

Supplementary Material

Fred Chow: the contributions of a quiet giant of photoinhibition and photoprotection

Alonso Zavafer^{A,B,D} and *Douglas A. Campbell*^C

^AResearch School of Biology, the Australian National University, Canberra, ACT 2600, Australia.

^BClimate Change Cluster, University of Technology Sydney, Ultimo, NSW 2001, Australia.

^CMount Allison University, Sackville, NB E4L 1E2, New Brunswick, Canada.

^DCorresponding author. Email: alonso.zavaleta@anu.edu.au

Table S1. Some chemicals used to study photodamage in order of appearance in this work

Chemical name	Abbrev.	Activity
Atrazine	-	A PSII inhibitor that binds to the plastoquinone binding sites thereby blocking electron transport between between Q_A to Q_B .
3-(3,4-Dichlorophenyl)-1,1-dimethylurea	DCMU	A PSII inhibitor that binds to the plastoquinone binding sites thereby blocking electron transport between between Q_A to Q_B .
Bromoxinil	-	A PSII inhibitor that blocks electron transport between Q_A to Q_B .
Lincomycin	-	Antibiotic that inhibits the translation of proteins in the chloroplast, thus inhibiting PSII repair.
Nigericin	-	A lipophilic uncoupler that collapses the trans-thylakoid ΔpH gradient
Dithiothreitol	DTT	Inhibitor of violaxanthin to zeaxanthin conversion

Table S2. Summary of frequently used parameters in photosynthesis research

Parameter	Concept
F_0	Chlorophyll fluorescence when all traps are open in the dark-adapted state, with quinone A (Q_A) in an oxidized state.
F_M	Maximum chlorophyll fluorescence in the dark-adapted state when all reaction centres are transiently closed and Q_A is in reduced state.
F_V	Variable fluorescence. Arithmetical difference between F_M and F_0
F_V/F_M	Maximum quantum yield of primary photochemistry.
F_M'	Maximum fluorescence when sample is light adapted.
NPQ	Non-photochemical quenching of excitation independent of photochemical reactions and fluorescence emission.
qI	Non-photochemical quenching due to photoinhibition, such as the formation of silent centres or photodamaged reaction centres.
qZ	Non-photochemical quenching due to sustained conversion of the xanthophyll violaxanthin to zeaxanthin via de-epoxidation to induce sustained quenching of excitation.
qE	Non-photochemical quenching caused by the reversible formation of ΔpH energization across the thylakoid membranes, which in turn can trigger xanthophyll de-epoxidation
$1/F_0 - 1/F_m$	The functional fraction of PSII that can perform photochemistry at a given time, in a dark-adapted state.
F_s	Fluorescence intensity at steady-state irradiance