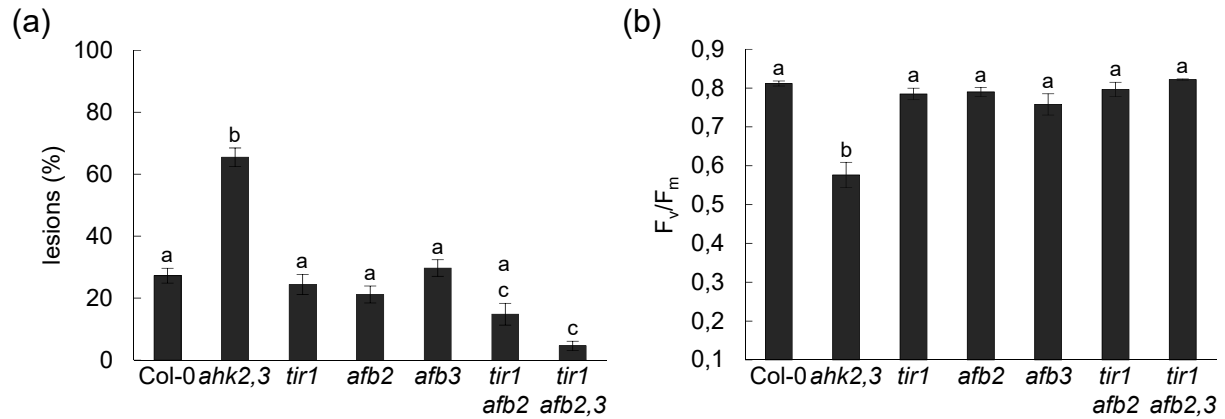
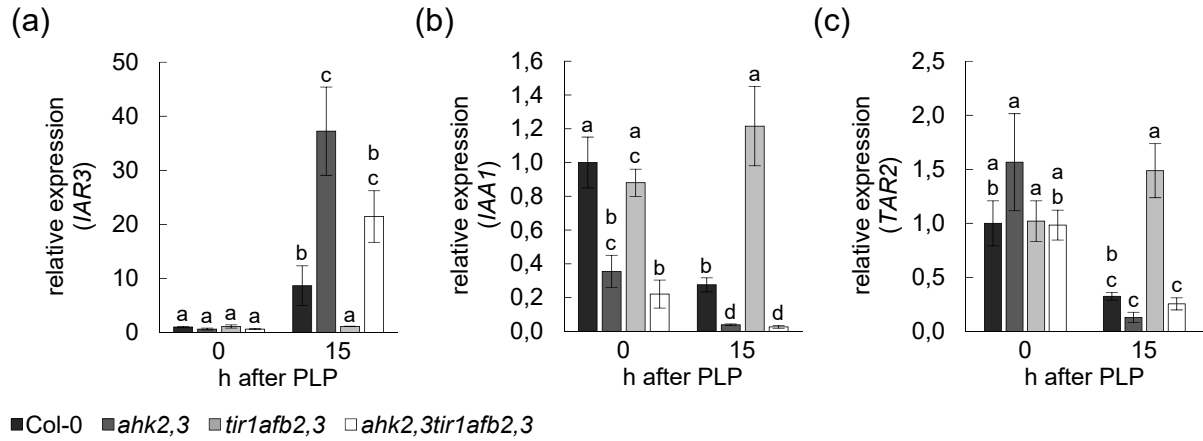


Supplemental Figure S1. qRT-PCR analysis of photoperiod stress-responsive auxin-related genes identified via RNA-seq. Transcript abundance of *IAR3* (a), *IAA1* (b) and *TAR2* (c) in wild type and *ahk2,3* 0, 4, 6 and 12 h after the PLP-treatment compared to respective control plants. The expression level of wild-type control at the end of the PLP treatment (0 h) was set to 1. Letters indicate significantly different statistical groups (one-way ANOVA; $p \leq 0.05$; $n \geq 3$). Error bars indicate SE. A schematic overview of the experimental setup can be found in Figure 1a.

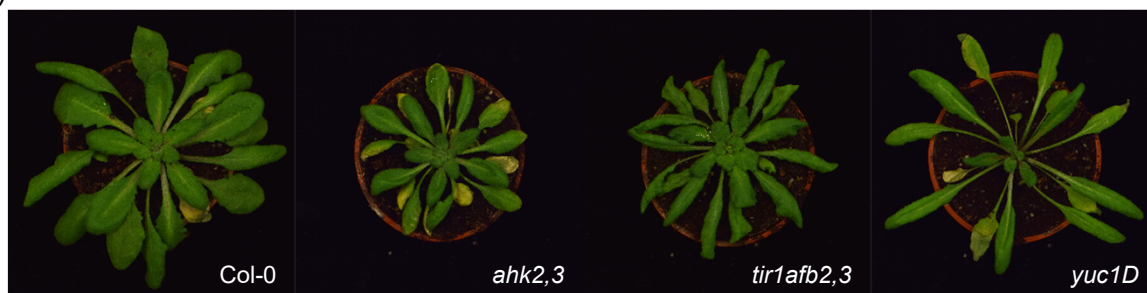


Supplemental Figure S2. Auxin receptors TIR1, AFB2 and AFB3 mediate the photoperiod stress sensitivity redundantly. (a) Lesion formation of leaves in five-week-old Col-0, *ahk2,3*, *tir1*, *afb2*, *afb3*, *tir1afb2* and *tir1afb2,3* plants the day after the PCD-inducing night (one-way ANOVA; $p \leq 0.05$; $n \geq 12$). (b) Efficiency of photosystem II (F_v/F_m) of leaves the day after the photoperiod stress treatment (Paired Wilcoxon test, FDR corrected via Benjamini-Hochberg test; $p \leq 0.05$; $n = 15$). Letters indicate significantly different statistical groups. Error bars indicate SE. Pictures of representative plants exposed to a 24-h prolongation of the light period are shown in Supplemental Figure S4c.

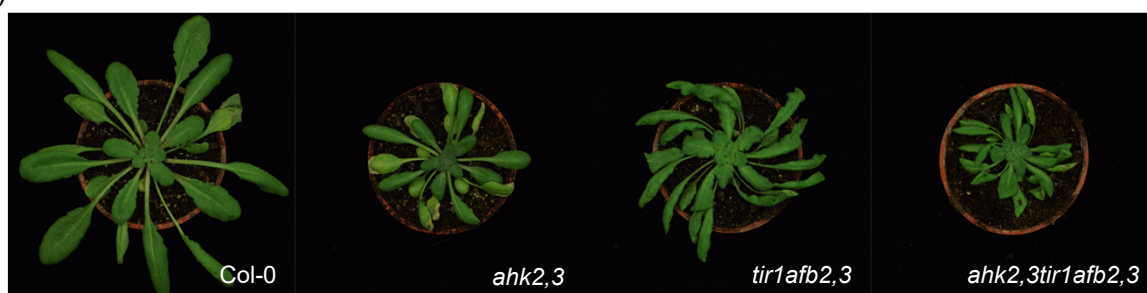


Supplemental Figure S3. Expression analysis of photoperiod stress-responsive auxin-related genes. Transcript abundance of *IAR3* (a), *IAA1* (b) and *TAR2* (c) 0 and 15 h after the PLP compared to respective control plants (same experimental setup as in Figure 5). The expression level of wild type at the end of the PLP treatment (0 h) was set to 1 (one-way ANOVA; $p \leq 0.05$; $n \geq 3$). Letters indicate significantly different statistical groups.

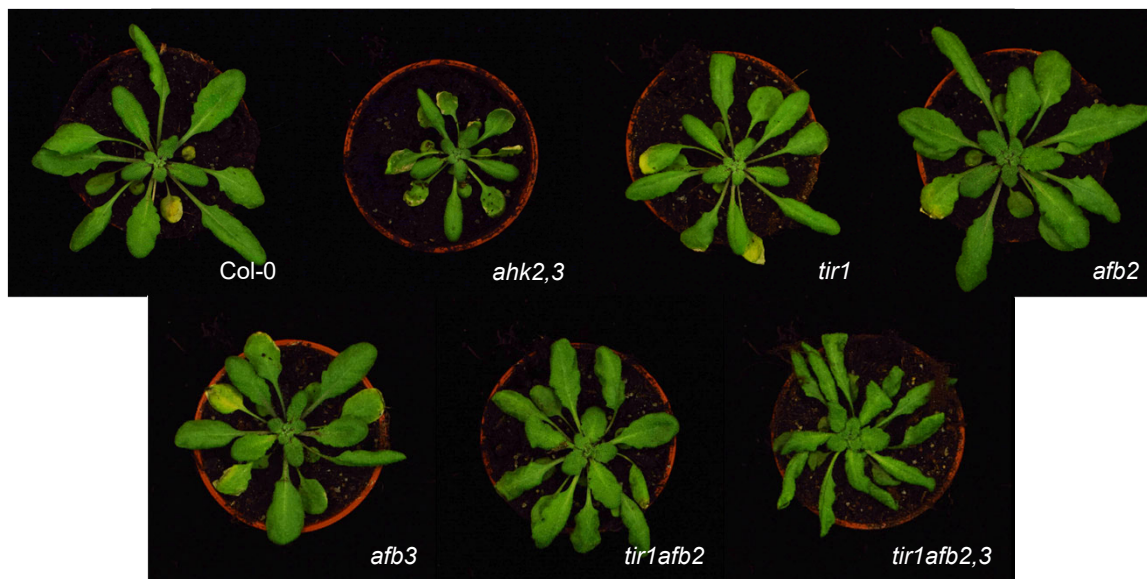
(a)



(b)



(c)



Supplemental Figure S4. Pictures of representative plants from experiments shown in this study. The plants were used for the experiments depicted in Figure 4 (a), Figure 5 (b) and Supplemental Figure S2 (c).

Supplemental Table S1. Overview over log₂-fold changes of transcript abundance corresponding to plots depicted in Figure 1. Bold numbers indicate a significant difference between compared genotypes/conditions ($p \leq 0.05$; $n = 3$). Data have been extracted from [33]. PLP, prolonged light period.

	<i>ahk2,3</i> control vs. WT control				WT PLP vs. WT control				<i>ahk2,3</i> PLP vs. <i>ahk2,3</i> control				<i>ahk2,3</i> PLP vs. WT PLP			
	0	4	6	12	0	4	6	12	0	4	6	12	0	4	6	12
<i>TAA1</i>	-1.17	-1.19	-1.89	-2.32	-0.53	-0.69	-1.51	-0.85	-1.05	-1.63	-0.84	-5.00	-1.68	-2.13	-1.22	-6.47
<i>TAR1</i>	-0.02	0.02	0.03	0.89	0.09	0.12	0.30	2.87	0.08	1.20	2.44	3.65	-0.03	1.10	2.17	1.68
<i>TAR2</i>	0.20	-0.49	-0.52	-0.45	0.98	0.86	0.68	-1.09	1.01	0.84	-0.16	-3.80	0.23	-0.50	-1.36	-3.15
<i>YUC1</i>	-0.02	0.02	-0.94	-0.07	0.09	-0.84	-0.66	0.02	0.08	-0.72	2.30	1.56	-0.03	0.14	2.02	1.47
<i>YUC2</i>	-1.53	-1.37	-0.71	-0.81	-0.43	-0.06	0.29	-0.42	0.98	0.76	-1.51	-5.11	-0.12	-0.56	-2.51	-5.49
<i>YUC3</i>	1.82	0.94	2.46	-0.07	0.09	-0.84	0.30	-0.94	-1.77	-1.64	-0.93	1.33	-0.03	0.14	1.23	2.20
<i>YUC4</i>	-0.73	-0.76	-1.65	-1.54	-1.61	-1.47	-2.71	-0.61	-1.33	-0.58	-0.20	-0.13	-0.45	0.13	0.86	-1.06
<i>YUC5</i>	-0.02	-0.56	-0.87	1.28	2.99	0.53	1.64	0.04	2.30	3.89	5.16	-2.62	-0.72	2.79	2.65	-1.38
<i>YUC6</i>	0.32	0.22	0.14	0.45	-0.51	-0.73	-2.23	-1.43	-0.40	-1.73	-3.83	-3.99	0.42	-0.77	-1.46	-2.11
<i>YUC7</i>	-0.02	0.98	-0.94	1.79	2.53	2.03	0.30	0.02	0.08	0.24	1.50	0.52	-2.47	-0.81	0.26	2.29
<i>YUC8</i>	-2.08	-2.24	-1.68	-1.19	-0.86	0.64	1.10	2.18	0.32	2.18	2.12	2.84	-0.89	-0.69	-0.66	-0.52
<i>YUC9</i>	-2.54	-0.51	-0.23	-0.63	-1.31	0.47	1.10	1.30	0.20	1.99	-0.69	-2.99	-1.03	1.01	-2.02	-4.92
<i>YUC10</i>	-0.02	0.02	-0.94	-0.07	0.09	0.12	-0.66	0.98	0.08	0.24	0.54	1.56	-0.03	0.14	0.26	0.51
<i>YUC11</i>	-0.02	0.02	0.03	-0.07	0.09	1.08	0.30	0.98	0.08	0.24	0.54	1.56	-0.03	-0.82	0.26	0.51
<i>DAO1</i>	-0.10	0.00	-0.27	-0.05	0.15	-0.03	0.10	0.76	0.16	-0.44	0.94	2.13	-0.09	-0.42	0.56	1.32
<i>DAO2</i>	-0.02	-2.14	0.03	-0.07	0.58	-1.10	1.82	0.02	0.56	1.22	1.41	4.91	-0.04	0.17	-0.39	4.82
<i>IAR3</i>	0.00	-0.52	-0.35	0.92	0.18	-0.05	1.45	3.52	0.16	1.41	4.00	4.83	-0.02	0.94	2.21	2.23
<i>ILR1</i>	-0.09	-0.03	0.04	-0.13	-0.12	-0.35	-0.38	0.79	-0.19	-0.26	0.77	2.96	-0.16	0.06	1.20	2.04
<i>ILL1</i>	0.01	0.07	0.06	-0.06	-0.03	-0.21	-0.46	-0.59	-0.06	-0.39	-0.69	-1.70	-0.01	-0.11	-0.17	-1.18
<i>ILL2</i>	-0.28	0.12	0.13	-0.10	-0.07	0.06	-0.03	-0.06	0.21	-0.06	-0.56	-1.01	0.00	0.00	-0.39	-1.05
<i>GH3.1</i>	1.81	0.98	-0.94	0.89	2.53	1.08	1.80	2.91	1.69	0.24	3.40	2.43	0.97	0.14	0.66	0.41
<i>GH3.2</i>	-3.35	-0.27	0.51	3.37	-0.77	2.28	5.08	9.02	2.52	3.38	6.11	6.06	-0.07	0.83	1.54	0.41
<i>GH3.3</i>	-2.17	-1.64	-1.86	-1.82	0.12	1.00	1.67	6.17	1.82	3.72	3.28	5.53	-0.47	1.09	-0.26	-2.46
<i>GH3.4</i>	-0.99	0.02	0.03	-0.07	-0.87	0.12	0.30	0.98	1.04	0.24	0.54	2.47	0.93	0.14	0.26	1.42
<i>GH3.5</i>	-0.39	0.40	1.02	0.76	-1.06	0.28	2.22	5.42	1.28	1.43	1.43	2.24	1.95	1.55	0.22	-2.42
<i>GH3.6</i>	-0.30	-1.40	-0.01	-0.36	0.60	0.46	1.38	1.14	0.15	0.84	1.86	2.57	-0.75	-1.02	0.47	1.07
<i>GH3.9</i>	-0.10	-0.54	0.42	-0.09	0.80	0.96	0.88	-0.07	1.44	1.56	-0.46	-1.92	0.54	0.06	-0.91	-1.94
<i>GH3.17</i>	1.12	0.84	1.60	1.18	0.40	0.49	-0.64	-0.03	0.32	-0.74	-2.48	-1.59	1.04	-0.39	-0.24	-0.37

Supplemental Table S2. Overview over log₂-fold changes of transcript abundance corresponding to plots depicted in Figure 2. Bold numbers indicate a significant difference between compared genotypes/conditions ($p \leq 0.05$; $n = 3$). Data have been extracted from [33]. PLP, prolonged light period.

	<i>ahk2,3</i> control vs. WT control				WT PLP vs. WT control				<i>ahk2,3</i> PLP vs. <i>ahk2,3</i> control				<i>ahk2,3</i> PLP vs. WT PLP			
	0	4	6	12	0	4	6	12	0	4	6	12	0	4	6	12
<i>TIR1</i>	0.16	0.27	0.47	0.00	0.36	-0.34	-0.56	-0.98	0.42	-1.28	-2.01	-2.84	0.22	-0.66	-0.98	-1.86
<i>AFB1</i>	-0.09	0.08	0.45	0.33	-0.02	0.40	-0.09	0.08	0.53	-0.17	-1.60	-2.63	0.46	-0.48	-1.06	-2.38
<i>AFB2</i>	0.04	0.27	0.17	0.19	-0.38	-0.14	-0.24	-0.12	-0.14	-0.48	-0.34	0.14	0.28	-0.07	0.07	0.45
<i>AFB3</i>	0.20	0.14	0.01	-0.31	0.44	-0.14	-0.60	-0.51	0.36	-0.93	-1.28	-1.54	0.12	-0.65	-0.67	-1.33
<i>AFB4</i>	0.00	0.10	0.05	0.02	0.03	0.44	0.74	0.19	0.22	0.71	0.79	-0.01	0.19	0.37	0.09	-0.19
<i>AFB5</i>	0.17	0.16	0.13	-0.07	0.10	-0.46	-1.00	-1.17	0.05	-1.13	-2.07	-2.80	0.12	-0.51	-0.94	-1.70
<i>IAA1</i>	-0.99	-0.79	-0.70	-0.87	0.46	0.48	0.39	0.06	0.28	0.03	-2.04	-2.17	-1.17	-1.23	-3.14	-3.09
<i>IAA2</i>	-0.63	-0.20	0.22	0.19	0.38	0.92	1.58	1.09	0.82	2.25	1.89	0.86	-0.19	1.13	0.53	-0.04
<i>IAA3</i>	0.08	-0.62	-0.30	-0.26	-0.46	-0.13	-0.72	-0.71	-0.71	-0.13	-1.76	-3.26	-0.17	-0.62	-1.34	-2.82
<i>IAA4</i>	-0.16	-0.19	0.04	-0.06	0.05	-0.08	-0.67	-0.98	0.27	-1.22	-2.94	-4.30	0.06	-1.34	-2.23	-3.37
<i>IAA5</i>	-2.17	-2.93	-1.53	-2.05	0.46	0.54	0.20	-0.31	0.87	1.31	-2.29	-4.72	-1.76	-2.16	-4.01	-6.46
<i>IAA6</i>	-0.05	-0.74	-0.44	-0.39	0.41	0.08	-0.23	0.01	-0.31	0.30	-1.86	-3.12	-0.77	-0.52	-2.07	-3.51
<i>IAA7</i>	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
<i>IAA8</i>	0.05	0.06	0.06	-0.25	0.13	0.01	-0.01	-1.01	0.09	-0.35	-0.75	-2.78	0.01	-0.30	-0.67	-2.02
<i>IAA9</i>	-0.07	-0.05	0.15	0.27	-0.09	0.45	0.23	0.15	-0.07	0.65	-0.07	-0.65	-0.05	0.15	-0.15	-0.52
<i>IAA10</i>	-0.05	0.35	0.19	1.03	-0.11	1.27	1.85	2.29	0.09	1.81	3.56	3.31	0.15	0.89	1.89	2.05
<i>IAA11</i>	0.09	0.03	0.13	-0.11	-0.07	-0.06	-0.29	-0.45	-0.05	-0.38	-1.14	-2.14	0.11	-0.30	-0.71	-1.80
<i>IAA12</i>	0.19	0.39	0.17	-0.01	0.31	0.27	-0.60	-1.40	0.02	-0.65	-2.04	-3.96	-0.10	-0.53	-1.28	-2.57
<i>IAA13</i>	-0.20	0.09	0.15	0.22	-0.28	0.05	-0.73	-0.40	-0.04	-0.31	-1.68	-1.33	0.05	-0.26	-0.81	-0.71
<i>IAA14</i>	-1.00	-0.03	-0.06	-0.32	0.08	0.19	-0.92	-0.04	-0.23	-1.87	-2.69	-1.99	-1.32	-2.10	-1.83	-2.26
<i>IAA15</i>	-1.46	2.47	0.99	-1.89	-1.35	1.98	1.26	0.64	-0.88	0.95	-0.42	1.56	-0.99	1.44	-0.70	-0.97
<i>IAA16</i>	-0.39	0.01	0.17	-0.03	-0.52	-0.25	-0.07	0.55	0.04	-0.64	0.56	1.29	0.18	-0.39	0.80	0.72
<i>IAA17</i>	-0.47	-1.06	-0.36	-0.42	1.85	0.50	0.16	-1.09	1.34	0.72	-0.82	-3.34	-0.97	-0.85	-1.34	-2.66
<i>IAA18</i>	0.30	0.10	0.08	-0.02	-0.07	-0.50	-0.53	0.25	-0.14	-0.58	0.03	1.39	0.24	0.02	0.64	1.12
<i>IAA19</i>	-1.40	-1.51	-0.75	-0.92	0.14	1.38	1.85	1.65	0.75	3.13	1.77	-1.10	-0.78	0.25	-0.83	-3.68
<i>IAA26</i>	0.02	0.12	0.04	0.03	-0.07	0.03	-0.38	-0.08	0.08	-0.26	0.05	0.15	0.17	-0.17	0.47	0.26
<i>IAA27</i>	0.09	-0.51	0.61	0.33	-0.38	-0.52	-1.52	-1.50	-0.73	0.21	-1.74	-3.64	-0.26	0.23	0.39	-1.81
<i>IAA28</i>	-0.18	0.21	0.68	0.84	-0.63	-0.11	-0.32	-0.37	-0.29	0.54	0.28	-0.24	0.15	0.86	1.27	0.97
<i>IAA29</i>	-2.66	-1.26	-0.71	-1.62	0.29	1.68	1.90	1.30	1.83	1.74	-0.41	-3.94	-1.12	-1.20	-3.03	-6.86
<i>ARF5</i>	0.62	0.28	0.38	0.06	-0.34	-0.52	-1.65	-0.70	-0.71	-0.99	-1.06	0.28	0.25	-0.18	0.97	1.04
<i>ARF6</i>	0.21	-0.13	0.21	0.05	-0.28	-0.39	-0.68	-0.25	-0.04	-0.54	-0.78	-0.19	0.45	-0.28	0.10	0.11
<i>ARF7</i>	0.08	0.33	0.19	0.33	-0.17	0.48	0.70	0.61	0.08	0.56	0.88	1.24	0.33	0.41	0.38	0.96
<i>ARF8</i>	0.27	0.12	0.35	0.13	0.00	-0.31	-0.90	-1.13	0.04	-0.75	-1.87	-3.04	0.31	-0.31	-0.61	-1.78
<i>ARF1</i>	0.08	0.11	-0.02	-0.17	-0.49	-0.35	-0.50	-0.43	-0.45	-0.49	-0.26	-0.43	0.12	-0.03	0.22	-0.17
<i>ARF2</i>	-0.16	0.12	0.00	-0.03	-0.55	-0.09	0.28	0.29	-0.43	0.00	0.78	0.44	-0.04	0.22	0.50	0.13
<i>ARF3</i>	-0.12	-0.13	0.02	-0.34	-0.25	-0.62	-1.01	-1.33	-0.16	-1.16	-2.22	-3.23	-0.02	-0.66	-1.19	-2.24
<i>ARF4</i>	0.25	0.27	0.41	0.32	-0.46	-0.35	-0.82	-1.11	-0.39	-0.68	-1.90	-3.63	0.31	-0.06	-0.67	-2.20
<i>ARF9</i>	-0.23	0.08	0.00	-0.19	-0.05	-0.13	-0.51	-0.25	0.04	-0.77	-1.18	-0.92	-0.14	-0.55	-0.67	-0.85
<i>ARF10</i>	0.20	0.25	0.35	0.35	0.43	-0.43	-0.76	-0.54	0.31	-0.84	-1.52	-1.71	0.07	-0.16	-0.41	-0.83
<i>ARF11</i>	-0.27	-0.31	-0.25	-0.43	-0.51	-0.34	-0.34	-0.25	-0.41	-0.49	-0.12	-0.18	-0.18	-0.46	-0.04	-0.36
<i>ARF12</i>	-0.02	0.98	1.93	0.89	0.09	0.12	0.30	0.02	-0.88	-0.72	-1.36	-0.37	-0.99	0.14	0.26	0.51
<i>ARF13</i>	-0.02	-0.94	0.99	-0.07	-0.87	-0.84	0.30	0.02	-0.88	0.24	-0.42	0.60	-0.03	0.14	0.26	0.51
<i>ARF14</i>	-0.02	-0.94	1.88	-0.07	0.09	-0.84	2.13	0.98	0.08	0.24	-0.35	0.60	-0.03	0.14	-0.60	-0.45
<i>ARF15</i>	-0.99	0.02	0.03	-0.07	-0.87	0.12	0.30	0.02	0.08	1.20	1.50	1.56	-0.03	1.10	1.23	1.47
<i>ARF16</i>	-0.02	-0.15	-0.04	-0.19	0.06	-0.33	-0.36	-0.81	-0.21	-0.62	-0.92	-1.04	-0.29	-0.44	-0.60	-0.42
<i>ARF17</i>	-0.16	-0.11	-0.18	-0.13	0.08	-0.05	-0.30	-0.06	0.20	-0.43	-0.41	-0.55	-0.04	-0.48	-0.29	-0.62
<i>ARF18</i>	0.36	0.52	0.35	0.28	-0.20	-0.09	-0.10	-0.41	-0.09	-0.21	-0.11	-2.03	0.46	0.41	0.33	-1.34
<i>ARF20</i>	-0.02	0.02	0.99	-0.07	-0.87	-0.84	0.30	0.98	-0.88	-0.72	-0.42	0.60	-0.03	0.14	0.26	-0.45
<i>ARF21</i>	-0.02	-0.89	0.03	-0.07	1.05	-1.75	0.30	1.85	0.08	-0.72	2.39	0.60	-0.99	0.14	2.11	-1.32
<i>ARF22</i>	-0.99	-1.46	1.89	1.77	0.09	-1.36	2.74	1.86	1.04	1.11	-0.36	1.65	-0.03	1.01	-1.22	1.56

Supplemental Table S3. Auxin concentrations (pmol g⁻¹ FW (mean ± SD)) corresponding to the plots depicted in Figure 3. tp, time point. PLP, prolonged light period.

Condition	tp	IAA		oxIAA		IAA-Asp		IAA-Glu		IAA-Glc		oxIAA-Glc	
<i>Col-0</i> control	1	16.9 ± 1.6	217.8 ± 26.5	2.1 ± 0.6	1.9 ± 0.7	75.7 ± 28.3	639.7 ± 84.4						
<i>ahk2,3</i> control	1	9.4 ± 0.7	118.2 ± 12.5	5.9 ± 0.6	2.9 ± 0.7	50.0 ± 10.6	356.5 ± 27.9						
<i>Col-0</i> PLP	1	21.3 ± 2.5	231.5 ± 26.7	3.3 ± 1.3	4.2 ± 1.5	121.9 ± 18.7	724.1 ± 72.7						
<i>ahk2,3</i> PLP	1	13.6 ± 0.9	114.7 ± 6.9	4.5 ± 1.1	3.2 ± 1.3	109.3 ± 18.5	353.3 ± 13.4						
<i>Col-0</i> control	2	18.7 ± 2.2	240.2 ± 20.1	1.7 ± 0.7	1.2 ± 0.3	56.0 ± 18.8	718.3 ± 68.4						
<i>ahk2,3</i> control	2	7.1 ± 1.4	114.8 ± 14.4	4.3 ± 1.2	1.6 ± 0.7	45.8 ± 4.0	336.8 ± 50.3						
<i>Col-0</i> PLP	2	39.1 ± 10.5	284.3 ± 24.3	7.5 ± 2.9	1.4 ± 0.4	126.0 ± 27.7	859.4 ± 69.9						
<i>ahk2,3</i> PLP	2	33.2 ± 3.1	122.4 ± 11.9	6.6 ± 0.8	1.0 ± 0.3	101.7 ± 13.4	344.0 ± 41.4						
<i>Col-0</i> control	3	16.5 ± 1.3	240.3 ± 17.8	1.7 ± 0.7	0.6 ± 0.2	83.2 ± 9.5	720.2 ± 54.6						
<i>ahk2,3</i> control	3	6.8 ± 0.7	110.7 ± 10.5	4.1 ± 0.5	1.3 ± 0.3	62.4 ± 16.2	326.3 ± 35.4						
<i>Col-0</i> PLP	3	17.7 ± 2.8	318.5 ± 29.9	9.4 ± 2.3	1.8 ± 0.7	151.5 ± 32.2	972.6 ± 59.6						
<i>ahk2,3</i> PLP	3	17.5 ± 2.1	189.6 ± 14.9	17.1 ± 2.4	1.1 ± 0.2	474.2 ± 94.9	562.1 ± 62.8						

Supplemental Table S4. Sequences of primers used for qRT-PCR.

Gene	AGI number	Forward Primer	Reverse Primer	Source
<i>BAP1</i>	AT3G61190	CCAGAGATTACGGCG CGTGTT	TACAGACCCCAAACCG GAACTCC	Nitschke <i>et al.</i> , 2016
<i>CAB2</i>	AT1G29920	AGAGGCCGAGGACTT GCTTTAC	GCCAATCTTCCGTTCT TGAGC	Nitschke <i>et al.</i> , 2016
<i>ZAT12</i>	AT5G59820	CGCTTTGTCGTCTGGAAGCAGCCCCACTCTCG TTG	TT	Nitschke <i>et al.</i> , 2016
<i>MCP2D</i>	AT1G79340	AACCCGCTATGCAGACCAGTTGGTTTCCCCGC ACACG	TGGA	Nitschke <i>et al.</i> , 2016
<i>PP2AA2</i>	AT3G25800	CCATTAGATCTTGTCT CTCTGCT	GACAAAACCCGTACCG AG	Nitschke <i>et al.</i> , 2016
<i>UBC10</i>	AT5G53300	CCATGGGCTAAATGGA AA	TTCATTTGGTCCTGTC TTCAG	Nitschke <i>et al.</i> , 2016
<i>IAA1</i>	AT4G14560	CGGAGCTCCATATCTC CGTAAG	CATCACCGACCAACAT CCAATC	this work
<i>IAR3</i>	AT1G51760	TTCCGCAGCATACCAT AGATCC	CTTGCCTTGTGATAAC CTGCTC	this work
<i>TAR2</i>	AT4G24670	ATGCAGGGATACGGAT TGGATG	CCGTTACATTCCCACA ACTGTC	this work