Supplementary Information

Flowering Time Genes Modulate Meristem Determinacy and Growth Form in *Arabidopsis*

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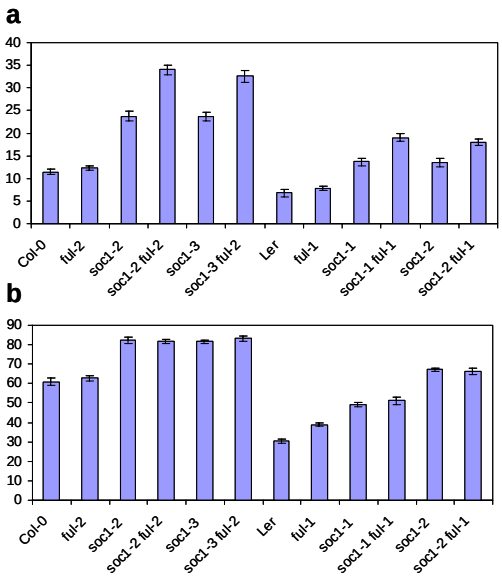
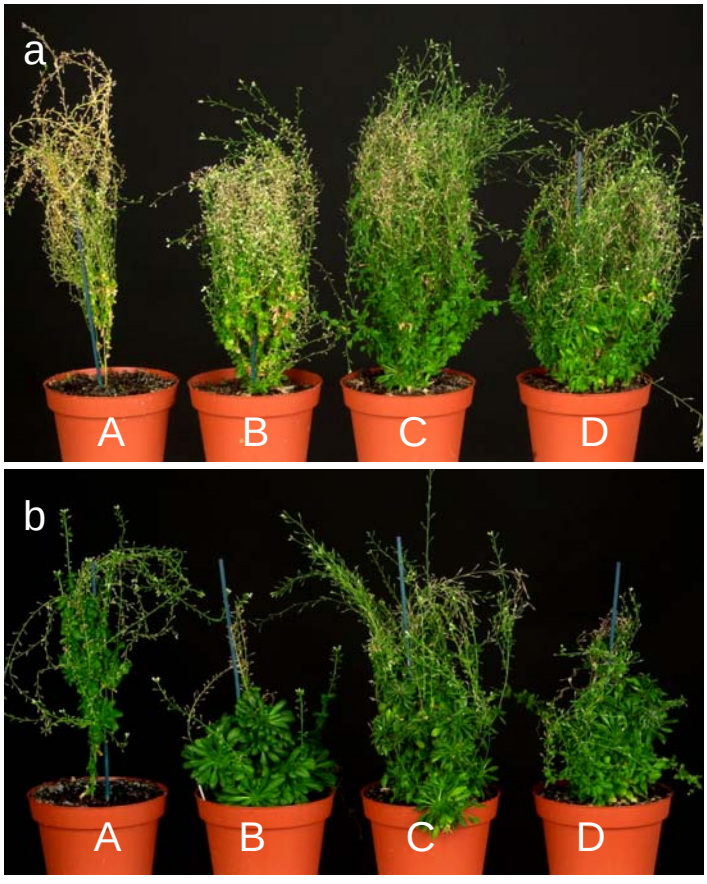
Supplementary Figure 1. Flowering-time analysis of *soc1* and *ful* mutations in different ecotypes. Leaf numbers of wild-type Col-0 and L*er* ecotypes, and *soc1* and *ful* single and double mutants grown under long- (a) or short-day (b) conditions. The *soc1* mutation delayed flowering significantly in both ecotypes under the two photoperiods, whereas *ful-2* in Col caused only a subtle delay under both light regimes, and *ful-1* in L*er* a significant delay in short days. The double mutant synergistically delayed flowering only in long days, indicating that both proteins are redundantly involved in photoperiodic flowering-time control downstream of FT.

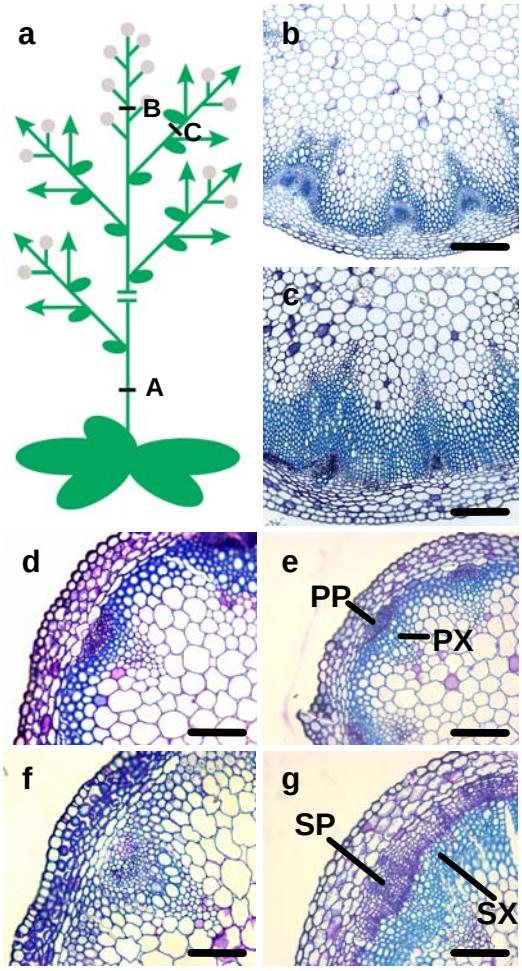


Supplementary Figure 2. Phenotypes of *soc1-3 ful-2* double mutants. a, Longitudinal section through an apical rosette, consisting of true leaves with axillary meristems (arrows). Bar=200 µm. **b,** Coinflorescence during the second growth cycle with several aerial rosettes at the base. **c,** Comparison of main inflorescences of *ful-2* (left) and *soc1-3 ful-2* (right) plants. The apical meristem of the *soc1-3 ful-2* inflorescence reverted back to vegetative growth and one aerial rosette developed an inflorescence in the next growth cycle. **d,** Aerial rosettes of an 8 month old *soc1-3 ful-2* mutant grown in short days, still in the vegetative stage. **e,** Close-up of the plant base of a *soc1-3 ful-2* mutant from Fig. 1d (right plant), grown for 5 months in long days, showing woodiness of all inflorescence stems.

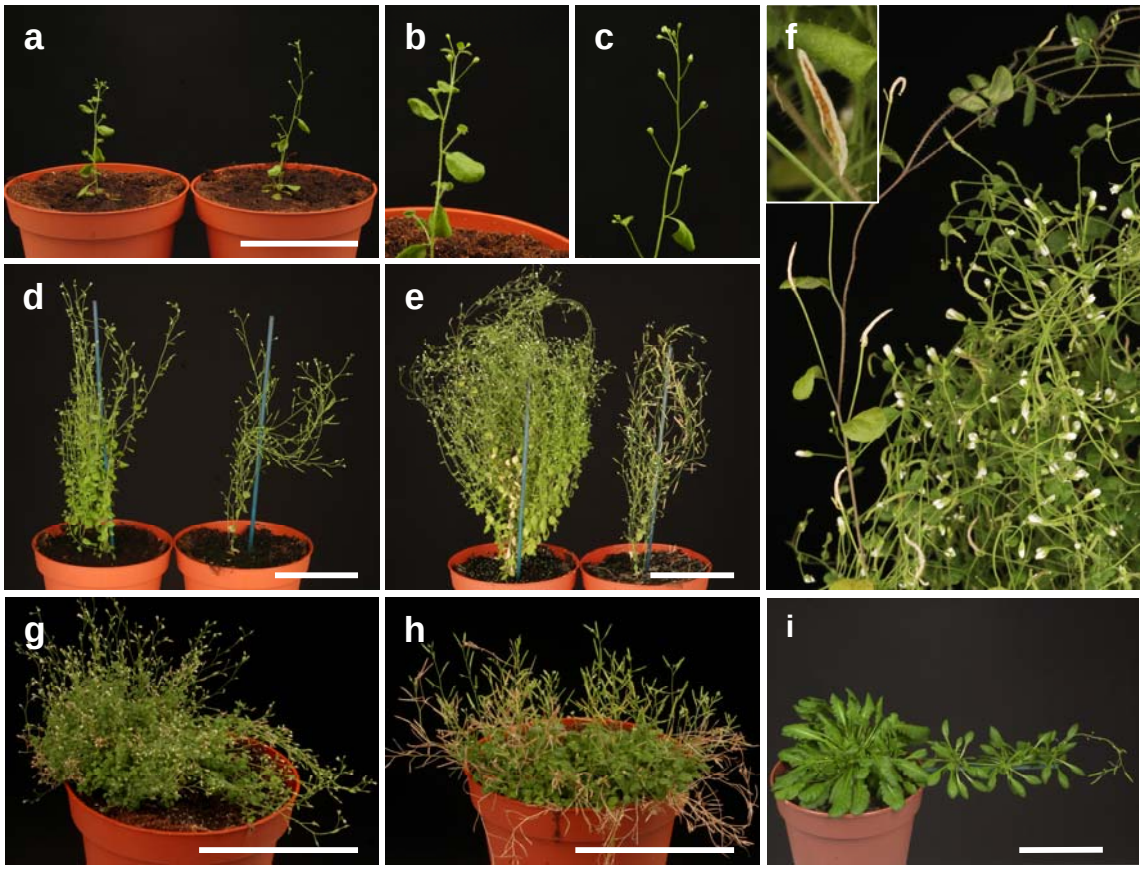
Supplementary Figure 3. Bract formation in *soc1* and *ful* mutants a, Col-0 wild-type, **b,** *soc1-3*, **c,** *ful-2*, and **d,** *soc1-3 ful-2* mutants. One or two bracts were occasionally visible in *soc1-3* and *ful-2* single mutants (white arrowhead), whereas the *soc1-3 ful-2* double mutant developed bracts subtending each flower.



Supplementary Figure 4. Perennial growth habits of different alleles of *soc1 ful* double mutants. The plants were either grown under long (a) or short days (b). (A) *soc1-1 ful1* in L*er*; (B) *soc1-2 ful-1* in L*er*; (C) *soc1-2 ful-2* in Col; (D) *soc1-3 ful-2* in Col.



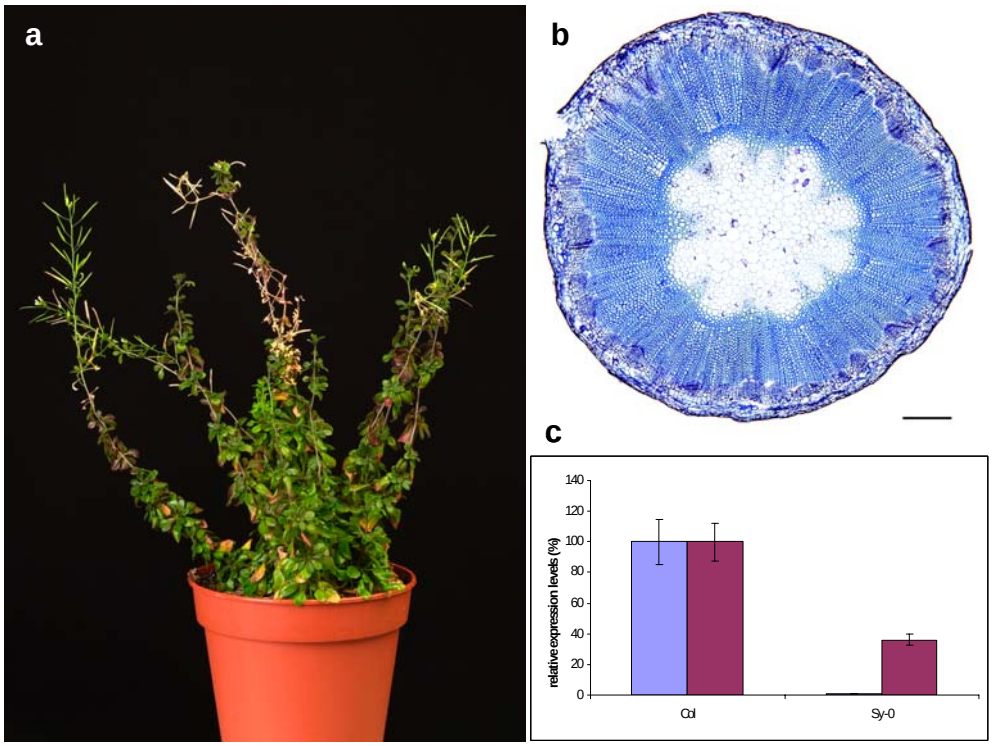
Supplementary Figure 5. Secondary growth in wild-type and *soc1-3 ful-2* plants. a, Schematic view of an *Arabidopsis* plant with indicated positions of cross-sections at 1 cm (A) above the basal rosette, at the inflorescence stem between floral nodes (B), and at a lateral shoot between vegetative nodes (C). **b,** Cross-section in (A) through a Col wild-type stem of 20 cm height 3 weeks after floral induction without secondary growth at this stage. **c,** Cross-section in (A) of a *soc1-3 ful-2* mutant at the same stage as the Col plant used in (b), with secondary xylem and phloem. **d,** and **e,** Cross-sections through a wild-type stem at positions (B) and (C), respectively, with no secondary growth. **f,** and **g,** Cross-sections through a *soc1-3 ful-2* stem at position (B) and (C), respectively, showing secondary growth at coinflorescences of higher order that contain cauline leaves and small aerial rosettes at position (C). At the very top where these inflorescences contain only flowers no secondary growth is visible (B). Scale bars 100 µm. Abbreviations: PP, primary phloem; PX, primary xylem; SP, secondary phloem; SX, secondary xylem.



Supplementary Figure 6. Growth phenotypes of transgenic plants and mutants.

a, Comparison of 4 week old 35S:*AGL19 soc1-3 ful-2* (left) and 35S:*AGL19* (right) plants starting flowering in long days. **b,** Enlarged 35S:*AGL19 soc1-3 ful-2* plant from (a) containing large bracts. **c,** Enlarged 35S:*AGL19* plant from (a) showing flower buds without bracts. **d,** Comparison of 8 week old 35S:*AGL19 soc1-3 ful-2* (left) and 35S:*AGL19* (right) plants showing different growth behavior. 35S:*AGL19 soc1-3 ful-2* plants develop many coinflorescences with aerial rosettes in the axils of cauline leaves. **e,** Three months after sowing, the 35S:*AGL19 soc1-3 ful-2* plant started a second growth cycle and contained many more coinflorescences, whereas the 35S:*AGL19* plant finished growth. **f,** Close up of the 35S:*AGL19 soc1-3 ful-2* plant from (e). The inset shows a silique of a 35S:*AGL19 soc1 ful* plant. Siliques of *soc1-3 ful-2* mutants had the short *ful* silique phenotype, but are full of seeds. **g,** and **h,** 35S:*FT ful-2* (g) and 35S:*FT soc1-3* (h) plants, growing as large, single plants with many short coinflorescences. **i,** *ft-1 soc1-3* double

mutant grown in short days. Multiple basal rosettes developed during the late vegetative phase, from which some eventually started to form an inflorescence with large aerial rosettes. The *soc1* mutants showed no other phenotype than the late flowering in short days. Bar = 10 cm.



Supplementary Figure 7. Sy-0 exhibits similar growth habits as *soc1 ful* plants. a, Sy-0 plant grown for 5 months in long days. Compared to *soc1-3 ful-2* double mutants, this *Arabidopsis* ecotype produced fewer coinflorescences that also developed aerial rosettes. **b,** Cross-section through the main stem of a 5 month old Sy-0 plant 1 cm above the rosette, showing extensive secondary growth. **c,** *SOC1* (blue bars) and *FUL* (pink bars) expression analysis in inflorescence stems of Col-0 and Sy-0 accessions. The MADS box repressor FLC suppresses *SOC1* and *FUL* expression[1]. FLC is up regulated in Sy-0 and recently it has been demonstrated that the *HUA2*-Sy-0 gene is a gain of function allele, which activates *FLC* expression[2], supporting that the Sy-0 phenotype in part is caused by the down-regulation of *SOC1* and *FUL*.

Supplementary Table 1. The table shows the used primers for quantitative RT-PCR.

gene/mutant	forward primer	reverse primer
eIF4A	TTCTCAAACCATAAGCATAAATAC	AAACTCAATGAAGTACTTGAGGGA
SOC1	TGCTTTGTGATGCTGAAGTTTCTC	TGCTGACTCGATCCTTAGTATCG
FUL	GAGAAGGTCTGGTTTGCTCAAG	AAATAGCGATCATAGCGTTCAAGT

1. Wigge, P. A. *et al*. Integration of spatial and temporal information during floral induction in *Arabidopsis*. *Science* **309**, 1056-1059 (2005).

2. Wang, Q. *et al*., HUA2 caused natural variation in shoot morphology of *A. thaliana*. *Current Biology* **17**, 1513-1519 (2007).