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Supplementary Material: *Functional Plant Biology*

Supplementary Material

Inhibition of non-photochemical quenching increases functional absorption cross-section of photosystem II as excitation from closed reaction centres is transferred to open centres, facilitating earlier light saturation of photosynthetic electron transport

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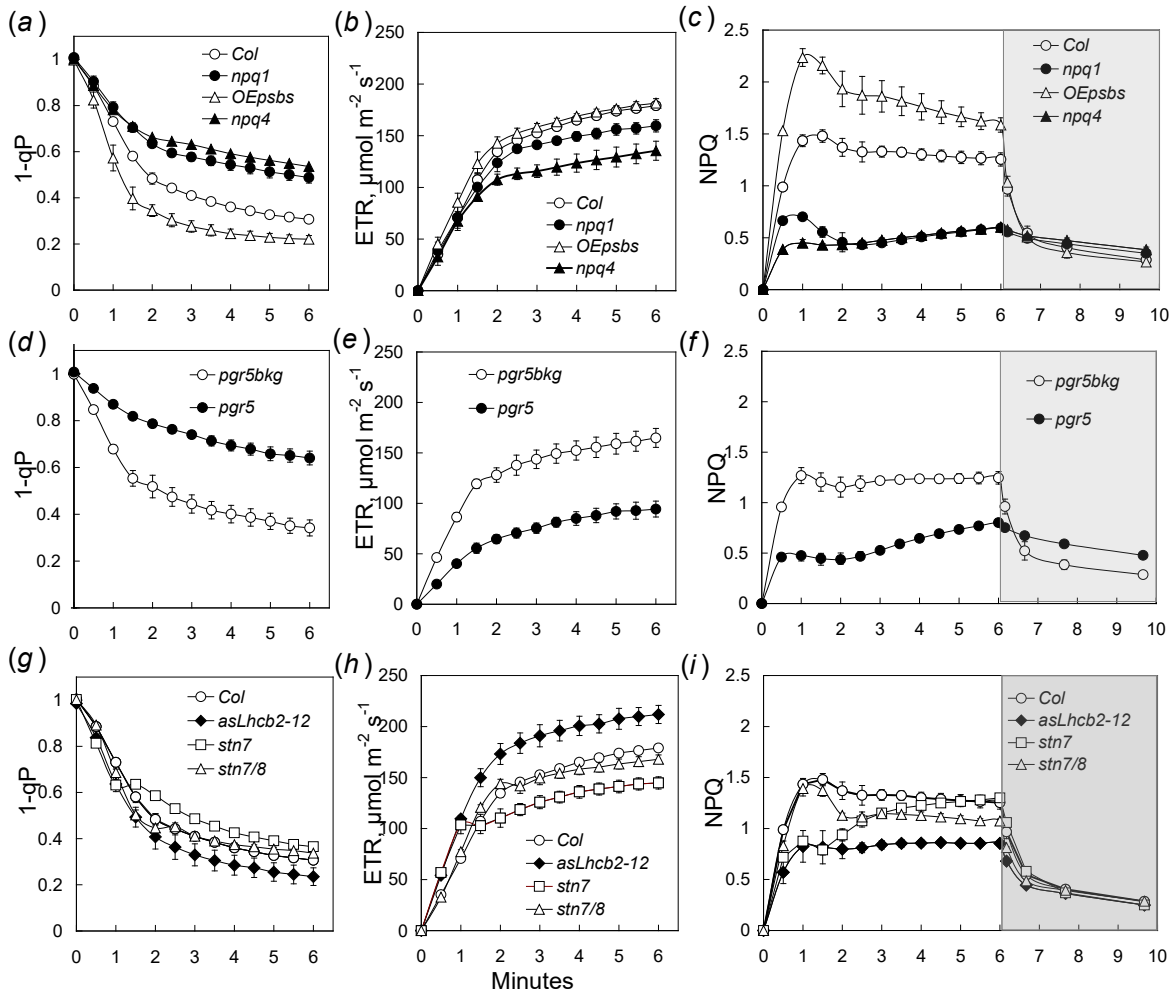
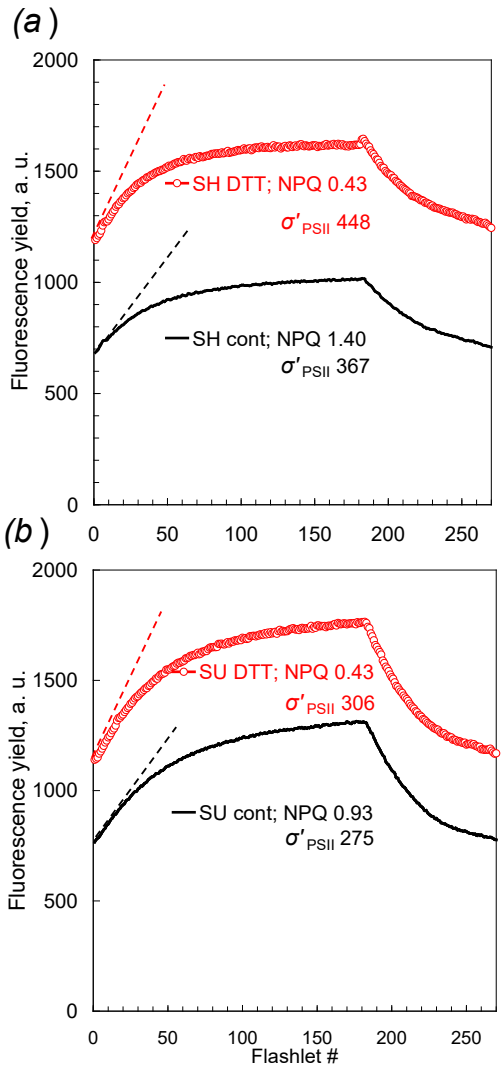
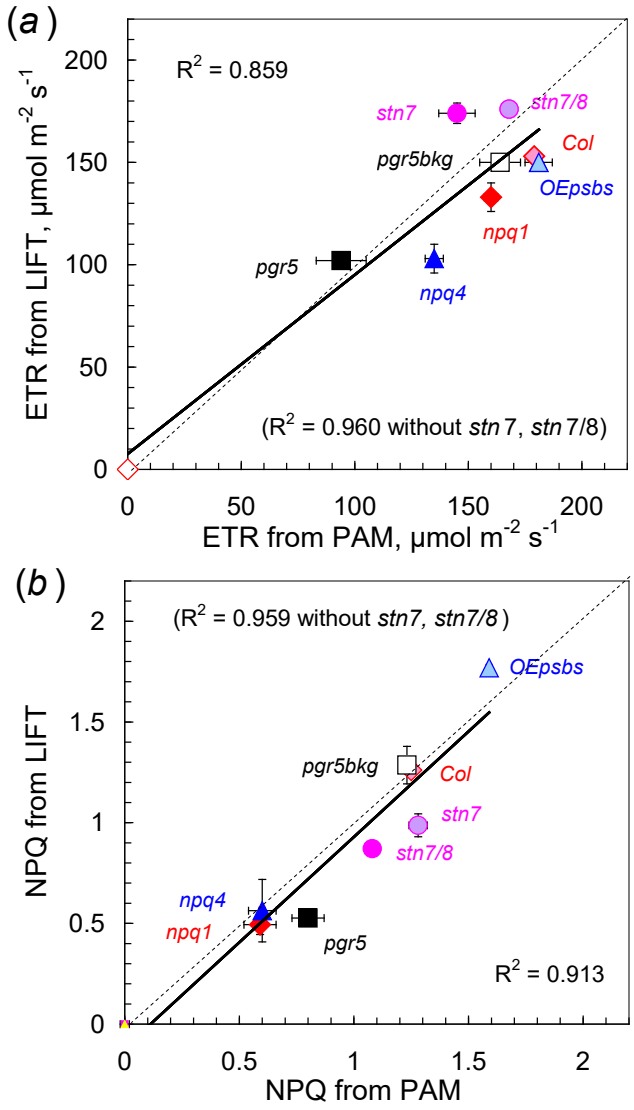


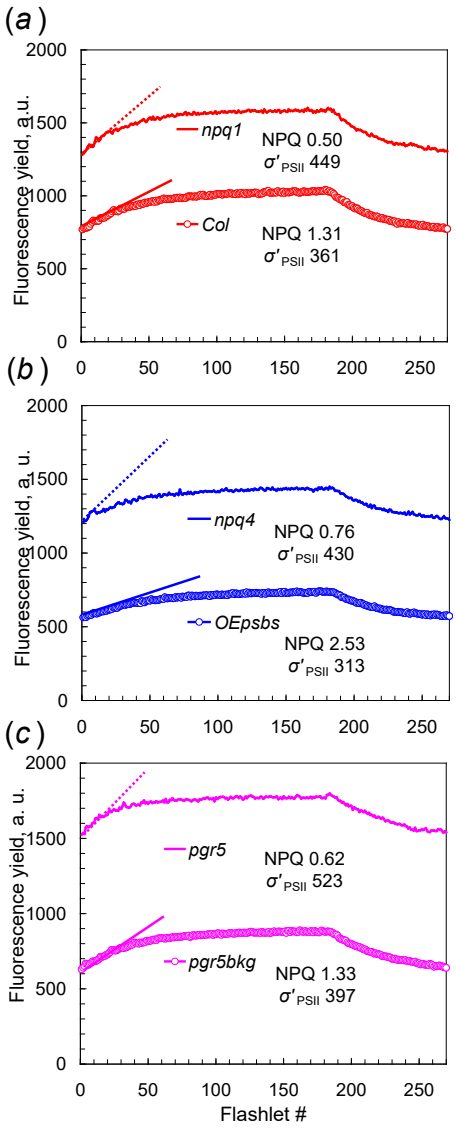
Supplementary data I: Induction of NPQ in dark adapted *Arabidopsis* genotypes transferred to 1000 µmol photons m^{-2} s^{-1} WL as monitored by saturating pulse of MINI-PAM at intervals of 30 s (means ± s.e; $n = 3$; error bars appear when they exceed symbol size).



Supplementary data II: To a first approximation, increase of functional absorption cross-section of PSII (σ'_{PSII}) is evident as an increase in the initial slope (drawn by eye) of the SQ_A phase of the transient chlorophyll fluorescence from individual Q_A flashes of LIFT/FRR. Treatment with DTT inhibits steady state NPQ and increases σ'_{PSII} in detached leaves of (*a*) shade- and (*b*) sun-grown spinach (SH and SU respectively) shown in representative Q_A flash transients 7.5 min. after transfer from dark to 530 µmol m^{-2} s^{-1} WL. Values of NPQ and σ'_{PSII} (units of $Å^2$/RCII) from FRR model fit to the transients are shown in each case.



Supplementary data III: Correlations between ETR and NPQ measured in rosettes of *Arabidopsis* using LIFT with those measured by MINI-PAM in leaves of *Arabidopsis* genotypes during steady state after 5 to 6 min. induction in 1050 µmol photons m^{-2} s^{-1} WL (broken line = ratio 1:1). The LIFT assays (n = 2–4 plants) were done on different individuals from the same populations of genotypes three and four days after the MINI-PAM assays (n = 3 plants; mean ± s.e.).



Supplementary data IV: The greater initial slope of the Q_A flash in *Arabidopsis* NPQ mutants, compared to their corresponding NPQ replete genotypes, after 9 min in 1000 µmol m^{-2} s^{-1} WL confirmed that σ'_{PSII} increases when NPQ is impaired. Values of NPQ and σ'_{PSII} (units of $Å^2$/RCII) from FRR model fit to the individual transients are shown in each case.