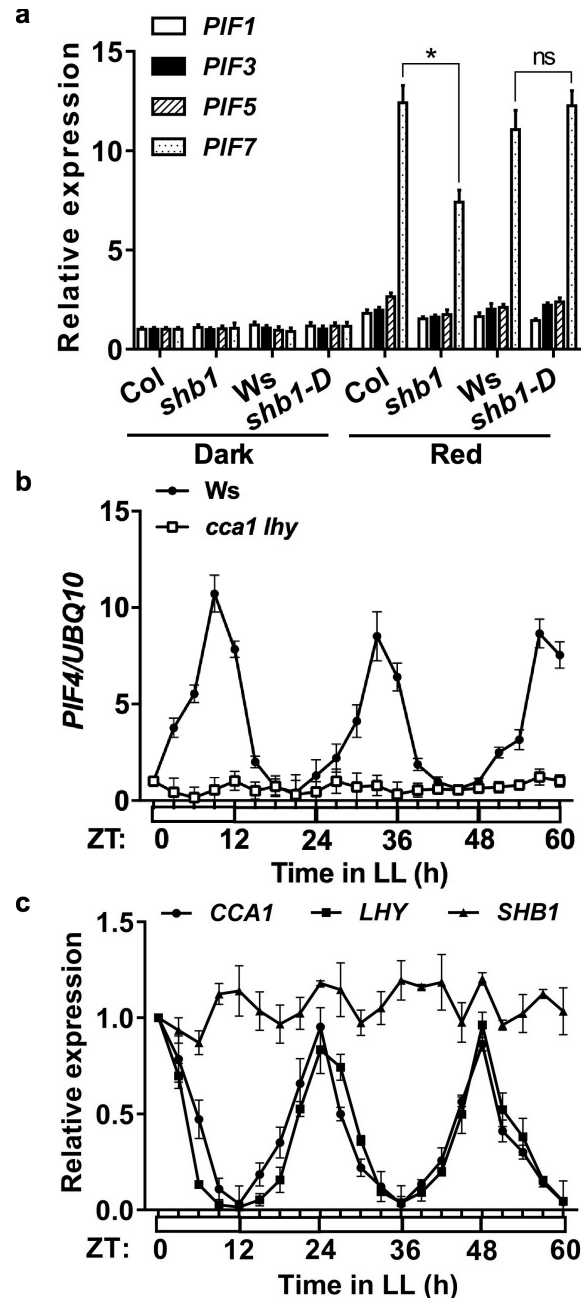
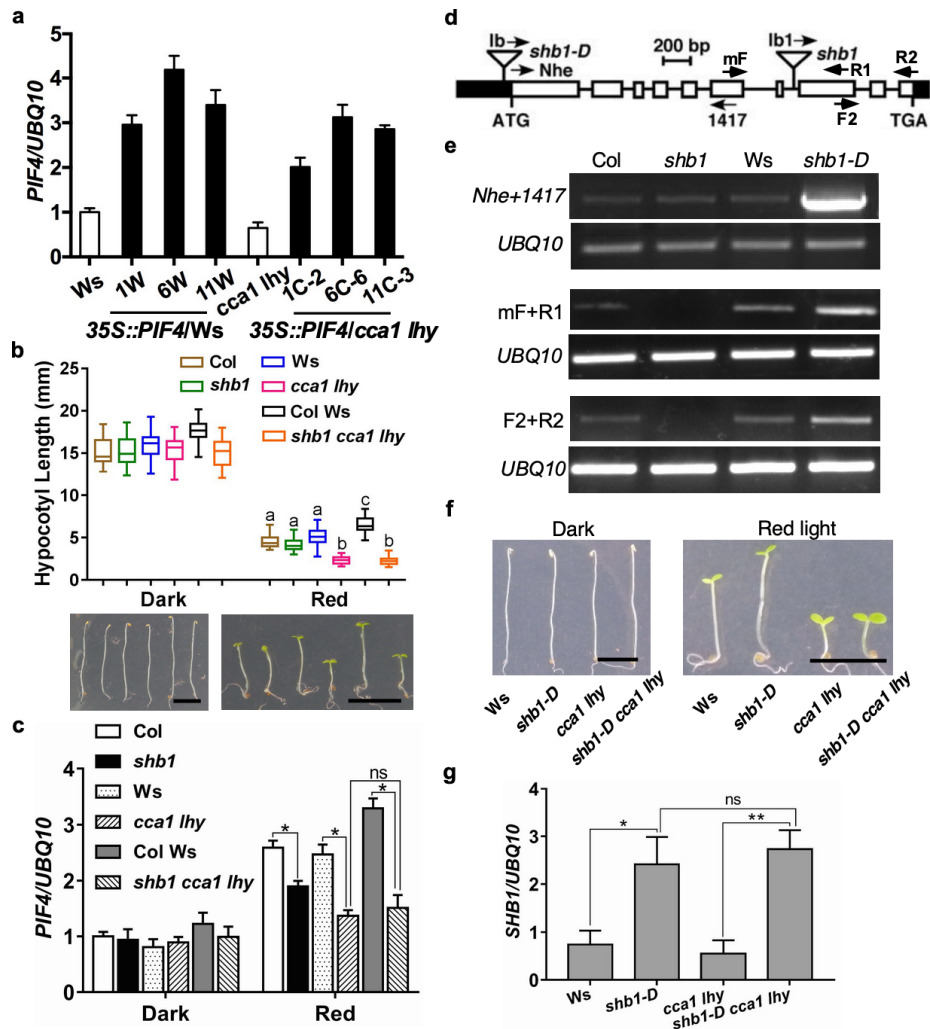
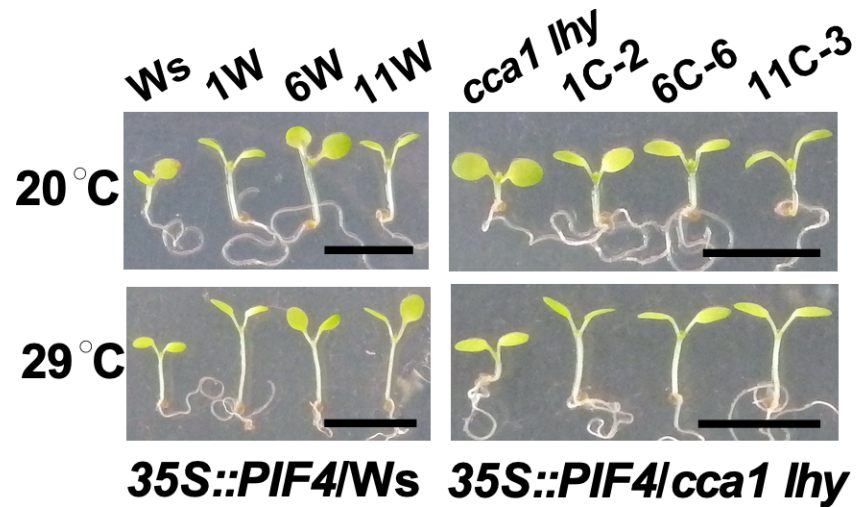




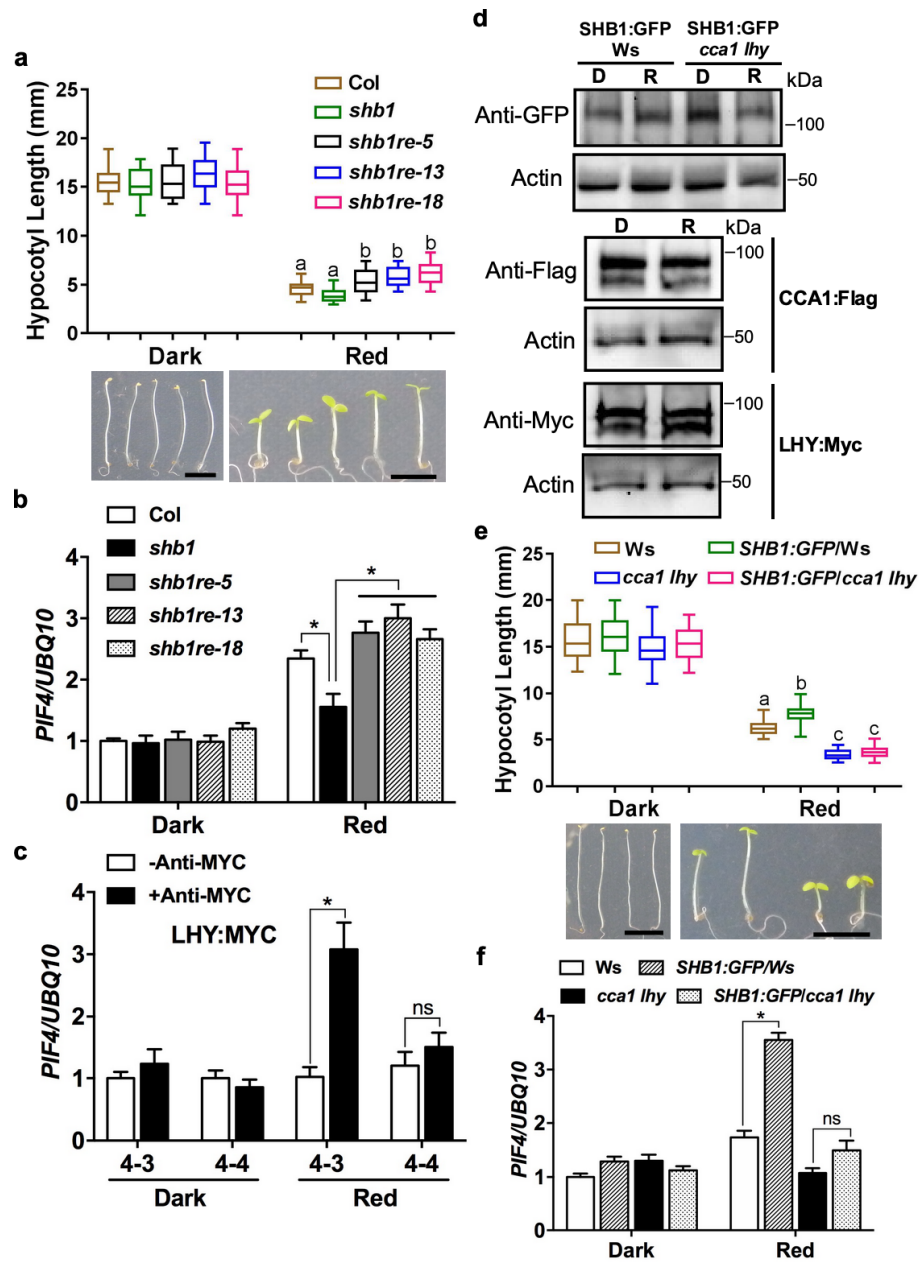
Supplementary Fig. 1 SHB1 does not upregulate the expression of a few other *PIFs*. (a) *PIF1*, *PIF3*, *PIF5* and *PIF7* expression in Col, *shb1*, Ws, and *shb1-D*. Seedlings were grown in dark for 4 days and then remained in the dark or transferred to  $15 \mu\text{mol m}^{-2} \text{s}^{-1}$  red light for 3 hours. (b) *PIF4* expression in Ws and *cca1 lhy* under continuous white light (LL) after entrained under 12-hr light and 12-hr dark for 7 days from two biological replicates. (c) *CCA1*, *LHY* and *SHB1* expression in Ws seedlings that were entrained under 12-hr light and 12-hr dark for 7 days, released into continuous white light (LL), and sampled every 3 hrs for 60 hrs. Primers used for *SHB1* are SHB1 F and SHB1 R. Gene expression in each sample was normalized to that of *UBQ10*, and data are presented as the means  $\pm$  SE calculated from two biological replicates. Source data are provided as a Source Data file.



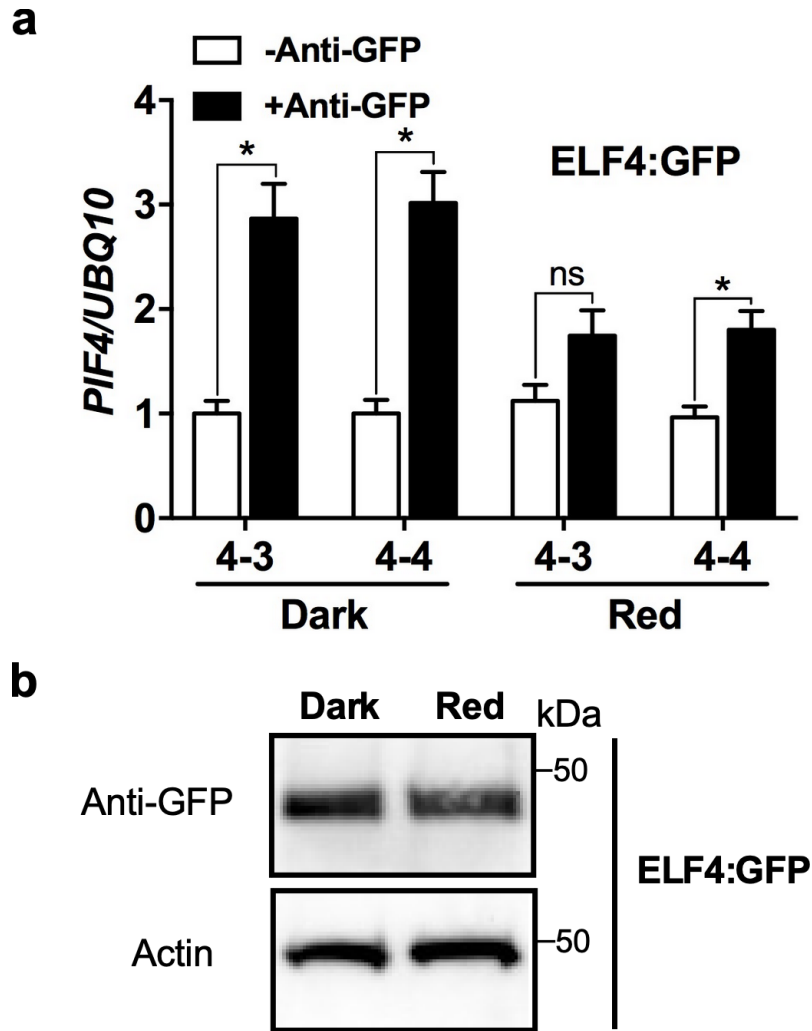
Supplementary Fig. 2 *PIF4* is overexpressed in either *Ws* or *cca1 lhy*. (a) *PIF4* expression driven by the CaMV 35S promoter in each line was normalized to that of *UBQ10*, and data are presented as the means $\pm$ SE calculated from two biological replicates. Seedlings were grown in a growth room with a 16L/8D cycle at 22 °C under 30  $\mu\text{mol m}^{-2} \text{s}^{-1}$  fluorescent white light for 4 days. Hypocotyl lengths (b) of and *PIF4* expression (c) in Col, *shb1*, *Ws*, *cca1 lhy*, Col *Ws*, and *shb1 cca1 lhy* in the dark or under 10  $\mu\text{mol m}^{-2} \text{s}^{-1}$  red light for 4 days. Several Col *Ws* lines were derived from the same cross when each *shb1*, *cca1* or *lhy* allele was genotyped and showed consistent phenotypes. One representative line was shown. Box plots display medians as horizontal lines, interquartile ranges as boxes and whiskers extending 1.5 times the interquartile range. (d) *SHB1* sequence coordination from BAC clone T30C3. Black boxes represent the untranslated regions. White boxes indicate exons, and lines indicate introns. (e) *SHB1* and *UBQ10* expression in Col, *shb1*, *Ws* and *shb1-D* for 35 cycles using Nhe and 1417, mF and R1, F2 and R2 or *UBQ10* primer pair. (f) Hypocotyl images of *Ws*, *shb1-D*, *cca1 lhy* and *shb1-D cca1 lhy* in the dark and under 10  $\mu\text{mol m}^{-2} \text{s}^{-1}$  red light for 4 days. Bar=5 mm. (g) *SHB1* and *UBQ10* expression in *Ws*, *shb1-D*, *cca1 lhy* and *shb1-D cca1 lhy* using *SHB1* F and *SHB1* R as in Supplementary Fig. 1c or *UBQ10* primer pair. For e and g, seedlings were grown as in a. Source data are provided as a Source Data file.



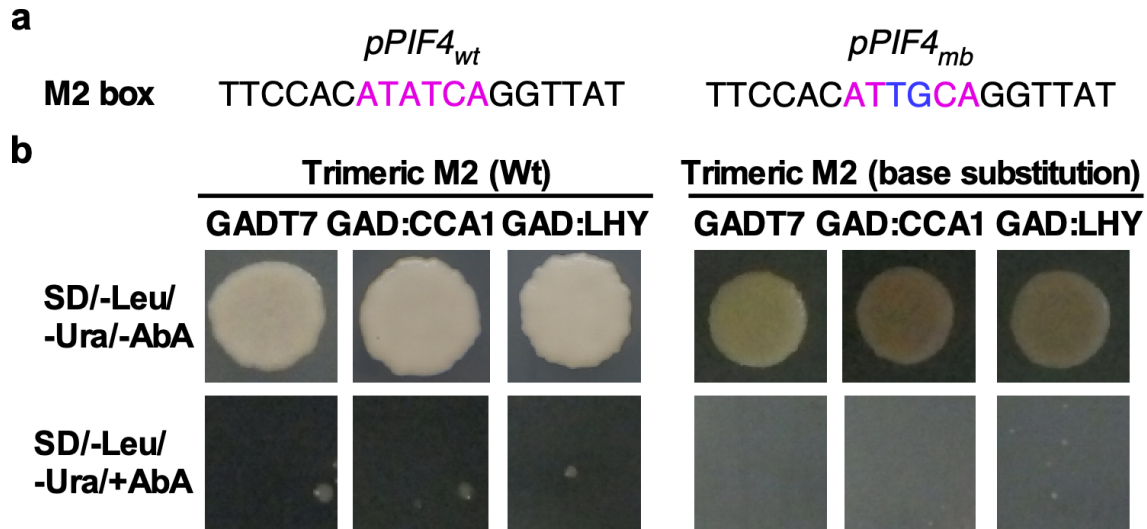
Supplementary Fig. 3 Hypocotyl images of *35S::PIF4:GFP* lines in *Ws* or *cca1 lhy* grown under  $30 \mu\text{mol m}^{-2} \text{s}^{-1}$  white light at 20 °C for 7 days or 20 °C for 4 days followed by 29 °C for 3 days. Bar=5 mm.



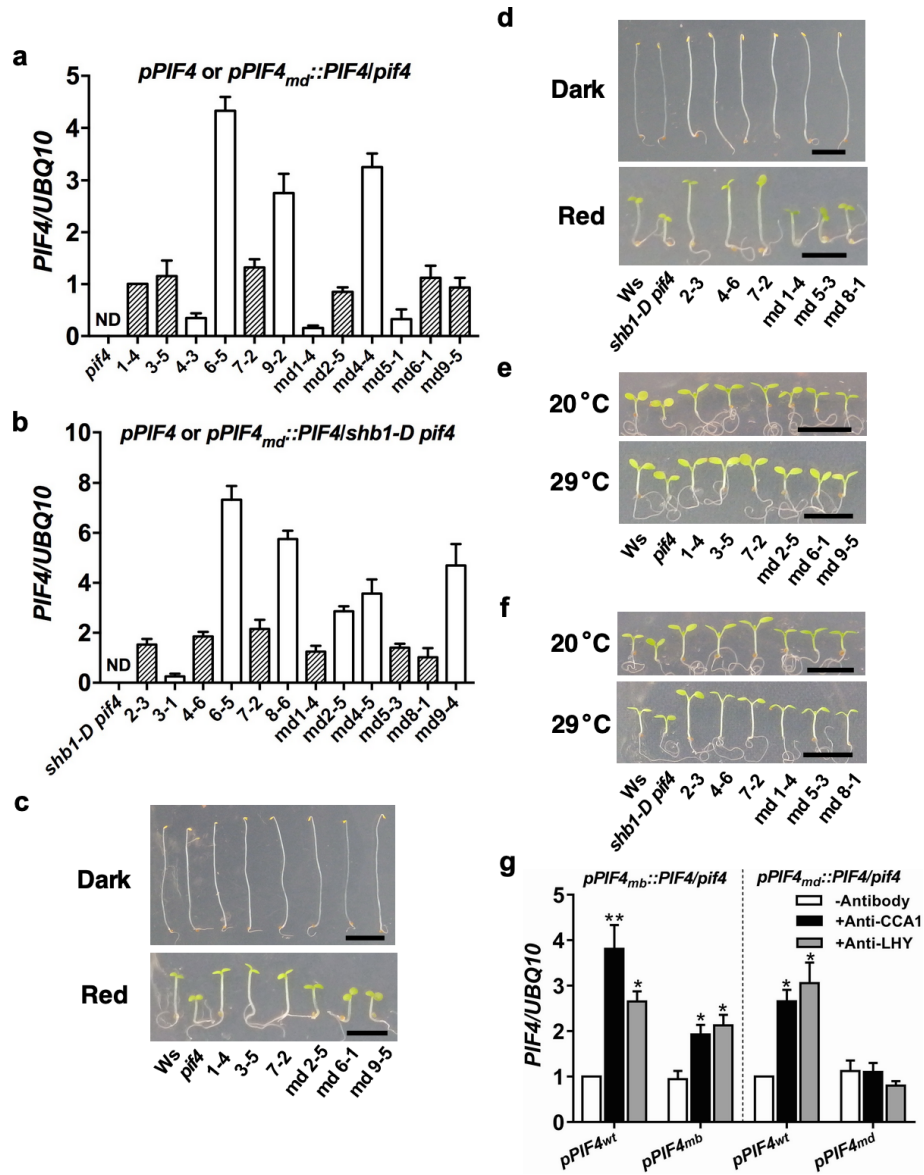
Supplementary Fig. 4 SHB1:GFP fusion protein is functional. Hypocotyl lengths (a) of and *PIF4* expression (b) in Col, *shb1* and three transgenic plants that carry *35S::SHB1:GFP* in *shb1*. Box plots display medians as horizontal lines, interquartile ranges as boxes and whiskers extending 1.5 times the interquartile range. (c) Association of LHY:MYC with the *PIF4* promoter. Seedlings were grown in the dark or under  $15 \mu\text{mol m}^{-2} \text{s}^{-1}$  red light for 5 days. (d) Accumulation of SHB1:GFP in Ws and *cca1 lhy* as well as CCA1:FLAG and LHY:MYC in the dark and under red light. Actin was probed as loading controls. Hypocotyl lengths (e) of and *PIF4* expression (f) in transgenic plants that carry *35S::SHB1:GFP* in Ws and *cca1 lhy*. Gene expression or enrichment of DNA fragments was normalized to that of *UBQ10*. Data are presented as the means  $\pm$  SE calculated from three biological replicates. Bar=5 mm. Source data are provided as a Source Data file.



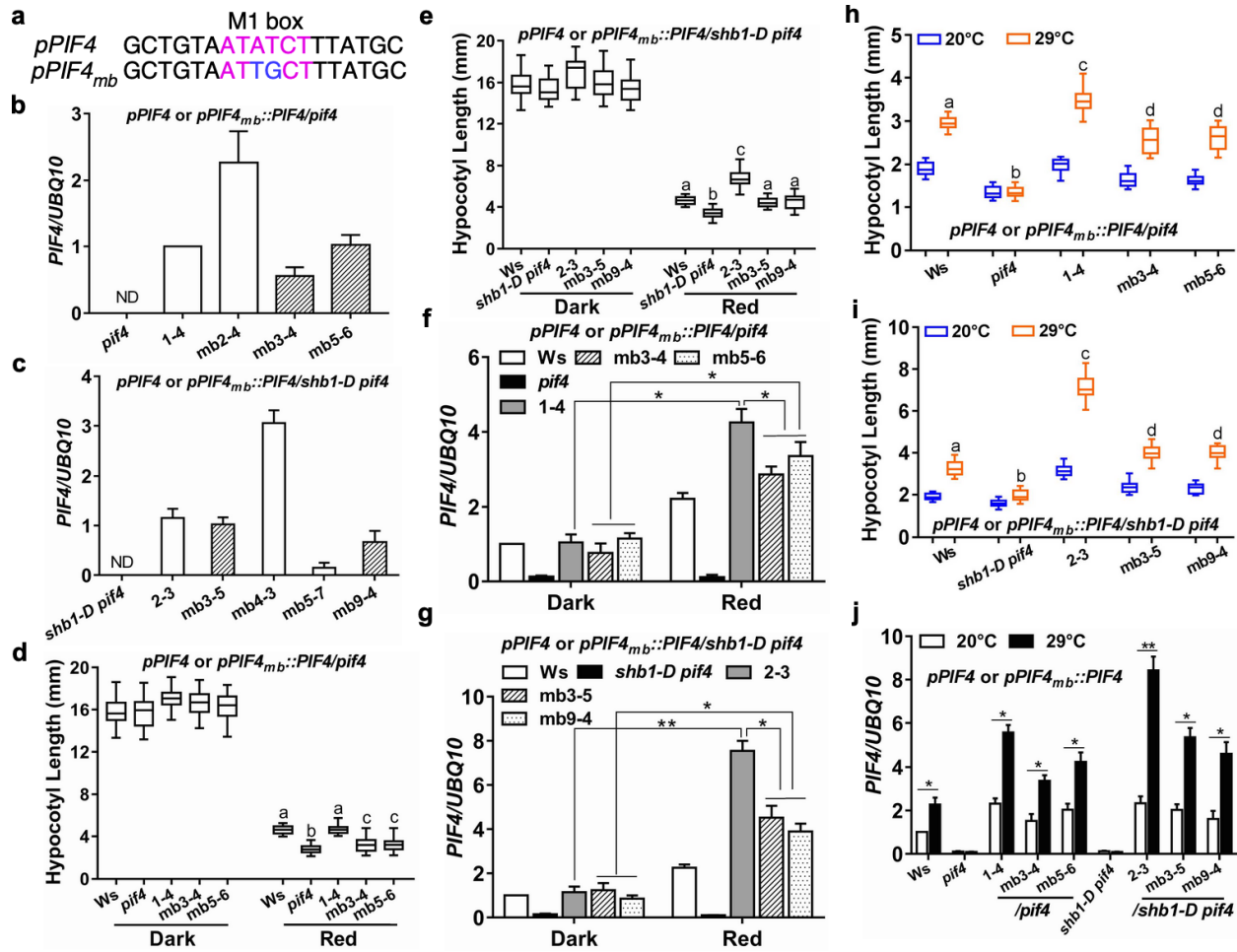
Supplementary Fig. 5 LUX or NOX and CCA1 or LHY have nearby binding sites in the *PIF4* promoter. (a) Association of ELF4:GFP with the *PIF4* promoter in the dark and under red light in two biological replicates. (b) Accumulation of ELF4:GFP in the dark or under 15  $\mu\text{mol m}^{-2} \text{s}^{-1}$  red light for 5 days in two biological replicates. Actin was probed as loading controls. Source data are provided as a Source Data file.



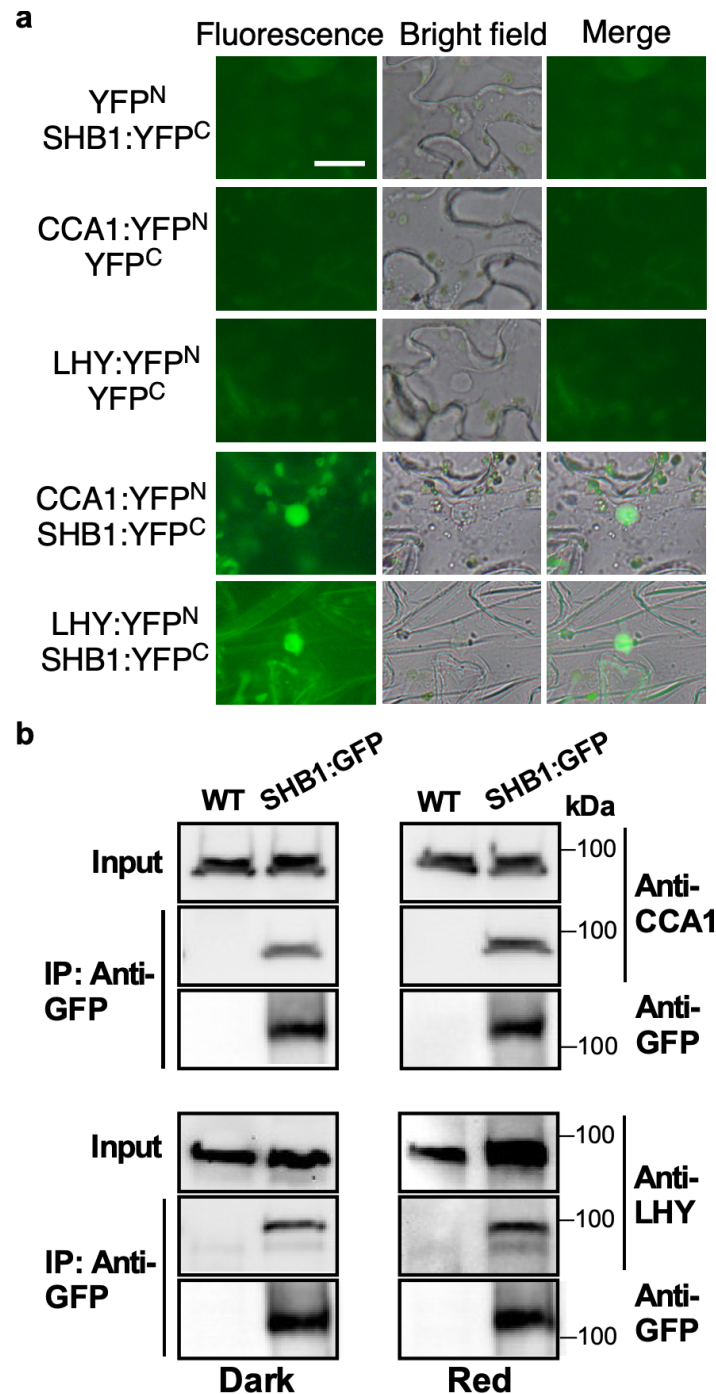
Supplementary Fig. 6 CCA1 and LHY do not bind Myb box M2 in the *PIF4* promoter. (a) Core sequences of the potential MYB binding element M2 are noted in red and the bases mutated by base substitution (mb) are noted in blue. (b) Y1H assays for CCA1 or LHY in pGADT7 over trimeric repeats of wild type (left) or mutated (right) M2 element. Each repeat has a 6-bp flanking sequence on either side of the M2 core element. Golden Y1H cells were grown on SD/-Leu/-Ura media with or without 300 ng/ml Aureobasidin A (AbA) selection.



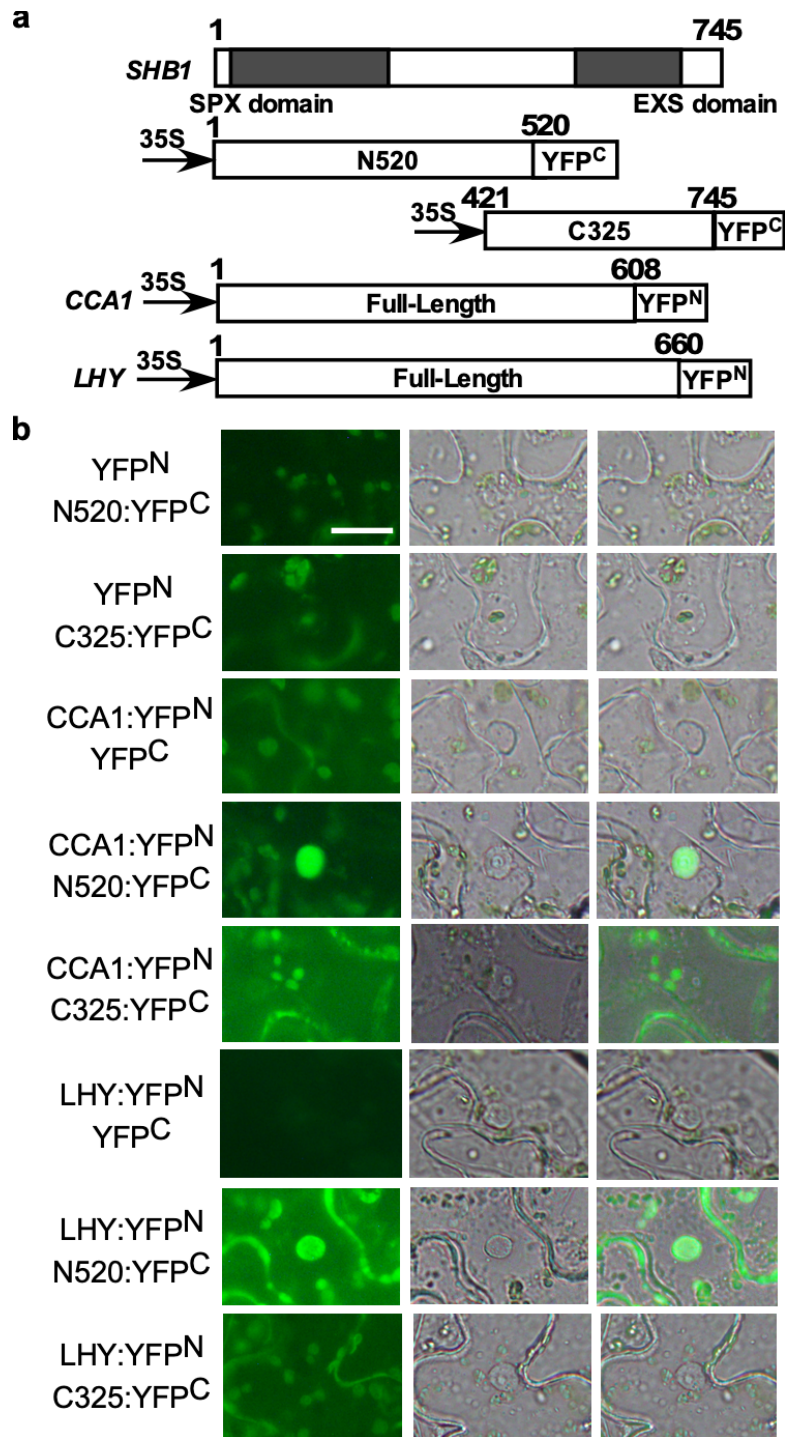
Supplementary Fig. 7 *pPIF4* or *pPIF4<sub>md</sub>::PIF4* transgene are introduced to *pif4* or *shb1-D pif4*. *PIF4* expression in *pif4* (a) or *shb1-D pif4* (b) lines under 50  $\mu\text{mol m}^{-2} \text{s}^{-1}$  white light normalized to that of *UBQ10* in one biological replicate and *PIF4* expression in 1-4 was set at 1. The shaded lines were selected for further hypocotyl and *PIF4* expression analysis. Hypocotyl images of *Ws*, *pif4* and *pPIF4* or *pPIF4<sub>md</sub>::PIF4* in *pif4* (c) and *Ws*, *shb1-D pif4* and *pPIF4* or *pPIF4<sub>md</sub>::PIF4* in *shb1-D pif4* (d) grown in the dark or under 10  $\mu\text{mol m}^{-2} \text{s}^{-1}$  red light for 4 days. Hypocotyl images of *Ws*, *pif4* and *pPIF4* or *pPIF4<sub>md</sub>::PIF4* in *pif4* (e) and *Ws*, *shb1-D pif4* and *pPIF4* or *pPIF4<sub>md</sub>::PIF4* in *shb1-D pif4* (f) under 30  $\mu\text{mol m}^{-2} \text{s}^{-1}$  white light at 20 °C for 7 days or 20 °C for 4 days followed by 29 °C for 3 days. Bar=5 mm. (g) Association of CCA1 and LHY with the *pPIF4* and *pPIF4<sub>mb</sub>* or *pPIF4<sub>md</sub>* promoter in 4-day-old dark-grown seedlings exposed to 15  $\mu\text{mol m}^{-2} \text{s}^{-1}$  red light for 3 hr from two biological replicates. A forward primer that contained a wild type, base-substituted or deleted M1 box was used with a common reverse primer in qPCR analysis. Enrichment of DNA fragments was quantified by qPCR and normalized to that of *UBQ10*. Source data are provided as a Source Data file.



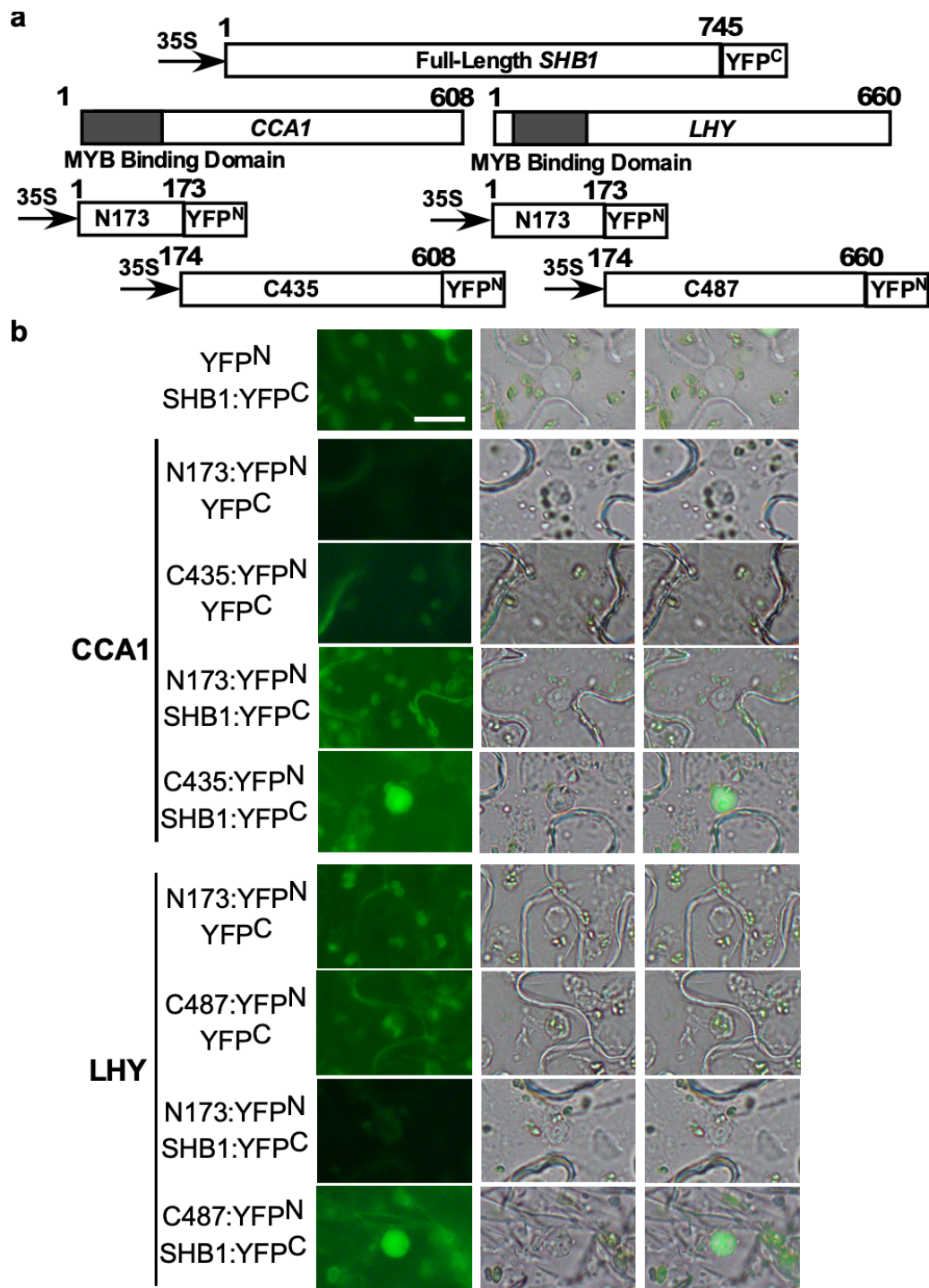
Supplementary Fig. 8 *pPIF4<sub>mb</sub>::PIF4* transgene is introduced to *pif4* or *shb1-D pif4*. (a) MYB binding element M1 is noted in red, and the bases mutated are noted in blue. *PIF4* expression in *pif4* (b) or *shb1-D pif4* (c) lines under 50  $\mu\text{mol m}^{-2} \text{s}^{-1}$  white light normalized to that of *UBQ10* in one biological replicate and *PIF4* expression in 1-4 was set at 1. The shaded lines were selected for further hypocotyl and *PIF4* expression analysis. Hypocotyl lengths of Ws, *pif4* and *pPIF4* or *pPIF4<sub>mb</sub>::PIF4* in *pif4* (d) and Ws, *shb1-D pif4* and *pPIF4* or *pPIF4<sub>mb</sub>::PIF4* in *shb1-D pif4* (e). *PIF4* expression in Ws, *pif4* and *pPIF4* or *pPIF4<sub>mb</sub>::PIF4* in *pif4* (f) and Ws, *shb1-D pif4* and *pPIF4* or *pPIF4<sub>mb</sub>::PIF4* in *shb1-D pif4* (g) from two biological replicates. The seedlings were grown in the dark or under 10  $\mu\text{mol m}^{-2} \text{s}^{-1}$  red light for 4 days. Hypocotyl lengths of Ws, *pif4* and *pPIF4* or *pPIF4<sub>mb</sub>::PIF4* in *pif4* (h) and Ws, *shb1-D pif4* and *pPIF4* or *pPIF4<sub>mb</sub>::PIF4* in *shb1-D pif4* (i) under 30  $\mu\text{mol m}^{-2} \text{s}^{-1}$  white light at 20 °C for 7 days or 20 °C for 4 days followed by 29 °C for 3 days. *PIF4* expression in Ws, *pif4*, *pPIF4* or *pPIF4<sub>mb</sub>::PIF4* in *pif4*, *shb1-D pif4* and *pPIF4* or *pPIF4<sub>mb</sub>::PIF4* in *shb1-D pif4* (j) grown at 20 °C for 5 days and then incubated at 20 °C or 29 °C for 4 h from two biological replicates. Significance levels by Student's two-tailed heteroscedastic t tests in d:  $p < 0.001$  between a and b or a and c,  $p < 0.05$  between b and c; in e:  $p < 0.001$  between a and b, a and c or b and c; in h:  $p < 0.001$  between a and b, a and c, b and c or c and d,  $p < 0.01$  between a and d; in i:  $p < 0.001$  between a and b, a and c, b and c, b and d or c and d;  $p < 0.01$  between a and d. Source data are provided as a Source Data file.



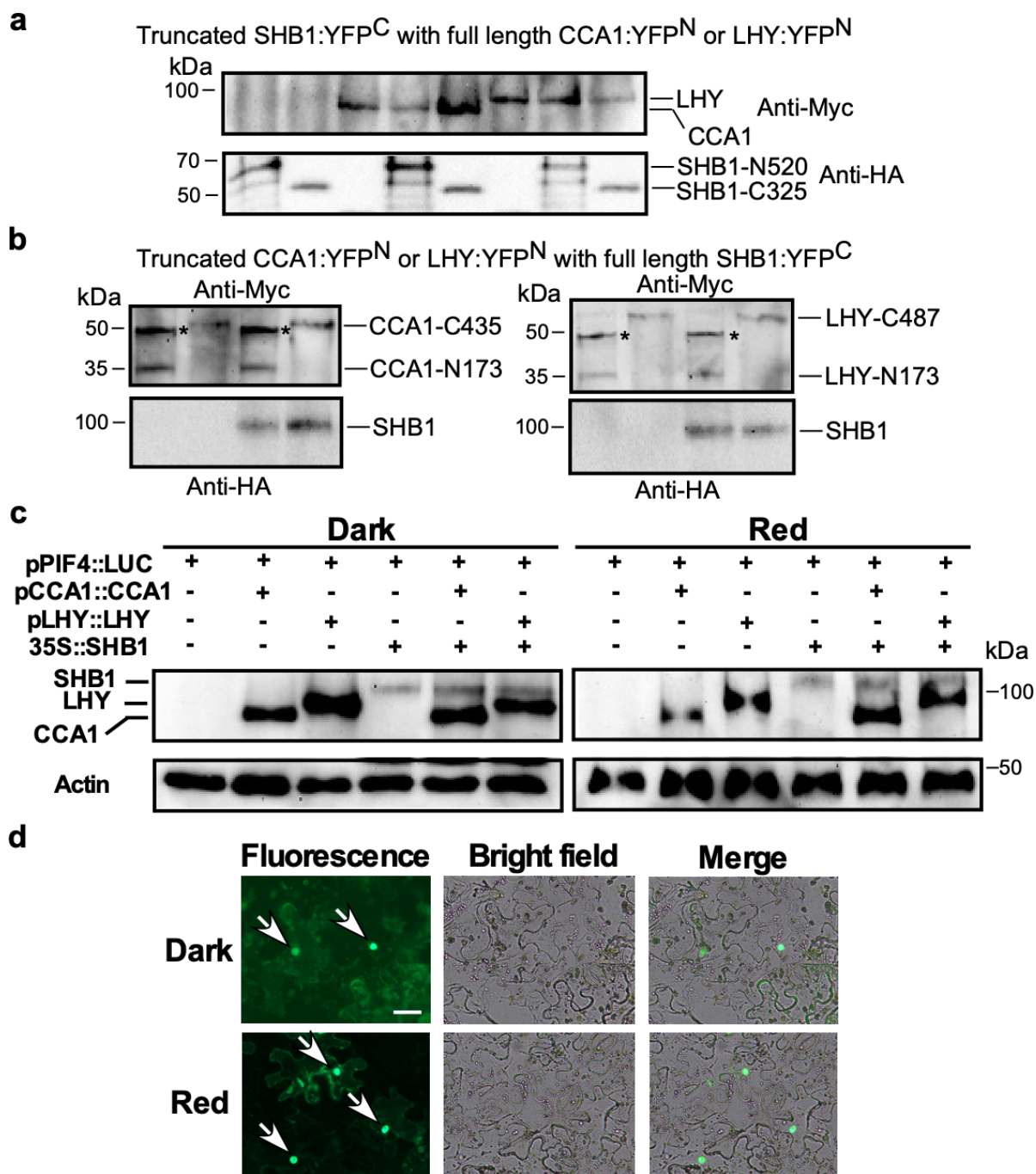
Supplementary Fig. 9 SHB1 interacts with CCA1 and LHY in the dark or under red light. (a) BiFC assays of YFP<sup>N</sup> with SHB1:YFP<sup>C</sup>, CCA1:YFP<sup>N</sup> or LHY:YFP<sup>N</sup> with YFP<sup>C</sup>, and CCA1:YFP<sup>N</sup> or LHY:YFP<sup>N</sup> with SHB1:YFP<sup>C</sup> in *Nicotiana* leaf epidermal cells in the dark or under red light. Fluorescent images were captured 48 to 72 hours after Agrobacteria transfection. Bar=10  $\mu$ m. (b) Co-immunoprecipitation (Co-IP) of CCA1 or LHY by SHB1:GFP in protein extracts prepared from transgenic *Arabidopsis* and immuno-precipitated with anti-GFP antibody. Protein blots were probed with anti-CCA1 or anti-LHY antibodies. Source data are provided as a Source Data file.



Supplementary Fig. 10 SHB1 N-terminus interacts with CCA1 or LHY. (a) Full-length and various deletion derivatives of SHB1 were fused with YFP<sup>C</sup> at their C termini. Full-length CCA1 or LHY was fused with YFP<sup>N</sup> at their C termini. All constructs were driven by the CaMV 35S promoter. The numbers above each construct indicate amino acid sequence coordination. (b) BiFC assays of YFP<sup>C</sup> fusion of SHB1 N-terminus or C-terminus with full-length CCA1:YFP<sup>N</sup> or LHY:YFP<sup>N</sup> in *Nicotiana* leaf epidermal cells. Fluorescent images were captured 48 to 72 hours after *Agrobacteria* transfection. Bar=10  $\mu$ m.



Supplementary Fig. 11 CCA1 or LHY C-terminus interacts with full-length SHB1. (a) Full-length and various deletion derivatives of CCA1 or LHY were fused with YFP<sup>N</sup> at their C termini. Full-length SHB1 was fused with YFP<sup>C</sup> at its C termini. All constructs were driven by the CaMV 35S promoter. The numbers above each construct indicate amino acid sequence coordination. (b) BiFC assay of YFP<sup>N</sup> fusion of CCA1 or LHY N-terminus or C-terminus with full-length SHB1:YFP<sup>C</sup> in *Nicotiana* leaf epidermal cells. Fluorescent images were captured 48 to 72 hours after *Agrobacteria* transfection. Bar=10  $\mu$ m.



Supplementary Fig. 12 Protein accumulation in domain mapping and transactivation assays. (a) Accumulation of SHB1 N520:YFP<sup>C</sup> or C325:YFP<sup>C</sup>, CCA1:YFP<sup>N</sup> and LHY:YFP<sup>N</sup> in *Nicotiana* leaves. (b) Accumulation of SHB1:YFP<sup>C</sup>, CCA1 N173:YFP<sup>N</sup> or C435:YFP<sup>N</sup>, and LHY N173:YFP<sup>N</sup> or C487:YFP<sup>N</sup> in *Nicotiana* leaves. \* indicates a nonspecific band associated with either the CCA1 N173 or LHY N173 construct. (c) Accumulation of CCA1:MYC, LHY:MYC and SHB1:MYC in Arabidopsis leaf protoplasts in the dark and under red light. Source data are provided as a Source Data file. (d) Subcellular localization of SHB1:GFP in *Nicotiana* leaf epidermal cells in the dark and under red light. Bar=5  $\mu$ m.

**Supplementary Table 1 List of primers used in this study**

| Primer Name                       | Primer Sequence (5'-3')          | Purpose                               |
|-----------------------------------|----------------------------------|---------------------------------------|
| <b>Quantitative real-time PCR</b> |                                  |                                       |
| PIF1 F                            | AGAAGCCACCACTACTGATGA            | Real-time PCR primer for <i>PIF1</i>  |
| PIF1 R                            | TGAAGGAAGGAGGAGGAATAGG           | Real-time PCR primer for <i>PIF1</i>  |
| PIF3 F                            | CTGAAAGGAGACGGCGTGATAG           | Real-time PCR primer for <i>PIF3</i>  |
| PIF3 R                            | CAGATAGTAACCAGACGCCATTGAC        | Real-time PCR primer for <i>PIF3</i>  |
| PIF4 F                            | CTTCAAGTGATGTGGATGGGGA           | Real-time PCR primer for <i>PIF4</i>  |
| PIF4 R                            | TGGGAACCCACCGATGTATCT            | Real-time PCR primer for <i>PIF4</i>  |
| PIF5 F                            | CAGATAAAGCTTCGATATTGGATGA        | Real-time PCR primer for <i>PIF5</i>  |
| PIF5 R                            | TAGCGAGCTGCTCCGATAAGAT           | Real-time PCR primer for <i>PIF5</i>  |
| PIF7 F                            | TTGAAACAGCTACAAGCACAAGTACAG      | Real-time PCR primer for <i>PIF7</i>  |
| PIF7 R                            | GATTCGAAGAACTTGAAGGCATG          | Real-time PCR primer for <i>PIF7</i>  |
| SHB1 F                            | AAGAATGGTGGAAGACAGAGAT           | Real-time PCR primer for <i>SHB1</i>  |
| SHB1 R                            | AGAAGCAGCAACGATGGT               | Real-time PCR primer for <i>SHB1</i>  |
| CCA1 F                            | GATCTGGTTATTAAGACTCGGAAGCCATATAC | Real-time PCR primer for <i>CCA1</i>  |
| CCA1 R                            | GCCTCTTTCTCTACCTTGGAGA           | Real-time PCR primer for <i>CCA1</i>  |
| LHY F                             | AAGTCTCCGAAGAGGGTC               | Real-time PCR primer for <i>LHY</i>   |
| LHY R                             | ATGTTCCAACACCGATC                | Real-time PCR primer for <i>LHY</i>   |
| Nhe                               | AGCATCACTCAAAACCCAAAAG           | Semi-quantitative PCR for <i>SHB1</i> |
| 1417                              | TATAACCAAGTTCAGTGCC              | Semi-quantitative PCR for <i>SHB1</i> |
| mF                                | GGCACTGAACTTGGTTATA              | Semi-quantitative PCR for <i>SHB1</i> |
| R1                                | TCTCTGTCTTCCACCATTCCTC           | Semi-quantitative PCR for <i>SHB1</i> |
| F2                                | CAAGCTTCTTGTTCTCACAACAA          | Semi-quantitative PCR for <i>SHB1</i> |
| R2                                | ATCTTCTTCGTAGTTGAACGGT           | Semi-quantitative PCR for <i>SHB1</i> |

|                    |                                  |                                                                                                |
|--------------------|----------------------------------|------------------------------------------------------------------------------------------------|
| UBQ10 RT/F         | TCCAGGACAAGGAGGTATTCCT CCG       | Real-time PCR primer for <i>UBQ10</i>                                                          |
| UBQ10 RT/R         | CCACCAAAGTTTTACATGAAAC GAA       | Real-time PCR primer for <i>UBQ10</i>                                                          |
| cMyc-R             | GATCTTCTTCAGAGATCAGTTTC TG       | Real-time PCR primer for exogenous <i>PIF4</i>                                                 |
| <b>ChIP-qPCR</b>   |                                  |                                                                                                |
| PIF4-1 F           | ATTTTAAAACACATTGCTAGAG AA        | ChIP-PCR primer for <i>PIF4-1</i>                                                              |
| PIF4-1 R           | CTCACCTAATAATGTTTTTTTTG GT       | ChIP-PCR primer for <i>PIF4-1</i>                                                              |
| PIF4-2 F           | TTGTATTTCTTATTAAGCCAAGG GT       | ChIP-PCR primer for <i>PIF4-2</i>                                                              |
| PIF4-2 R           | CTATAGCGTTATGGTTTTTGTCG AT       | ChIP-PCR primer for <i>PIF4-2</i>                                                              |
| PIF4-3 F           | CAAAAACACCCTCAAATCATTGT          | ChIP-PCR primer for <i>PIF4-3</i>                                                              |
| PIF4-3 R           | AGAAGAAGAAGATGAGAGAGGT TCA       | ChIP-PCR primer for <i>PIF4-3</i>                                                              |
| PIF4-4 F           | AGATAGAGAGTTGTGTTGGGCG T         | ChIP-PCR primer for <i>PIF4-4</i>                                                              |
| PIF4-4 R           | TGATTAAGAGATACAAGGAGGA GCA       | ChIP-PCR primer for <i>PIF4-4</i>                                                              |
| M1 F               | AAAAGATTGCAGTACTGTTGTC CCT       | ChIP-PCR primer for <i>PIF4-M1</i>                                                             |
| M1 R               | CAACTCACAAAACATGAAAGAA AC        | ChIP-PCR primer for <i>PIF4-M1</i>                                                             |
| M2 F               | TGTTTCTTTCATGTTTTGTGAGT TG       | ChIP-PCR primer for <i>PIF4-M2</i>                                                             |
| M2 R               | GAAAGCTTCTGGACGAATCAGA A         | ChIP-PCR primer for <i>PIF4-M2</i>                                                             |
| UBQ10 F            | TCCAGGACAAGGAGGTATTCCT CCG       | ChIP-PCR primer for <i>UBQ10</i>                                                               |
| UBQ10 R            | CCACCAAAGTTTTACATGAAAC GAA       | ChIP-PCR primer for <i>UBQ10</i>                                                               |
| M1 <sub>wt</sub> F | TCCCTCGCTGTA <b>AATATCTTTA</b>   | ChIP-PCR primers for <i>PIF4</i> promoter without or with M1 box base substitution or deletion |
| M1 <sub>mb</sub> F | TATCTCCCTCGCTGTA <b>ATTG</b>     |                                                                                                |
| M1 <sub>md</sub> F | TATCTTCCCTCGCTGTATTA             |                                                                                                |
| M1 R2              | GCCCAACACA <b>ACTCTCTATCTC</b> T |                                                                                                |

|                         |                                                                     |                                                   |
|-------------------------|---------------------------------------------------------------------|---------------------------------------------------|
| <b>Yeast one-hybrid</b> |                                                                     |                                                   |
| PIF4 FSal<br>           | gcgtcgacATGTCCCAGAACTTGC<br>CAC                                     | Cloning primer for <i>PIF4</i> promoter           |
| PIF4 RXho<br>           | ccctcgagATATTCTGGCAATCTAG<br>GAAAGCTT                               | Cloning primer for <i>PIF4</i> promoter           |
| 4M1LBS<br>FKpn          | ggggtaccAATCATTATCTCCCTCG<br>CTGT                                   | Cloning primer for <i>PIF4</i> promoter           |
| 4M1LBS<br>RXho          | ccctcgagAAGCTTCTGGACGAAT<br>CAGAA                                   | Cloning primer for <i>PIF4</i> promoter           |
| M1tri F                 | agcttCTGTAATATCTTTATGCGCT<br>GTAATATCTTTATGCGCTGTAAT<br>ATCTTTATGg  | Cloning oligo for <i>PIF4</i> promoter            |
| M1tri R                 | tcgacCATAAAGATATTACAGCGC<br>ATAAAGATATTACAGCGCATAAA<br>GATATTACAGa  | Cloning oligo for <i>PIF4</i> promoter            |
| M2tri F                 | agcttTCCACATATCAGGTTATTTT<br>CACATATCAGGTTATTTCCACAT<br>ATCAGGTTAg  | Cloning oligo for <i>PIF4</i> promoter            |
| M2tri R                 | tcgacTAACCTGATATGTGGAAAT<br>AACCTGATATGTGGAAATAACC<br>TGATATGTGGAAa | Cloning oligo for <i>PIF4</i> promoter            |
| M1tri Fmu               | agcttCTGTAATTGCTTTATGCGC<br>TGTAATTGCTTATGCGCTGTAAT<br>TGCTTTATGCGg | Cloning oligo for mutated <i>PIF4</i><br>promoter |
| M1tri Rmu               | tcgacCGCATAAAGCAATTACAGC<br>GCATAAGCAATTACAGCGCATA<br>AAGCAATTACAGa | Cloning oligo for mutated <i>PIF4</i><br>promoter |
| M2tri Fmu               | agcttTCCACATATCAGGTTATTTT<br>CACATATCAGGTTATTTCCACAT<br>ATCAGGTTAg  | Cloning oligo for mutated <i>PIF4</i><br>promoter |
| M2tri Rmu               | tcgacTAACCTGATATGTGGAAAT<br>AACCTGATATGTGGAAATAACC<br>TGATATGTGGAAa | Cloning oligo for mutated <i>PIF4</i><br>promoter |
| <b>Gene cloning</b>     |                                                                     |                                                   |
| PIF4 F                  | CCGCGTCCTGTATTTGGCTA                                                | Cloning primer for <i>PIF4</i>                    |
| PIF4 R                  | GTGGTCCAAACGAGAACCGT                                                | Cloning primer for <i>PIF4</i>                    |
| pPIF4 F                 | CCGCGTCCTGTATTTGGCTA                                                | Cloning primer for <i>PIF4</i> promoter           |
| pPIF4 R                 | GTCAGATCTCTGGAGACATTTC<br>A                                         | Cloning primer for <i>PIF4</i> promoter           |

|                   |                                  |                                                                   |
|-------------------|----------------------------------|-------------------------------------------------------------------|
| pCCA1 F           | TCATGCATGGTTAGCTTAGCTTA          | Cloning primer for <i>CCA1</i>                                    |
| CCA1 F            | ATGGAGACAAATTCGTCTGGAG           | Cloning primer for <i>CCA1</i>                                    |
| CCA1 NR           | ATTCATGGAGGATGCAGCAGAG<br>A      | Cloning primer for <i>CCA1</i> N terminus                         |
| CCA1 CF           | ATGGAGATGGCCAATGAAGATC<br>GA     | Cloning primer for <i>CCA1</i> C terminus                         |
| CCA1 R            | TGTGGAAGCTTGAGTTTCCAA            | Cloning primer for <i>CCA1</i>                                    |
| pLHY F            | GGTTAGTAACAAAACTGGTCT<br>ATT     | Cloning primer for <i>LHY</i>                                     |
| LHY F             | ATGGATACTAATACATCTGGAG<br>AAG    | Cloning primer for <i>LHY</i>                                     |
| LHY NR            | TAAGGGATACTTGTTCCACAG            | Cloning primer for <i>LHY</i> N terminus                          |
| LHY CF            | ATGTTGAATCAGGCGTTCTTGG<br>A      | Cloning primer for <i>LHY</i> C terminus                          |
| LHY R             | TGTAGAAGCTTCTCCTTCCAAT           | Cloning primer for <i>LHY</i>                                     |
| SHB1 F            | ATGAGGTTTGGGAAAGAGTT             | Cloning primer for <i>SHB1</i>                                    |
| SHB1 NR           | GCTTGTTAGTTGATCTCCCAAG<br>A      | Cloning primer for <i>SHB1</i> N terminus                         |
| SHB1 CF           | ATGGGCACTGAACTTGGTTATA           | Cloning primer for <i>SHB1</i> C terminus                         |
| SHB1 R            | ATTGTTATGATGATCTCCATCTT          | Cloning primer for <i>SHB1</i>                                    |
| 4M1m-1 F          | TAATTGCTTTATGCTCCTGTCAC<br>TTTCT | Forward primer for M1 box base substitution mutation              |
| 4M1m R            | CAGCGAGGGAGATAATGATTCT<br>CT     | Reverse primer for M1 box base substitution and deletion mutation |
| 4M1m-2 F          | TATTATGCTCCTGTCACTTTCTG<br>TCTGT | Forward primer for M1 box deletion mutation                       |
| <b>Genotyping</b> |                                  |                                                                   |
| X5                | GAAGATACGGGTTTTGCAT              | Genotyping primer for <i>shb1-D</i>                               |
| 701               | GGGAAGCTTGGATGTCTTGAA            | Genotyping primer for <i>shb1-D</i>                               |
| JL202             | GGGAAGCTTGGATGTCTTGAA            | T-DNA left border primer for <i>shb1-D</i>                        |
| SHB1 LP           | TTGTAGTTTTGCACATGGACG            | Genotyping primer for <i>shb1</i>                                 |
| SHB1 RP           | TCCCCAGTCAAGAACAATGTC            | Genotyping primer for <i>shb1</i>                                 |
| PIF4 LP           | ATGGAACACCAAGGTTGGAGT            | <i>PIF4</i> 5' primer                                             |
| PIF4 RP           | GTGGTCCAAACGAGAACCGT             | <i>PIF4</i> 3' primer                                             |

|         |                                    |                                                            |
|---------|------------------------------------|------------------------------------------------------------|
| PIF4 Lb | AACCTGCGTGCAATCCATCT               | T-DNA left border primer for <i>pif4</i>                   |
| LBb1.3  | ATTTTGCCGATTTTCGGAAC               | T-DNA left border primer                                   |
| CCA1 F1 | AAAGCTGAATCATCTCTTCAGC<br>CACTAGT  | Genotyping primer for <i>cca1</i>                          |
| CCA1 R1 | GCTTGCGTTTGATGTCTCT                | Genotyping primer for <i>cca1</i>                          |
| LHY F1  | CTTACCAACGAAAGTAAGTCTA<br>AGAAAGC  | Genotyping primer for <i>lhy</i>                           |
| LHY R1  | AAAGATTGGAGAAGCAAACCTAC<br>TAACACT | Genotyping primer for <i>lhy</i>                           |
| LHY R   | AACCTGACATGACCAAAGAAAT<br>GTTCGGA  | Genotyping primer for <i>lhy</i>                           |
| JL270LB | TTTCTCCATATTGACCATCATAC<br>TCATTG  | T-DNA left border primer for <i>cca1</i><br>and <i>lhy</i> |