Supplementary Figure 1. Staining of organs of proGmGAMYB::GUS Arabidopsis. The stem leaves, inflorescence, rosette leaves and roots of 30-day-old proGmGAMYB::GUS Arabidopsis plants were placed into X-Gluc staining solution. Took photos after decoloring.

Supplementary Figure 2. Molecular identification of GmGAMYB-ox transgenic soybean. (A) Identification of GmGAMYB-ox transgenic soybean by PCR analysis. (B) The expression levels of GmGAMYB were quantified by qRT-PCR analysis in transgenic soybean and WT plants. GmActin4 gene was used for normalization. For each experiment, three technical replicates were conducted. Data shown are mean ± SD of three independent experiments (**P < 0.01, Student’s t-test).

Table S1. Plant GAMYB genes’ information.

| Gene name | Accession number |
|-----------|-----------------|
| GmGAMYB   | KC525897        |
| MpMYB33   | RDX95167.1      |
| SsGAMYB   | TKY68413.1      |
| CcMYB33   | XP_020219565.1  |
| VaMYB33   | XP_027909434.1  |
| VaGAMYB   | XP_017431637.1  |
| LaGAMYB   | XP_019449331.1  |
| AtMYB65   | NP_001327042.1  |
| AtMYB33   | sp|Q8W1W6.1       |
| OsGAMYB   | LOC_Os01g59660.1|
| ZmGAMYB   | NP_001130632.1  |
| VvGAMYB   | CBI40642.3      |
| MeGAMYB   | Manes.04G153700.1|
| SjGAMYB   | Solyc01g009070.2.1|
| CsGAMYB   | Cucsa.364400.1  |
| HvGAMYB   | HORVU3Hr1G079490.4|
| MtMYB33   | XP_013445158.1  |
| PpMYB157  | Potri.003G189700.1|
| ReGAMYB   | 29686.m000890   |
Table S2. The specific sequences of the primers.

| Primer                  | Sequence (5'-3')                                        |
|-------------------------|--------------------------------------------------------|
| GmGAMYB-3F6H-F          | TGGAGCTCGGTGACCCATGAAAGAAGATATTGAAGATG                 |
| GmGAMYB-3F6H-R          | GATCCTGGGATCCCCGAGAGGGGCTGGAATGGATTTC                 |
| GmGAMYB-TOPO-F          | CACCATGAAGAAGATATTGAAGATG                              |
| GmGAMYB-TOPO-R          | GAGGGGGCTGGAATGGATTTC                                 |
| proGmGAMYB-GUS-F        | CACCATAAGTAACGAGGCAGTGAATAT                          |
| proGmGAMYB-GUS-R        | AACAAGAAGAAGCCCTAGAAAC                                |
| qGmGAMYB-F              | GCGGCTGATTGCTGAACCTT                                  |
| qGmGAMYB -R             | GTGCTTTTGGCTATGCTGAC                                  |
| qGmGA20ox-F             | GATAGAGAGACCCCTGTGCCT                                  |
| qGmGA20ox-R             | TGAGAAGCAGAGCAAACAGAG                                  |
| qGmFULc-F               | GAAAATTCATAAGAGGTGTGCGC                                |
| qGmFULc-R               | GACCAATTGTGGATTTTTTGCT                                 |
| qGmFUL2b-F              | GCTTTGATAGATTTCAGACAG                                  |
| qGmFUL2b-R              | CCTGCTTTGTTGCTAGTACAT                                  |
| qGmTCP8-F               | ATTTGCACGTAGTCATTAAAC                                 |
| qGmTCP8-R               | CAGCTTTGTTTGTTCACACGTAA                                |
| qGmTCP12-F              | CTCGATCAATTCACATGCAG                                  |
| qGmTCP12-R              | TTGTGTTGGAAGTGGGTT                                    |
| qGmFPF1-F               | CAAGGAAACCCATCTTTCTGTG                                 |
| qGmFPF1-R               | CAATCGTAATGTGCTAGAGCTC                                |
| qGmActin4 -F            | GTGTCAGCCATCTGTCCCATTT                                 |
| qGmActin4 -R            | GTTCAAGCTTGTGTCTGGAATCA                                |
| GmGBP1-TOPO-F           | CACCATGGCCACTCTGGAAGAGCTT                             |
| GmGBP1-TOPO-R           | GAATGCCCTCTTTCAATCCATG                                |