



Fig. 1S. Images of effective quantum yield of PSII ( $\Phi_{\text{PSII}}$ ) in intact and detached roots of various *Arabidopsis* lines. For the detached root sample, roots were excised from 21-d-old seedlings and grown for 7 d, whereas for the intact root control, shoots of 28-d-old seedlings were removed immediately before experiments. Data were obtained from the samples exposed to actinic light ( $110 \mu\text{mol photons m}^{-2} \text{ s}^{-1}$ ) for 10 min. The color scale represents the  $\Phi_{\text{PSII}}$  value ranged from 0 (red) to 0.6 (purple). Bar = 1.0 cm.