

Supplementary Information

Fine-tuning the photosynthetic light harvesting apparatus for improved photosynthetic efficiency and biomass yield

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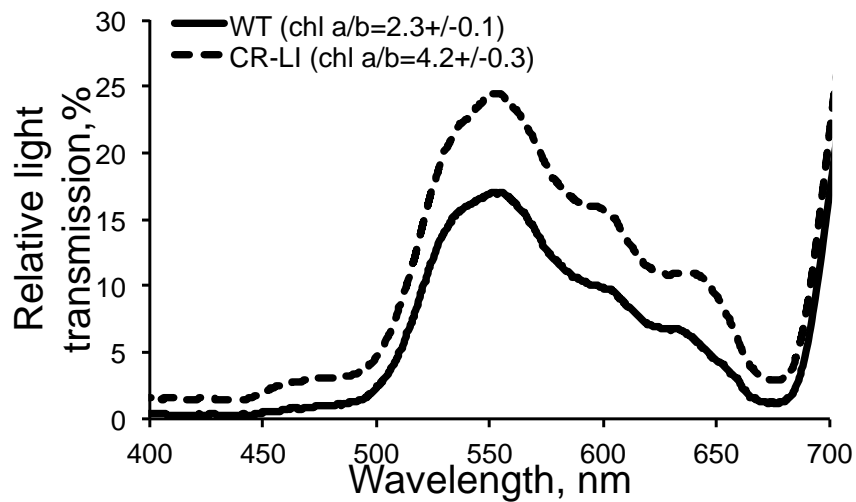
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Supplementary Figure S2

a



b



CR L-1
Chl a/b=5-6

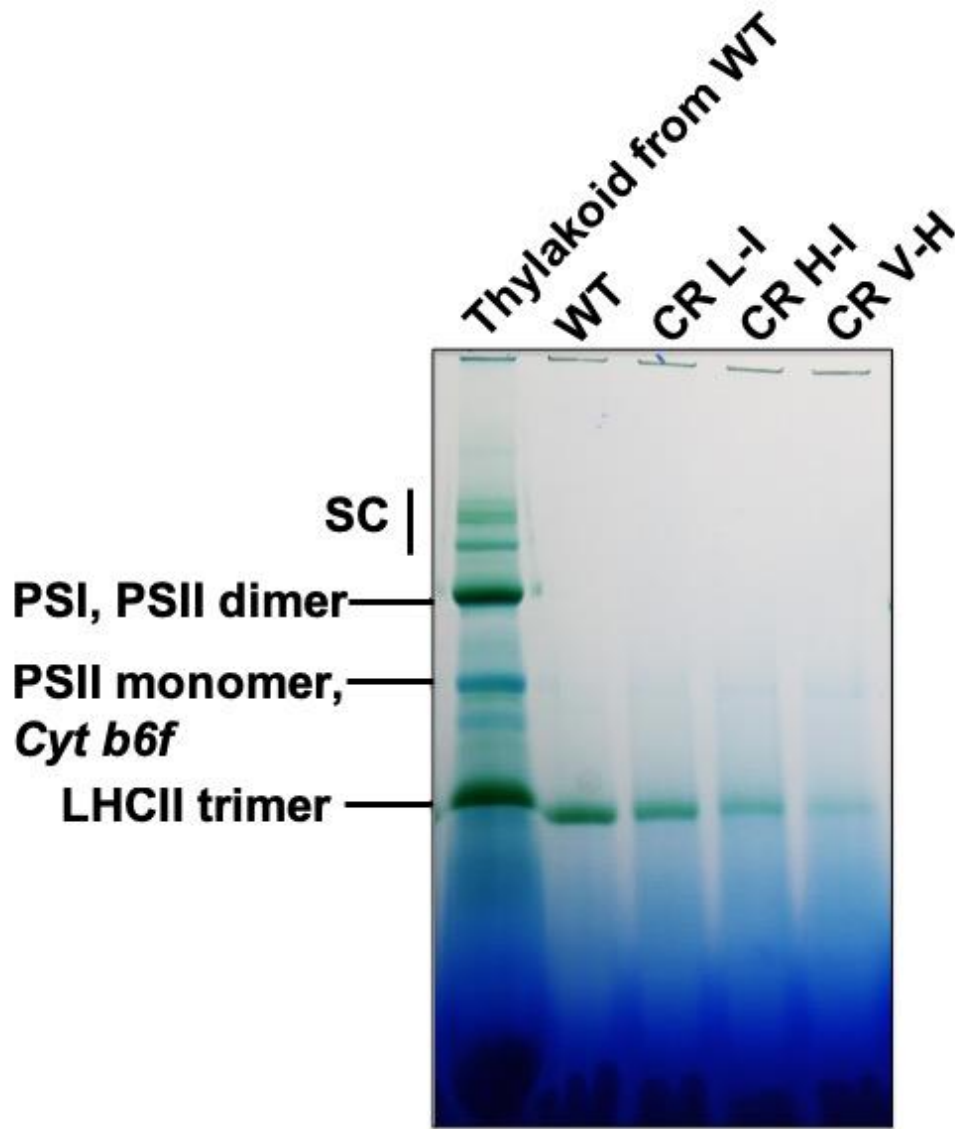
WT
Chl a/b=3

(a) **Light transmission through leaves of wild-type and transgenic plants.**

The transmission spectra were normalized to the total incident sunlight and taken from the fifth, fully expanded, leaf from the apex. Data presented is the average of three independent plant measurements.

(b) **Ten week old CRL-1 and wild-type plants grown in the greenhouse.** Plant densities are similar to those used in the field. Note the differences in leaf color and relative plant height between CR L-1 and wild-type (WT) plants.

Supplementary Figure S3



Blue native gel analysis of LHCII trimer fraction isolated by SDGU. Identical volumes of LHCII trimer bands from SDGU were resolved on 4%-16% BN-gel. SC is supercomplexes.

Supplementary Figure S4



Field study planting site in in Ithaca, Saunders County, Nebraska

Supplementary Table S1

Sample	Bottom Leaf	Middle Leaf	Top Leaf
WT - 5 weeks old	3.47 ± 0.11	3.89 ± 0.12	4.16 ± 0.10
WT - 7 weeks old	3.17 ± 0.06	3.87 ± 0.10	4.09 ± 0.10
CR L-1 - 5 weeks old	5.85 ± 1.39	6.25 ± 1.23	6.46 ± 0.56
CR L-1 - 7 weeks old	4.55 ± 0.66	5.16 ± 0.33	5.89 ± 0.25
CR H-1 - 5 weeks old	7.07 ± 1.65	8.45 ± 0.16	8.22 ± 0.84
CR H-1 - 7 weeks old	7.72 ± 0.68	8.23 ± 0.09	8.98 ± 0.54
CR V-H - 5 weeks old	8.37 ± 0.49	10.27 ± 1.37	9.24 ± 1.00
CR V-H - 7 weeks old	11.11 ± 2.67	11.02 ± 1.58	10.87 ± 1.85

Leaf position dependency of Chl *a/b* ratio in wild-type and CR transgenic plants. Fully expanded non-senescent leaves at the bottom, middle and top position of plants ranging from 5 and 7 week-old age were compared. Results are the average and ±SD of at least 3 independent experiments. Chl content from leaves was determined according to Porra *et al.* (1989)²⁴

Supplementary Table S2

Sample	<i>Chl a + b</i> ($\mu\text{g}/\text{unit volume}$)	<i>Chl a/b</i> ratio
WT	92.17 \pm 7.58 100%	1.56 \pm 0.10
CR L-1	72.86 \pm 12.51 79%	2.02 \pm 0.24
CR H-1	57.21 \pm 6.22 62%	2.20 \pm 0.24
CR V-H	41.98 \pm 4.24 46%	4.45 \pm 0.77

Chlorophyll content/per and Chl *a/b* ratio of an equal unit volume of LHCII trimer complexes from wild-type and CR transgenic lines. Chlorophyll analyses were made using isolate LHCII trimer fractions from SDGU as described in Fig. 3. Results are the average and \pm SD of at least 3 independent experiments. Data is expressed as a percentage of wild type (100%). Chl content was determined according to Porra *et al.* (1989)²⁴