

## Supplementary Material

### **Monochromatic red light during plant growth decreases the size and improves the functionality of stomata in chrysanthemum**

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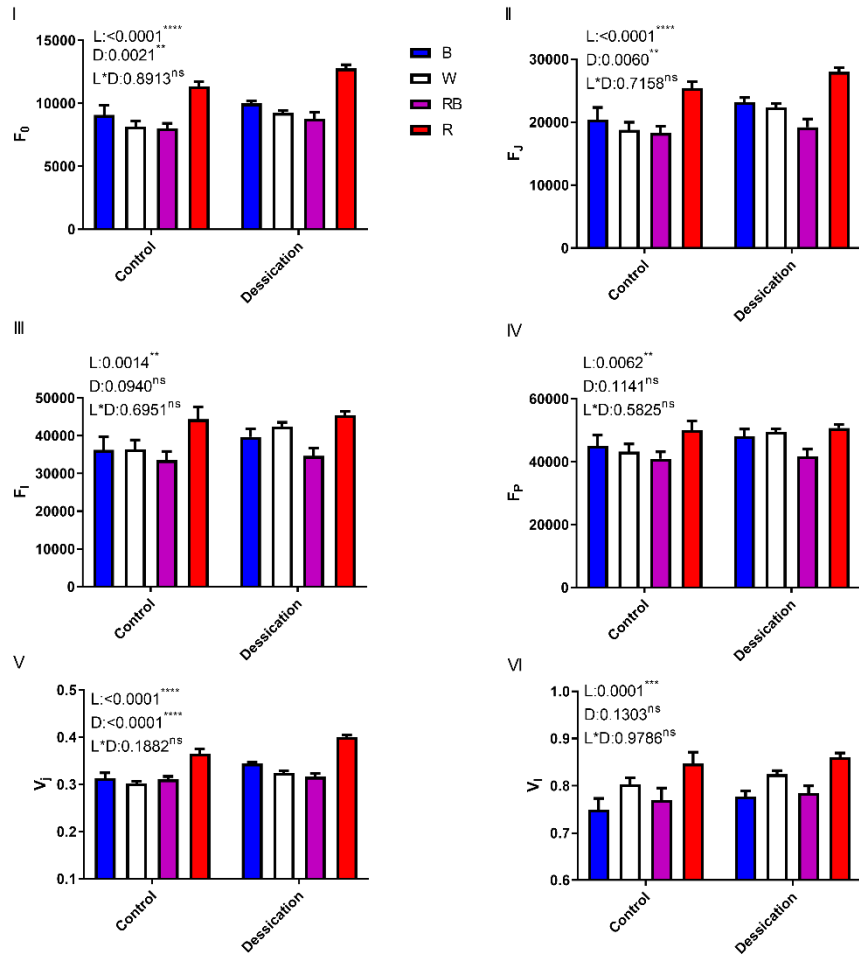
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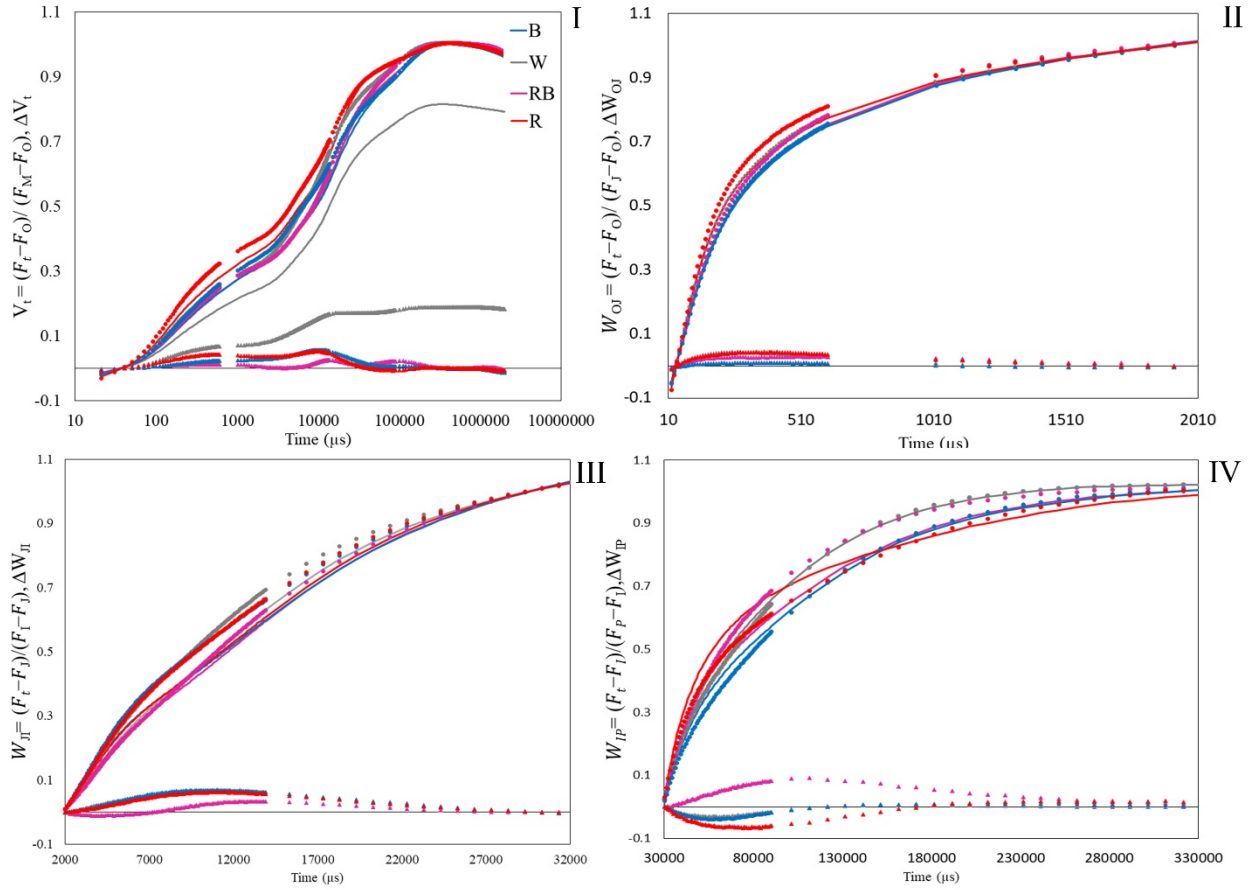
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**Fig. S1.** Fluorescence transient induction curve parameters for OJIP curve [O step (i), J step (ii), I step (iii), P step (iv),  $V_j$  (v) and  $V_I$  (vi)] on cut chrysanthemum fully hydrated and 2 h-desiccated leaves. Plants were grown under different light quality regimes {blue (400–500 nm), white [41% blue (400–500 nm), 39% intermediate (500–600 nm), and 20% red (600–700 nm)], red and blue [30% blue (400–500 nm), and 70% red (600–700 nm)] as well as red (600–700 nm); see spectrum in Fig. 1}. The inserts denote significant differences for light spectra (L), desiccation (D) and their interaction (L×D). The desiccation curve is provided in Fig. 7. Values are means of four replicates. ns, not significant; \*\*significant at the 0.01 probability level; \*\*\*significant at the 0.001 probability level; \*\*\*\*significant at the 0.0001 probability level.



**Fig. S2.** The chlorophyll a fluorescence transients of cut chrysanthemum fully-hydrated (solid line) and 2 h-desiccated (dash line) leaves (desiccation curve in Fig. 7). The difference kinetics ( $\Delta$ ) of the chlorophyll a fluorescence (triangle) were also performed. Plants were grown under different light quality regimes {blue (400–500 nm), white [41% blue (400–500 nm), 39% intermediate (500–600 nm), and 20% red (600–700 nm)], red and blue [30% blue (400–500 nm), and 70% red (600–700 nm)] as well as red (600–700 nm); see spectrum in Fig. 1}. (I) The fluorescence kinetics were normalized by  $F_0$  and  $F_M$  as  $V_t = (F_t - F_0) / (F_M - F_0)$  (Top lines) and  $\Delta V_t = V_t$  (desiccation) -  $V_t$  (control) (Bottom lines). (II) The fluorescence kinetics were normalized by  $F_0$  and  $F_J$  as  $W_{OJ} = (F_t - F_0) / (F_J - F_0)$  (Top lines) and  $\Delta W_{OJ} = W_{OJ}$  (desiccation) -  $W_{OJ}$  (control) (Bottom lines). (III) The fluorescence kinetics were normalized by  $F_J$  and  $F_I$  as  $W_{JI} = (F_t - F_J) / (F_I - F_J)$  (Top lines) and  $\Delta W_{JI} = W_{JI}$  (desiccation) -  $W_{JI}$  (control) (Bottom lines). (IV) The fluorescence kinetics were

normalized by  $F_I$  and  $F_P$  as  $W_{IP} = (F_t - F_I) / (F_P - F_I)$  (Top lines) and  $\Delta W_{IP} = W_{IP} (\text{desiccation}) - W_{IP} (\text{control})$  (Bottom lines). Values are means of four replicates.

**Table S1. Parameters of fitted curves for transpiration rate (E) versus time during desiccation of cut chrysanthemum leaves grown under different light quality regimes {blue (B; 400–500 nm), white [W; 41% blue (400–500 nm), 39% intermediate (500–600 nm), and 20% red (600–700 nm)], red and blue [RB; 30% blue (400–500 nm), and 70% red (600–700 nm)] as well as red (R; 600–700 nm); see spectrum in Fig. 1}**

The desiccation curve is provided in Fig. 7I.  $E_0$  is the maximum transpiration rate; plateau is the value of E when it stabilizes; K is the rate constant of E decrease; half time is the time when E reaches its half value; span is the difference between maximum E and when it reached to plateau. Values are means of four replicates  $\pm$  SEM. Values shown by different letters indicate significant differences at  $P \leq 0.05$ .

	Light spectra			
	B	W	RB	R
$E_0$ (mmol m <sup>-2</sup> s <sup>-1</sup> ) <sup>1</sup>	2	1.9	1.4	1.8
Plateau unit (mmol m <sup>-2</sup> s <sup>-1</sup> ) <sup>1</sup>	0.28	0.17	0.006	0.22
K (s <sup>-1</sup> )	3.1 <sup>b</sup>	2.5 <sup>b</sup>	1.4 <sup>c</sup>	5.7 <sup>a</sup>
Half time (s)	0.22 <sup>b</sup>	0.27 <sup>b</sup>	0.49 <sup>c</sup>	0.12 <sup>a</sup>
Span (mmol m <sup>-2</sup> s <sup>-1</sup> )	1.7 <sup>b</sup>	1.7 <sup>b</sup>	1.4 <sup>a</sup>	1.5 <sup>a</sup>
<b>R<sup>2</sup></b>	0.87	0.89	0.82	0.84

<sup>1</sup> No significant difference.

**Table S2. Parameters of fitted curves for transpiration rate (E) versus relative water content (RWC) during desiccation of cut chrysanthemum leaves grown under different light quality regimes {blue (B; 400–500 nm), white [W; 41% blue (400–500 nm), 39% intermediate (500–600 nm), and 20% red (600–700 nm)], red and blue [RB; 30% blue (400–500 nm), and 70% red (600–700 nm)] as well as red (R; 600–700 nm); see spectrum in Fig. 1}**

The desiccation curve is provided in Fig. 7II.  $E_0$  is the transpiration rate at maximum RWC; plateau is the value of E when it stabilizes; K is the rate of the E by RWC curve; half RWC is the RWC of the leaf when E reaches to its half value; span is the difference between maximum and plateau in E by RWC curve. Values are means of four replicates  $\pm$  SEM. Values shown by different letters indicate significant differences at  $P \leq 0.05$ .

	<b>B</b>	<b>W</b>	<b>RB</b>	<b>R</b>
<b><math>E_0</math> (mmol m<sup>-2</sup> s<sup>-1</sup>)</b>	1.8 <sup>a</sup>	1.8 <sup>a</sup>	1.1 <sup>b</sup>	1.3 <sup>b</sup>
<b>Plateau (mmol m<sup>-2</sup> s<sup>-1</sup>)<sup>1</sup></b>	0.32	0.23	0.18	0.21
<b>K (%)</b>	0.13 <sup>b</sup>	0.11 <sup>b</sup>	0.13 <sup>b</sup>	0.22 <sup>a</sup>
<b>Half RWC (%)</b>	88 <sup>b</sup>	86 <sup>b</sup>	87 <sup>b</sup>	93 <sup>a</sup>
<b>Span (mmol m<sup>-2</sup> s<sup>-1</sup>)</b>	1.5 <sup>b</sup>	1.6 <sup>b</sup>	0.9 <sup>a</sup>	1.1 <sup>a</sup>
<b>R<sup>2</sup></b>	0.94	0.94	0.92	0.95

<sup>1</sup>Nt significant difference.