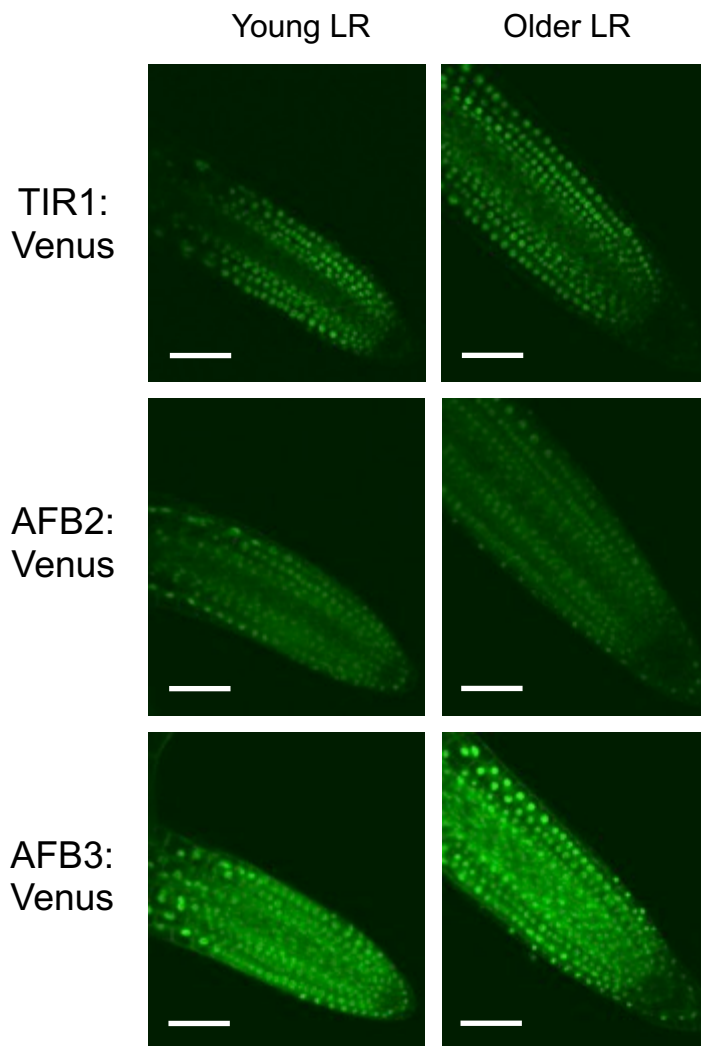
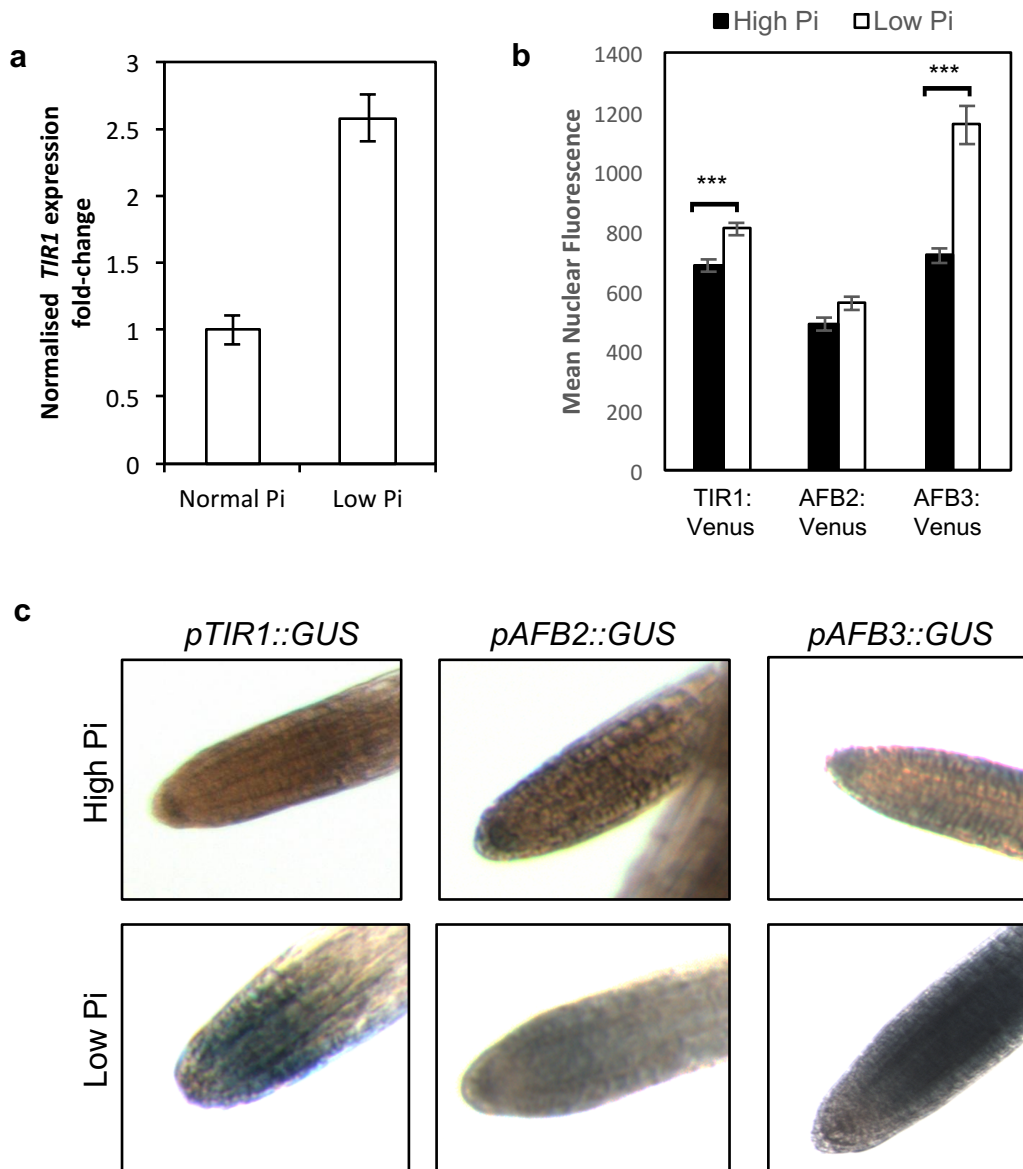
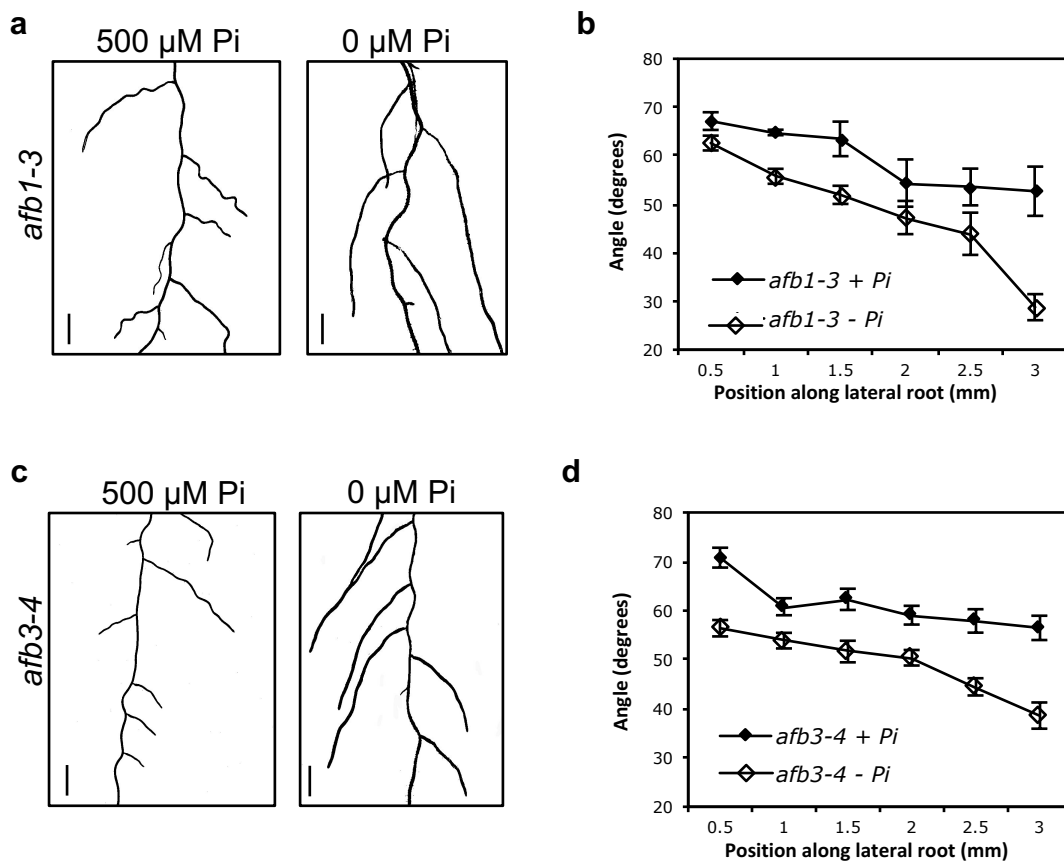




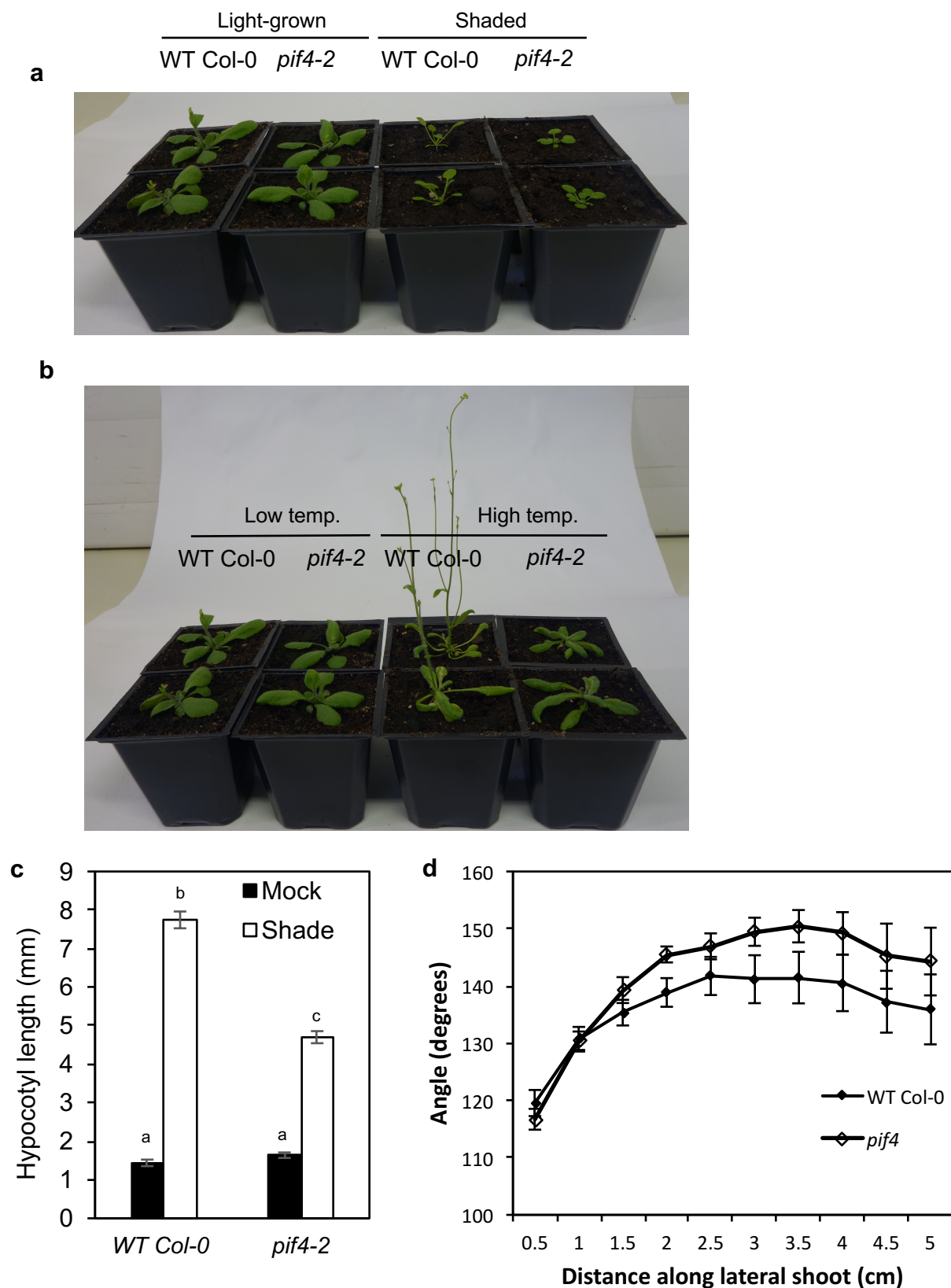
Supplementary Figure 1. Comparative expression of TIR1/AFB receptor translational reporter lines in young and old lateral roots in Arabidopsis. No significant differences in expression were seen in lateral roots of different ages. *pTIR1::TIR1:Venus* (TIR1:Venus); *pAFB2::AFB2:Venus* (AFB2:Venus); *pAFB3::AFB3:Venus* (AFB3:Venus). Scale bar = 30 μ M.



Supplementary Figure 2. *TIR1/AFB* expression under phosphorus replete and –deficient conditions. *TIR1* expression increases approximately 2.5 fold in roots of wild-type Arabidopsis seedlings grown in phosphorus-deficient conditions (a). Phosphorus deficiency induces significant increases in *TIR1::Venus* (*pTIR1::TIR1:VENUS*) and *AFB3::Venus* (*pAFB3::AFB3:VENUS*) levels in Arabidopsis lateral roots (b). Students T-tests gave p-values of 2.77×10^{-5} for *TIR1*, and 1.65×10^{-10} for *AFB3*. $p > 0.05$ for *AFB2*. X-Gluc staining of lateral roots of *pTIR1/AFB::GUS* transcriptional marker lines grown in phosphorus-replete and phosphorus-deficient conditions (c). Bars represent s.e.m.



Supplementary Figure 3. Effect of phosphate deficiency on lateral root GSA in *Arabidopsis* Low phosphorus levels cause lateral root GSA in *afb1-3* (a,b) and *afb3-4* (c,d) mutant seedlings to shift towards a more vertical GSA. Scale = 5 mm. Bars represent s.e.m.



Supplementary Figure 4. Effects of temperature and light on shoot branch GSA in *Arabidopsis* Phenotypes of WT Col-0 and *pif4-2* adult plants under (a) shaded and (b) high temperature conditions. (c) Hypocotyls of WT Col-0 seedlings elongate significantly more than those of *pif4-2* under shaded conditions. Different letters indicate significant differences at $p < 0.01$. (d) Quantification of lateral branch GSAs of wild-type Col-0 and *pif4-2* mutant plants. *pif4-2* lateral branches are slightly but not significantly more vertical than those of Col-0.