

# Application of fast light readapted plants for measurement of chlorophyll fluorescence and $P_{700}$ light absorption with the RLC method.

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## Recalculation of P and $\Delta P$ values:

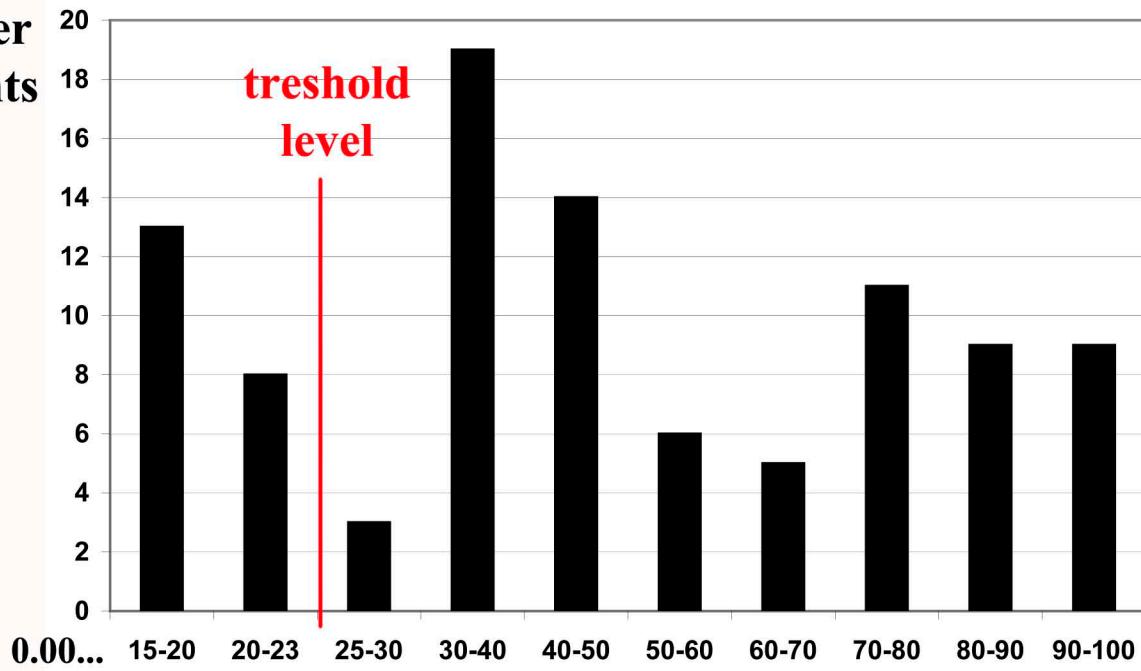
P is the steady state-level of  $P_{700}$  absorption in light;  $P_0$  – is the minimum current signal of  $P_{700}$  absorption that is measured after each SP and cessation of far-red light both in the dark and light regimes (Klughammer and Schreiber 1994, 2008). The minimum current signal of  $P_{700}$  absorption is accepted as the zero level and subtracted from all the values ( $P_M$ ,  $P_M'$ , P,  $P_0$ ); therefore, the  $P_0$  value is always zero and not given in the tables of Dual-PAM-100 software (discussed in Lysenko *et al.* 2020). The values of P are also not shown in the tables of Dual-PAM-100 software; however, P values are used for the calculation of the coefficients  $Y(I) = (P_M' - P)/(P_M - P_0)$  and  $Y(ND) = (P - P_0)/(P_M - P_0)$  (Klughammer and Schreiber 1994, 2008). Considering  $P_0$  subtraction, these values can be reduced to  $Y(I) = \Delta P/P_m$ , where  $\Delta P = P_M' - P$ , and  $Y(ND) = P/P_m$ . Consequently,

$$\Delta P = Y(I) \times P_m \quad (\text{Eq. 1})$$

$$P = Y(ND) \times P_m \quad (\text{Eq. 2}).$$

The values  $P_m$ ,  $P_m'$ ,  $Y(I)$ , and  $Y(ND)$  are given in the tables of the Dual-PAM-100 software. The genuine  $P_m$  values cannot be measured in plants that lack the step of dark-adaptation. For such plants, the  $P_m$  value of a previously measured dark-adapted plant was used as the quasi- $P_m$  value. Based on these quasi- $P_m$  values, Dual-PAM-100 software automatically calculated (quasi)- $Y(I)$  and (quasi)- $Y(ND)$ . These quasi  $P_m$ ,  $Y(I)$ , and  $Y(ND)$  values were used for the backward recalculation of  $\Delta P$  and P values only. In all cases, the recalculated values  $\Delta P$  and P were compared with the genuine  $P_m'$  given in the tables. If  $|P_m' - (\Delta P + P)| < 0.0025$ , then the data were accepted; if the difference was  $\geq 0.0025$ , then the recalculated data were discarded. The threshold level  $\pm 0.0025$  was chosen empirically (Suppl. Fig. S1) and reflects the probable level of inaccuracy in the Excel software calculations. For most recalculated data, the difference was within  $\pm 0.001$ .

# Number of points

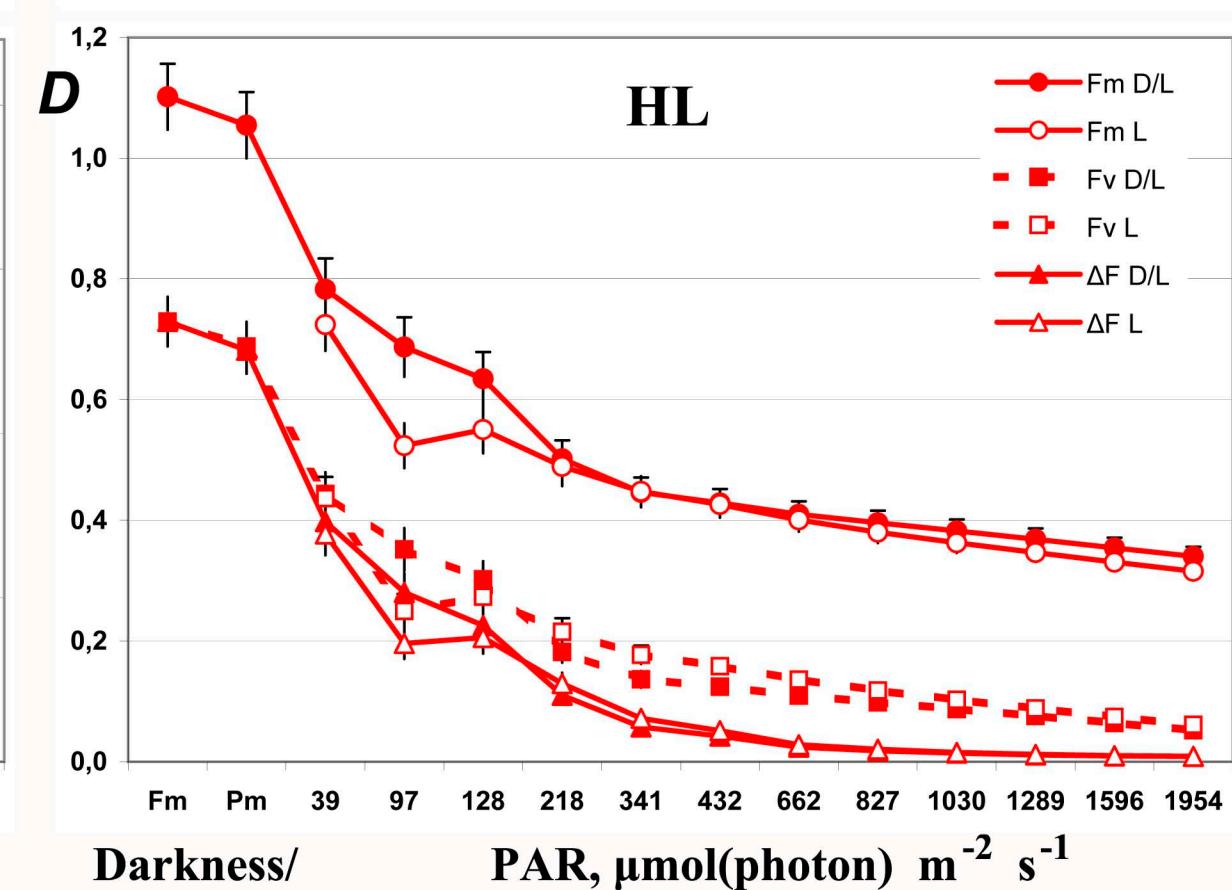
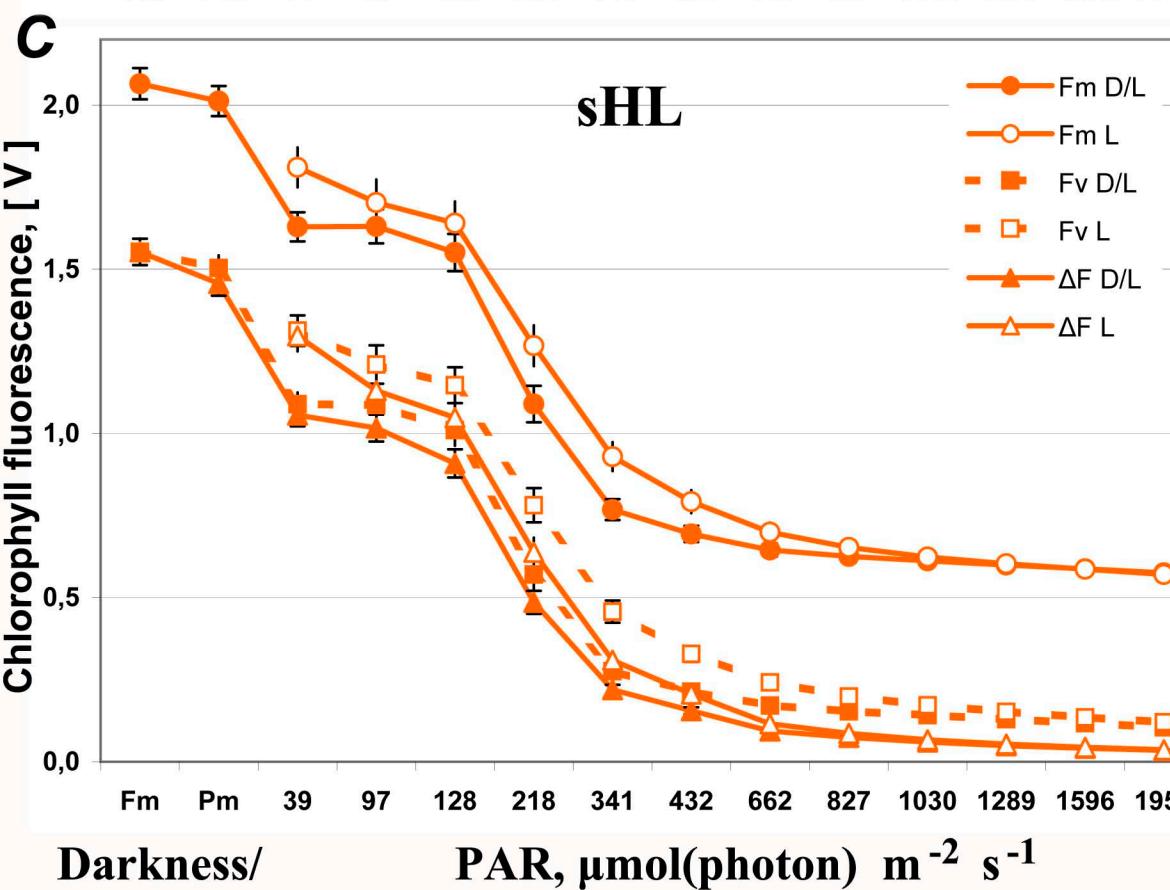
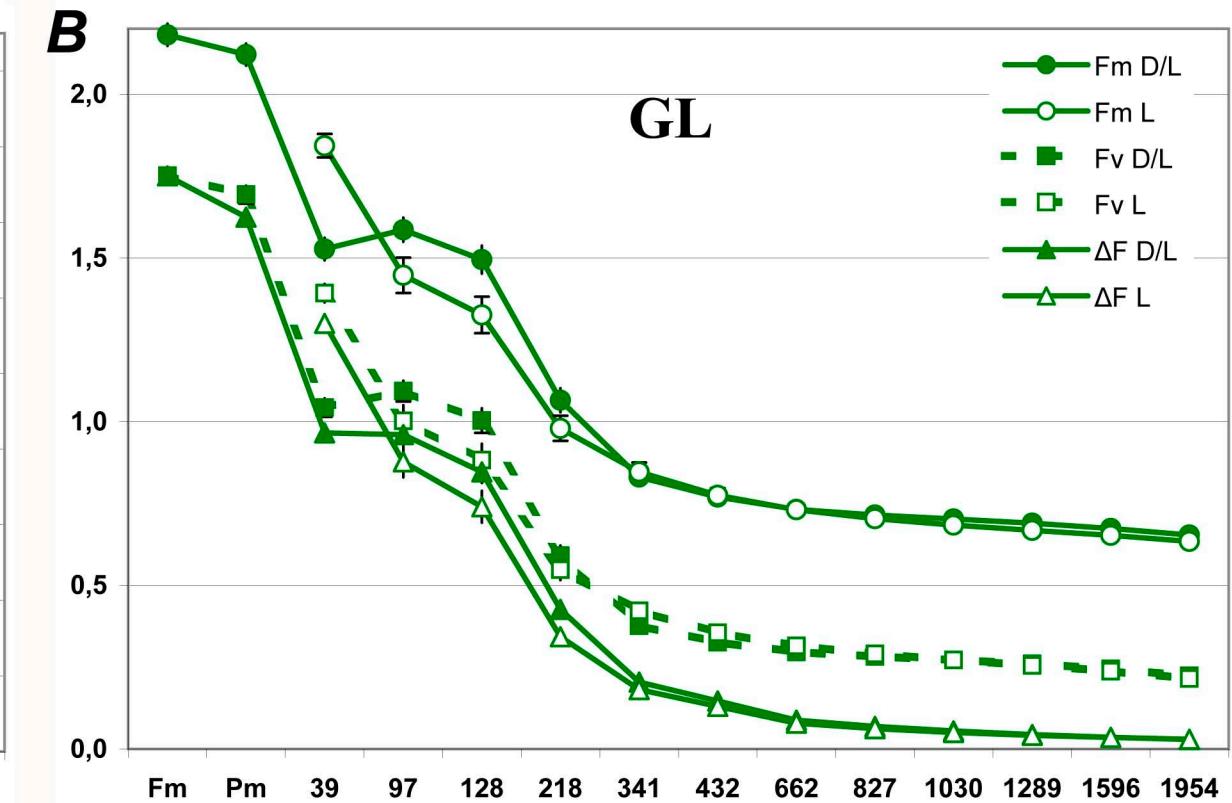
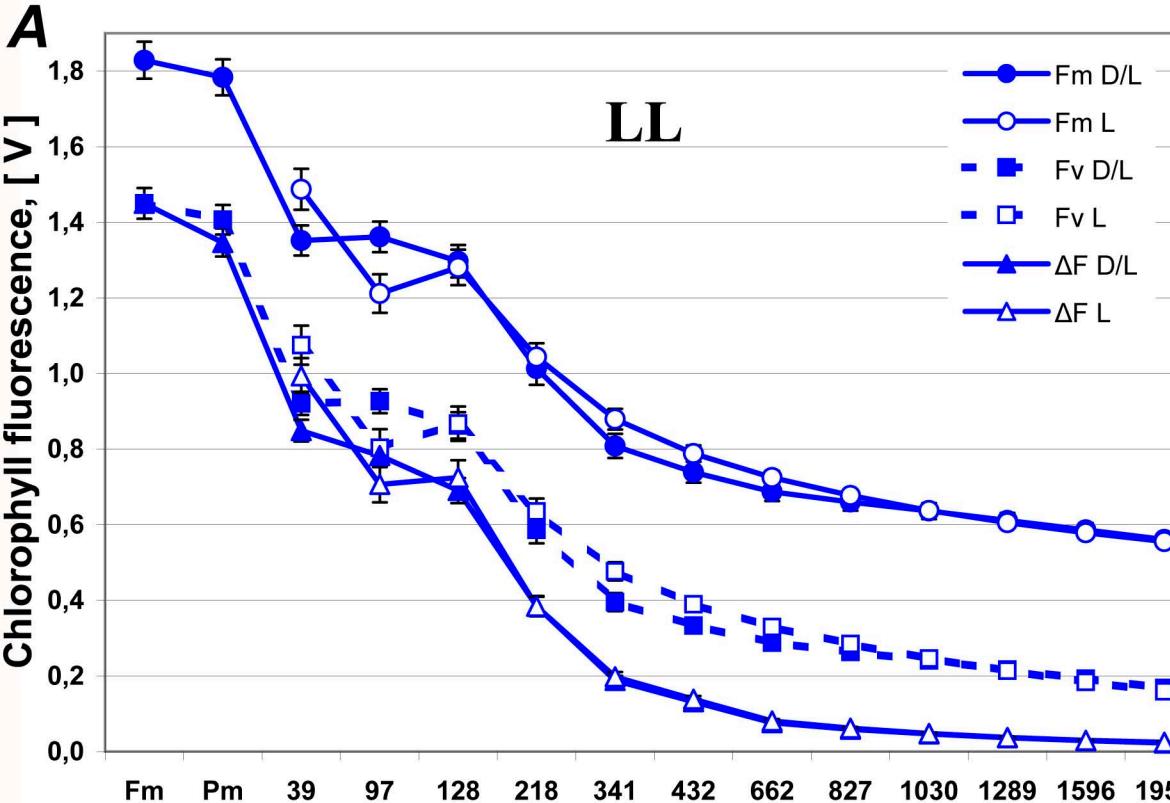


$\Delta P + P \neq Pm'$   
Size of inconsistency, range  $|\pm 0.0015 - 0.0100|$

**Fig. S1** The distribution of inconsistent data points,  $\Delta P + P \neq Pm'$

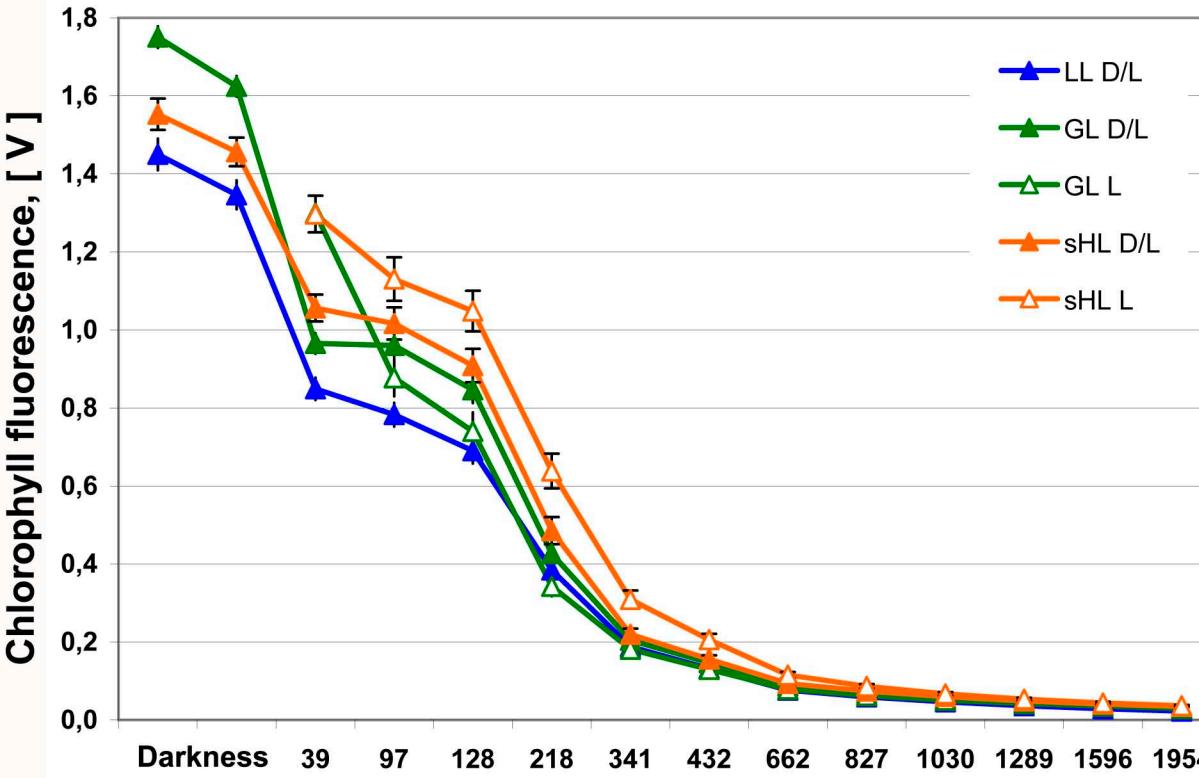
All the results  $Pm' - (\Delta P + P) \neq 0$  were collected; the data points with small differences were ranged.

The threshold level ( $\pm 0.0025$ ) was chosen empirically. The data points with smaller absolute values of the difference were accepted (see Text).



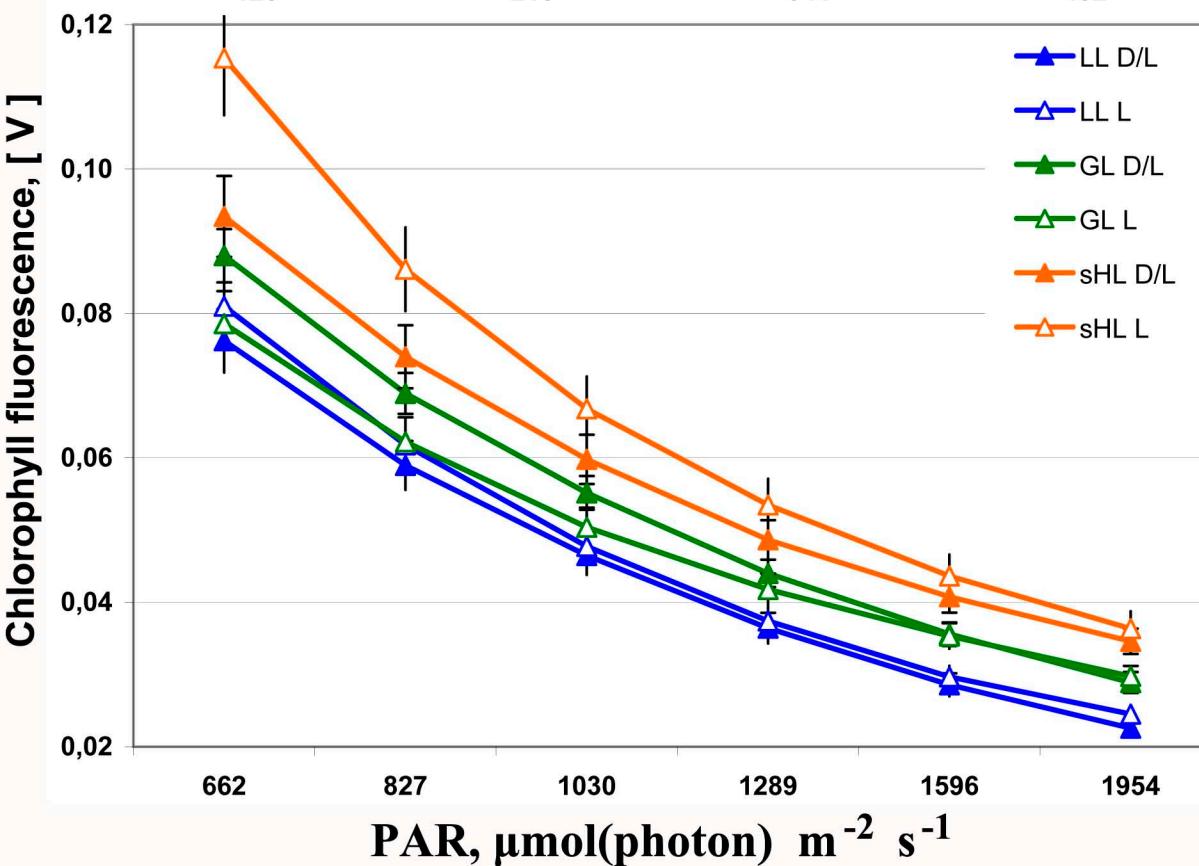
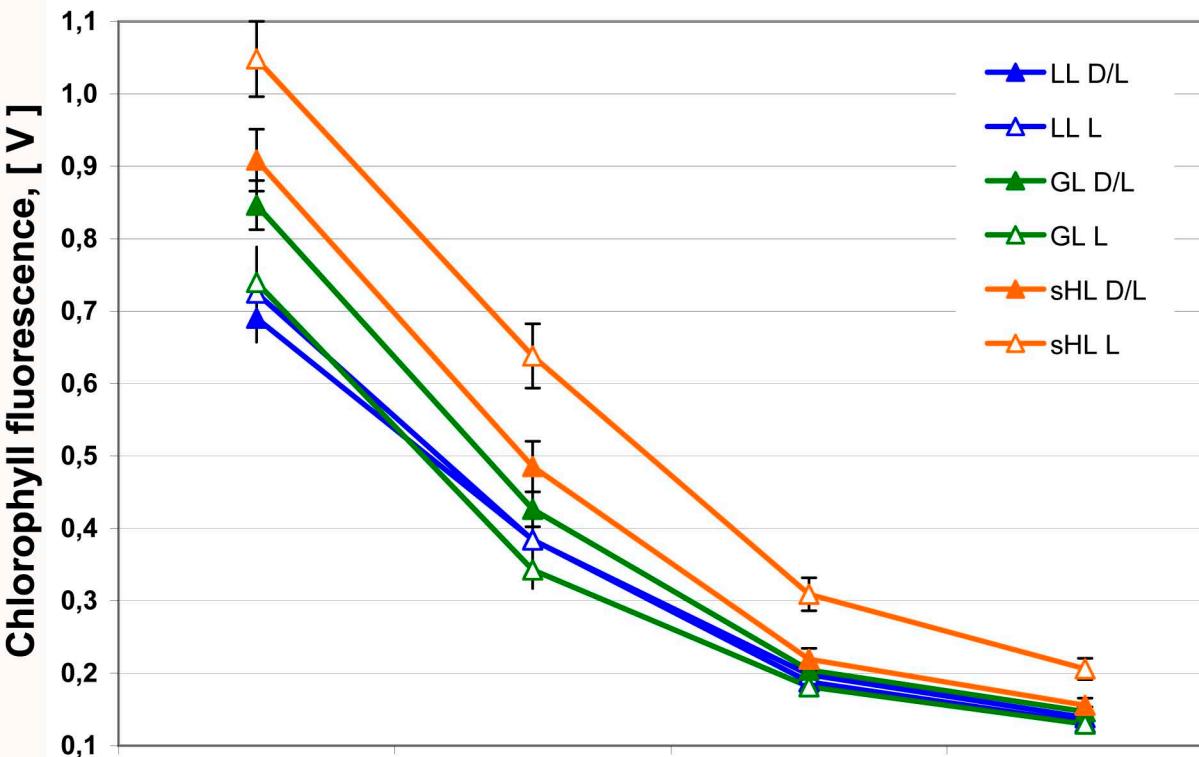
**Fig. S2** The parameters of Chl fluorescence  $\text{Fm}'$ ,  $\text{Fv}'$ , and  $\Delta\text{F}$

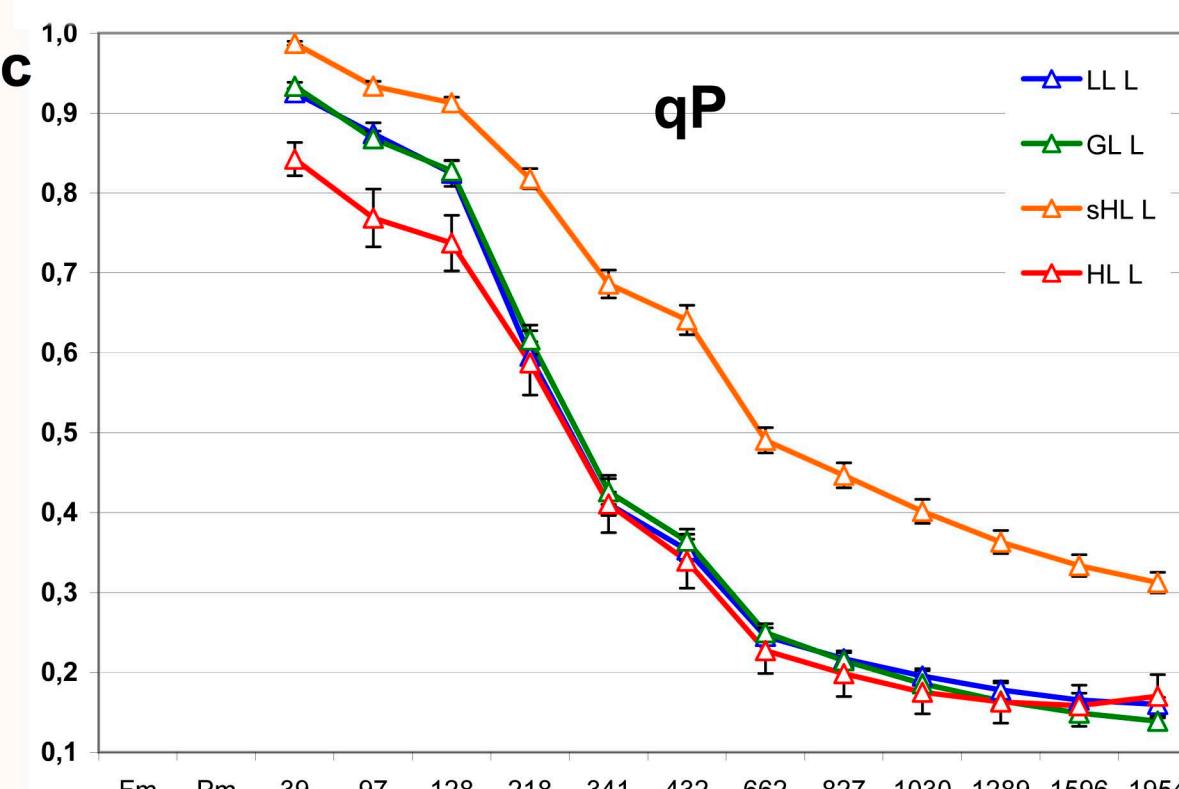
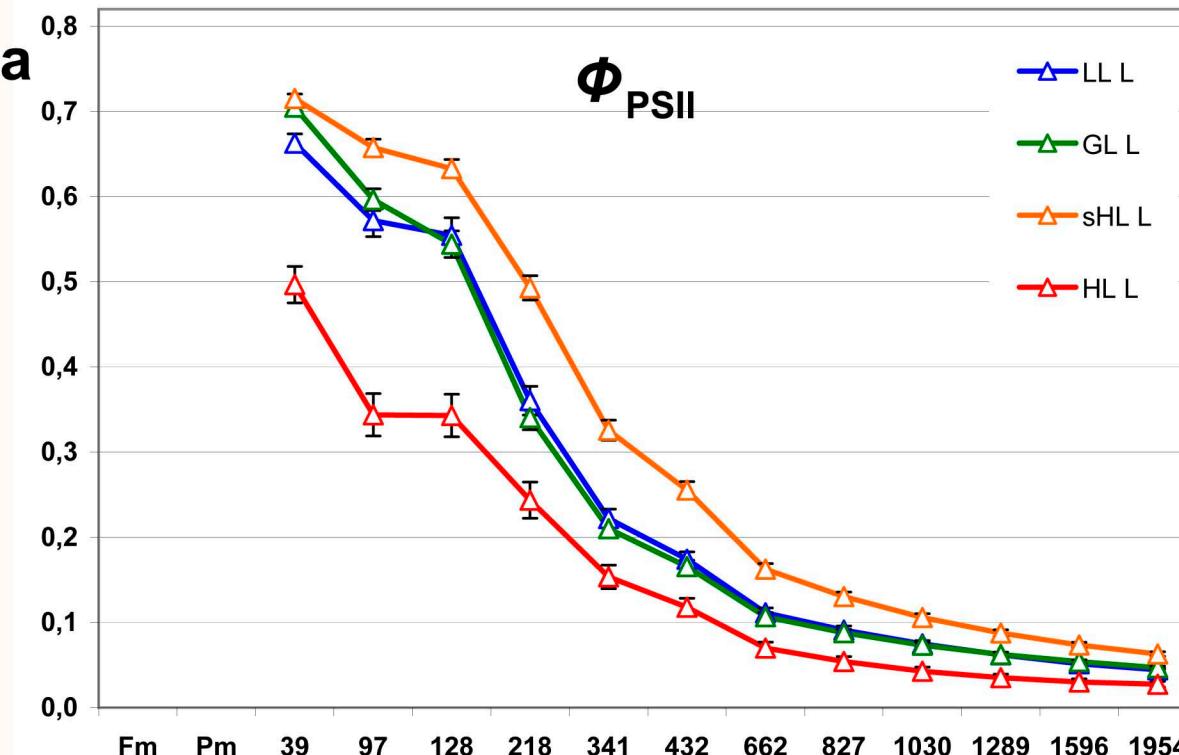
All these parameters are shown in one graph for each type of plants (LL, GL, sHL, and HL). The data  $\text{Fm}'$  and  $\Delta\text{F}$  are the same as in Fig. 1. All designations are the same as in Fig. 1.



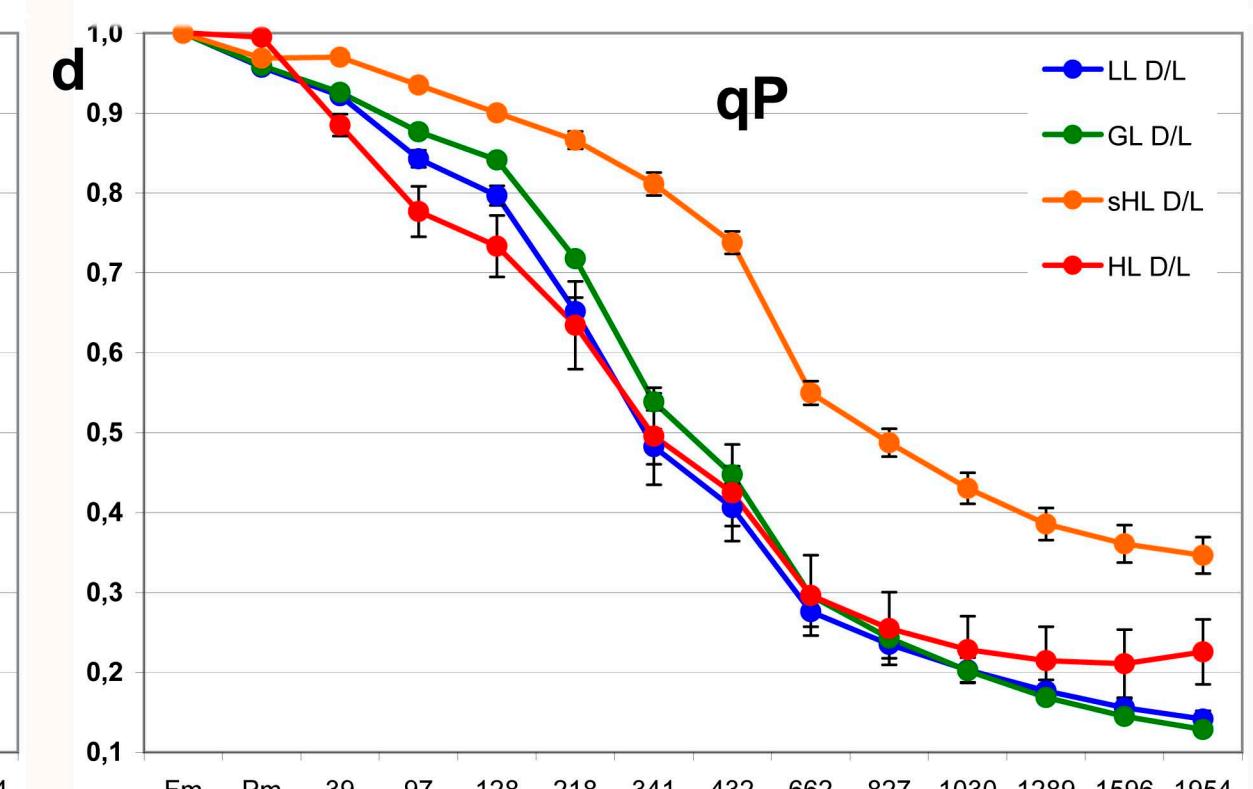
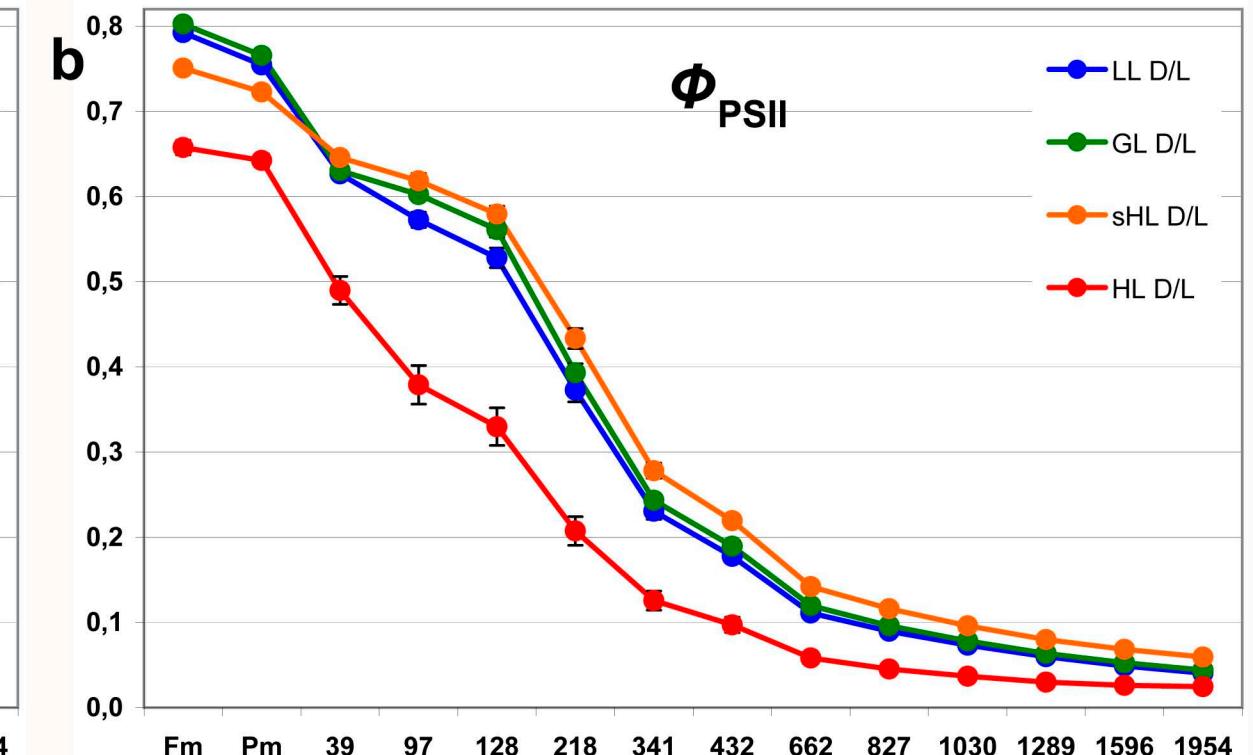
**Fig. S3** The data from Fig. 1c are represented with higher resolution

Some data were omitted for better visibility. All designations are the same as in Fig. 1.





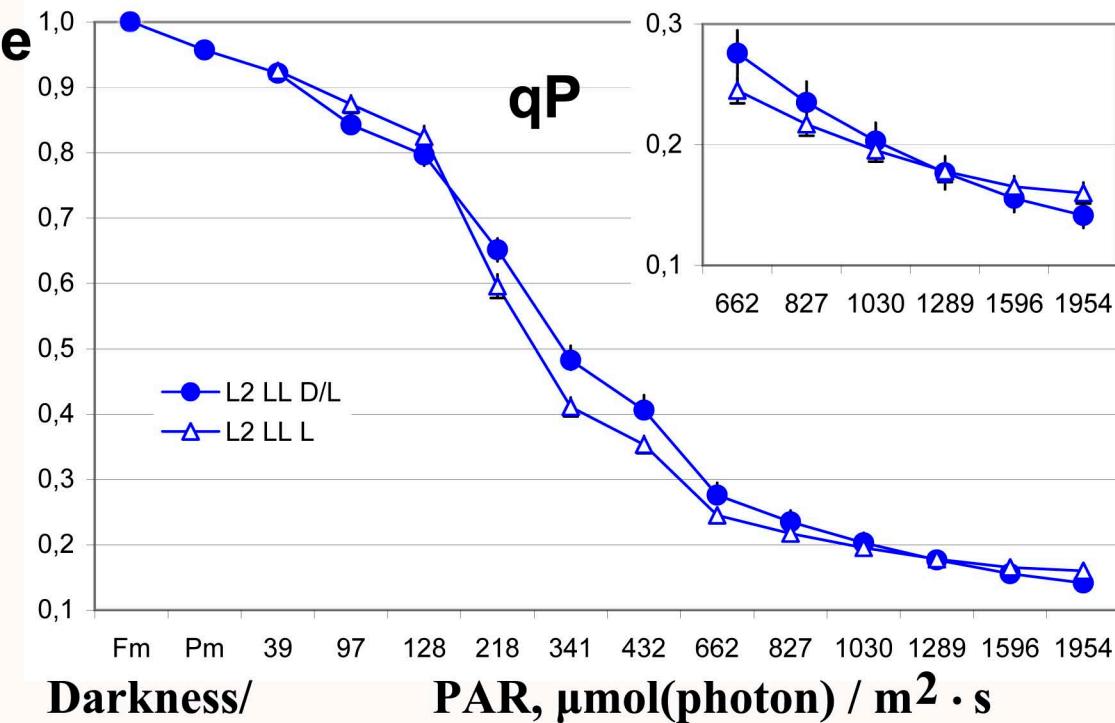
Darkness/ PAR,  $\mu\text{mol}(\text{photon}) / \text{m}^2 \cdot \text{s}$



Darkness/ PAR,  $\mu\text{mol}(\text{photon}) / \text{m}^2 \cdot \text{s}$

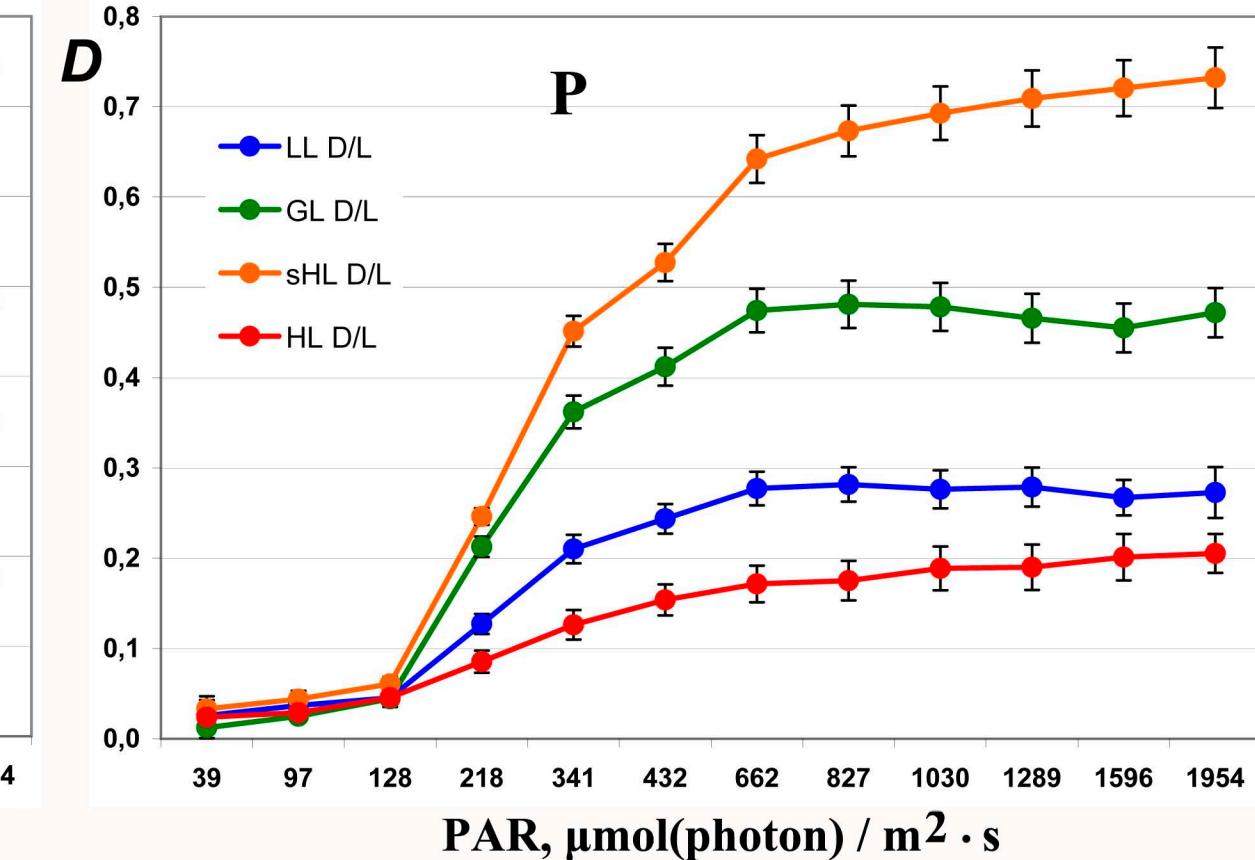
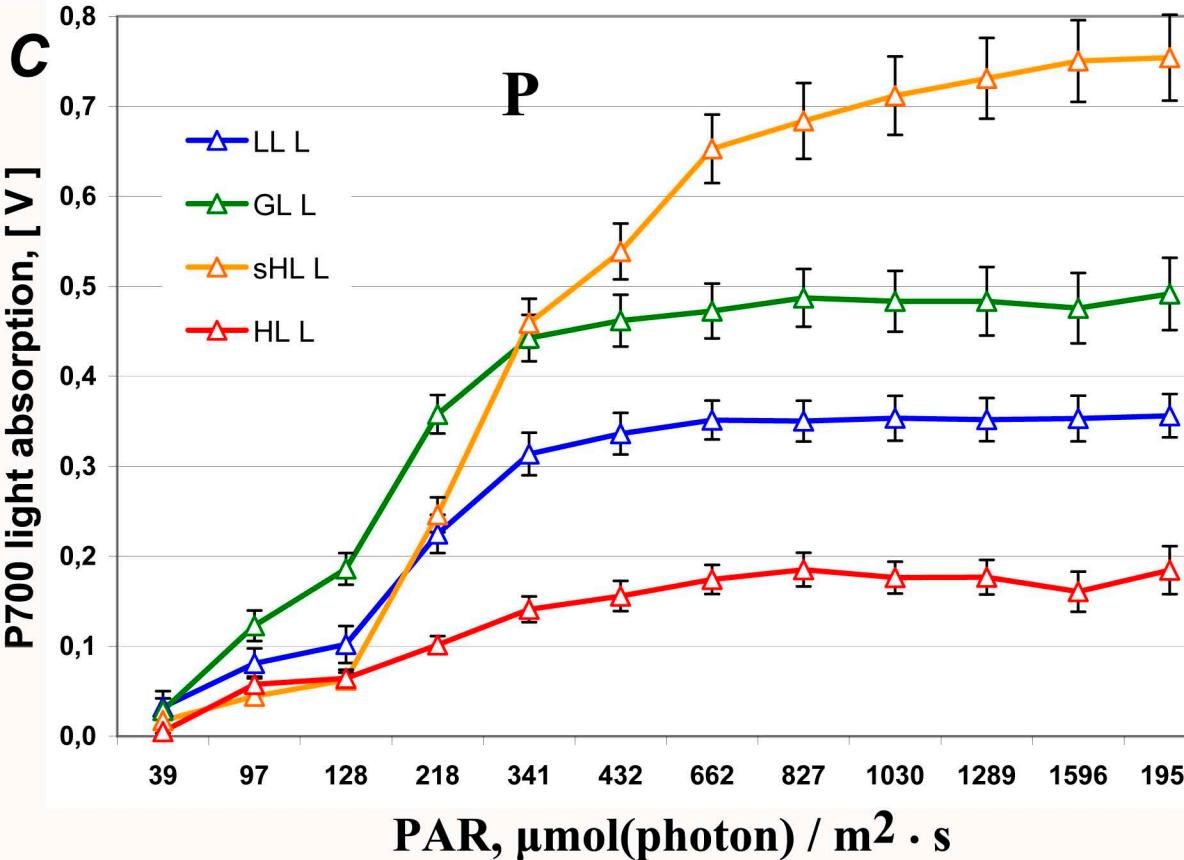
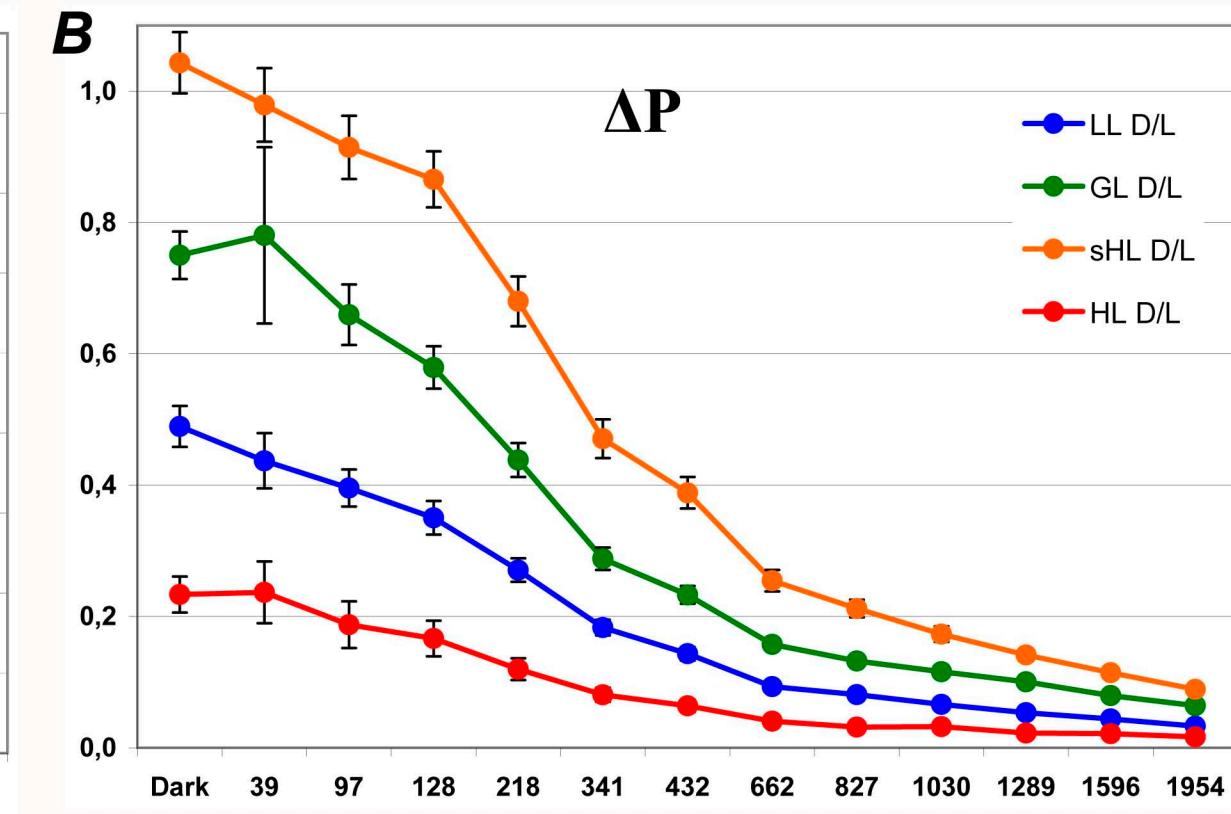
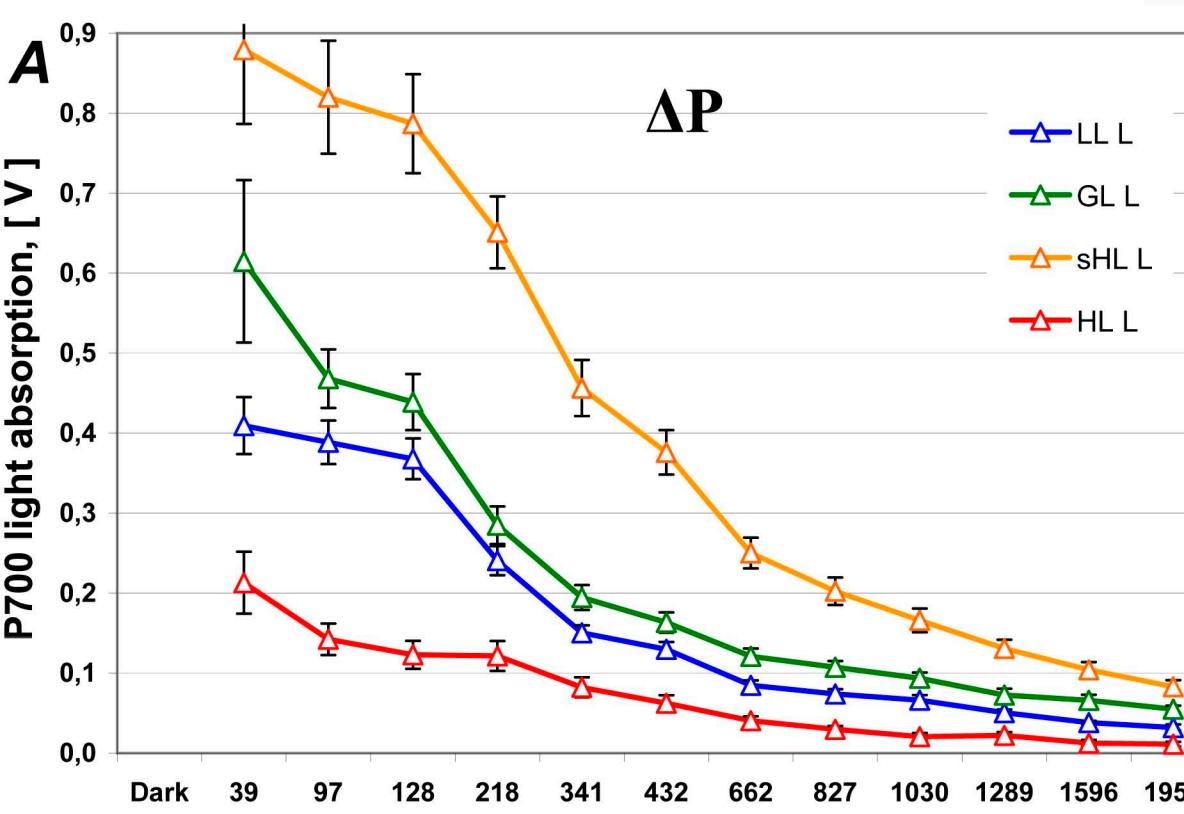
**Fig. S4** The coefficients of Chl fluorescence  $\Phi_{PSII}$  and qP

All the data are the same as in Fig. 3. The data were rearranged for the comparison between the whole pictures obtained in D/L and L variants (a-d). All designations are the same as in Fig. 1.



**Fig. S4** The coefficients of Chl fluorescence  $\Phi_{\text{PSII}}$  and qP (continued)

All the data are the same as in Fig. 3. The data from Fig. 3c were repeated; the data obtained from GL plants were omitted for better visibility of the qP dynamics in LL plants (e). All designations are the same as in Fig. 1.



**Fig. S5** The parameters of  $P_{700}$  light absorption  $P$  and  $\Delta P$

All the data are the same as in Fig. 5. The data were rearranged for the comparison between the whole pictures obtained in D/L and L variants. All designations are the same as in Fig. 1.