Appendix A: Formulae and definitions of terms used by the JIP-test for the analysis of Chl *a* fluorescence transient OJIP (from Strasser *et al.* 2004; Tsimilli-Michael and Strasser 2013).

Data extracted from the recorded fluorescence transient OJIP	
F_t	Fluorescence at time t after onset of actinic illumination
$F_{20\mu s}$	minimal reliable recorded fluorescence, at 20 µs with the Handy-PEA-fluorimeter
$F_{50\mu s}$	Fluorescence at 50 µs
$F_{300\mu s}$	Fluorescence at 300 µs
F_J	Fluorescence at the J-step (2 ms) of OJIP
F_I	Fluorescence at the I-step (30 ms) of OJIP
F_P	Maximal recorded (equal to maximal possible) fluorescence, at the peak *P* of OJIP
Fluorescence parameters derived from the extracted data	
$F_0=F_{20\mu s}$	Minimal fluorescence, when all PS II RCs are open
F_P (F_M)	Maximal fluorescence, when all PS II RCs are closed
$F_u=F_t-F_0$	Variable fluorescence at time *t*
$F_V=F_M-F_0$	Maximal variable fluorescence
$V_t= (F_t - F_0)/(F_M - F_0)$	Relative variable fluorescence at time *t*
$V_J= (F_J - F_0)/(F_M - F_0)$	Relative variable fluorescence at the J-step
$V_I= (F_I - F_0)/(F_M - F_0)$	Relative variable fluorescence at the I-step
$M_0= [(\Delta F/\Delta t)_0]/(F_M - F_{50\ \mu s})$ $= 4(F_{300\ \mu s} - F_{50\ \mu s})/(F_M - F_{50\ \mu s})$	Approximated initial slope (in ms^{-1}) of the fluorescence transient normalised on the maximal variable fluorescence F_V
Specific energy fluxes (per QA-reducing PSII reaction centre—RC)	
$ABS/RC = M_0\ (1/V_J)\ (1/\varphi_{Po})$	Absorption flux per RC
$TR_0/RC = M_0\ (1/V_J)$	Trapped energy flux per RC
$ET_0/RC = M_0\ (1/V_J)\psi_{Eo}$	Electron transport flux per RC
$RE_0/RC = M_0\ (1/V_J)\psi_{Eo}\ \delta_{Ro}$	Electron flux reducing end electron acceptors at the PSI acceptor side, per RC
Yields or flux ratios	
$\varphi_{Po} = TR_0/ABS = [1 - (F_0/F_M)]$	Maximum quantum yield of primary photochemistry
$\psi_{Eo} = ET_0/TR_0 = (1 - V_J)$	Efficiency of a trapped exciton to move an electron into the electron transport chain further than Q_A^-
$\varphi_{Eo} = ET_0/ABS = [1 - (F_0 /F_M)]\psi_{Eo}$	Quantum yield of electron transport at time zero
$\delta_{Ro} = RE_0/ET_0 = (1 - V_I)/(1 - V_J)$	Efficiency/probability with which an electron from the intersystem electron carriers is transferred to reduce end electron acceptors at the PSI acceptor side (RE)
$\delta_{Ro} = RE_0/ABS = [1 - (F_0/F_m)](1 - V_I)$	Quantum yield for reduction of end electron acceptors at the PSI acceptor side (RE)
$\gamma_{RC} = Chl_{RC}/Chl_{total} = RC/(ABS + RC)$	Probability that a PSII Chl molecule functions as RC
$RC/ABS = \gamma_{RC}/(1 - \gamma_{RC})=\varphi_{Po}\ (V_J/M_0)$	Q_A-reducing RCs per PSII antenna Chl (reciprocal of ABS/RC)
Performance indexes	
$PI_{ABS} =[\gamma_{RC}/(1 - \gamma_{RC})]\ .\ [\varphi_{Po}/(1-\varphi_{Po})]\ .\ [\psi_{Eo}/(1 - \psi_{Eo})]$	Performance index (potential) for energy conservation from exciton to the reduction of intersystem electron acceptors
$PI_{total} = PI_{ABS}\ .\ [\delta_{Ro}/(1 - \delta_{Ro})]$	Performance index (potential) for energy conservation from exciton to the reduction of PSI end acceptors