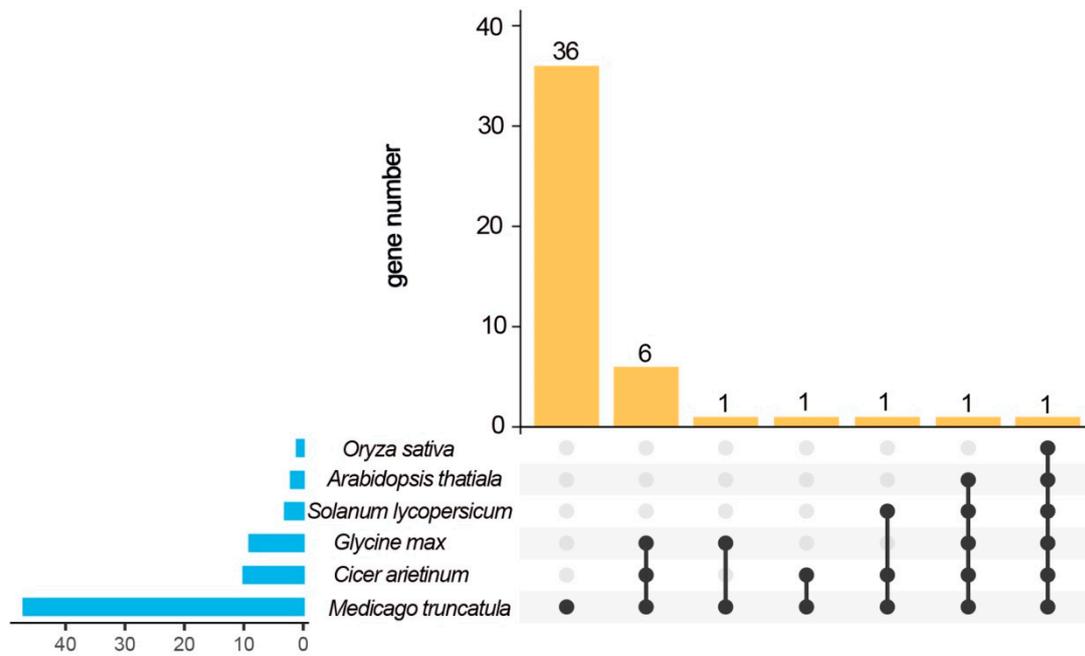
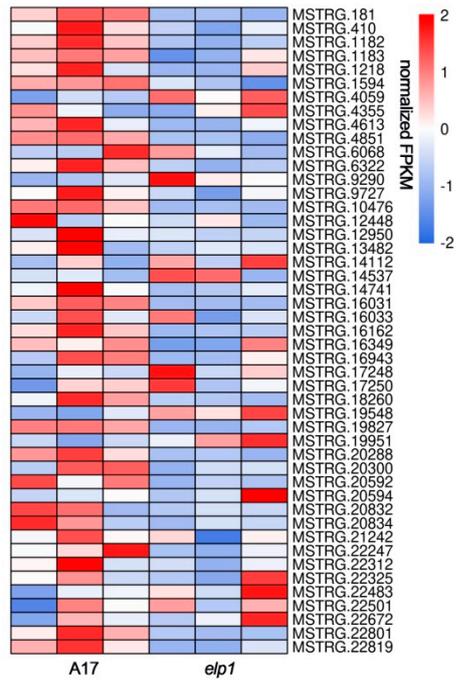


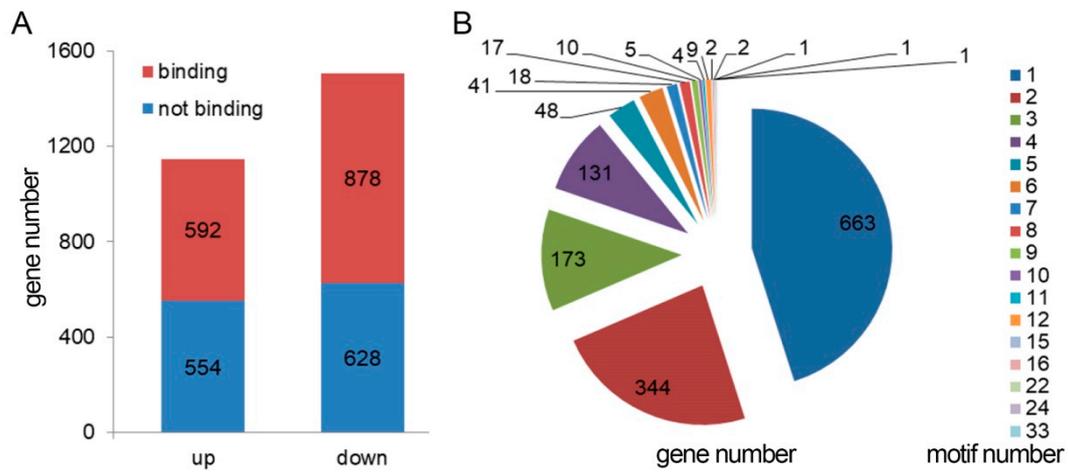
**Figure S1** Principal component analysis (PCA) and heatmap analysis among three biological replicates from the WT (A17) and *elp1* mutant samples.



**Figure S2** Upset plot comparing new genes identified in genome datasets of *Medicago truncatula*, *Cicer arietinum*, *Glycine max*, *Solanum lycopersicum*, *Arabidopsis thaliana* and *Oryza sativa* species.



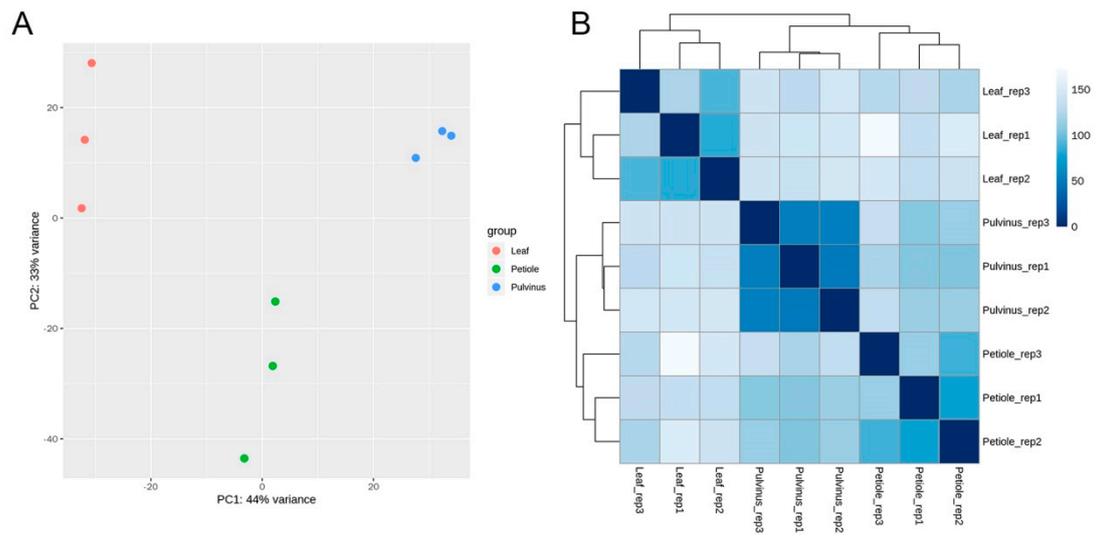
**Figure S3** Heatmap analyses of 47 novel genes in WT (A17) and *elp1* mutant samples.



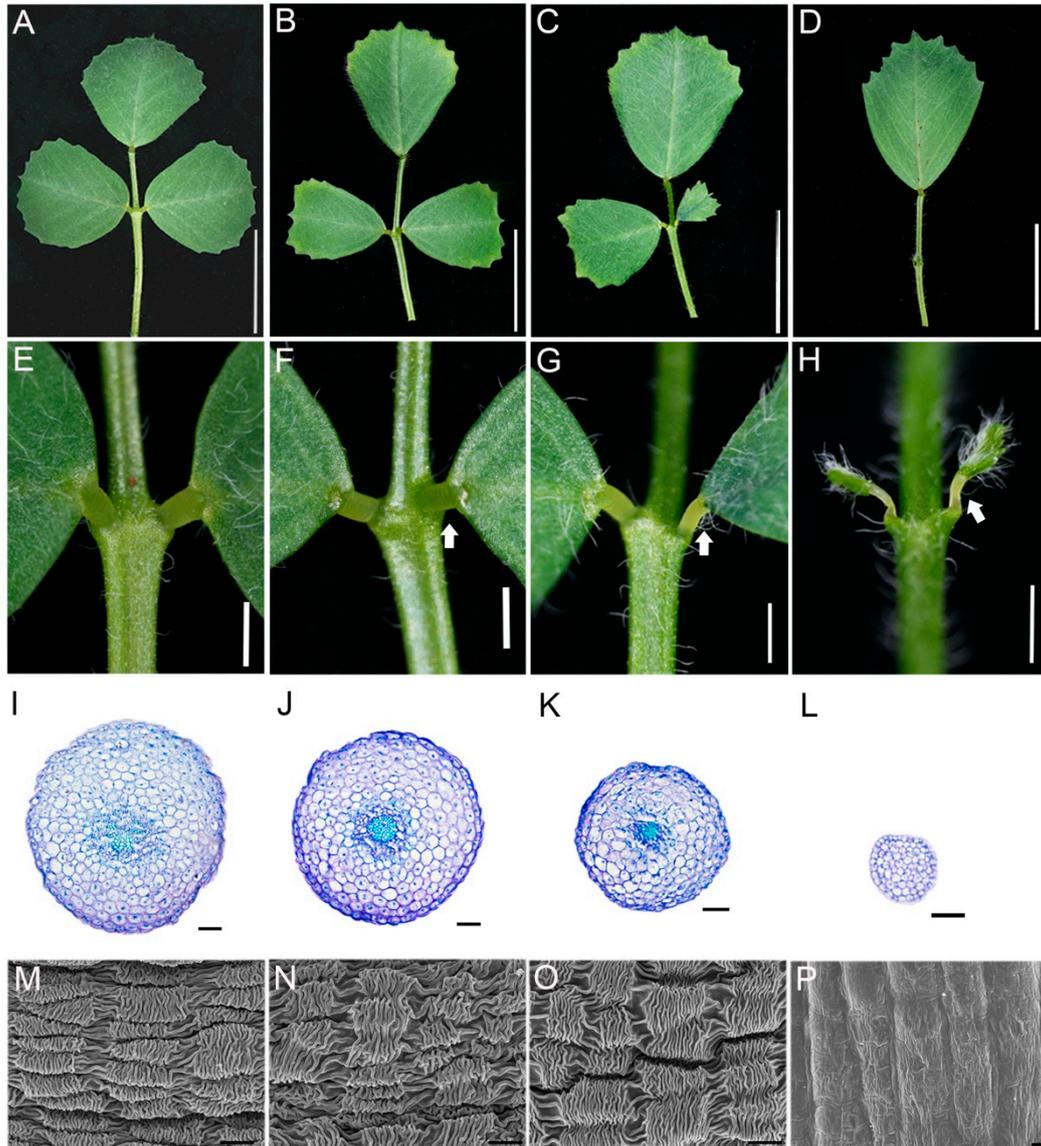
**Figure S4** ELP1 binding targets analysis.

(A) ELP1 direct targets analysis from DEGs. Red, DEGs with ELP1 binding motif in the promoter region; blue, DEGs without ELP1 binding motif in the promoter region.

(B) Motif number statistics in the promoter region of ELP1 direct targets from DEGs.



**Figure S5** Principal component analysis (PCA) and heatmap analysis among three biological replicates from the petiole, pulvinus and leaf tissues.



**Figure S6** Pulvinus defect phenotype of *lls1* mutant.

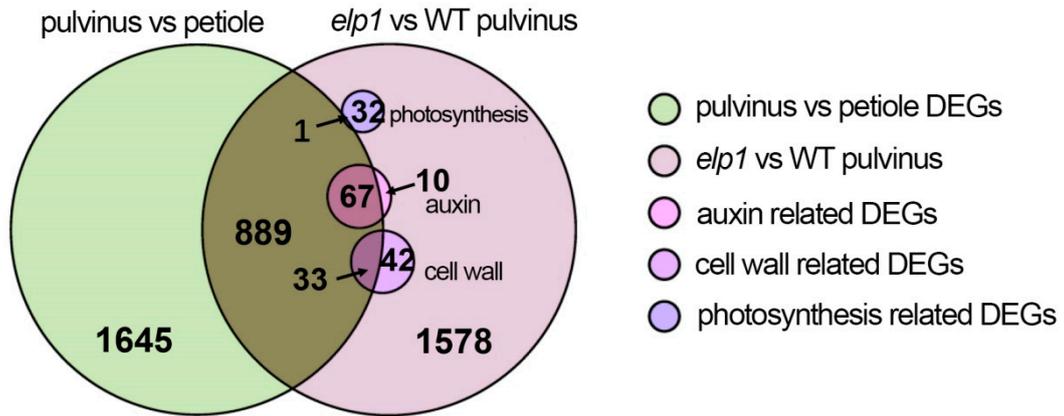
(A-D) Morphogenesis of compound leaves of WT (A) and the moderately defective phenotype (B), severely defective mutant (C) and extremely defective phenotype (D) of *lls1* mutant, respectively.

(E-H) Morphogenesis of lateral pulvinus of WT (E), the moderately defective phenotype (F), severely defective phenotype (G) and extremely defective phenotype (H) of *lls1* mutant, respectively. Arrows indicate the lateral defective pulvini.

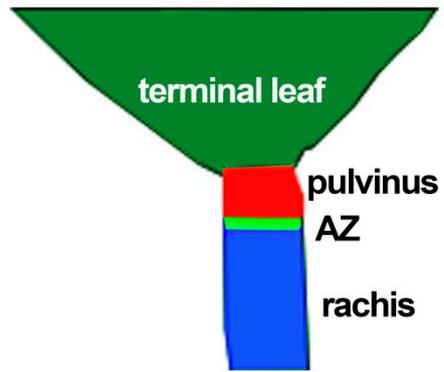
(I-L) Cross sections of pulvinus of WT (I), the moderately defective phenotype (J), severely defective phenotype (K) and extremely defective phenotype (L) of *lls1* mutant, respectively.

(M-P) Scanning electron microscope images of a pulvinus of WT (M) and the moderately defective phenotype (N), severely defective phenotype (O) and extremely defective phenotype (P) of *lls1* mutant, respectively.

Scale bars, 1 cm in (A-D), 1 mm in (E-F), 50  $\mu$ m in (I-L), 10  $\mu$ m in (M-O), 2  $\mu$ m in (P).



**Figure S7** Comparative transcriptome analysis between the 2652 (*elp1* vs WT pulvinus) and 2635 (petiole vs pulvinus in WT) DEGs.



**Figure S8** Schematic diagram for terminal leaf, pulvinus, abscission zone (AZ) and rachis position in *M. truncatula* compound leaf.