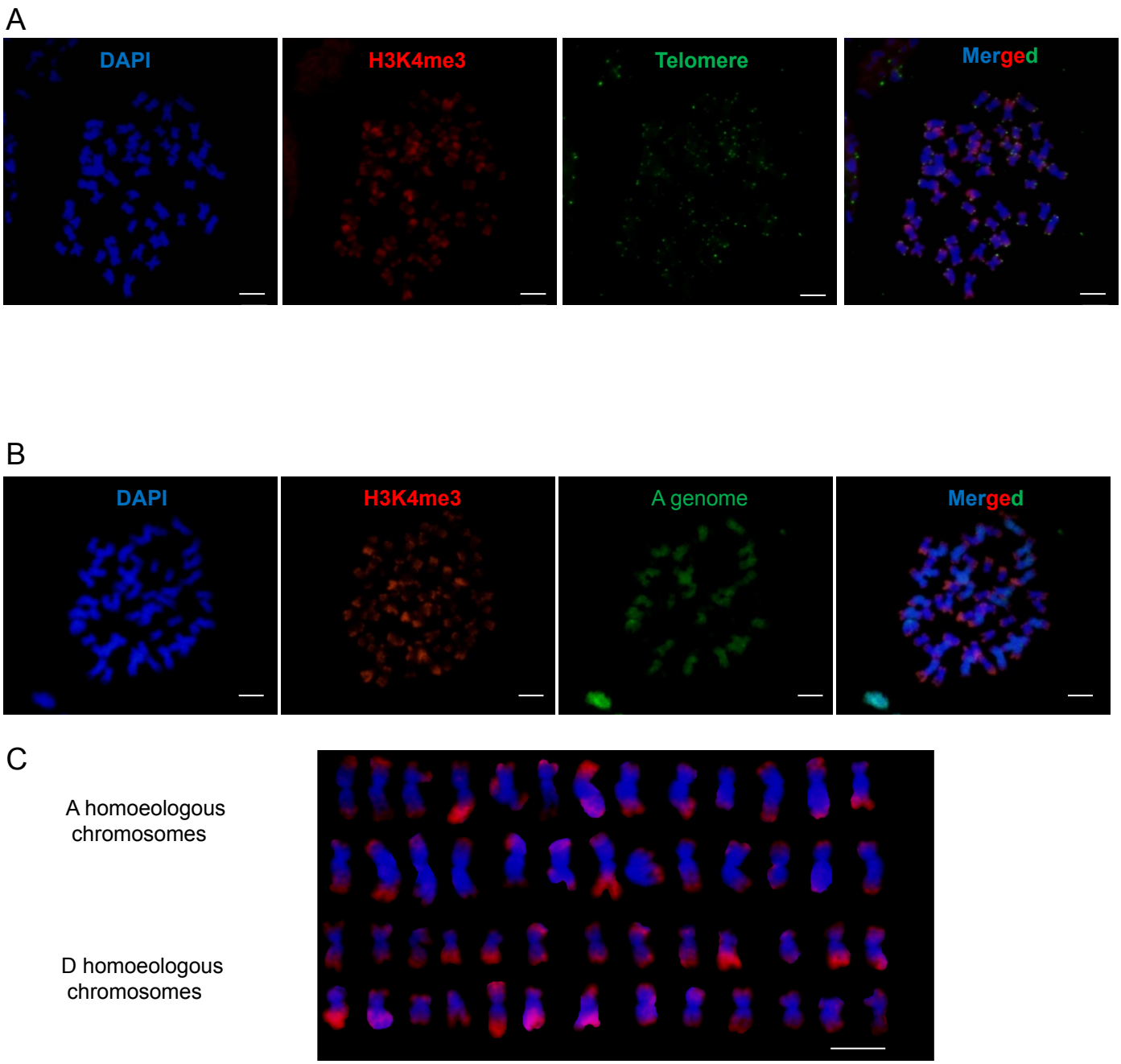
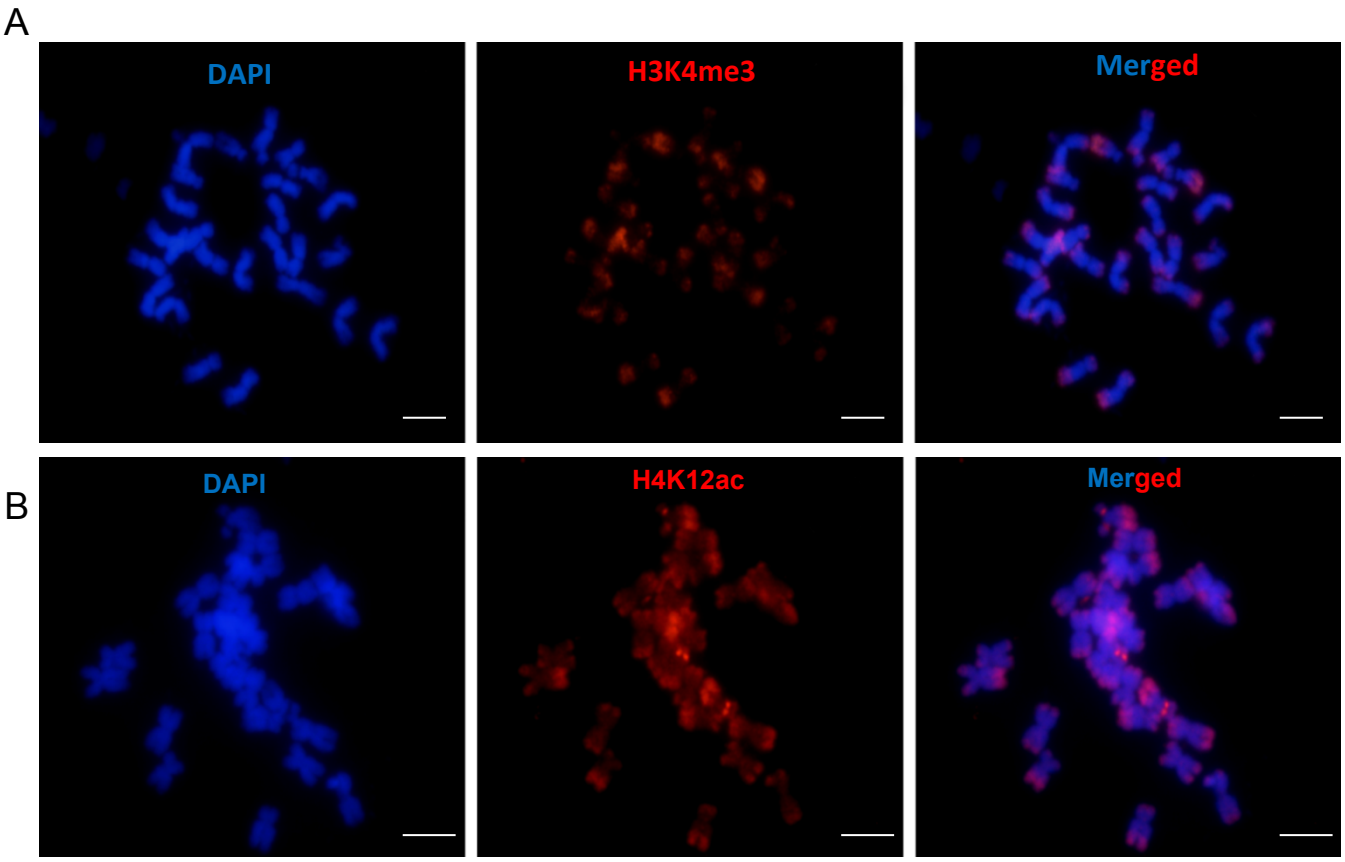
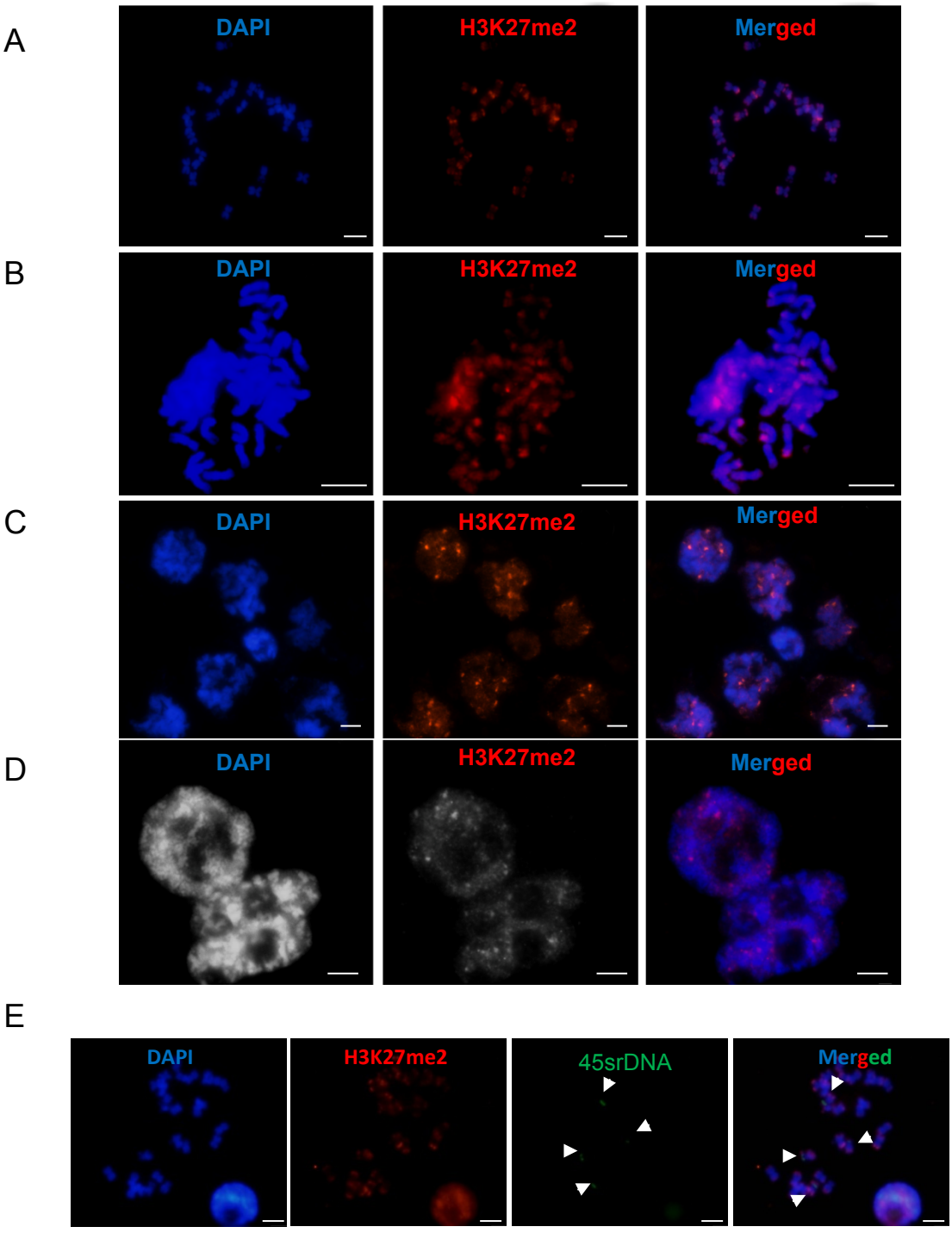


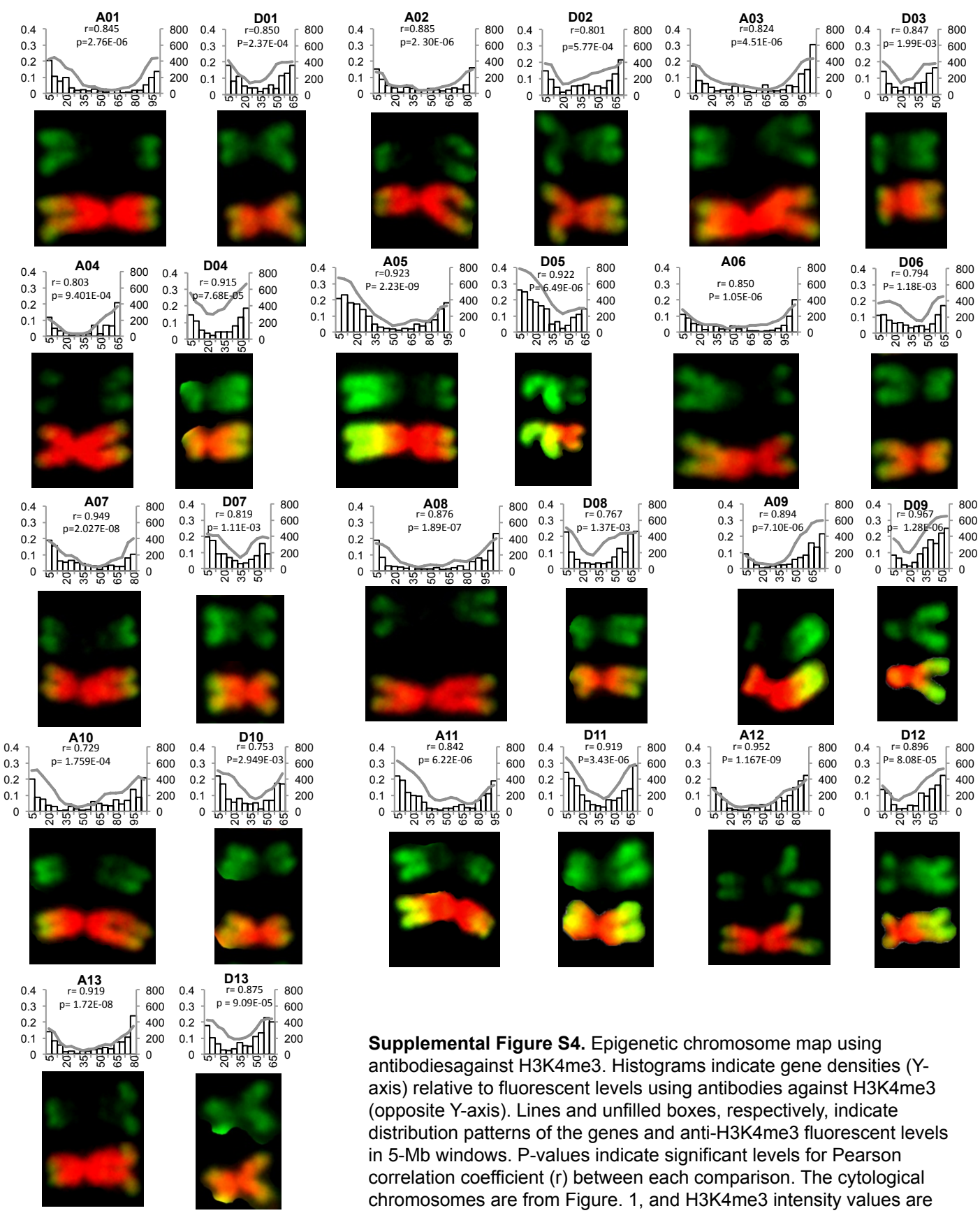
Supplemental Figure S1. Antibodies against H3K4me3 Immunostaining and telomere locations of metaphase chromosomes in allotetraploid cotton. A and D homoeologous chromosomes were discriminated by genomic DNA *in situ* hybridization (GISH) using total genomic DNA of *G. arboreum* as a probe. A, Distribution of H3K4me3 and telomere across *G. hirsutum* metaphase chromosomes. Blue, red, and green indicate chromosomes (counterstained with DAPI), H3k4me3 (cy3), and telomeres (digoxigenin-labeled probes), respectively; bar=5μm. B, Discrimination between A and D homoeologous chromosomes by genomic *in situ* hybridization (GISH). Genomic DNA from *G. arboreum* was used as digoxigenin-labeled probe (fluorescein-conjugated anti-digoxigenin) in GISH analysis. Blue, red, and green signals indicate chromosomes, H3k4me3, A homoeologous chromosomes, respectively. C, A and D homoeologous chromosomes are arranged based on GISH, telomere, and immuno-staining patterns; bar=5μm.



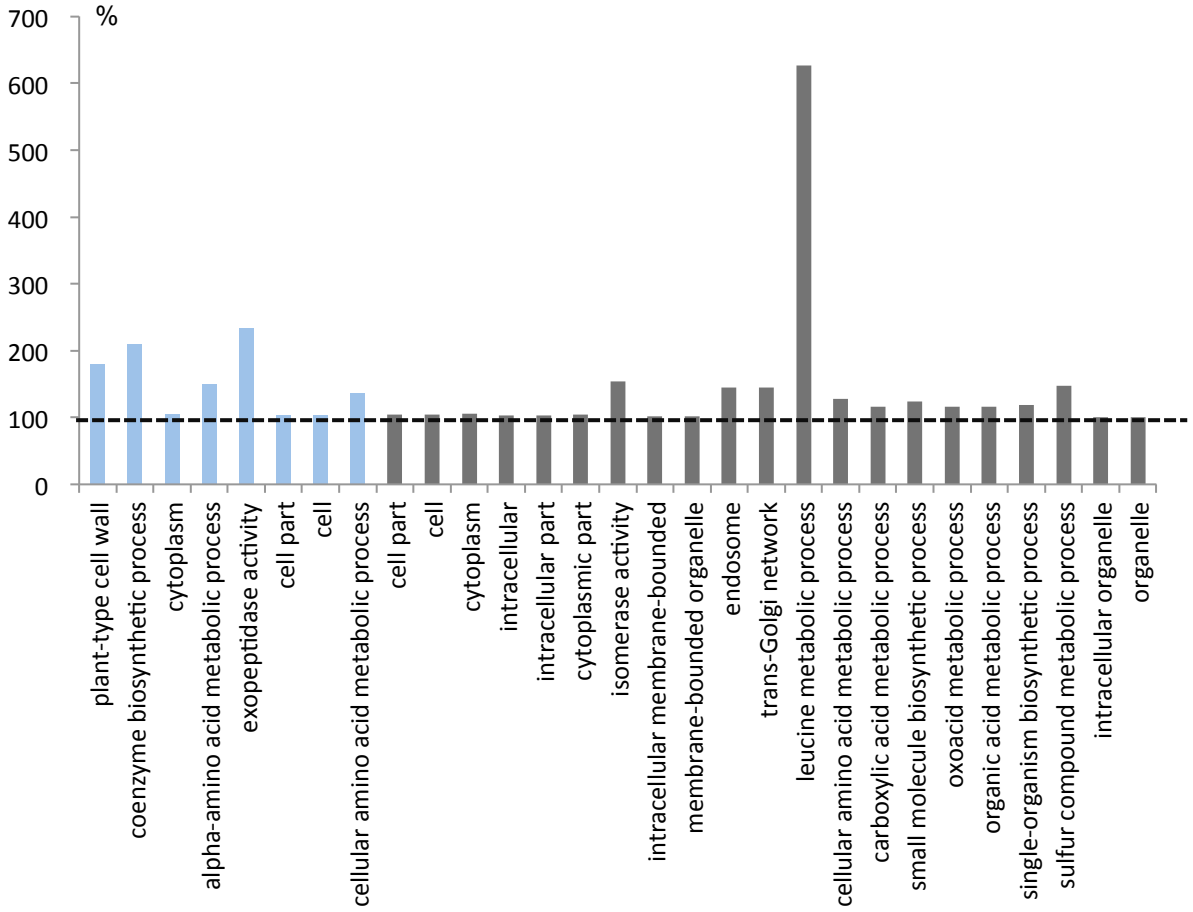
Supplemental Figure S2. Immunostaining images generated using antibodies against H3K4me3 and H4K12ac, respectively, in metaphase chromosomes of *G. arboreum*. A, Immunolabeling images using antibodies against H3K4me3 to metaphase of *G.arboreum.* Metaphase chromosomes counterstained with DAPI (blue) and antibodies against H3K4me3 (Cy3, red); bar=5μm. B, Immunofluorescence images using antibodies against H4K12ac to metaphase of *G.arboreum*. Metaphase chromosomes counterstained with DAPI (blue) and antibodies against H3K4ac12 (Cy3, red); bar=5μm.



Supplemental Figure S3. Immunostaining images of interphase and metaphase chromosomes with antibodies against H3K27me2. A, Metaphase images of *G. arboreum*, showing chromosomes (blue, DAPI) and H3K27me2 (red, cy3); bar=5μm. B, Metaphase images of *G. hirsutum*, showing chromosomes (blue, DAPI) and H3K27me2 (red, cy3); bar=5μm. C, Interphase images of *G. arboreum*, showing chromosomes (blue, DAPI) and H3K27me2 (red, cy3); bar=5μm. D, Interphase images of *G. hirsutum*, showing interphase cell (left, DAPI) and H3K27me2(middle, cy3); bar=5μm. E, The relationship between H3K27me2 and 45S rDNA in *G. arboreum*, showing chromosomes (blue, DAPI), H3k27me2 (red, Cy3), and 45S rDNA (green, digoxigenin-labeled probes were detected using fluorescein-conjugated anti-digoxigenin); bar=5μm.



Supplemental Figure S4. Epigenetic chromosome map using antibodiesagainst H3K4me3. Histograms indicate gene densities (Y-axis) relative to fluorescent levels using antibodies against H3K4me3 (opposite Y-axis). Lines and unfilled boxes, respectively, indicate distribution patterns of the genes and anti-H3K4me3 fluorescent levels in 5-Mb windows. P-values indicate significant levels for Pearson correlation coefficient (r) between each comparison. The cytological chromosomes are from Figure. 1, and H3K4me3 intensity values are shown in supplemental Data 2.



Supplemental Figure S5. Gene Ontology (GO) analysis of the genes with homoeolog expression bias. Blue and grey histograms indicate enrichment of the genes with A-homoeolog expression bias (A>D) and D-homoeolog expression bias (D>A), respectively.