

Table 1S. The measured and calculated chlorophyll fluorescence variables in healthy and PVY infected control rooted plants (C), control grafts (C/C), transgenic rooted plants (T), and transgenic grafts (T/C) 3, 7, and 14 days after the inoculation (DAI). The values are means $\pm$ SE. Values within the same row followed by the same letter(s) are not significantly different ($P < 0.05$).

Stage	Parameter	C healthy	C PVY	C/C healthy	C/C PVY	T healthy	T PVY	T/C healthy	T/C PVY
3 DAI	F_0	718 ± 7^a	738 ± 11^{ab}	711 ± 10^{abc}	710 ± 9^{abc}	684 ± 5^{ac}	693 ± 10^{ac}	671 ± 11^c	669 ± 13^c
	F_m	$3,778 \pm 32^a$	$3,785 \pm 37^a$	$3,722 \pm 28^a$	$3,645 \pm 56^a$	$3,597 \pm 40^{ab}$	$3,362 \pm 53^b$	$2,941 \pm 107^c$	$2,914 \pm 102^c$
	F_v/F_0	4.272 ± 0.012^a	4.156 ± 0.069^a	4.216 ± 0.047^a	4.111 ± 0.057^a	4.268 ± 0.032^a	3.919 ± 0.091^a	3.435 ± 0.130^b	3.348 ± 0.193^b
	V_j	0.454 ± 0.006^a	0.445 ± 0.004^a	0.442 ± 0.005^a	0.453 ± 0.012^a	4.424 ± 0.005^a	0.436 ± 0.007^a	0.547 ± 0.019^b	0.600 ± 0.019^b
	V_i	0.802 ± 0.005^a	0.780 ± 0.005^a	0.779 ± 0.003^a	0.784 ± 0.005^a	0.804 ± 0.009^{ab}	0.811 ± 0.009^{ab}	0.829 ± 0.001^{abc}	0.845 ± 0.005^c
	ϕ_{P_0}	0.810 ± 0.001^a	0.806 ± 0.003^a	0.808 ± 0.002^a	0.806 ± 0.002^a	0.810 ± 0.001^a	0.796 ± 0.004^a	0.774 ± 0.006^b	0.768 ± 0.010^b
	ψ_0	0.546 ± 0.006^a	0.555 ± 0.004^a	0.558 ± 0.005^a	0.547 ± 0.012^a	0.576 ± 0.005^a	0.564 ± 0.007^a	0.453 ± 0.019^b	0.400 ± 0.019^b
	ϕ_{E_0}	0.442 ± 0.005^a	0.447 ± 0.003^a	0.451 ± 0.005^a	0.441 ± 0.011^a	0.467 ± 0.004^a	0.449 ± 0.006^a	0.353 ± 0.016^b	0.308 ± 0.018^b
	ϕ_{D_0}	0.190 ± 0.001^a	0.194 ± 0.003^a	0.192 ± 0.002^a	0.194 ± 0.002^a	0.190 ± 0.001^a	0.204 ± 0.004^a	0.226 ± 0.006^b	0.232 ± 0.010^b
	ABS/RC	1.932 ± 0.024^a	2.001 ± 0.034^a	1.906 ± 0.023^a	1.916 ± 0.036^a	1.778 ± 0.017^a	1.877 ± 0.043^a	2.578 ± 0.106^b	2.875 ± 0.295^b
	TR ₀ /RC	1.565 ± 0.019^a	1.610 ± 0.023^a	1.540 ± 0.016^a	1.543 ± 0.026^a	1.442 ± 0.015^a	1.493 ± 0.028^a	1.992 ± 0.074^b	2.193 ± 0.196^b
	DI ₀ /RC	0.366 ± 0.005^a	0.389 ± 0.010^a	0.366 ± 0.007^a	0.372 ± 0.010^a	0.336 ± 0.004^a	0.384 ± 0.016^a	0.586 ± 0.035^b	0.682 ± 0.100^b
	RC/CS ₀	372.9 ± 5.3^a	369.7 ± 4.7^a	373.6 ± 2.5^a	375.8 ± 7.7^a	384.8 ± 3.8^a	365.3 ± 5.2^a	256.9 ± 16.2^b	242.1 ± 19.8^b
	PI _(abs)	2.68 ± 0.07^a	2.59 ± 0.10^a	2.81 ± 0.13^a	2.68 ± 0.17^a	3.22 ± 0.08^a	2.88 ± 0.15^a	1.10 ± 0.13^b	0.90 ± 0.20^b
7 DAI	M_0	0.707 ± 0.012^a	0.721 ± 0.014^a	0.683 ± 0.008^a	0.712 ± 0.014^a	0.612 ± 0.011^a	0.653 ± 0.017^a	1.097 ± 0.045^b	1.326 ± 0.149^b
	F_0	738 ± 4^a	745 ± 8^a	708 ± 10^{ab}	737 ± 11^a	677 ± 13^{bc}	680 ± 9^{bc}	660 ± 10^c	660 ± 23^c
	F_m	$3,792 \pm 19^a$	$3,786 \pm 34^a$	$3,634 \pm 49^a$	$3,731 \pm 28^a$	$3,648 \pm 52^a$	$3,657 \pm 37^a$	$3,101 \pm 29^b$	$2,981 \pm 147^b$
	F_v/F_0	4.107 ± 0.026^a	4.086 ± 0.051^a	4.187 ± 0.107^{ab}	4.110 ± 0.095^a	4.400 ± 0.033^{ab}	4.386 ± 0.032^{ab}	3.700 ± 0.039^{ac}	3.439 ± 0.325^c
	V_j	0.458 ± 0.008^a	0.451 ± 0.010^a	0.459 ± 0.016^a	0.483 ± 0.021^a	0.379 ± 0.012^b	0.368 ± 0.005^b	0.555 ± 0.008^c	0.565 ± 0.029^c
	V_i	0.787 ± 0.003^a	0.790 ± 0.003^a	0.815 ± 0.004^{ab}	0.805 ± 0.005^a	0.794 ± 0.013^a	0.791 ± 0.007^a	0.841 ± 0.004^c	0.861 ± 0.009^c
	ϕ_{P_0}	0.804 ± 0.001^a	0.803 ± 0.002^a	0.807 ± 0.004^a	0.804 ± 0.004^a	0.815 ± 0.001^{ab}	0.814 ± 0.001^{ab}	0.787 ± 0.002^{ac}	0.771 ± 0.017^c
	ψ_0	0.542 ± 0.008^a	0.549 ± 0.010^a	0.541 ± 0.016^a	0.517 ± 0.021^a	0.621 ± 0.012^b	0.632 ± 0.005^b	0.445 ± 0.008^c	0.435 ± 0.029^c
	ϕ_{E_0}	0.436 ± 0.007^a	0.441 ± 0.009^a	0.437 ± 0.015^a	0.416 ± 0.019^a	0.506 ± 0.010^b	0.505 ± 0.010^b	0.351 ± 0.007^c	0.338 ± 0.030^c
	ϕ_{D_0}	0.196 ± 0.001^a	0.197 ± 0.002^a	0.193 ± 0.004^a	0.196 ± 0.004^a	0.185 ± 0.001^{ab}	0.186 ± 0.001^{ab}	0.213 ± 0.002^{ac}	0.229 ± 0.017^c
	ABS/RC	1.965 ± 0.016^a	1.977 ± 0.018^a	1.889 ± 0.023^a	1.929 ± 0.045^a	1.765 ± 0.025^a	1.705 ± 0.018^a	2.598 ± 0.082^b	2.909 ± 0.377^b
	TR ₀ /RC	1.581 ± 0.013^a	1.588 ± 0.012^a	1.521 ± 0.015^a	1.549 ± 0.029^a	1.435 ± 0.018^a	1.389 ± 0.016^a	2.045 ± 0.062^b	2.199 ± 0.234^b
	DI ₀ /RC	0.385 ± 0.003^a	0.389 ± 0.007^a	0.366 ± 0.011^{ab}	0.380 ± 0.017^a	0.327 ± 0.006^{ab}	0.316 ± 0.003^{ab}	0.553 ± 0.022^{ac}	0.702 ± 0.139^c
	RC/CS ₀	376.5 ± 2.1^a	376.9 ± 4.5^a	373.4 ± 3.2^a	380.7 ± 2.5^a	384.7 ± 3.1^a	388.9 ± 4.7^a	253.6 ± 7.1^b	249.1 ± 23.7^b
	PI _(abs)	2.49 ± 0.11^a	2.56 ± 0.15^a	2.69 ± 0.24^a	2.39 ± 0.24^a	4.15 ± 0.26^b	4.00 ± 0.47^b	1.18 ± 0.09^c	1.24 ± 0.36^c
	M_0	0.723 ± 0.013^a	0.714 ± 0.021^a	0.699 ± 0.027^a	0.752 ± 0.046^a	0.545 ± 0.022^a	0.512 ± 0.015^a	1.136 ± 0.049^b	1.289 ± 0.205^b

Table 1S continues on the next page.

Table 1S (continued)

Stage	Parameter	C healthy	C PVY	C/C healthy	C/C PVY	T healthy	T PVY	T/C healthy	T/C PVY
14 DAI	F_0	714 ± 5^a	787 ± 14^b	734 ± 8^{ab}	798 ± 10^{bc}	699 ± 6^a	761 ± 37^{abc}	686 ± 21^a	734 ± 24^{abc}
	F_m	$3,783 \pm 27^a$	$3,738 \pm 32^b$	$3,557 \pm 49^a$	$3,455 \pm 197^b$	$3,666 \pm 78^a$	$3,441 \pm 56^{ab}$	$3,109 \pm 37^b$	$3,200 \pm 104^b$
	F_v/F_0	4.293 ± 0.020^a	3.729 ± 0.077^b	3.836 ± 0.098^{ab}	3.358 ± 0.297^b	4.240 ± 0.090^{ab}	3.542 ± 0.116^{bc}	3.585 ± 0.162^{bc}	3.358 ± 0.296^{bc}
	V_j	0.455 ± 0.005^a	0.501 ± 0.021^{ac}	0.474 ± 0.010^a	0.509 ± 0.025^{ac}	0.368 ± 0.010^b	0.380 ± 0.013^b	0.567 ± 0.022^c	0.577 ± 0.029^c
	V_i	0.813 ± 0.004^a	0.826 ± 0.003^{ab}	0.836 ± 0.005^{ab}	0.824 ± 0.011^{ab}	0.794 ± 0.013^a	0.806 ± 0.008^a	0.825 ± 0.009^{ab}	0.855 ± 0.008^b
	ϕ_{p0}	0.811 ± 0.001^a	0.788 ± 0.003^{ab}	0.793 ± 0.004^{ab}	0.761 ± 0.021^b	0.809 ± 0.003^a	0.776 ± 0.011^{ab}	0.780 ± 0.009^{ab}	0.766 ± 0.016^{ab}
	ψ_0	0.545 ± 0.005^a	0.499 ± 0.021^{ac}	0.526 ± 0.010^a	0.492 ± 0.025^{ac}	0.632 ± 0.010^b	0.620 ± 0.013^b	0.433 ± 0.022^c	0.423 ± 0.029^c
	ϕ_{E0}	0.443 ± 0.004^a	0.394 ± 0.019^{ac}	0.418 ± 0.010^{ac}	0.361 ± 0.029^c	0.510 ± 0.008^b	0.482 ± 0.017^{ab}	0.339 ± 0.021^c	0.325 ± 0.028^c
	ϕ_{D0}	0.189 ± 0.001^a	0.212 ± 0.003^{ab}	0.207 ± 0.004^{ab}	0.239 ± 0.021^b	0.191 ± 0.003^a	0.224 ± 0.011^b	0.220 ± 0.009^{ab}	0.234 ± 0.016^{ab}
	ABS/RC	2.044 ± 0.026^a	2.282 ± 0.053^{ab}	2.015 ± 0.031^a	2.282 ± 0.045^b	1.796 ± 0.023^a	1.989 ± 0.105^a	2.407 ± 0.163^{ab}	2.618 ± 0.256^b
	TR ₀ /RC	1.659 ± 0.020^a	1.798 ± 0.038^{ac}	1.599 ± 0.015^{ab}	1.707 ± 0.041^{abc}	1.449 ± 0.015^{ab}	1.538 ± 0.060^{ab}	1.874 ± 0.108^{ac}	1.990 ± 0.156^c
	DI ₀ /RC	0.386 ± 0.005^a	0.484 ± 0.017^{bc}	0.418 ± 0.015^{abc}	0.557 ± 0.074^{bcd}	0.343 ± 0.009^a	0.452 ± 0.047^{abc}	0.533 ± 0.058^{bcd}	0.628 ± 0.102^{bcd}
	RC/CS ₀	348.0 ± 4.4^a	349.4 ± 6.1^a	364.7 ± 2.6^{ab}	353.2 ± 9.4^a	389.0 ± 4.6^b	380.8 ± 4.3^{ab}	286.7 ± 15.0^c	290.8 ± 19.1^c
	PI _(abs)	2.55 ± 0.06^a	1.71 ± 0.21^{bc}	2.17 ± 0.17^{abc}	1.52 ± 0.30^{bee}	4.03 ± 0.23^d	3.18 ± 0.48^a	1.27 ± 0.21^e	1.11 ± 0.36^e
	M ₀	0.749 ± 0.010^a	0.907 ± 0.047^{be}	0.759 ± 0.008^a	0.880 ± 0.034^{abee}	0.542 ± 0.009^d	0.582 ± 0.043^{ad}	1.082 ± 0.087^e	1.194 ± 0.140^e