SUPPLEMENTARY MATERIAL

Early detection of phosphorus deficiency stress in cucumber at the cellular level using chlorophyll fluorescence signals

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Table S1. Descriptive statistics of 33 parameters of chlorophyll fluorescence

Parameter	Mean		Standard deviation	Coefficient of variation (%)
	value	standard error		
t for F_m	441.95	8.144	151.9	34.38
Area (A_m)	42865.0	1278.895	23857.48	55.66
Area to F_J	285.31	7.665	143.0	50.12
F_o	667.56	5.674	105.8	15.86
F_m	2374.9	43.03	802.7	33.80
F_v	1707.3	41.38	772.0	45.22
$F_K = 0.3$ ms	1067.0	9.610	179.3	16.80
$F_J = 2$ ms	1378.397	16.53	308.4	22.37
$F_I = 30$ ms	1992.4	29.66	553.3	27.77
F_o/F_m	0.306	0.004	0.083	27.19
F_v/F_m	0.694	0.004	0.083	11.97
F_v/F_o	2.568	0.060	1.110	43.24
V_K	0.260	0.004	0.074	28.33
V_J	0.435	0.003	0.058	13.24
dVG/dt_o	1913.6	24.13	450.2	23.52
dV/dt_o	1513.3	21.79	406.5	26.86
S_m	24.27	0.308	5.739	23.65

Parameter	Mean		Standard deviation	Coefficient of variation (%)
	value	standard error		
S_S [RS]	0.495	0.006	0.106	21.47
S_S [VG]	0.386	0.004	0.084	21.65
$S_m/t(F_m)$	0.06	0.001	0.022	36.97
ABS/RC	3.107	0.044	0.824	26.52
DI_o/RC	1.012	0.026	0.486	48.03
Et_o/RC	1.168	0.008	0.140	11.98
RE_o/RC	0.404	0.004	0.080	19.73
$psi_{(o)} = ET_o/TR_o$	0.565	0.003	0.058	10.18
RC/CS_o	233.12	4.258	79.43	34.07
DI_o/CS_o	205.03	3.787	70.65	34.46
TR_o/CS_o	462.53	4.565	85.16	18.41
RE_o/CS_o	263.54	3.506	65.41	24.82
PI_{abs}	1.523	0.071	1.331	87.37
PI_{total}	1.075	0.063	1.174	109.21
DF_{total}	–0.263	0.027	0.510	194.01
$p2G$	–0.166	0.021	0.388	233.73

Source: own study.

Table S2. Parameter averages with standard error – term 1 (t_1)

Variable	Factor	Young leaf		Old leaf		Total	
		mean	standard error	mean	standard error	mean	standard error
t for F_m	control	290.0	22.48	306.7	30.35	298.3	18.13
	–P	303.3	22.48	313.3	30.35	308.3	18.13
Area (A_m)	control	70918.2	4001.1	70152.6	5663.2	70535.4	3510.0
	–P	67826.7	4001.1	56782.6	5663.2	62304.6	3510.0
Area to F_J	control	461.5	21.77	439.2	47.05	450.4	25.18
	–P	457.1	21.77	417.5	47.05	437.3	25.18
F_o	control	746.3	27.83	715.8	66.03	731.1	35.29
	–P	677.3	27.83	599.8	66.03	638.6	35.29
F_m	control	3647.8	136.42	3555.7	323.90	3601.8	173.16
	–P	3383.8	136.42	2984.3	323.90	3184.1	173.16
F_v	control	2901.5	109.86	2839.8	258.99	2870.7	138.60
	–P	2706.5	109.86	2384.5	258.99	2545.5	138.60
$F_K = 0.3$ ms	control	1316.7	58.66	1219.8	121.00	1268.3	67.15
	–P	1193.3	58.66	1032.8	121.00	1113.1	67.15
$F_J = 2$ ms	control	1833.5	84.09	1709.0	172.92	1771.3	95.49
	–P	1715.2	84.09	1497.3	172.92	1606.3	95.49
$F_I = 30$ ms	control	2885.0	106.2	2853.3	274.4	2869.2	143.0
	–P	2641.0	106.2	2380.2	274.4	2510.6	143.0

Variable	Factor	Young leaf		Old leaf		Total	
		mean	standard error	mean	standard error	mean	standard error
F_o/F_m	control	0.2046	0.0021	0.2013	0.0031	0.2029	0.0018
	–P	0.2002	0.0021	0.2007	0.0031	0.2005	0.0018
F_v/F_m	control	0.7954	0.0021	0.7987	0.0031	0.7971	0.0018
	–P	0.7998	0.0021	0.7993	0.0031	0.7995	0.0018
F_v/F_o	control	3.8889	0.0517	3.9714	0.0769	3.9301	0.0450
	–P	3.9990	0.0517	3.9907	0.0769	3.9948	0.0450
V_K	control	0.1964	0.0064	0.1774	0.0112	0.1869	0.0068
	–P	0.1895	0.0064	0.1709	0.0112	0.1802	0.0068
V_J	control	0.3744	0.0092	0.3498	0.0163	0.3621	0.0095
	–P	0.3817	0.0092	0.3619	0.0163	0.3718	0.0095
dVG/dt_o	control	2470.0	148.5	2176.7	239.5	2323.3	141.7
	–P	2133.3	148.5	1830.0	239.5	1981.7	141.7
dV/dt_o	control	2176.7	126.2	1925.8	212.6	2051.3	125.5
	–P	1967.5	126.2	1649.2	212.6	1808.3	125.5
S_m	control	24.48	1.0687	24.75	2.1133	24.61	1.1321
	–P	25.02	1.0687	25.76	2.1133	25.39	1.1321
S_S [RS]	control	0.5263	0.0085	0.5454	0.0194	0.5358	0.0110
	–P	0.5554	0.0085	0.5921	0.0194	0.5738	0.0110
S_S [VG]	control	0.4248	0.0089	0.4432	0.0157	0.4340	0.0098
	–P	0.4432	0.0089	0.4825	0.0157	0.4628	0.0098
$S_m/t(F_m)$	control	0.0858	0.0050	0.0813	0.0044	0.0836	0.0032
	–P	0.0841	0.0050	0.0835	0.0044	0.0838	0.0032
ABS/RC	control	2.3904	0.0385	2.2982	0.0673	2.3443	0.0404
	–P	2.2559	0.0385	2.1325	0.0673	2.1942	0.0404
DI_o/RC	control	0.4890	0.0109	0.4629	0.0178	0.4760	0.0106
	–P	0.4520	0.0109	0.4287	0.0178	0.4404	0.0106
Et_o/RC	control	1.1896	0.0182	1.1928	0.0240	1.1912	0.0148
	–P	1.1140	0.0182	1.0817	0.0240	1.0978	0.0148
RE_o/RC	control	0.5000	0.0203	0.4531	0.0264	0.4766	0.0174
	–P	0.4915	0.0203	0.4452	0.0264	0.4684	0.0174
$psi_{(o)} = ET_o/TR_o$	control	0.6256	0.0092	0.6502	0.0163	0.6379	0.0095
	–P	0.6183	0.0092	0.6381	0.0163	0.6282	0.0095
RC/CS_o	control	312.4	11.46	311.4	27.08	311.9	14.29
	–P	300.0	11.46	274.2	27.08	287.1	14.29
DI_o/CS_o	control	152.7	6.08	144.2	13.84	148.5	7.43
	–P	135.7	6.08	120.8	13.84	128.3	7.43
TR_o/CS_o	control	593.6	21.98	571.6	52.40	582.6	28.00
	–P	541.6	21.98	479.0	52.40	510.3	28.00
RE_o/CS_o	control	371.2	11.81	371.6	31.32	371.4	16.39
	–P	333.8	11.81	298.7	31.32	316.3	16.39
PI_{abs}	control	2.7318	0.1474	3.2497	0.4492	2.9908	0.2411
	–P	2.9058	0.1474	3.5211	0.4492	3.2134	0.2411

Variable	Factor	Young leaf		Old leaf		Total	
		mean	standard error	mean	standard error	mean	standard error
PI_{total}	control	1.9960	0.1938	2.0830	0.4503	2.0395	0.2355
	–P	2.3302	0.1938	2.5824	0.4503	2.4563	0.2355
DF_{total}	control	0.2957	0.0372	0.2927	0.0762	0.2942	0.0405
	–P	0.3558	0.0372	0.3697	0.0762	0.3628	0.0405
$p2G$	control	0.1261	0.0335	0.1191	0.0513	0.1226	0.0320
	–P	0.2263	0.0335	0.1030	0.0513	0.1647	0.0320

Source: own study.

Table S3. Parameter averages with standard error – term 2 (t_2)

Variable	Factor	Young leaf		Old leaf		Total	
		mean	standard error	mean	standard error	mean	standard error
t for F_m	control	295.0	16.77	331.7	38.89	313.3	20.57
	–P	283.3	16.77	288.3	38.89	285.8	20.57
Area (A_m)	control	79672.3	2316.0	75296.2	3242.6	77484.3	1957.0
	–P	74291.7	2316.0	73724.5	3242.6	74008.1	1957.0
Area to F_J	control	464.9	7.11	502.5	15.78	483.7	9.19
	–P	488.7	7.11	493.5	15.78	491.1	9.19
F_o	control	684.8	13.63	650.8	12.14	667.8	10.09
	–P	699.5	13.63	665.8	12.14	682.7	10.09
F_m	control	3369.3	63.65	3316.7	111.16	3343.0	61.95
	–P	3512.7	63.65	3430.0	111.16	3471.3	61.95
F_v	control	2684.5	54.10	2665.8	104.02	2675.2	56.17
	–P	2813.2	54.10	2764.2	104.02	2788.7	56.17
$F_K = 0.3$ ms	control	1174.2	34.34	1134.8	24.85	1154.5	22.25
	–P	1238.5	34.34	1160.3	24.85	1199.4	22.25
$F_J = 2$ ms	control	1707.2	40.80	1715.2	40.72	1711.2	28.45
	–P	1799.0	40.80	1730.3	40.72	1764.7	28.45
$F_I = 30$ ms	control	2543.7	76.9	2607.3	102.8	2575.5	61.7
	–P	2742.2	76.9	2708.8	102.8	2725.5	61.7
F_o/F_m	control	0.2032	0.0027	0.1973	0.0053	0.2003	0.0029
	–P	0.1993	0.0027	0.1945	0.0053	0.1969	0.0029
F_v/F_m	control	0.7968	0.0027	0.8027	0.0053	0.7997	0.0029
	–P	0.8007	0.0027	0.8055	0.0053	0.8031	0.0029
F_v/F_o	control	3.9233	0.0670	4.0891	0.1330	4.0062	0.0745
	–P	4.0242	0.0670	4.1557	0.1330	4.0900	0.0745
V_K	control	0.1823	0.0064	0.1822	0.0046	0.1823	0.0040
	–P	0.1915	0.0064	0.1792	0.0046	0.1853	0.0040
V_J	control	0.3810	0.0105	0.4003	0.0090	0.3907	0.0069
	–P	0.3915	0.0105	0.3860	0.0090	0.3887	0.0069
dVG/dt_o	control	2020.0	109.1	1920.0	68.0	1970.0	67.8
	–P	2283.3	109.1	2030.0	68.0	2156.7	67.8

Variable	Factor	Young leaf		Old leaf		Total	
		mean	standard error	mean	standard error	mean	standard error
dV/dt_o	control	1845.0	87.5	1832.5	61.1	1838.8	54.3
	–P	2051.7	87.5	1875.0	61.1	1963.3	54.3
S_m	control	29.69	0.9990	28.22	0.8025	28.96	0.6312
	–P	26.50	0.9990	26.76	0.8025	26.63	0.6312
S_S [RS]	control	0.5751	0.0095	0.6016	0.0064	0.5883	0.0067
	–P	0.5645	0.0095	0.5904	0.0064	0.5774	0.0067
S_S [VG]	control	0.4553	0.0089	0.4724	0.0063	0.4638	0.0058
	–P	0.4459	0.0089	0.4636	0.0063	0.4548	0.0058
$S_m/t(F_m)$	control	0.1021	0.0037	0.0933	0.0076	0.0977	0.0041
	–P	0.0937	0.0037	0.0928	0.0076	0.0932	0.0041
ABS/RC	control	2.1832	0.0399	2.0724	0.0299	2.1278	0.0291
	–P	2.2181	0.0399	2.1052	0.0299	2.1617	0.0291
DI_o/RC	control	0.4439	0.0116	0.4096	0.0158	0.4267	0.0106
	–P	0.4423	0.0116	0.4099	0.0158	0.4261	0.0106
Et_o/RC	control	1.0764	0.0224	0.9969	0.0181	1.0366	0.0167
	–P	1.0802	0.0224	1.0411	0.0181	1.0606	0.0167
RE_o/RC	control	0.5348	0.0162	0.4435	0.0179	0.4891	0.0158
	–P	0.4873	0.0162	0.4433	0.0179	0.4653	0.0158
$psi_{(o)} = ET_o/TR_o$	control	0.6190	0.0105	0.5997	0.0090	0.6093	0.0069
	–P	0.6085	0.0105	0.6140	0.0090	0.6113	0.0069
RC/CS_o	control	313.6	2.94	314.6	6.95	314.1	3.60
	–P	315.4	2.94	316.3	6.95	315.9	3.60
DI_o/CS_o	control	139.3	3.91	128.2	4.02	133.8	3.10
	–P	139.5	3.91	129.6	4.02	134.5	3.10
TR_o/CS_o	control	545.5	10.24	522.6	10.63	534.1	7.87
	–P	560.0	10.24	536.2	10.63	548.1	7.87
RE_o/CS_o	control	337.5	7.35	313.6	9.52	325.6	6.39
	–P	340.7	7.35	329.4	9.52	335.0	6.39
PI_{abs}	control	2.9512	0.2010	2.9966	0.2141	2.9739	0.1437
	–P	2.8647	0.2010	3.1658	0.2141	3.0153	0.1437
PI_{total}	control	2.9167	0.2280	2.3841	0.2018	2.6504	0.1559
	–P	2.4137	0.2280	2.4051	0.2018	2.4094	0.1559
DF_{total}	control	0.4607	0.0393	0.3743	0.0369	0.4175	0.0273
	–P	0.3691	0.0393	0.3686	0.0369	0.3689	0.0273
$p2G$	control	0.1792	0.0307	0.2203	0.0248	0.1998	0.0200
	–P	0.1258	0.0307	0.1753	0.0248	0.1506	0.0200

Source: own study.

Table S4. Parameter averages with standard error – term 3 (t_3)

Variable	Factor	Young leaf		Old leaf		Total	
		mean	standard error	mean	standard error	mean	standard error
t for F_m	control	330.0	16.06	305.0	22.32	317.5	13.89
	–P	291.7	16.06	326.7	22.32	309.2	13.89
Area (A_m)	control	76281.4	1723.9	78880.1	3029.1	77580.8	1689.6
	–P	74155.1	1723.9	72924.4	3029.1	73539.8	1689.6
Area to F_J	control	472.5	8.07	426.4	9.44	449.4	8.05
	–P	448.6	8.07	426.6	9.44	437.6	8.05
F_o	control	712.3	13.43	652.7	9.88	682.5	11.65
	–P	692.5	13.43	639.3	9.88	665.9	11.65
F_m	control	3406.0	67.13	3365.2	61.58	3385.6	45.26
	–P	3395.5	67.13	3283.0	61.58	3339.3	45.26
F_v	control	2693.7	57.50	2712.5	56.05	2703.1	38.85
	–P	2703.0	57.50	2643.7	56.05	2673.3	38.85
$F_K = 0.3$ ms	control	1246.5	31.81	1091.3	17.75	1168.9	28.16
	–P	1185.8	31.81	1047.3	17.75	1116.6	28.16
$F_J = 2$ ms	control	1783.0	39.40	1565.0	23.63	1674.0	36.68
	–P	1682.5	39.40	1513.2	23.63	1597.8	36.68
$F_I = 30$ ms	control	2571.2	71.5	2560.3	56.7	2565.8	43.8
	–P	2624.5	71.5	2580.3	56.7	2602.4	43.8
F_o/F_m	control	0.2092	0.0027	0.1941	0.0029	0.2016	0.0027
	–P	0.2041	0.0027	0.1949	0.0029	0.1995	0.0027
F_v/F_m	control	0.7908	0.0027	0.8059	0.0029	0.7984	0.0027
	–P	0.7959	0.0027	0.8051	0.0029	0.8005	0.0027
F_v/F_o	control	3.7860	0.0634	4.1561	0.0795	3.9710	0.0674
	–P	3.9022	0.0634	4.1382	0.0795	4.0202	0.0674
V_K	control	0.1981	0.0063	0.1619	0.0034	0.1800	0.0060
	–P	0.1828	0.0063	0.1544	0.0034	0.1686	0.0060
V_J	control	0.3975	0.0100	0.3368	0.0065	0.3672	0.0094
	–P	0.3670	0.0100	0.3308	0.0065	0.3489	0.0094
dVG/dt_o	control	2173.3	81.1	1770.0	65.5	1971.7	76.3
	–P	2036.7	81.1	1673.3	65.5	1855.0	76.3
dV/dt_o	control	2030.0	75.1	1660.0	38.2	1845.0	66.1
	–P	1873.3	75.1	1548.3	38.2	1710.8	66.1
S_m	control	28.37	0.7392	29.08	0.9730	28.73	0.5875
	–P	27.47	0.7392	27.59	0.9730	27.53	0.5875
S_S [RS]	control	0.5504	0.0080	0.5736	0.0064	0.5620	0.0068
	–P	0.5545	0.0080	0.5929	0.0064	0.5737	0.0068
S_S [VG]	control	0.4424	0.0071	0.4674	0.0055	0.4549	0.0062
	–P	0.4536	0.0071	0.4881	0.0055	0.4709	0.0062
$S_m/t(Fm)$	control	0.0871	0.0028	0.0967	0.0045	0.0919	0.0029
	–P	0.0942	0.0028	0.0858	0.0045	0.0900	0.0029

Variable	Factor	Young leaf		Old leaf		Total	
		mean	standard error	mean	standard error	mean	standard error
ABS/RC	control	2.3016	0.0364	2.1635	0.0263	2.2326	0.0317
	–P	2.2671	0.0364	2.0976	0.0263	2.1823	0.0317
DI_o/RC	control	0.4820	0.0125	0.4200	0.0101	0.4510	0.0116
	–P	0.4629	0.0125	0.4092	0.0101	0.4361	0.0116
Et_o/RC	control	1.0958	0.0209	1.1563	0.0165	1.1260	0.0143
	–P	1.1421	0.0209	1.1297	0.0165	1.1359	0.0143
RE_o/RC	control	0.5646	0.0149	0.5173	0.0145	0.5410	0.0132
	–P	0.5159	0.0149	0.4492	0.0145	0.4825	0.0132
$psi_{(o)} = ET_o/TR_o$	control	0.6025	0.0100	0.6632	0.0065	0.6328	0.0094
	–P	0.6330	0.0100	0.6692	0.0065	0.6511	0.0094
RC/CS_o	control	309.4	3.07	301.6	4.01	305.5	2.55
	–P	305.6	3.07	305.0	4.01	305.3	2.55
DI_o/CS_o	control	149.1	3.85	126.7	2.99	137.9	3.78
	–P	141.3	3.85	124.7	2.99	133.0	3.78
TR_o/CS_o	control	563.2	10.21	526.0	7.72	544.6	8.25
	–P	551.2	10.21	514.7	7.72	532.9	8.25
RE_o/CS_o	control	339.1	8.08	348.9	6.79	344.0	5.16
	–P	349.1	8.08	344.5	6.79	346.8	5.16
PI_{abs}	control	2.5216	0.1769	3.8075	0.1923	3.1646	0.2143
	–P	3.0018	0.1769	4.0138	0.1923	3.5078	0.2143
PI_{total}	control	2.7023	0.1690	3.0900	0.1810	2.8961	0.1268
	–P	2.4735	0.1690	2.6668	0.1810	2.5701	0.1268
DF_{total}	control	0.4252	0.0274	0.4860	0.0293	0.4556	0.0204
	–P	0.3912	0.0274	0.4204	0.0293	0.4058	0.0204
$p2G$	control	0.2517	0.0204	0.3065	0.0661	0.2791	0.0335
	–P	0.2168	0.0204	0.2191	0.0661	0.2180	0.0335

Source: own study.

Table S5. Parameter averages with standard error – term 4 (t_4)

Variable	Factor	Young leaf		Old leaf		Total	
		mean	standard error	mean	standard error	mean	standard error
t for F_m	control	320.0	18.92	345.0	23.96	332.5	15.61
	–P	281.7	18.92	328.3	23.96	305.0	15.61
Area (A_m)	control	71602.2	2100.3	80476.8	2132.6	76039.5	1810.2
	–P	66997.1	2100.3	72513.3	2132.6	69755.2	1810.2
Area to F_J	control	420.7	8.77	447.6	10.39	434.2	7.11
	–P	441.6	8.77	447.2	10.39	444.4	7.11
F_o	control	634.5	11.18	622.8	13.21	628.7	11.49
	–P	700.0	11.18	625.8	13.21	662.9	11.49
F_m	control	3125.2	62.34	3268.0	69.04	3196.6	47.61
	–P	3132.2	62.34	3209.8	69.04	3171.0	47.61

Variable	Factor	Young leaf		Old leaf		Total	
		mean	standard error	mean	standard error	mean	standard error
F_v	control	2490.7	56.85	2645.2	57.08	2567.9	44.81
	–P	2432.2	56.85	2584.0	57.08	2508.1	44.81
$F_K = 0.3$ ms	control	1044.3	27.49	1027.8	31.90	1036.1	24.71
	–P	1166.5	27.49	1032.3	31.90	1099.4	24.71
$F_J = 2$ ms	control	1508.0	38.01	1524.2	42.03	1516.1	30.76
	–P	1664.7	38.01	1527.7	42.03	1596.2	30.76
$F_I = 30$ ms	control	2342.7	67.2	2459.7	85.8	2401.2	54.8
	–P	2371.8	67.2	2485.5	85.8	2428.7	54.8
F_o/F_m	control	0.2034	0.0037	0.1906	0.0016	0.1970	0.0039
	–P	0.2236	0.0037	0.1950	0.0016	0.2093	0.0039
F_v/F_m	control	0.7966	0.0037	0.8094	0.0016	0.8030	0.0039
	–P	0.7764	0.0037	0.8050	0.0016	0.7907	0.0039
F_v/F_o	control	3.9297	0.0853	4.2497	0.0443	4.0897	0.0900
	–P	3.4749	0.0853	4.1277	0.0443	3.8013	0.0900
V_K	control	0.1647	0.0053	0.1532	0.0053	0.1589	0.0053
	–P	0.1915	0.0053	0.1567	0.0053	0.1741	0.0053
V_J	control	0.3512	0.0089	0.3410	0.0091	0.3461	0.0080
	–P	0.3963	0.0089	0.3488	0.0091	0.3726	0.0080
dVG/dt_o	control	1646.7	75.2	1560.0	106.5	1603.3	68.0
	–P	1883.3	75.2	1640.0	106.5	1761.7	68.0
dV/dt_o	control	1550.8	69.4	1525.8	77.1	1538.3	54.9
	–P	1760.0	69.4	1536.7	77.1	1648.3	54.9
S_m	control	28.87	1.0572	30.45	1.2301	29.66	0.7948
	–P	27.57	1.0572	28.26	1.2301	27.91	0.7948
S_S [RS]	control	0.5865	0.0063	0.6143	0.0115	0.6004	0.0083
	–P	0.5711	0.0063	0.6140	0.0115	0.5925	0.0083
S_S [VG]	control	0.4824	0.0066	0.4975	0.0084	0.4900	0.0067
	–P	0.4588	0.0066	0.4972	0.0084	0.4780	0.0067
$S_m/t(F_m)$	control	0.0916	0.0035	0.0897	0.0043	0.0906	0.0029
	–P	0.0981	0.0035	0.0871	0.0043	0.0926	0.0029
ABS/RC	control	2.1422	0.0244	2.0141	0.0381	2.0781	0.0353
	–P	2.2566	0.0244	2.0278	0.0381	2.1422	0.0353
DI_o/RC	control	0.4359	0.0107	0.3840	0.0080	0.4100	0.0144
	–P	0.5046	0.0107	0.3954	0.0080	0.4500	0.0144
Et_o/RC	control	1.1065	0.0138	1.0738	0.0225	1.0901	0.0131
	–P	1.0573	0.0138	1.0629	0.0225	1.0601	0.0131
RE_o/RC	control	0.5373	0.0172	0.4973	0.0144	0.5173	0.0149
	–P	0.5478	0.0172	0.4588	0.0144	0.5033	0.0149
$psi_{(o)} = ET_o/TR_o$	control	0.6488	0.0089	0.6590	0.0091	0.6539	0.0080
	–P	0.6037	0.0089	0.6512	0.0091	0.6274	0.0080
RC/CS_o	control	296.2	2.74	309.5	3.73	302.9	2.63
	–P	310.1	2.74	308.5	3.73	309.3	2.63

| Variable	Factor	Young leaf		Old leaf		Total	
		mean	standard error	mean	standard error	mean	standard error
DI_o/CS_o	control	129.2	3.90	118.8	2.88	124.0	4.48
	–P	156.5	3.90	122.0	2.88	139.3	4.48
TR_o/CS_o	control	505.3	8.36	504.1	10.54	504.7	7.68
	–P	543.5	8.36	503.8	10.54	523.6	7.68
RE_o/CS_o	control	327.8	5.36	332.1	7.34	329.9	4.36
	–P	327.9	5.36	327.9	7.34	327.9	4.36
PI_{abs}	control	3.4327	0.1912	4.1341	0.2205	3.7834	0.2218
	–P	2.3586	0.1912	3.8191	0.2205	3.0888	0.2218
PI_{total}	control	3.3072	0.2592	3.6141	0.3152	3.4607	0.2035
	–P	2.5373	0.2592	3.0055	0.3152	2.7714	0.2035
DF_{total}	control	0.5068	0.0350	0.5494	0.0461	0.5281	0.0287
	–P	0.4029	0.0350	0.4635	0.0461	0.4332	0.0287
$p2G$	control	0.2909	0.0350	0.3944	0.0934	0.3426	0.0488
	–P	0.2405	0.0350	0.2392	0.0934	0.2399	0.0488

Source: own study.
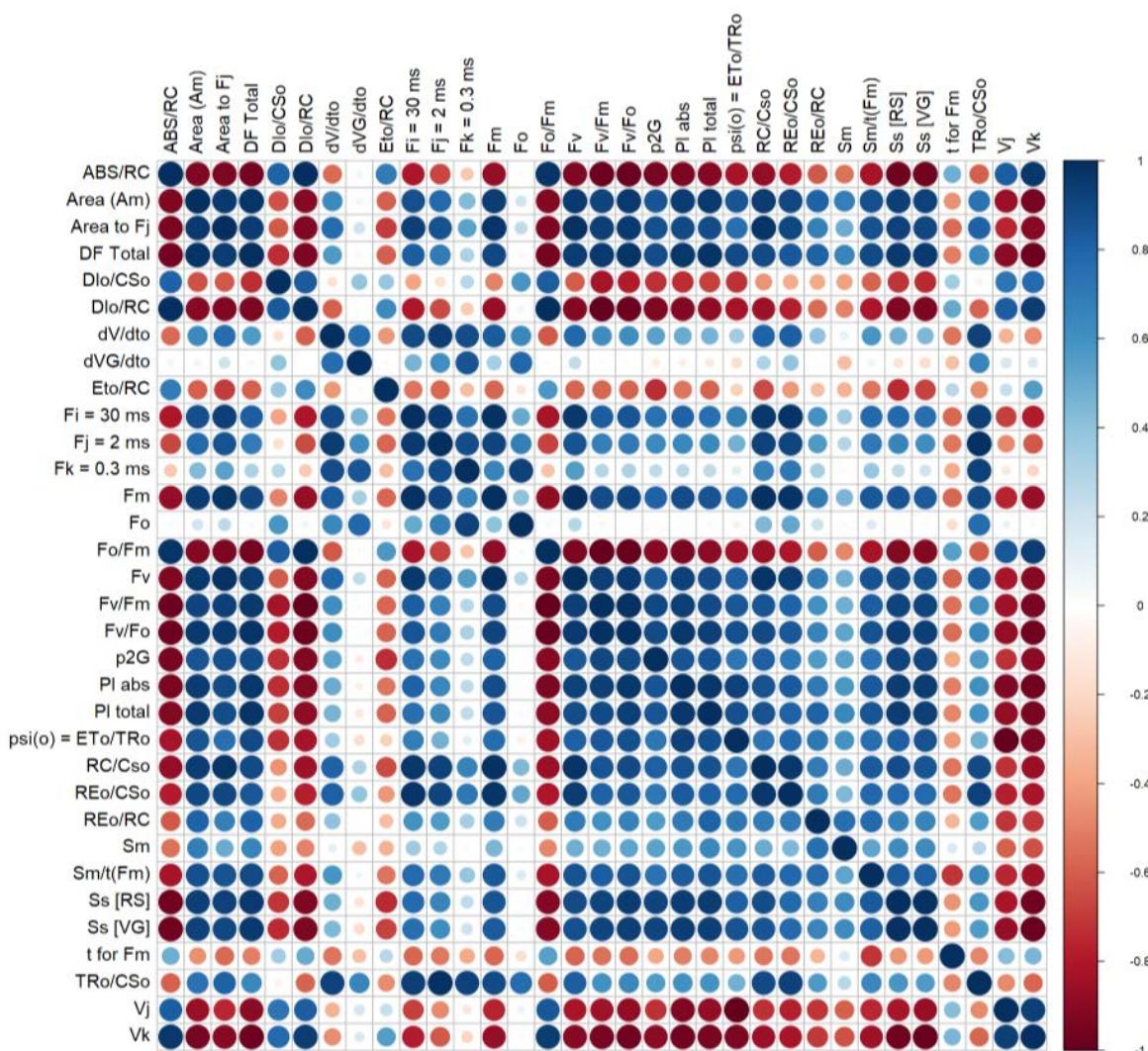
Fig. S1. Pearson correlations between indices for control plants; source: own study
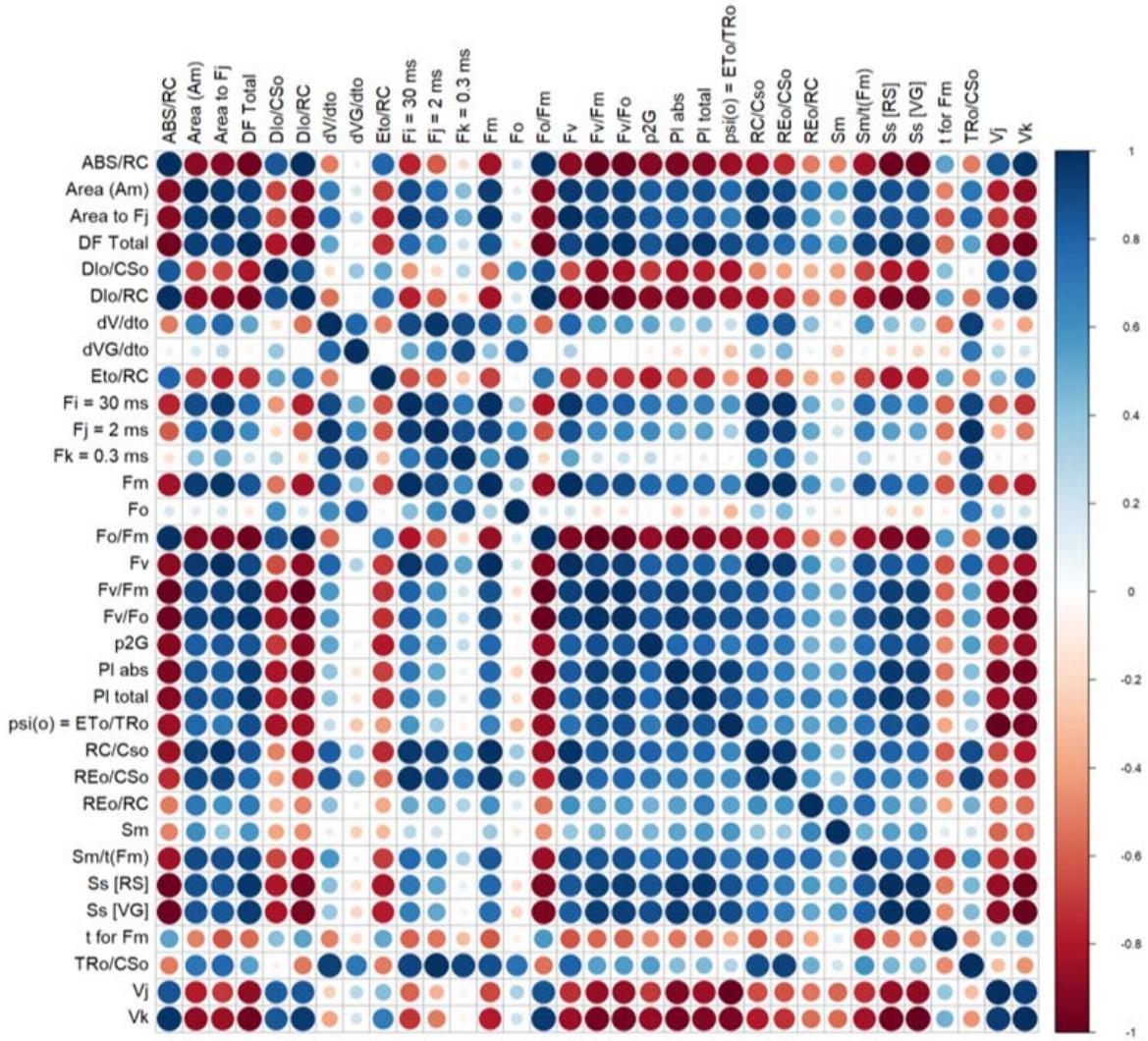
Fig. S2. Pearson correlations between indices for plants with phosphorus deficiency; source: own study
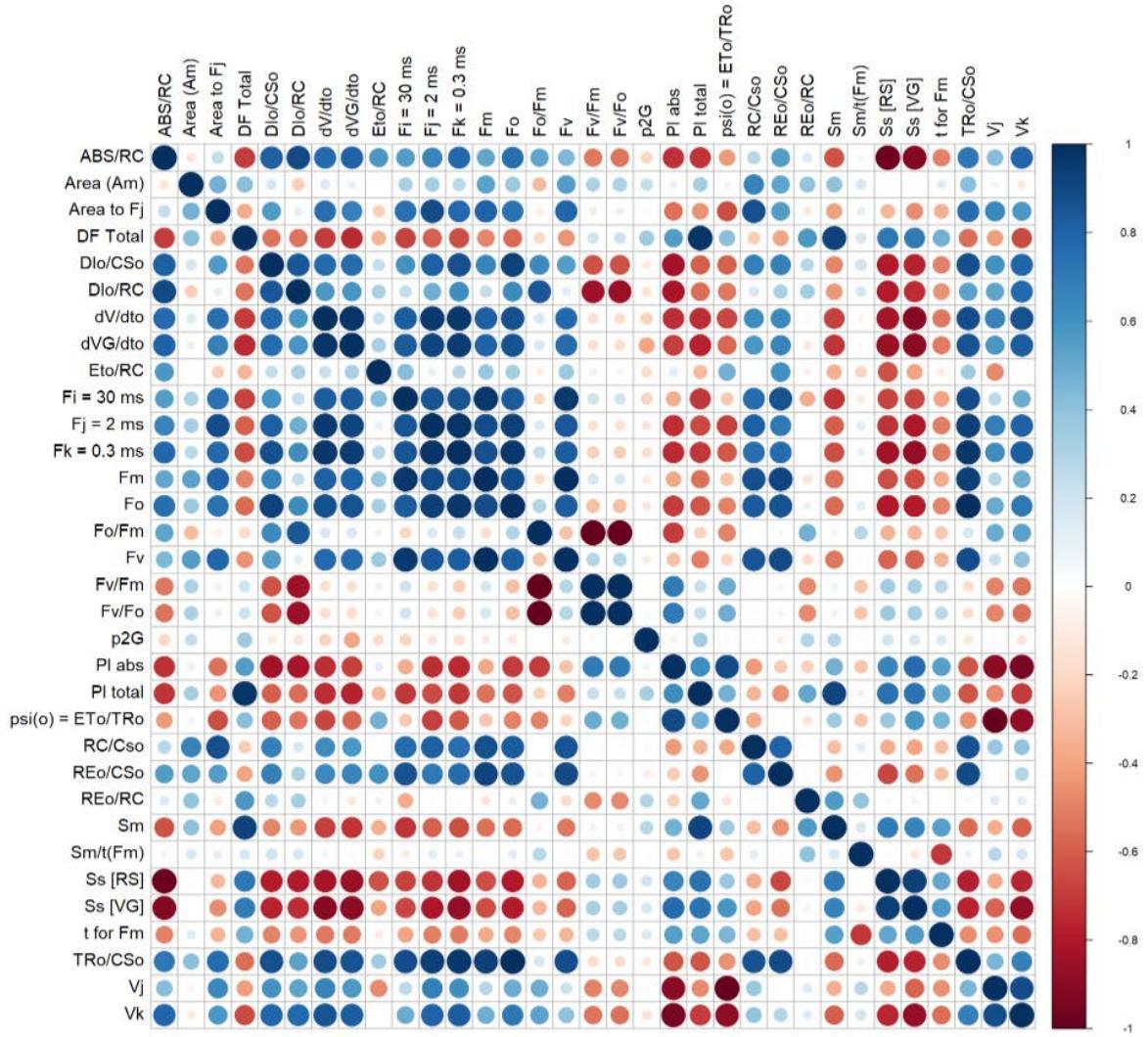
Fig. S3. Pearson correlations between plant indices without stress and leaf age; source: own study

Table S6. Rotated component matrix

Parameter	Component		
	1	2	3
t for F_m	**−0.900**	−0.310	−0.178
Area (A_m)	**0.870**	0.330	0.341
Area to F_J	**0.779**	0.433	0.431
F_o	−0.179	**0.885**	0.051
F_m	**0.801**	0.505	0.312
F_v	**0.830**	0.450	0.315
$F_K = 0.3$ ms	0.237	**0.955**	0.165
$F_J = 2$ ms	0.583	**0.723**	0.358
$F_I = 30$ ms	**0.728**	0.581	0.326
F_o/F_m	**−0.878**	−0.298	−0.360
F_v/F_m	**0.878**	0.298	0.360
F_v/F_o	**0.880**	0.281	0.349
V_K	**−0.910**	−0.149	−0.374
V_J	**−0.970**	−0.023	−0.111
dVG/dt_o	−0.099	**0.962**	−0.130
dV/dt_o	0.466	**0.836**	0.202
S_m	**0.782**	−0.054	0.391
S_S [RS]	**0.772**	0.086	0.623
S_S [VG]	**0.847**	0.079	0.510
$S_m/t(F_m)$	**0.903**	0.220	0.256
ABS/RC	**−0.840**	−0.241	−0.483
DI_o/RC	**−0.851**	−0.289	−0.430
Et_o/RC	−0.383	−0.207	**−0.884**
RE_o/RC	**0.849**	0.237	−0.092
$psi_{(o)} = ET_o/TR_o$	**0.970**	0.023	0.111
RC/CS_o	**0.750**	0.434	0.487
DI_o/CS_o	**−0.917**	−0.028	−0.297
TR_o/CS_o	0.598	**0.737**	0.282
RE_o/CS_o	**0.815**	0.506	0.223
PI_{abs}	**0.917**	0.096	0.338
PI_{total}	**0.928**	0.094	0.316
DF_{total}	**0.912**	0.226	0.336
$p2G$	**0.778**	0.277	0.528
Total variance explained – rotation sums of squared loadings			
Total	20.315	6.749	4.533
% of variance	61.561	20.451	13.737
Cumulative %	61.561	82.012	95.749

Source: own study.
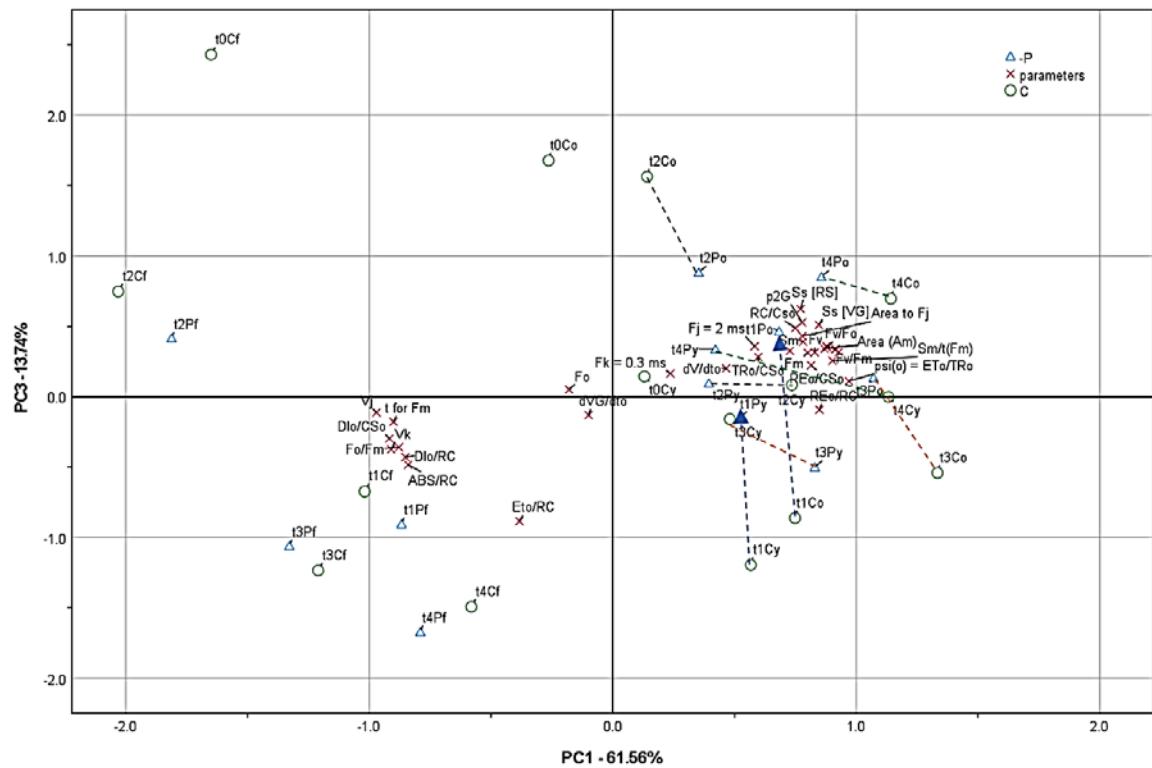
Fig. S4. Analysed components in the space of two principal components (PC1 and PC3) explaining a total of 75.30% of the overall variability along with the experimental layouts; source: own study