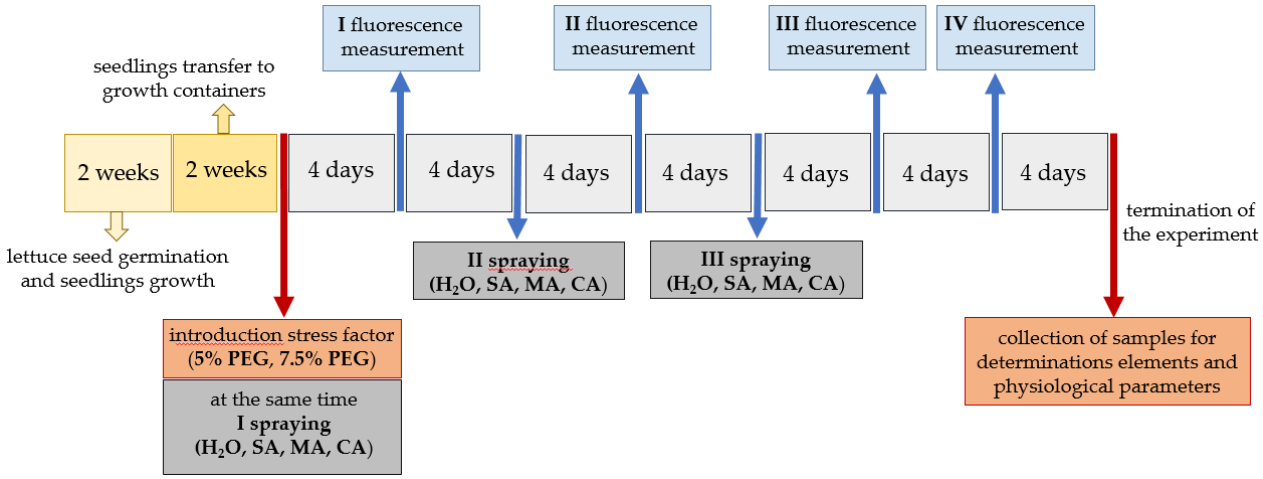
Supplementary Materials:



Scheme S1. Acquisition of lettuce plant material for determination

Table S1. Summary of ANOVA results plant yielding by PEG level and various kinds of foliar spray

Source of variation	Plant yielding (g·plant^{-1})			Dry matter plant yielding (g·plant^{-1})		
	d.f.	F	*p*	d.f.	F	*p*
PEG level (PEG)	2	18.996	**< 0.0001**	2	14.273	**< 0.0004**
Foliar spray (FS)	4	0.369	NS	4	3.194	**0.0438**
PEG x FS	8	0.231	NS	8	0.543	NS
Error	15			15		

d.f. - degrees of freedom; (NS –non significant); bold – significant differences

Table S2. Summary of ANOVA results for uptake of elements by PEG level and various kinds of foliar spray

Source of variation	N			P			K		
	d.f.	F	*p*	d.f.	F	*p*	d.f.	F	*p*
PEG level (PEG)	2	34.123	**< 0.0001**	2	20.593	**< 0.0001**	2	20.593	**< 0.0001**
Foliar spray (FS)	4	0.650	NS	4	2.116	NS	4	2.116	NS
PEG x FS	8	0.456	NS	8	0.591	NS	8	0.591	NS
Error	15			15			15		
Source of variation	**Ca**			**Mg**			**Na**		
	d.f.	F	*p*	d.f.	F	*p*	d.f.	F	*p*
PEG level (PEG)	2	35.408	**< 0.0001**	2	114.99	**< 0.0001**	2	20.623	**< 0.0001**
Foliar spray (FS)	4	2.599	NS	4	4.798	**< 0.0108**	4	1.89	NS
PEG x FS	8	0.522	NS	8	1.547	NS	8	0.746	NS
Error	15			15			15		

d.f. - degrees of freedom; (NS –non significant); bold – significant differences

Table S3. Results of the Pearson coefficient (r) and p-value between plant yielding and elements. Correlation coefficients are significant with $p < 0.05$

Variable	Plant yielding	DM Plant yielding	N	P	K	Ca	Mg	Na
			$N = 30$					
Plant yielding	---	$r = 0.859$ $p = 0.00$	0.7303 0.00	0.4352 0.016	0.6286 0.00	0.7941 0.00	0.7809 0.00	0.6556 0.00
DM Plant yielding	---	---	$r = 0.7112$ $p = 0.00$	0.5542 0.001	0.7336 0.00	0.8293 0.00	0.7454 0.00	0.7182 0.00
N	---	---	---	$r = 0.8585$ $p = 0.00$	0.9373 0.00	0.9199 0.00	0.9415 0.00	0.943 0.00
P	---	---	---	---	$r = 0.8978$ $p = 0.00$	0.7804 0.00	0.8113 0.00	0.9103 0.00
K	---	---	---	---	---	$r = 0.9208$ $p = 0.00$	0.8985 0.00	0.9371 0.00
Ca	---	---	---	---	---	---	$r = 0.9505$ $p = 0.00$	0.8981 0.00
Mg	---	---	---	---	---	---	---	$r = 0.9136$ $p = 0.00$
Na	---	---	---	---	---	---	---	---

Table S4. The impact of the application of organic acids on selected parameters of chlorophyll fluorescence (F_0, F_M)

PEG level	Foliar spray (A)	F_0			F_M		
		Term I	**Term II**	**Term III**	**Term I**	**Term II**	**Term III**
0	control	8875 a	9460 a	9081 ab	54347 a	54868 a	56569 a
	H_20	9460 a	8258 a	8377 ab	57804 a	47184 a	53957 a
	SA	9536 a	9786 a	7293 ab	57241 a	57263 a	46859 a
	MA	9049 a	8756 a	7402 ab	55561 a	56059 a	47672 a
	CA	8580 a	8204 a	8160 ab	51827 a	50067 a	52949 a
5	control	9352 a	7781 a	8550 ab	56417 a	50923 a	55334 a
	H_20	9536 a	9211 a	7456 ab	56743 a	58672 a	44269 a
	SA	9081 a	10263 a	8258 ab	54651 a	62681 a	49720 a
	MA	8258 a	9233 a	10122 c	52126 a	58910 a	62085 a
	CA	7683 a	9828 a	7076 a	48344 a	60123 a	46014 a
7.5	control	7900 a	7618 a	7911 ab	51465 a	49698 a	48473 a
	H_20	8193 a	10143 a	7662 ab	51606 a	61110 a	50489 a
	SA	7271 a	10035 a	7098 ab	47477 a	59506 a	45689 a
	MA	7900 a	9428 a	7629 ab	52028 a	53730 a	50403 a
	CA	7478 a	8315 a	7911 ab	49531 a	47454 a	50024 a

Table S5. The impact of the application of organic acids on selected parameters of chlorophyll fluorescence (F_V, F_V/F_M)

PEG level	Foliar spray (A)	F_V			F_V / F_M		
		Term I	**Term II**	**Term III**	**Term I**	**Term II**	**Term III**
0	control	45472 a	45408 a	47488 a	0.84 a	0.83 a	0.84 a
	H_20	48344 a	38926 a	45581 a	0.84 a	0.82 a	0.85 a
	SA	47705 a	47477 a	39566 a	0.83 a	0.83 a	0.85 a
	MA	46512 a	47303 a	40270 a	0.84 a	0.84 a	0.85 a
	CA	43247 a	41863 a	44789 a	0.84 a	0.84 a	0.85 a
5	control	47065 a	43142 a	46783 a	0.83 a	0.85 a	0.85 a
	H_20	47206 a	49460 a	36813 a	0.83 a	0.84 a	0.83 a
	SA	45570 a	52418 a	41462 a	0.83 a	0.84 a	0.83 a
	MA	43868 a	49677 a	51963 a	0.84 a	0.84 a	0.84 a
	CA	40661 a	50295 a	38937 a	0.84 a	0.84 a	0.85 a
7.5	control	43565 a	42080 a	40563 a	0.85 a	0.85 a	0.84 a
	H_20	43413 a	50967 a	42828 a	0.84 a	0.83 a	0.85 a
	SA	40205 a	49471 a	38591 a	0.85 a	0.83 a	0.84 a
	MA	44128 a	44301 a	42774 a	0.85 a	0.82 a	0.85 a
	CA	42053 a	39139 a	42113 a	0.85 a	0.83 a	0.84 a

Table S6. The impact of the application of organic acids on selected parameters of chlorophyll fluorescence (F_V/F_0, Pi_{abs})

PEG level	Foliar spray (A)	F_V / F_0			Pi_{abs}		
		Term I	Term II	Term III	Term I	Term II	Term III
0	control	5.14 a	4.79 a	5.24 a	2.73 a	2.48 a	2.93 a
	H_20	5.13 a	4.71 a	5.45 a	2.48 a	1.94 a	3.47 a
	SA	4.99 a	4.84 a	5.46 a	2.28 a	2.02 a	5.14 a
	MA	5.14 a	5.40 a	5.44 a	2.70 a	3.06 a	3.59 a
	CA	5.06 a	5.13 a	5.48 a	2.75 a	3.20 a	4.06 a
5	control	5.05 a	5.58 a	5.48 a	2.93 a	4.04 a	3.50 a
	H_20	4.96 a	5.40 a	4.93 a	2.53 a	3.09 a	3.62 a
	SA	5.02 a	5.14 a	5.02 a	2.69 a	3.25 a	3.16 a
	MA	5.33 a	5.38 a	5.14 a	3.33 a	3.49 a	2.75 a
	CA	5.29 a	5.12 a	5.52 a	3.54 a	2.67 a	4.30 a
7.5	control	5.52 a	5.57 a	5.16 a	3.76 a-c	4.76 a	3.65 a
	H_20	5.34 a	5.08 a	5.59 a	3.83 a-c	2.81 a	4.55 a
	SA	5.56 a	4.99 a	5.45 a	4.02 bc	2.76 a	4.47 a
	MA	5.59 a	4.68 a	5.61 a	3.90 a-c	2.62 a	5.10 a
	CA	5.63 a	4.73 a	5.34 a	4.22 c	2.00 a	4.34 a

Table S7. The impact of the application of organic acids on selected parameters of chlorophyll fluorescence (ABS/RC, TR_0/RC)

PEG level	Foliar spray (A)	ABS/RC			TR_0/RC		
		Term I	Term II	Term III	Term I	Term II	Term III
0	control	2.397 a	2.703 a	2.310 a	2.003 a	2.237 a	1.940 a
	H_20	2.520 a	2.873 a	2.147 a	2.107 a	2.370 a	1.817 a
	SA	2.657 a	2.910 a	1.713 a	2.213 a	2.413 a	1.450 a
	MA	2.303 a	2.287 a	2.090 a	1.930 a	1.927 a	1.763 a
	CA	2.307 a	2.330 a	1.967 a	1.930 a	1.947 a	1.663 a
5	control	2.397 a	2.097 a	2.040 a	2.000 a	1.773 a	1.723 a
	H_20	2.657 a	2.433 a	2.167 a	2.207 a	2.047 a	1.787 a
	SA	2.463 a	2.307 a	2.420 a	2.053 a	1.930 a	2.010 a
	MA	2.053 a	2.210 a	2.470 a	1.730 a	1.860 a	2.060 a
	CA	1.977 a	2.673 a	1.867 a	1.660 a	2.237 a	1.580 a
7.5	control	2.037 a	1.877 a	2.003 a	1.723 a	1.593 a	1.673 a
	H_20	1.993 a	2.623 a	1.853 a	1.677 a	2.187 a	1.570 a
	SA	1.950 a	2.367 a	1.723 a	1.650 a	1.970 a	1.453 a
	MA	1.903 a	2.520 a	1.833 a	1.613 a	2.080 a	1.557 a
	CA	1.787 a	2.653 a	1.950 a	1.517 a	2.193 a	1.640 a

Table S8. Summary of ANOVA results for selected parameters of chlorophyll fluorescence by PEG level and various kind of foliar spray

Source of variation	F_0			Fv			F_M		
	d.f.	F	*p*	d.f.	F	*p*	d.f.	F	*p*
PEG level (PEG)	2	4.13	0.0261	2	8.58	0.0011	2	8.13	0.0015
Foliar spray (FS)	4	0.68	NS	4	0.53	NS	4	0.54	NS
PEG x FS	8	4.31	0.0015	8	3.43	0.0065	8	3.69	0.0042
Error	30			30			30		
Source of variation	**F_V / F_0**			**F_V / F_M**			**PI_{ABS}**		
	d.f.	F	*p*	d.f.	F	*p*	d.f.	F	*p*
PEG level (PEG)	2	0.89	NS	2	1	NS	2	0.508	NS
Foliar spray (FS)	4	1.09	NS	4	1	NS	4	2.247	NS
PEG x FS	8	2.61	0.0268	8	3	0.0321	8	5.954	0.0001
Error	30			30			30		
Source of variation	**ABS/RC**			**TR_0/RC**					
	d.f.	F	*p*	d.f.	F	*p*			
PEG level (PEG)	2	0.901	NS	2	1.172	NS			
Foliar spray (FS)	4	0.827	NS	4	0.848	NS			
PEG x FS	8	4.552	0.001	8	4.641	0.0009			
Error	30			30					

(NS –non significant); F_0 – initial fluorescence, Fv – maximum variable fluorescence, F_M – maximum fluorescence intensity; F_V/F_0 – primary photochemical reaction yield rate; F_V/F_M – maximum photochemical quantum PSII after dark adaptation; PI_{ABS} performance index on absorption basis; ABS/RC – light energy absorbed by the PSII antenna photon flux per active reaction centre, TR_0/RC – total energy used to reduce QA by the unit reaction centre of PSII per energy captured by a single active RC

Table S9. Summary of ANOVA results for physiological parameters by PEG level and various kinds of foliar spray

Source of variation	$O_2^{\bullet-}$			H_2O_2			MDA		
	d.f.	F	*p*	d.f.	F	*p*	d.f.	F	*p*
PEG level (PEG)	2	36.178	< 0.0001	2	17.575	< 0.0001	2	46.994	< 0.0001
Foliar spray (FS)	4	17.874	< 0.0001	4	1.809	NS	4	40.073	< 0.0001
PEG x FS	8	6.903	< 0.0001	8	1.101	NS	8	13.997	< 0.0001
Error	30			30			30		
Source of variation	**AsA**			**Pro**			**Phe**		
	d.f.	F	*p*	d.f.	F	*p*	d.f.	F	*p*
PEG level (PEG)	2	159.153	< 0.0001	2	233.93	< 0.0001	2	355.238	< 0.0001
Foliar spray (FS)	4	12.462	< 0.0001	4	18.153	< 0.0001	4	117.744	< 0.0001
PEG x FS	8	9.605	< 0.0001	8	2.338	0.04	8	7.386	< 0.0001
Error	30			30			30		
Source of variation	**Fla**			**Chl a+b**			**Car**		
	d.f.	F	*p*	d.f.	F	*p*	d.f.	F	*p*
PEG level (PEG)	2	286.565	< 0.0001	2	0.73	NS	2	3.503	0.04
Foliar spray (FS)	4	62.707	< 0.0001	4	0.777	NS	4	12.626	< 0.0001
PEG x FS	8	1.748	NS	8	0.874	NS	8	3.652	0.005
Error	30			30			30		

(NS –non significant); $O_2^{\bullet-}$–Superoxide anion - H_2O_2– Hydrogen peroxide; MDA – Malondialdehyde; AsA – Ascorbic acid; Pro – Proline; Phe – Total phenolics; Fla (Fla) – Flavonols; Chl a+b – Chlorophyll a+b ; Car – Carotenoids

Table S10. Results of the Pearson coefficient (r) and p-value between physiological parameters. Correlation coefficients are significant with $p < 0.05$ (data marked in grey)

Variable	$O_2^{\bullet-}$	H_2O_2	MDA	AsA	Pro	Phe	Fla	Chl a+b	Car
			***N* = 30**						
$O_2^{\bullet-}$	---	***r*** = - 0.1974 ***p*** = 0.194	0.7426 0.00	0.2262 0.135	0.4199 0.004	0.1947 0.199	0.1919 0.206	- 0.0319 0.835	- 0.3237 0.03
H_2O_2	---	---	***r*** = - 0.187 ***p*** = 0.219	- 0.3628 0.014	- 0.6228 0.00	- 0.6253 0.00	- 0.6039 0.00	0.1252 0.412	- 0.2531 0.093
MDA	---	---	---	***r*** = - 0.0065 ***p*** = 0.966	0.3295 0.027	0.0906 0.554	0.0949 0.535	- 0.0562 0.714	- 0.3825 0.009
AsA	---	---	---	---	***r*** = 0.3171 ***p*** = 0.033	0.4734 0.001	0.2781 0.064	0.0668 0.663	0.4351 0.003
Pro	---	---	---	---	---	***r*** = 0.8826 ***p*** = 0.00	0.9166 0.00	0.2295 0.129	0.3193 0.033
Phe	---	---	---	---	---	---	***r*** = 0.9413 ***p*** = 0.00	0.1737 0.254	0.5885 0.00
Fla	---	---	---	---	---	---	---	***r*** = 0.2096 ***p*** = 0.167	0.5013 0.00
Chl a+b	---	---	---	---	---	---	---	---	***r*** = 0.3107 ***p*** = 0.038
Car	---	---	---	---	---	---	---	---	---