Supplementary Material

Differences between barley and maize revealed in limitations of photosystems I and II under high temperature and low air humidity

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General map of deleted points for calculating the ratios qC/Y(ND) and qC/Y(NA).

Table S1. The ratio qC/Y(ND) in maize. Map of points deleted because of small denominator value.

	24ºC		37ºC		42ºC		46ºC	
	HH	LH	HH	LH	HH	LH	HH	LH
Whole IC deleted:			3	2	4	2	1	
Number of IC:	24	23	17	18	15	14	17	16
41			1					1
81			1					
121				1				
161			1	1 + 1				
201								
241	1							1
281	1			1	2			
321		1	1	1	1	1		
361	2				3	1		1
401	2		1	2	3	1		
441	7 * + 1	7 * + 1	1	1	2	1 + 3		1
Whole RLC deleted:								
Number of RLC:	23	23	20	20	19	16	18	16
72	3	1	2 + 2	3	2 + 3	3	1	1
128			1				1	
218								
432								
662								
827								
1289								
1596								
1954								1 *

Deleted Y(ND): negative value; zero value (0);
value ≤ 0.025; 0.025 < value > 0.030; value ≥ 0.030.
* - data absent.

Table S2. The ratio qC/Y(ND) in barley. Map of points deleted because of small denominator value.

	24ºC		37ºC		42ºC		46ºC	
	HH	LH	HH	LH	HH	LH	HH	LH
Whole IC deleted:	6	2	3	3	1			
Number of IC:	19	24	16	18	17	19	17	22
41	1 + 1	2+1+1+1	2	1+1+1		1 *	9 + 1	2+2+1+2
81			1	2 + 2		1 *		2 + 1 + 2
121								
161		2						
201	1	2					1 + 1	1
241				1			1	
281	2		2	1 + 1			1	
321	3	1	1 + 3	1 + 6				
361	1 + 1	1 + 3	1 + 2	1 + 7	1 + 1	1		1
401	2 + 5	1 + 3	2 + 6	1 + 8	1 + 1	1	1 + 1	1 + 1
441	5 * + 7	5 * + 6	1 + 6	3 + 9	3	1 + 2	2 + 1	1
Whole RLC deleted:								
Number of RLC:	25	25	19	21	17	19	17	20
72	2 + 8	1 + 5	4+7+1	4 + 10	3 + 1	2 + 6	2 + 1	2
128			2					
218								
432								
662								
827							1 *	
1289							1 *	
1596							1 *	
1954							1 *	

Deleted Y(ND): negative value; zero value (0);
value ≤ 0.025; 0.025 < value > 0.030; value ≥ 0.030.
* - data absent.

Table S3. The ratio qC/Y(NA) in maize. Map of points deleted because of small denominator value.

	24ºC		37ºC		42ºC		46ºC	
	HH	LH	HH	LH	HH	LH	HH	LH
Whole IC deleted:			1	1		3	1	2
Number of IC:	24	23 +1#	19	19	19	14	17	14
1								1 *
41					2			
81					1 + 3		1 + 3	
121					1 + 1	1		
161				1	1 + 1	1	1	1 + 1
201					1	1	1	1
241				1	1 + 1			
281						1		1
321				1			2	
361				1			1	
401								
441	7 *	7 *			1			
Whole RLC deleted:			1			4		
Number of RLC:	23	23	20	19	19	12	18	16
72			1	1			1	1
128							1 + 1	1
218							1	
432			1		2	1	1	
662			1					1
827			1					1
1289			1					
1596			1					
1954								1 *

Deleted Y(NA): negative value; zero value (0);
        value ≤ 0.025; 0.025 < value > 0.030; value ≥ 0.030.
* - data absent. # - incomplete (short) curve.

Table S4. The ratio qC/Y(NA) in barley. Map of points deleted because of small denominator value.

	24ºC		37ºC		42ºC		46ºC	
	HH	LH	HH	LH	HH	LH	HH	LH
Whole IC deleted:	2	2		1		1	1	4
Number of IC:	23	24	19	20	18	18	16	18
1	1 *	1 *				2 *	1 *	
41			1			1 *	8+1+1	2 + 1
81	1	1	2	3		1 *		2
121	1	1 + 3	1+1+1	1	1	1	1 + 1	
161	1	1 + 2	1 +	1				1 + 1
201	1	1 + 1		2			2	1
241	1	2	1 +	1 + 1			2	1
281		1 + 1		1			2	
321		1		1				
361				1			1	
401	1							
441	7 *	6 * + 1		1				
Whole RLC deleted:	2	2		1				
Number of RLC:	23	23	19	20	17	19	17	20
72							1	3
128	1 + 3	2					1	3
218	1	1 + 2	4	1				1 + 1
432	1 + 1		2	1				
662	1		1	1		1		
827							1 *	
1289							1 *	
1596	1						1 *	
1954				1			1 *	

Deleted Y(NA): negative value; zero value (0);
  value ≤ 0.025; 0.025 < value > 0.030; value ≥ 0.030.
* - data absent.

Fig. S1. Limitation at the acceptor side of PSI (Y(NA)). Revisualization of the data from Fig.1.
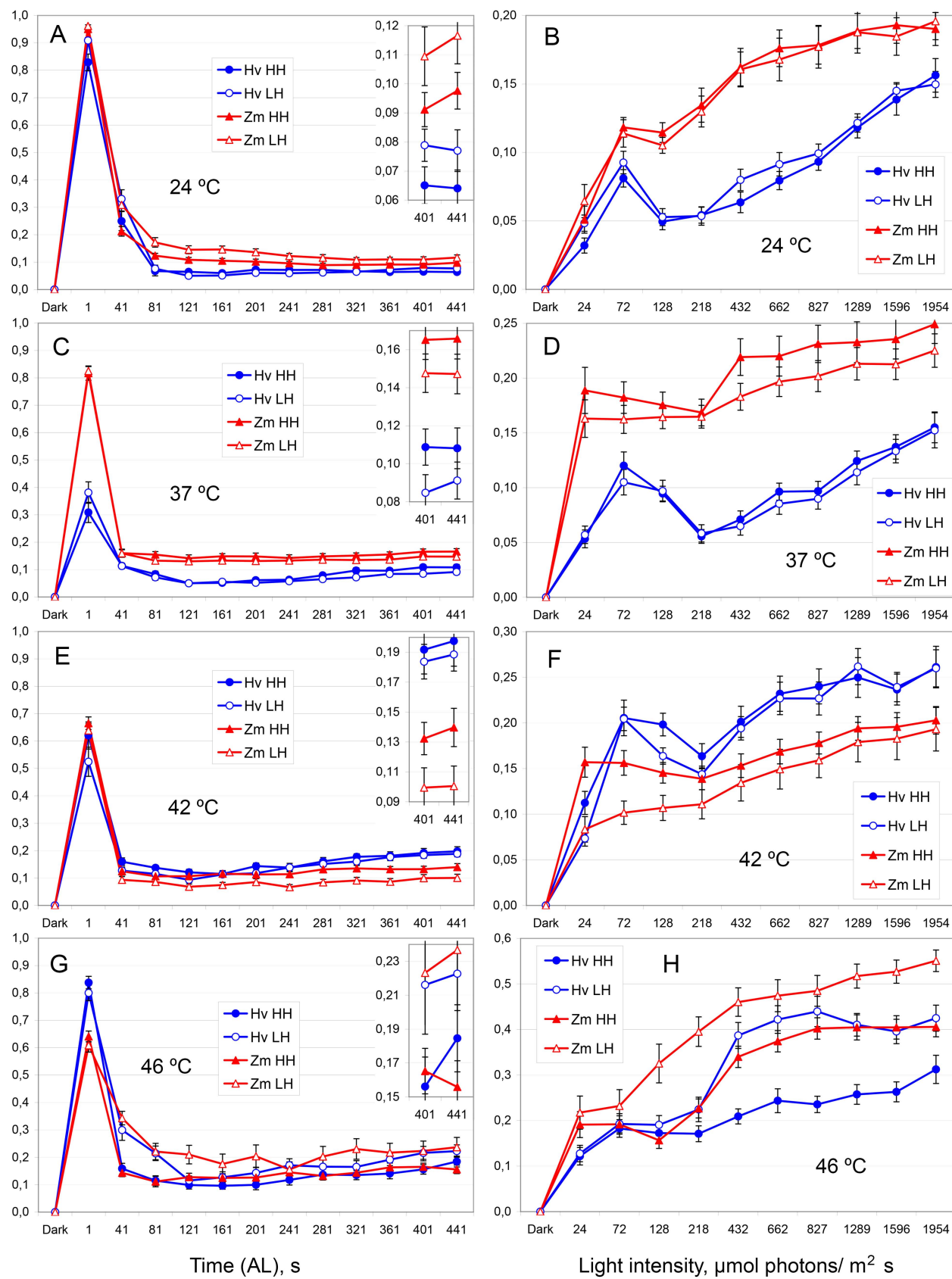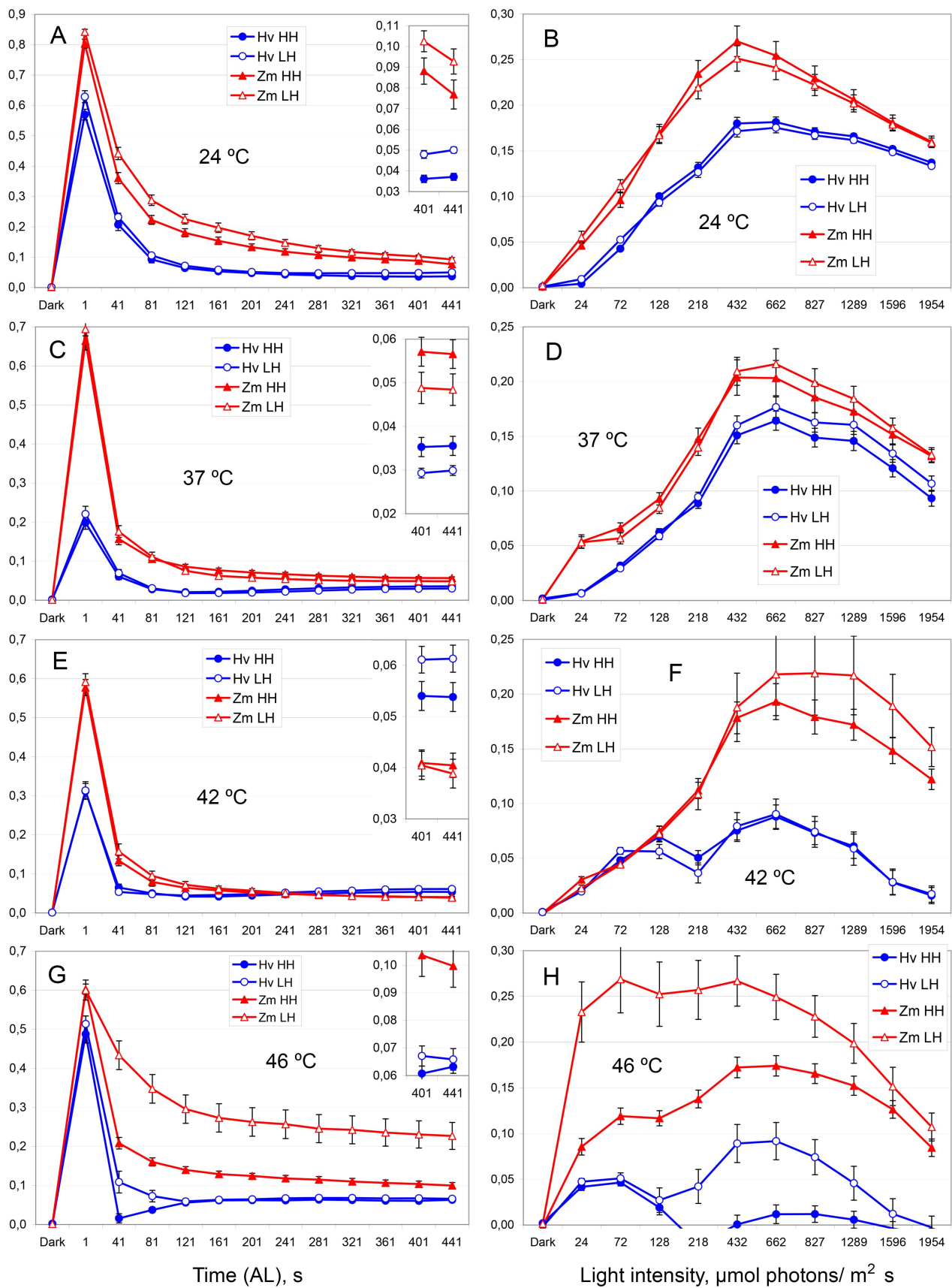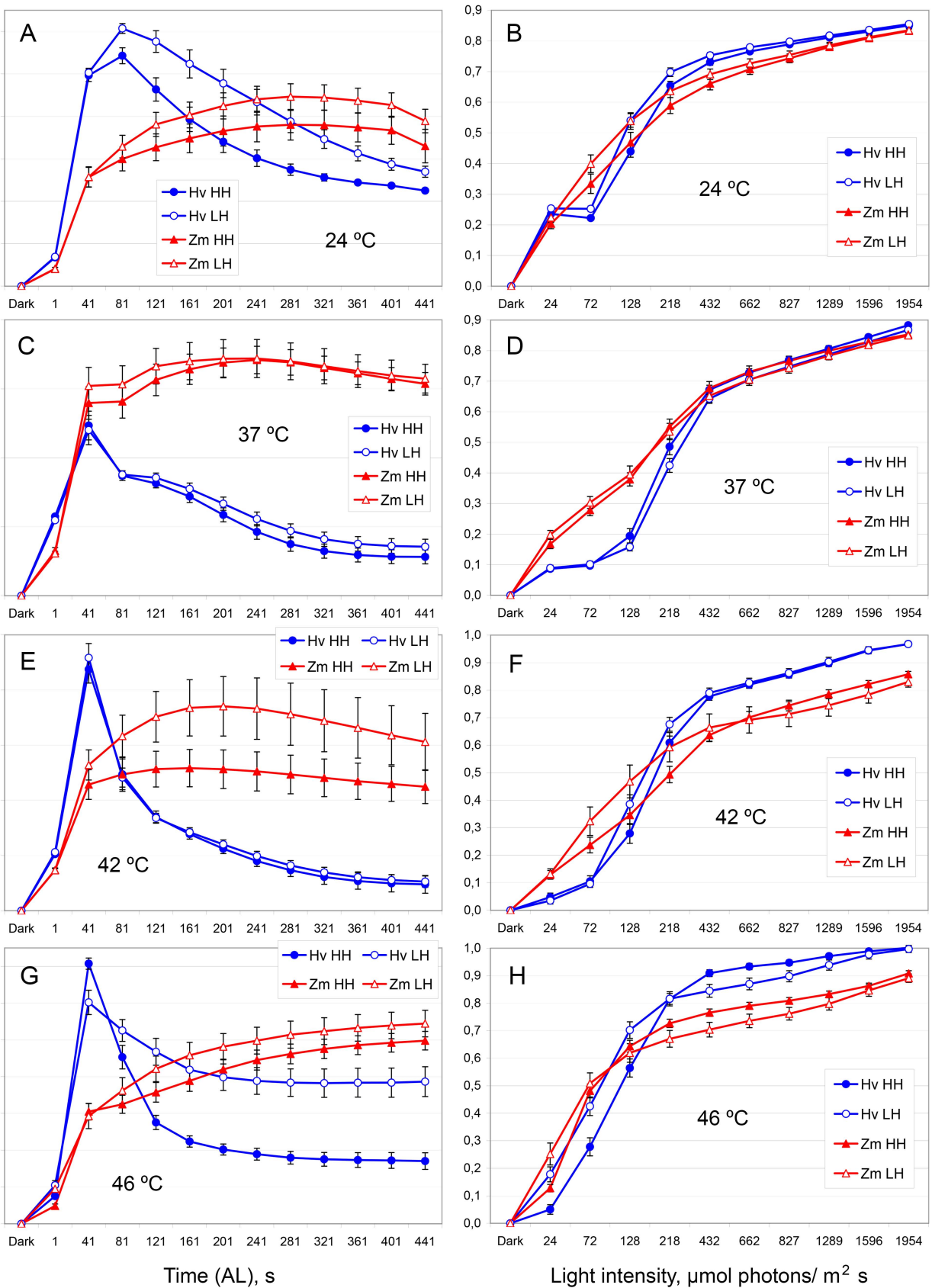

Left column – IC; right column – RLC. The temperatures are shown on panels. Blue circles – barley (Hv); red triangles – maize (Zm); filled symbols – HH air; open symbols – LH air. Means ± SE. Insets show the corresponding small values with the higher resolution.

Fig. S2. Limitation at the donor side of PSI (Y(ND)). Revisualization of the data from Fig. 2.
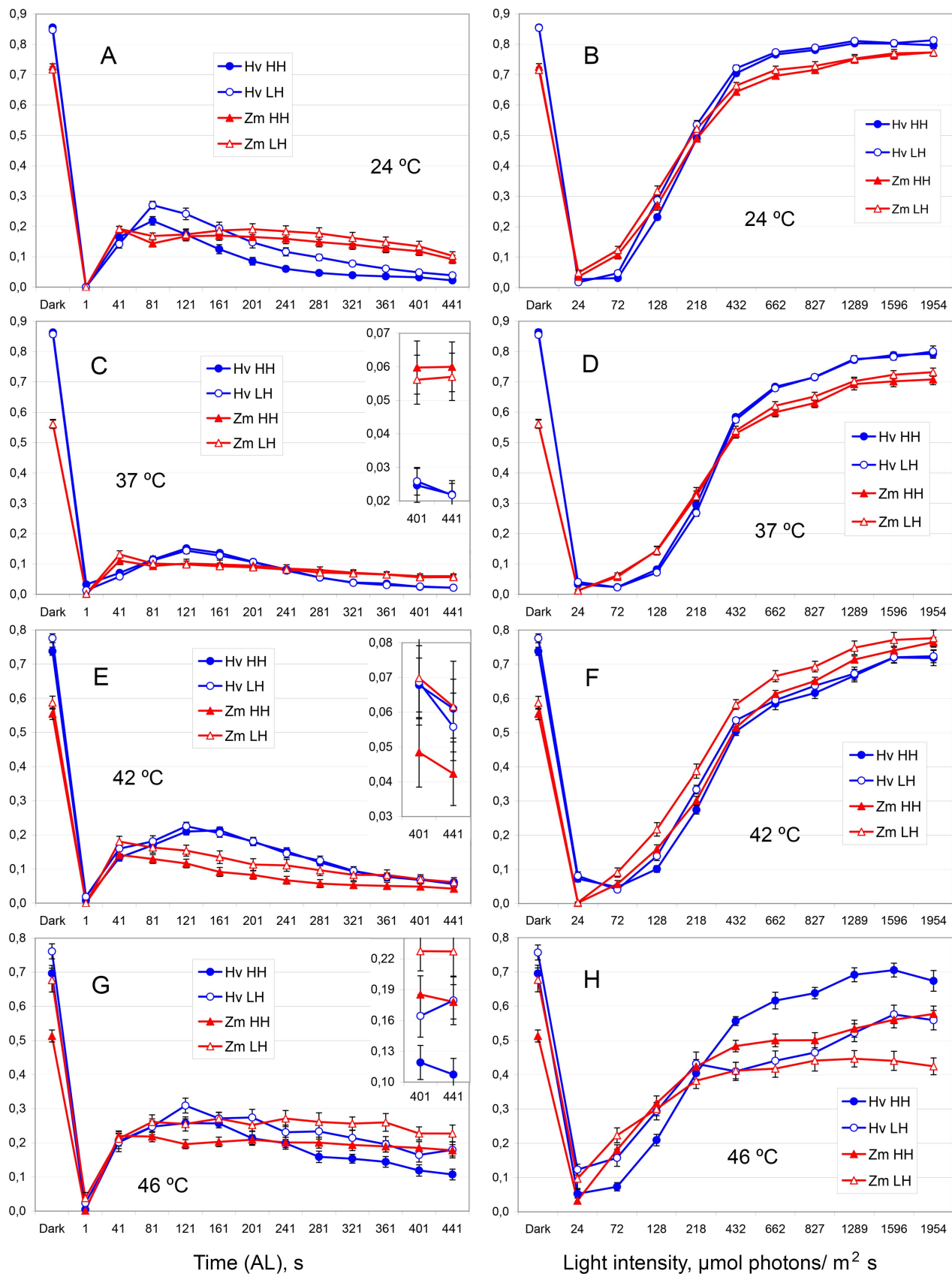
Left column – IC; right column – RLC. The temperatures are shown on panels. All designations are the same as in Fig. S1 and Fig. 5. Means ± SE. Insets show the corresponding small values with the higher resolution.

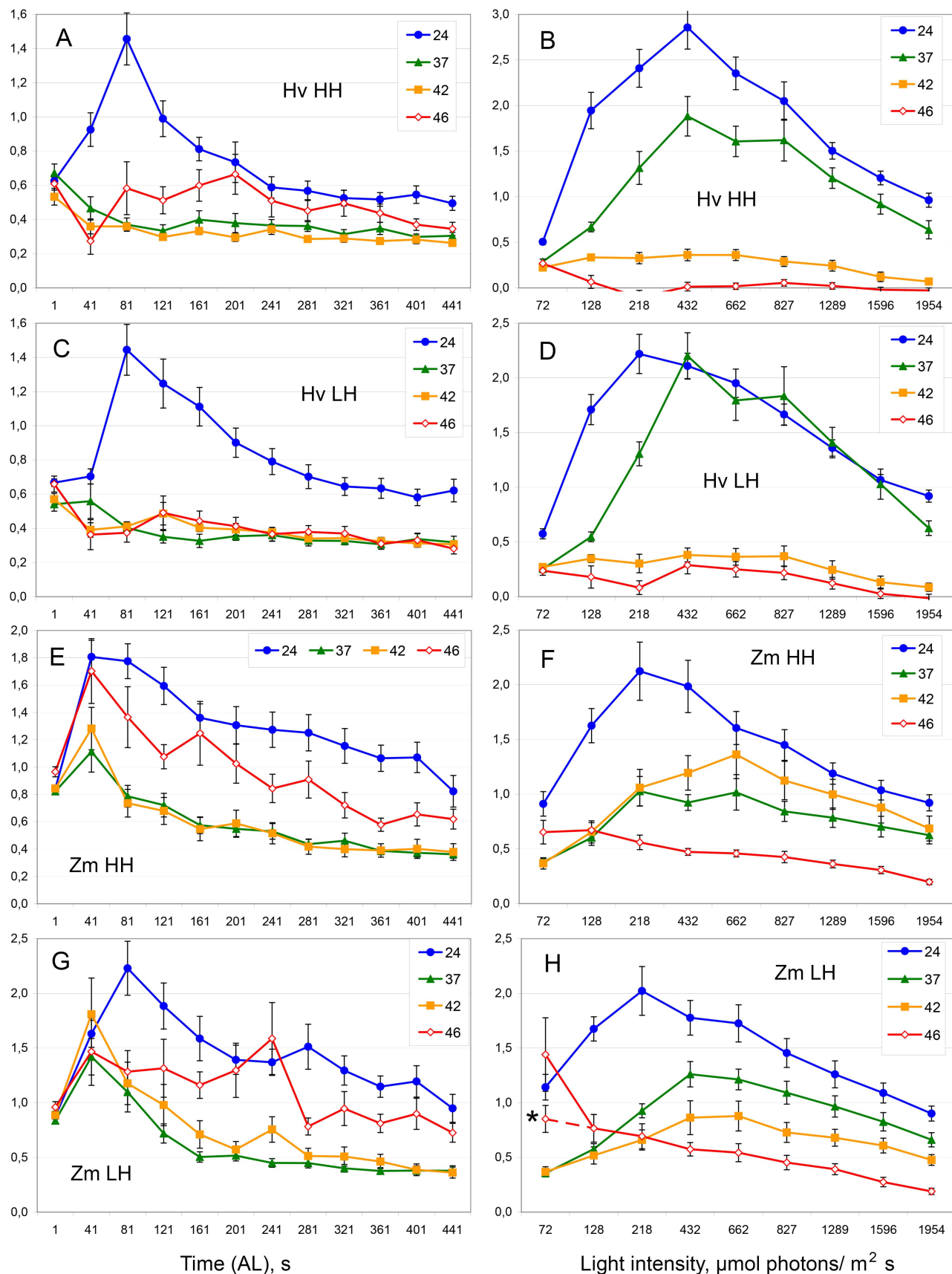Fig. S3. Limitation at the acceptor side of PSII (qC). Revisualization of the data from Fig. 3.

Left column – IC; right column – RLC. The temperatures are shown on panels. All designations are the same as in Fig. S1 and Fig. 5. Means ± SE. Insets show the corresponding small values with the higher resolution.

Fig. S4. Non-photochemical quenching of PSII (qN). Revisualization of the data from Fig. 4.
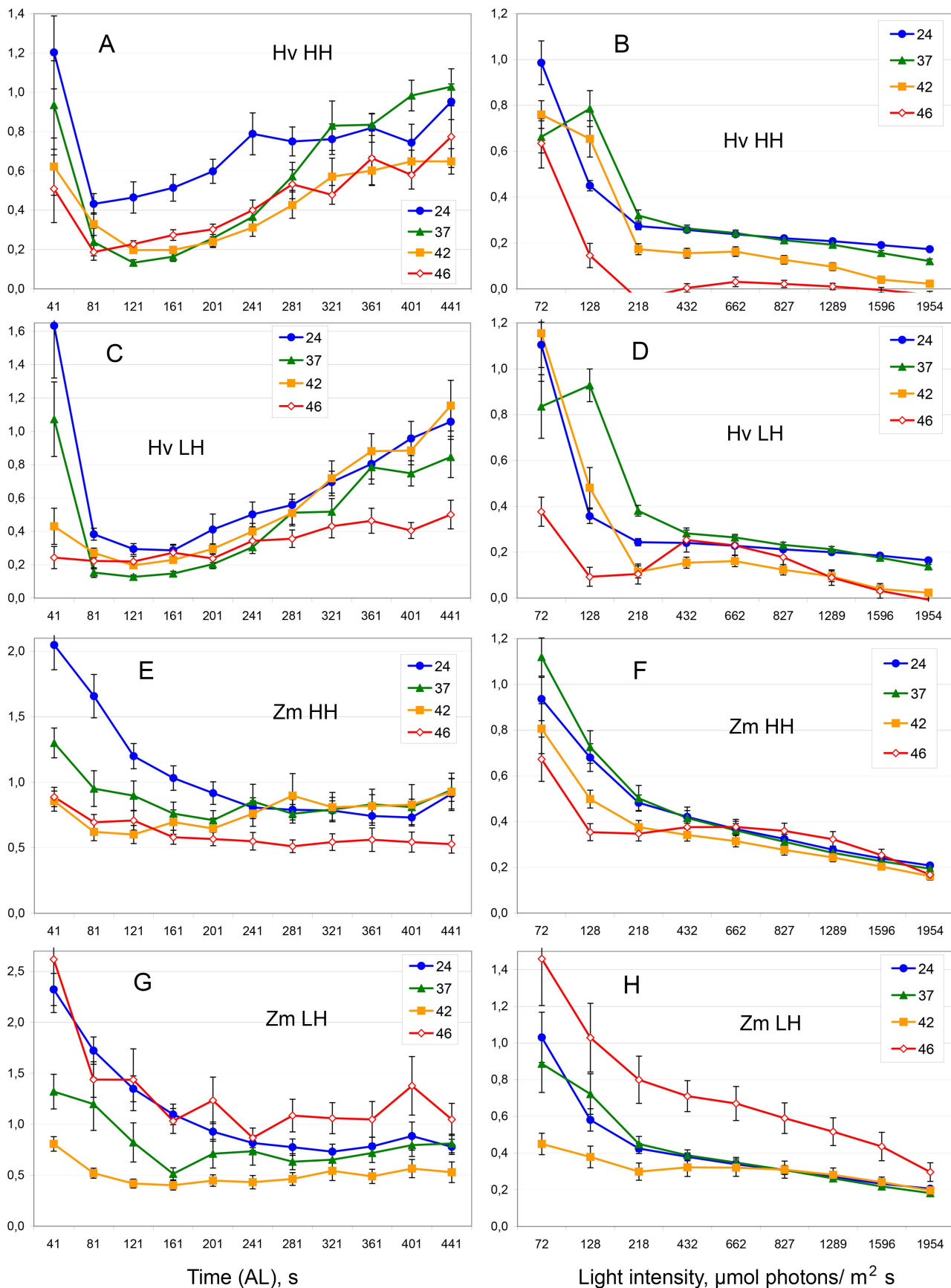

Left column – IC; right column – RLC. The temperatures are shown on panels. All designations are the same as in Fig. S1 and Fig. 5. Means ± SE.

Fig. S5. The ratio qC/Y(NA). Revisualization of the data from Fig. 5.

Left column – IC; right column – RLC. The variants are shown on panels: Hv – barley; Zm – maize; HH and LH – higher and lower relative humidity of air. Numerals indicate temperature in Celsius degree. * – variant of corresponding point in curve without 3 drastically different but irremovable data points (as more credible; connected with dashed line). Means ± SE.

Fig. S6. The ratio qC/Y(ND). Revisualization of the data from Fig. 6.

Left column – IC; right column – RLC. The variants are shown on panels. All designations are the same as in Fig. S5 and Fig. 1. Means ± SE.

Fig. S7. Limitations of PSI at 42ºC and 46ºC.
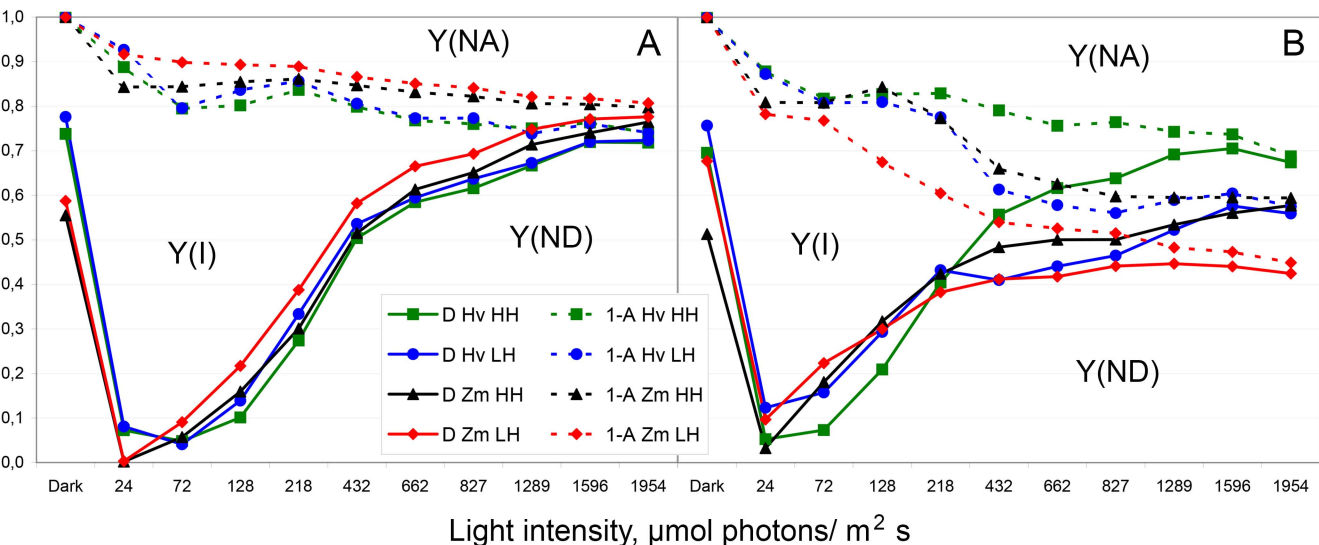
The data from Figs 1 and 2. A – 42ºC (pictures at 24ºC, 37ºC, and 42ºC are generally similar); B – 46ºC.
Solid lines – Y(ND); the area of Y(ND) is below each line.
Dashed lines – [1 – Y(NA)]; the area of Y(NA) is above each line, between a line and 1.
Y(I) + Y(ND) + Y(NA) = 1 (Klughammer and Schreiber 2008); therefore, area between corresponding solid and hatched lines is 1 – Y(NA) – Y(ND) = Y(I) (quantum yield of PSI).
Green squares – barley (Hv) under HH conditions; blue circles – barley (Hv) under LH conditions; black triangles – maize (Zm) under HH conditions; red diamonds – maize (Zm) under LH conditions.
Means only are shown for the sake of simplicity.