 ± 0,024 for Cr (0.3 [$\mu g g^{-1}$] (information value)); 23.6 ± 2.7 [$\mu g g^{-1}$] for Na (24.4 ± 2.1 [$\mu g g^{-1}$]); 16161 ± 127 [$\mu g g^{-1}$] for K (16080 ± 210 [$\mu g g^{-1}$]). Precision was calculated as the coefficient of variations (CV) of duplicates. As a result of the analysis, the measurement precision values were in the range from 1.5% to 4.9% for all investigated elements. Finally, the limits of detection, calculated as three standard deviations of 7 independent replicates of the reagent blank, were respectively (in $\mu g\ L^{-1}$) 0.03 for As; 0.008 for Cd; 0.05 for Cr; 0.05 for Ni; 0.07 for Pb; 0.5 for Ca; 0.5 for Mg and 1 $mg\ L^{-1}$ for Na and K.

S2

SUPPLEMENTARY TABLE (S2). Differences (± standard deviation) between elements (Cd, Pb, Ni, As, Cr) contents in exposed plants to control plants in 2012 and 2013. Different letters denote significant differences at level $\alpha = 0.05$.

Series ×site	Cd	Pb	Ni	As	Cr
			2012		
1×1	0.036^{abc}±0.010	0.85 ^{defg} ±0.128	0.45 ^{bc} ± 0.47	0.100 ^{cdef} ± 0.031	0.73 ^{abcde} ±0.33
1×2	0.319^{fg}±0.022	0.78 ^{cdefg} ±0.030	0.76 ^{c} ± 0.36	0.108 ^{def} ± 0.018	0.91 ^{abcdef} ±0.28
1×3	0.021^{ab}±0.014	0.90 ^{efgh} ±0.063	-0.09 ^{abc} ±0.45	0.749 ^{h} ±0.114	0.17 ^{ab} ±0.45
1×4	0.062^{abcd}±0.015	0.63 ^{bcd} ±0.100	0.08 ^{abc} ±0.28	0.082 ^{cde} ±0.015	0.64 ^{abcd} ±0.39
1×5	-0.025^{a}±0.044	0.41 ^{ab} ±0.051	0.03 ^{abc} ±0.05	0.043 ^{abcd} ±0.009	1.16 ^{cdef} ±0.14
2×1	0.211^{def}±0.020	0.57 ^{abc} ±0.044	0.25 ^{abc} ±0.36	-0.008 ^{ab} ± 0.008	1.03 ^{bcdef} ±0.30
2×2	0.427^{g}±0.008	0.60 ^{bcd} ±0.096	0.54 ^{bc} ±0.46	-0.017 ^{a} ± 0.019	1.38 ^{defg} ±0.48
2×3	0.604^{hi}±0.059	0.69 ^{cdef} ±0.068	1.88 ^{d} ±0.27	1.139 ^{i} ±0.057	2.24 ^{g} ±0.38
2×4	0.464^{h}±0.036	0.94 ^{fgh} ±0.100	2.86 ^{e} ±0.26	0.028 ^{abc} ±0.013	3.48 ^{h} ±0.23
2×5	0.277^{efg}±0.048	1.14 ^{h} ±0.217	6.73 ^{g} ±0.65	0.143 ^{ef} ±0.010	5.76 ^{i}j ±0.80
3×1	0.663^{i}±0.047	1.63 ^{i} ±0.026	6.55 ^{g} ±0.71	0.156 ^{fg} ±0.019	6.71 ^{j} ±0.61
3×2	0.416^{g}±0.108	1.48 ^{i} ±0.141	7.31 ^{g} ±0.32	0.223 ^{g} ±0.019	5.56 ^{i} ±0.48
3×3	0.718^{i}±0.074	0.31 ^{a} ±0.020	3.95 ^{f} ±0.47	0.052 ^{abcd} ±0.016	4.97 ^{i} ±0.30
3×4	0.098^{abcd}±0.017	0.67 ^{cde} ±0.123	-0.51 ^{a} ±0.25	0.106 ^{def} ±0.015	0.38 ^{abc} ±0.24
3×5	0.154^{bcde}±0.023	1.03 ^{gh} ±0.186	-0.35 ^{ab} ±0.13	0.051 ^{abcd} ±0.029	1.00 ^{bcdef} ±0.42
4×1	0.233^{cdef}±0.050	0.97 ^{gh} ±0.134	0.31 ^{abc} ±0.43	0.063 ^{bcd} ±0.011	1.39 ^{defg} ±0.49
4×2	0.223^{cdef}±0.058	0.97 ^{gh} ±0.114	0.04 ^{ab} ±0.29	0.043 ^{abcd} ±0.012	1.70 ^{fg} ±0.25
4×3	0.201^{bcde}±0.023	0.91 ^{efgh} ±0.183	0.12 ^{abc} ±0.35	0.058 ^{bcd} ±0.020	1.08 ^{bcdef} ±0.41
4×4	0.147^{abcd}±0.028	0.93 ^{efgh} ±0.206	0.01 ^{ab} ±0.12	0.092 ^{cdef} ±0.016	1.53 ^{defg} ±0.43
4×5	0.222^{cdef}±0.038	0.79 ^{cdefg} ±0.040	0.33 ^{abc} ±0.11	0.053 ^{abcd} ±0.020	1.67 ^{efg} ±0.43
			2013		
1×1	0.515 ^{f} ±0.020	0.60 ^{gh} ±0.04	0.34 ^{ab} ±0.06	0.062 ^{de} ±0.010	1.19 ^{a} ± 0.03
1×2	0.089 ^{abc} ±0.009	0.49 ^{def} ±0.02	0.57 ^{abcd} ±0.12	0.044 ^{bcd} ±0.004	1.96 ^{bc} ±0.21
1×3	0.133 ^{bcd} ±0.006	0.46 ^{cde} ±0.03	0.40 ^{abc} ±0.12	0.057 ^{cde} ±0.004	1.71 ^{abc} ±0.03
1×4	0.092 ^{abc} ±0.018	0.56 ^{efgh} ±0.03	1.29 ^{e} ±0.07	0.054 ^{cde} ±0.003	1.75 ^{abc} ±0.08
1×5	0.088 ^{ab} ±0.015	0.16 ^{b} ±0.03	0.27 ^{a} ±0.04	0.009 ^{ab} ±0.004	1.42 ^{ab} ±0.15
2×1	0.086 ^{ab} ±0.023	0.58 ^{fgh} ±0.09	0.99 ^{cde} ±0.29	0.070 ^{de} ±0.009	3.04 ^{e} ±0.12
2×2	0.088 ^{ab} ±0.015	0.39 ^{cd} ±0.03	1.02 ^{cde} ±0.07	0.046 ^{cd} ±0.007	2.94 ^{e} ±0.28
2×3	0.117 ^{bcd} ±0.024	0.36 ^{c} ±0.01	1. 07 ^{de} ±0.08	0.083 ^{e} ±0.021	2.20 ^{cd} ±0.12
2×4	0.115 ^{bcd} ±0.018	0.48 ^{def} ±0.01	0.94 ^{bcde} ±0.09	0.066 ^{de} ±0.014	2.08 ^{cd} ±0.22
2×5	0.045 ^{ab} ±0.004	0.17 ^{b} ±0.03	0.48 ^{abcd} ±0.02	0.020 ^{abc} ±0.005	2.13 ^{cd} ±0.09
3×1	0.073 ^{ab} ±0.006	0.61 ^{h} ±0.03	8.42 ^{h} ±0.68	0.168 ^{f} ±0.023	4.98 ^{f} ±0.20
3×2	0.190 ^{cd} ±0.022	1.15 ^{j} ±0.02	1.38 ^{e} ±0.15	0.182 ^{f} ±0.012	2.54 ^{de} ±0.09
3×3	0.081 ^{ab} ±0.007	0.15 ^{b} ±0.02	7.15 ^{f} ±0.30	0.085 ^{e} ±0.013	13.15 ^{j} ±0.23
3×4	0.214 ^{d} ±0.044	0.19 ^{b} ±0.02	6.87 ^{f} ±0.22	0.202 ^{f} ±0.029	13.25 ^{j} ±0.26
3×5	0.086 ^{ab} ±0.004	0.09 ^{ab} ±0.02	7.23 ^{f} ±0.28	0.063 ^{de} ±0.007	13.60 ^{j} ±0.44
4×1	0.689 ^{g} ±0.024	0.88 ^{i} ±0.05	7.27 ^{f} ±0.27	0.196 ^{f} ±0.034	9.45 ^{gh} ±0.52
4×2	0.378 ^{e} ±0.018	0.50 ^{defg} ±0.05	7.91 ^{gh} ±0.70	0.086 ^{e} ±0.006	13.22 ^{ij} ±0.29
4×3	0.395 ^{e} ±0.012	0.51 ^{efgh} ±0.11	7.14 ^{f} ±0.25	0.166 ^{f} ±0.035	12.68 ^{i} ±0.37
4×4	0.541 ^{f} ±0.025	0.79 ^{i} ±0.08	7.45 ^{fg} ±0.37	0.173 ^{f} ±0.013	10.01 ^{h} ±0.36
4×5	0.374 ^{e} ±0.034	0.18 ^{b} ±0.03	7.14 ^{f} ±0.33	0.075 ^{de} ±0.013	9.14 ^{g} ±0.91

S3

SUPPLEMENTARY TABLE (S3). Effect of interaction (series × sites) on mean contents (±standard deviation) of Na, K, Mg and Ca [mg g^{-1}] for 2012 and 2013. Different letters within each column (element) denote significant differences at level α = 0.05 (Tukey's test).

interaction	2012				2013			
	Na	K	Mg	Ca	Na	K	Mg	Ca
F(p-value)	9.714(p<0.05)	114.4(p<0.05)	70.14(p<0.05)	13.97(p<0.05)	41.12(p<0.05)	49.09(p<0.05)	9.82(p<0.05)	63.48(p<0.05)
1×0	4.01^{a}±0.03	46.30^{bcd}±0.27	2.47^{ijk}±0.08	4.606^{bc}±0.14	1.284^{a}±0.07	72.55^{b}±1.30	4.55^{b}±0.05	19.82^{a}±0.58
1×1	4.55^{a}±0.04	52.58^{a}±0.37	2.80^{ghij}±0.18	2.364^{h}±0.08	0.19^{ghi}±0.02	72.19^{b}±1.51	3.22^{defg}±0.13	10.25^{hij}±0.24
1×2	4.01^{a}±0.03	50.30^{ab}±0.64	2.47^{ijk}±0.08	4.61^{bc}±0.14	0.252^{fghi}±0.02	82.01^{a}±0.61	5.77^{a}±0.34	15.24^{bc}±0.34
1×3	4.01^{a}±0.03	48.70^{abc}±1.37	2.47^{ijk}±0.08	4.61^{bc}±0.14	0.48^{cde}±0.04	62.72^{c}±2.14	4.18^{bcd}±0.23	16.71^{b}±0.41
1×4	3.15^{b}±0.09	45.17^{cde}±0.60	2.41^{jk}±0.16	4.34^{bcde}±0.25	0.29^{efgh}±0.01	35.51^{ij}±0.89	2.68^{fghi}±0.09	12.12^{efgh}±0.20
1×5	2.17^{fghi}±0.04	36.95^{h}±1.13	3.00^{fghi}±0.08	2.33^{h}±0.11	0.13^{hi}±0.01	35.56^{ij}±0.58	3.63^{bcdef}±0.11	14.32^{cd}±0.54
2×0	2.88^{bcd}±0.01	41.26^{efg}±0.88	4.18^{a}±0.10	5.83^{a}±0.30	0.12^{hi}±0.00	43.28^{gh}±1.11	3.65^{bcde}±0.32	10.15^{ij}±0.24
2×1	2.99^{bc}±0.17	50.29^{ab}±1.94	3.91^{abc}±0.17	3.83^{cdef}±0.06	0.72^{b}±0.08	17.142^{kl}±0.72	1.87^{i}±0.14	20.24^{a}±0.33
2×2	3.18^{b}±0.09	44.84^{cde}±0.70	3.15^{efgh}±0.07	4.73^{b}±0.15	0.57^{bc}±0.04	53.73^{de}±1.06	3.32^{def}±0.08	12.72^{def}±0.14
2×3	1.89^{hi}±0.10	40.26^{fgh}±0.63	2.42j^{k}±0.05	2.18^{h}±0.07	0.14^{hi}±0.01	44.77^{fgh}±1.23	3.67^{bcde}±0.18	12.40^{efg}±0.27
2×4	2.94^{bc}±0.10	49.66^{ab}±0.35	4.10^{ab}±0.14	4.73^{b}±0.28	0.24^{fghi}±0.010	71.70^{b}±1.95	4.06^{bcd}±0.26	10.96^{fghij}±0.26
2×5	2.78^{bcde}±0.10	27.37^{i}±1.24	3.20^{efg}±0.21	3.51^{fg}±0.06	0.37^{defg}±0.03	53.66^{de}±1.29	3.25^{defg}±0.12	11.86^{efghi}±0.15
3×0	2.72^{bcdef}±0.23	41.22^{efg}±0.47	2.42^{jk}±0.06	4.53^{bcd}±0.18	1.31^{a}±0.11	48.14^{ef}g±0.69	2.92^{efgh}±0.23	12.72^{defg}±0.18
3×1	1.79^{i}±0.15	39.56^{fgh}±0.18	3.16^{efgh}±0.04	2.36^{h}±0.12	0.17^{hi}±0.01	36.25^{ij}±0.62	3.39^{cdef}±0.07	12.52^{defg}±0.50
3×2	2.51^{cdefg}±0.15	42.65^{def}±0.56	3.82^{abcd}±0.04	2.92^{gh}±0.05	0.15^{hi}±0.05	41.73^{ghi}±1.15	3.08^{efgh}±0.15	9.17^{j}±0.25
3×3	2.31^{defghi}±0.12	26.77^{i}±0.27	2.60^{hijk}±0.13	4.01^{bcdef}±0.19	0.41^{cdef}±0.02	22.584^{k}±0.85	2.31^{ghi}±0.34	19.34^{a}±0.35
3×4	2.46^{cdefgh}±0.13	38.43^{gh}±0.17	2.53^{ijk}±0.12	4.78^{b}±0.24	0.48^{cde}±0.01	43.65^{gh}±0.44	2.98^{efgh}±0.09	12.22^{efg}±0.23
3×5	2.66^{bcdefg}±0.07	47.12^{bc}±0.39	3.41^{cde}f±0.02	2.23^{h}±0.11	0.13^{hi}±0.02	40.03^{hi}±0.79	3.54^{cdef}±0.18	13.40^{cde}±0.34
4×0	2.21^{efghi}±0.06	22.34^{j}±0.51	0.96^{l}±0.03	3.72^{defg}±0.14	0.23^{fghi}±0.01	59.65^{cd}±2.33	4.34^{bc}±0.14	10.85^{ghij}±0.20
4×1	2.22^{efghi}±0.09	25.75^{ij}±0.477	3.32^{defg}±0.19	3.88^{cdef}±0.08	0.55^{bcd}±0.04	14.81^{l}±0.42	2.18^{hi}±0.14	20.34^{a}±0.54
4×2	2.50^{cdefg}±0.12	45.50^{cd}±0.71	2.08^{k}±0.10	3.70^{efg}±0.06	0.54^{bcd}±0.04	51.08^{ef}±1.13	3.27^{de}f±0.10	11.92^{efghi}±0.28
4×3	2.31^{defghi}±0.14	40.02^{fgh}±0.70	3.59^{bcde}±0.09	2.30^{h}±0.03	0.08^{i}±0.007	31.68^{j}±2.28	3.02^{efgh}±0.14	11.57^{efghi}±0.15
4×4	2.11^{ghi}±0.07	22.67^{j}±0.09	1.08^{l}±0.06	3.84^{cdef}±0.10	0.14^{hi}±0.00	32.64^{j}±0.36	2.77^{efghi}±0.06	9.51^{j}±0.35
4×5	2.27^{efghi}±0.09	25.29^{ij}±0.45	3.70^{abcde}±0.08	3.82^{cdef}±0.07	0.41^{cdef}±0.03	42.33^{ghi}±0.66	1.84^{i}±0.15	10.99^{fghij}±0.40

S4

SUPPLEMENTARY FIGURE (S4). Chlorophyll *a* and *b* contents (± standard deviation) in *L. multiflorum* leaves in 2012 and 2013 growing seasons in relation to control values. Different letters denote significant differences at level α = 0.05.