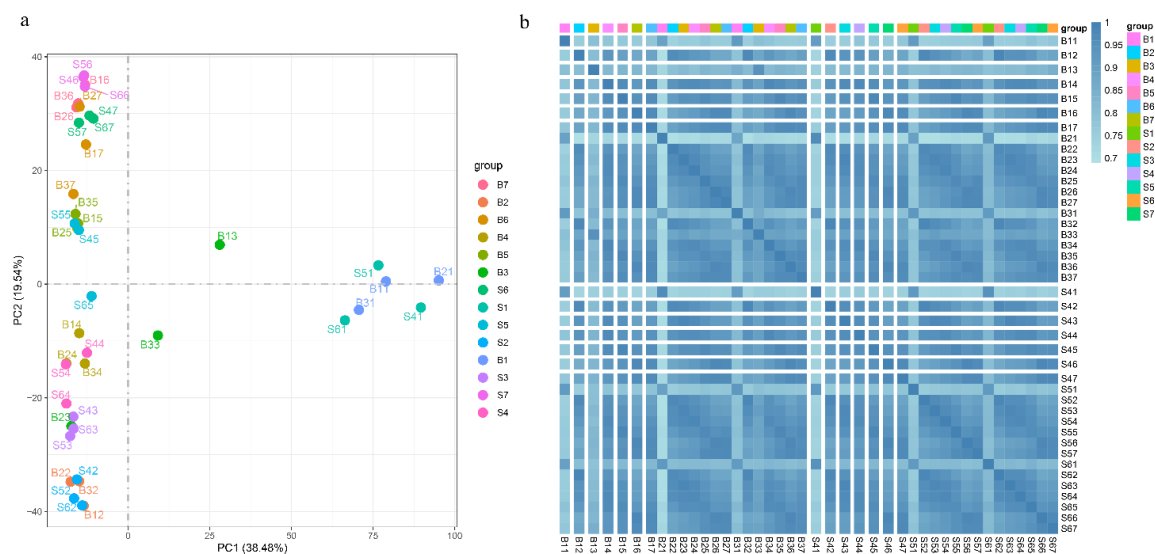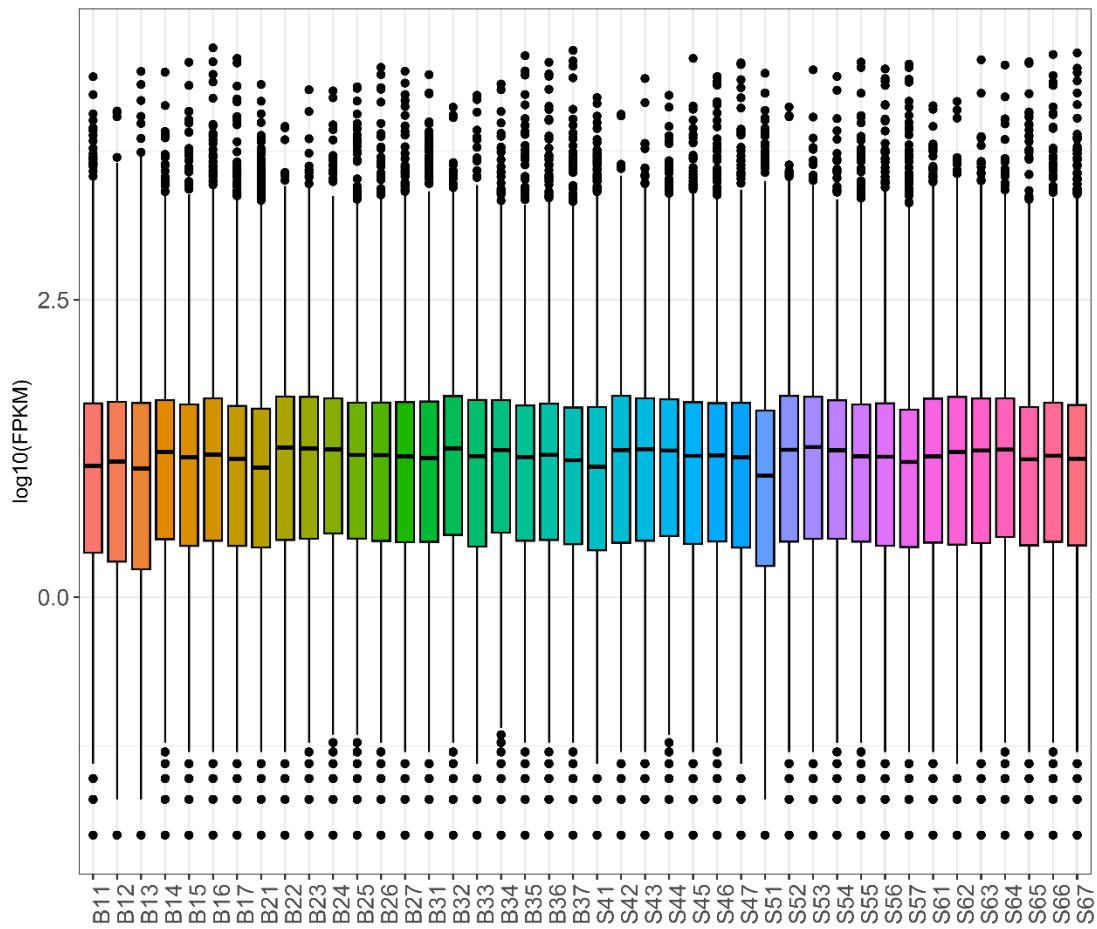**Supplementary Figure S1 The flowchart of methodology of the article.**
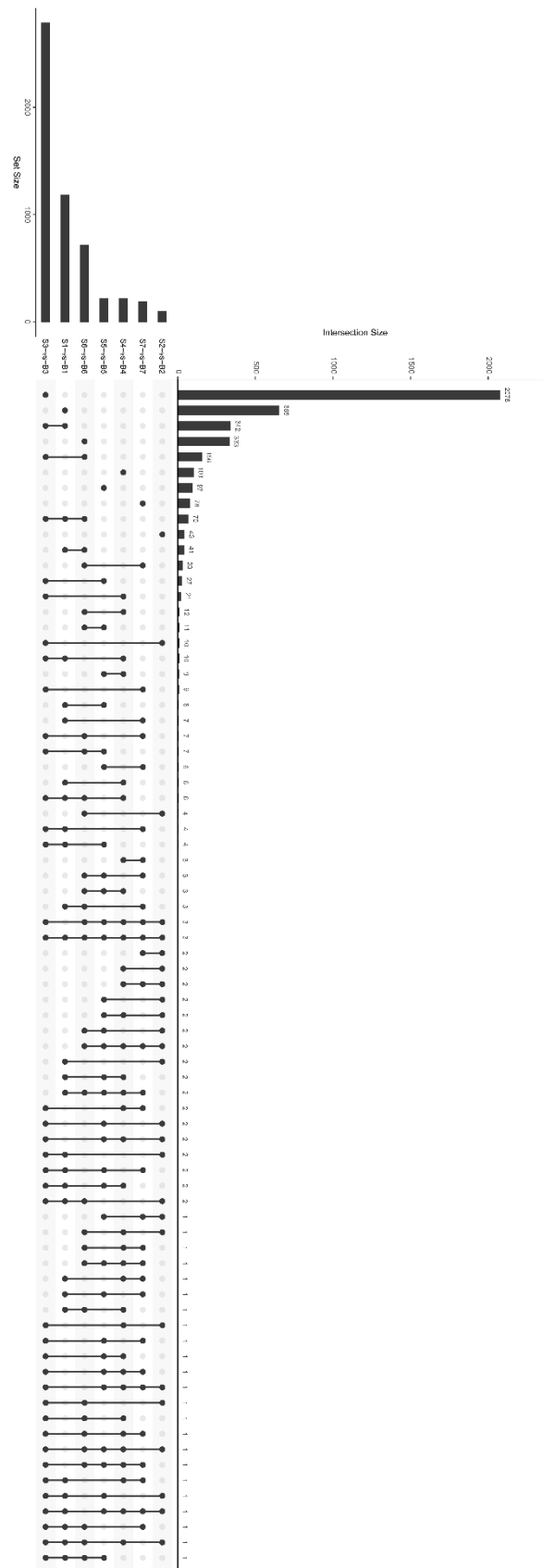
Supplementary Figure S2 The correlation analysis of all samples. (a) Principal component analysis of different samples. (b) Correlation heatmap of gene expression level in all samples.
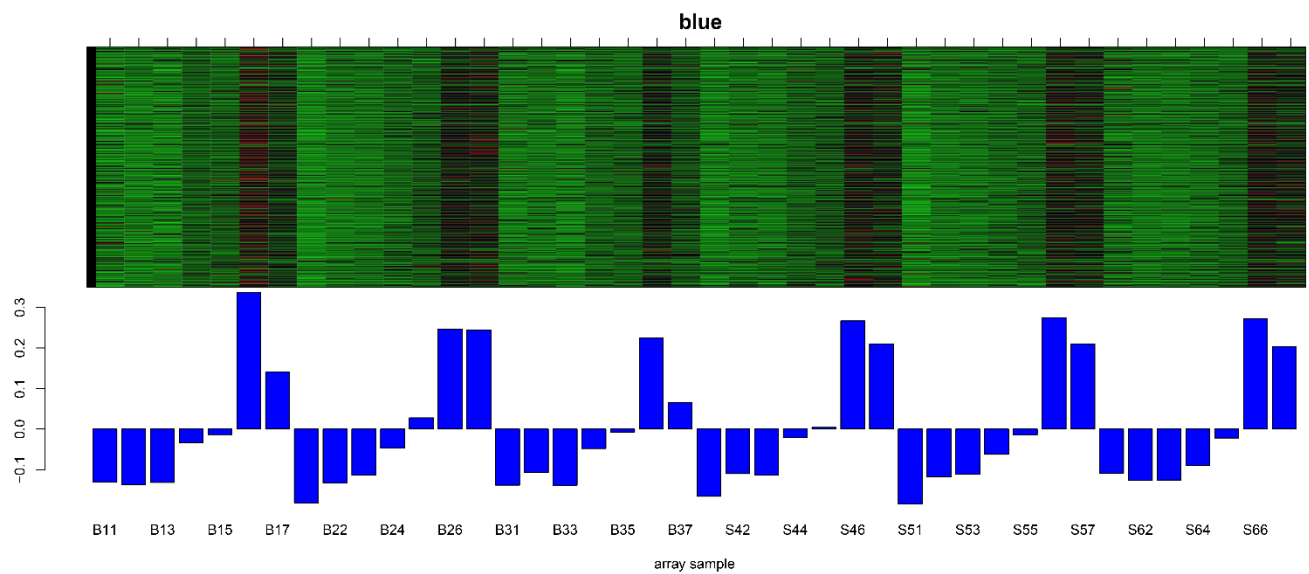
'B1' indicated the end of flowering of large fruit type. 'B2' indicated the 7 days after flowering of large fruit type. 'B3' indicated the 14 days after flowering of large fruit type. 'B4' indicated the 21 days after flowering of large fruit type. 'B5' indicated the 28 days after flowering of large fruit type. 'B6' indicated the 35 days after flowering of large fruit type. 'B7' indicated the 42 days after flowering of large fruit type. 'S1' indicated the end of flowering of small fruit type. 'S2' indicated the 7 days after flowering of small fruit type. 'S3' indicated the 14 days after flowering of small fruit type. 'S4' indicated the 21 days after flowering of small fruit type. 'S5' indicated the 28 days after flowering of small fruit type. 'S6' indicated the 35 days after flowering of small fruit type. 'S7' indicated the 42 days after flowering of small fruit type. 'B11' means the first replicate of B1. 'B12' means the first replicate of B2. 'B13' means the first replicate of B3. 'B14' means the first replicate of B4. 'B15' means the first replicate of B5. 'B16' means the first replicate of B6. 'B17' means the first replicate of B7. 'B21' means the second replicate of B1. 'B22' means the second replicate of B2. 'B23' means the second replicate of B3. 'B24' means the second replicate of B4. 'B25' means the second replicate of B5. 'B26' means the second replicate of B6. 'B27' means the second replicate of B7. 'B31' means the third replicate of B1. 'B32' means the third replicate of B2. 'B33' means the third replicate of B3. 'B34' means the third replicate of B4. 'B35' means the third replicate of B5. 'B36' means the third replicate of B6. 'B37' means the third replicate of B7.'S41' means the first replicate of S1. 'S42' means the first replicate of S2. 'S43' means the first replicate of S3. 'S44' means the first replicate of S4. 'S45' means the first replicate of S5. 'S46' means the first replicate of S6. 'S47' means the first replicate of S7. 'S51' means the second replicate of S1. 'S52' means the second replicate of S2. 'S53' means the second replicate of S3. 'S54' means the second replicate of S4. 'S55' means the second replicate of S5. 'S56' means the second replicate of S6. 'S57' means the second replicate of S7.'S61' means the third replicate of S1. 'S62' means the third replicate of S2. 'S63' means the third replicate of S3. 'S64' means the third replicate of S4. 'S65' means the third replicate of S5. 'S66' means the third replicate of S6. 'S67' means the third replicate of S7.

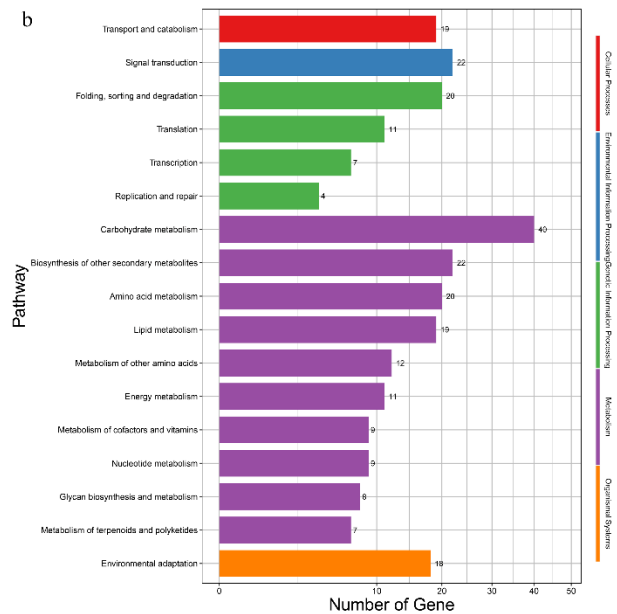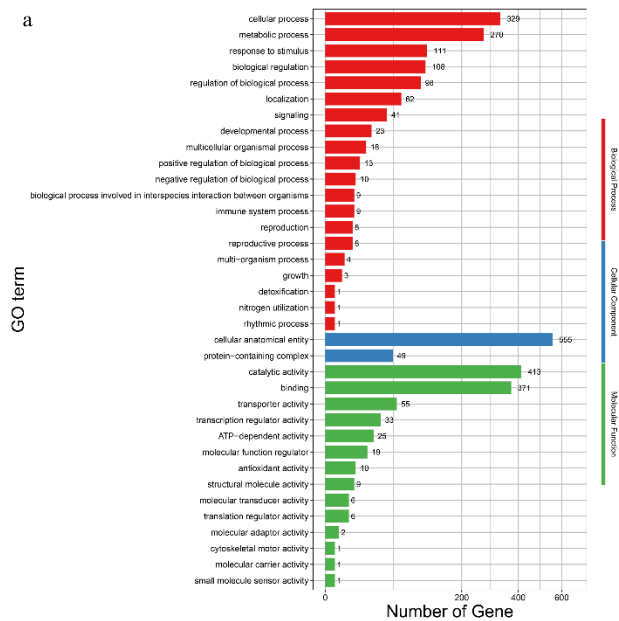**Supplementary Figure S3 The FPKM box diagram of genes in different samples.**

'B11' means the first replicate of B1. 'B12' means the first replicate of B2. 'B13' means the first replicate of B3. 'B14' means the first replicate of B4. 'B15' means the first replicate of B5. 'B16' means the first replicate of B6. 'B17' means the first replicate of B7. 'B21' means the second replicate of B1. 'B22' means the second replicate of B2. 'B23' means the second replicate of B3. 'B24' means the second replicate of B4. 'B25' means the second replicate of B5. 'B26' means the second replicate of B6. 'B27' means the second replicate of B7. 'B31' means the third replicate of B1. 'B32' means the third replicate of B2. 'B33' means the third replicate of B3. 'B34' means the third replicate of B4. 'B35' means the third replicate of B5. 'B36' means the third replicate of B6. 'B37' means the third replicate of B7. 'S41' means the first replicate of S1. 'S42' means the first replicate of S2. 'S43' means the first replicate of S3. 'S44' means the first replicate of S4. 'S45' means the first replicate of S5. 'S46' means the first replicate of S6. 'S47' means the first replicate of S7. 'S51' means the second replicate of S1. 'S52' means the second replicate of S2. 'S53' means the second replicate of S3. 'S54' means the second replicate of S4. 'S55' means the second replicate of S5. 'S56' means the second replicate of S6. 'S57' means the second replicate of S7. 'S61' means the third replicate of S1. 'S62' means the third replicate of S2. 'S63' means the third replicate of S3. 'S64' means the third replicate of S4. 'S65' means the third replicate of S5. 'S66' means the third replicate of S6. 'S67' means the third replicate of S7.

Supplementary Figure S4 Upset map of differentially expressed genes in peach fruit development with different fruit types in the same period.
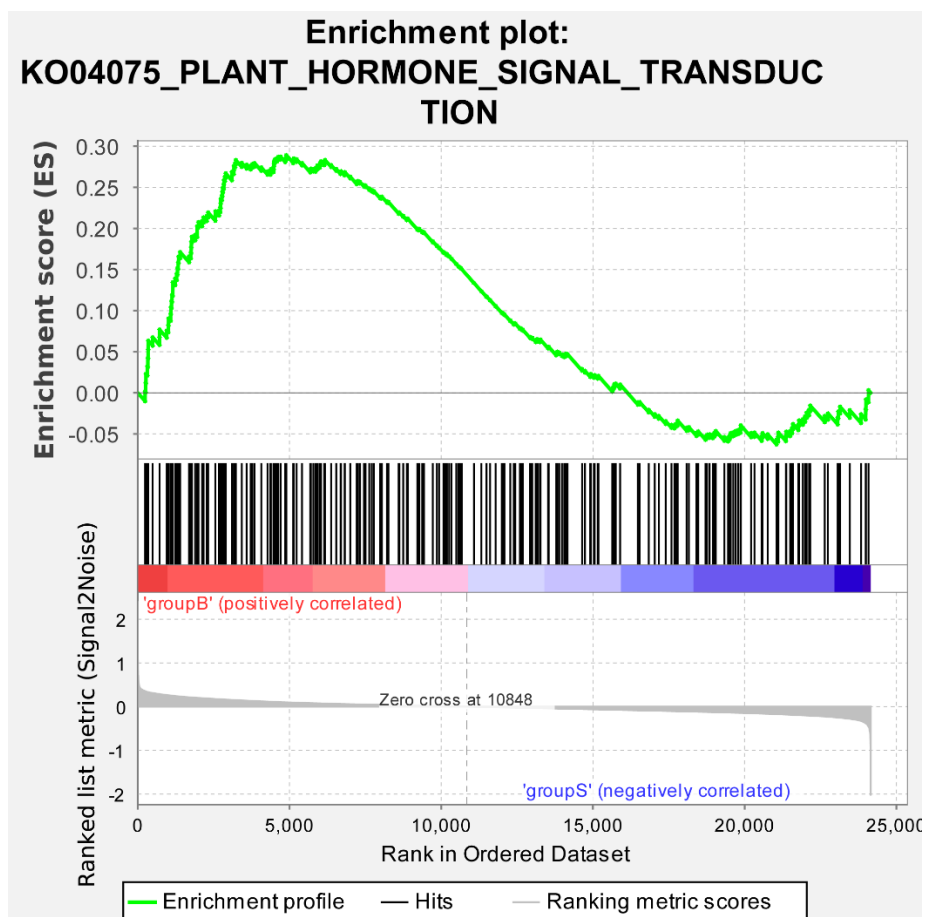
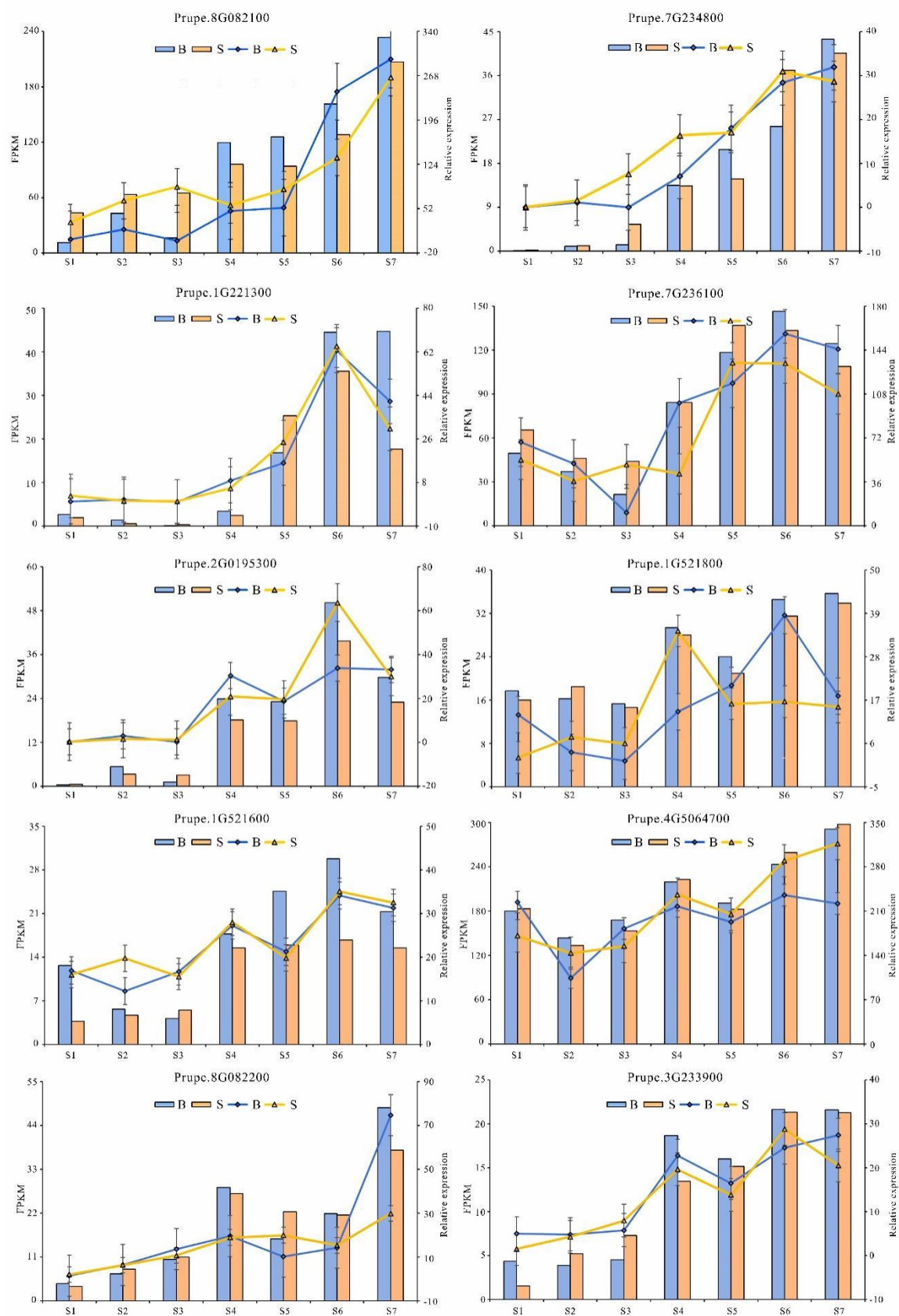**Supplementary Figure S5 Heatmap and gene expression of blue module.**

Explain: The expression patterns of all genes contained in the blue module are displayed byheatmap, and the changes of the module characteristic values among different samples are presented by histogram

Supplementary Figure S6 GO and KEGG enrichment analysis of DEGs in blue module. (a) GO enrichment analysis of DEGs in blue module. (b) KEGG enrichment analysis of DEGs in blue module.
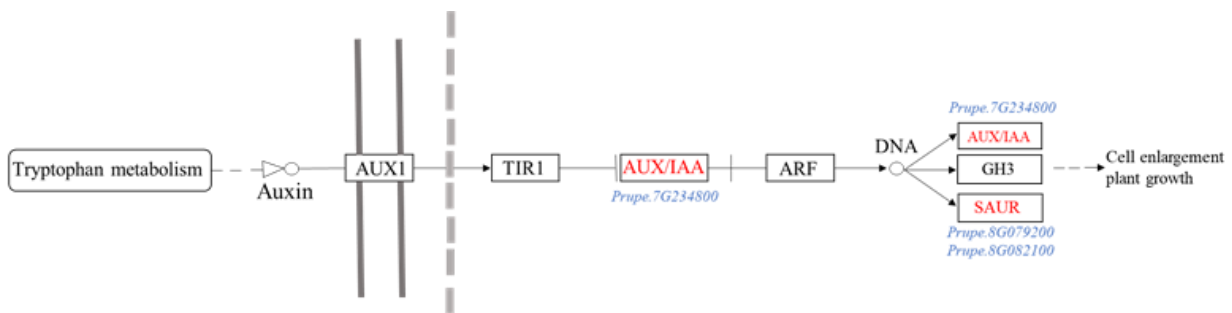
Supplementary Figure S7 Results of plant hormone signal transduction pathways analysis based on set enrichment of differential genes (GSEA) method.

Supplementary Figure S8 Validation of RNA-seq by qRT-PCR.

The column chart and left longitudinal coordinate indicate the FPKM value of RNA-seq, whereas the broken line diagram and right longitudinal coordinate show the relative expression of qRT-PCR. S1-S7: the end of flowering, 7, 14, 21, 28, 35 and 42 days after flowering, respectively. 'S' indicated the small fruit type, 'B' indicated the big fruit type.

Supplementary Figure S9 The auxin synthesis pathway using KEGG pathway analysis about the three candidate genes.