

Chapter 4: Integrated Modeling, GWAS and eQTL Analysis

Reveals Complex Genetic Regulatory Network of Foliar Terpene Biosynthesis in *Eucalyptus camaldulensis*

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Supplementary Information 4.1

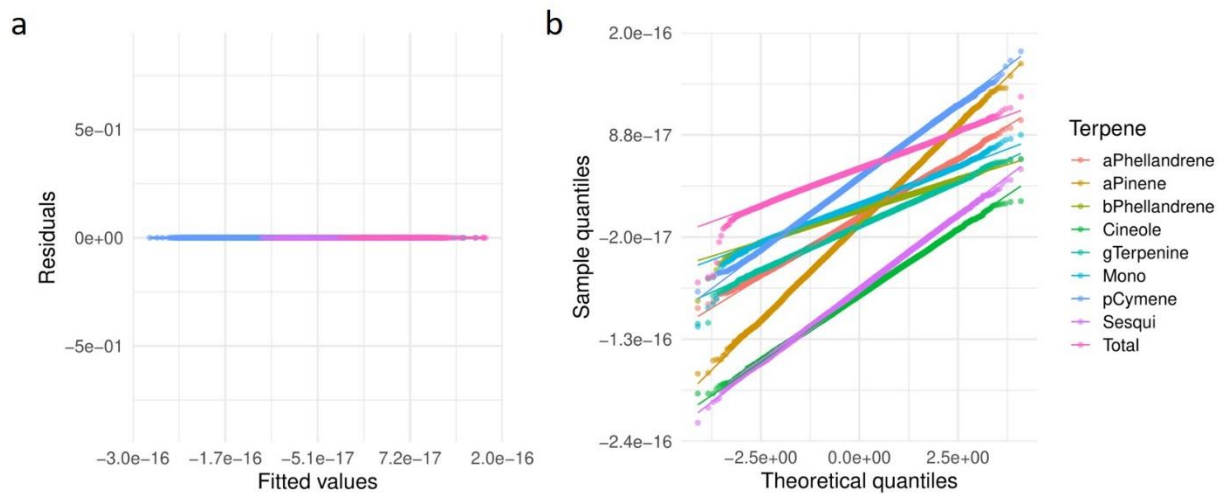


Figure S1. Residuals versus fitted and QQ (quantile-quantile) plots of the mixed linear models for the nine terpene traits.

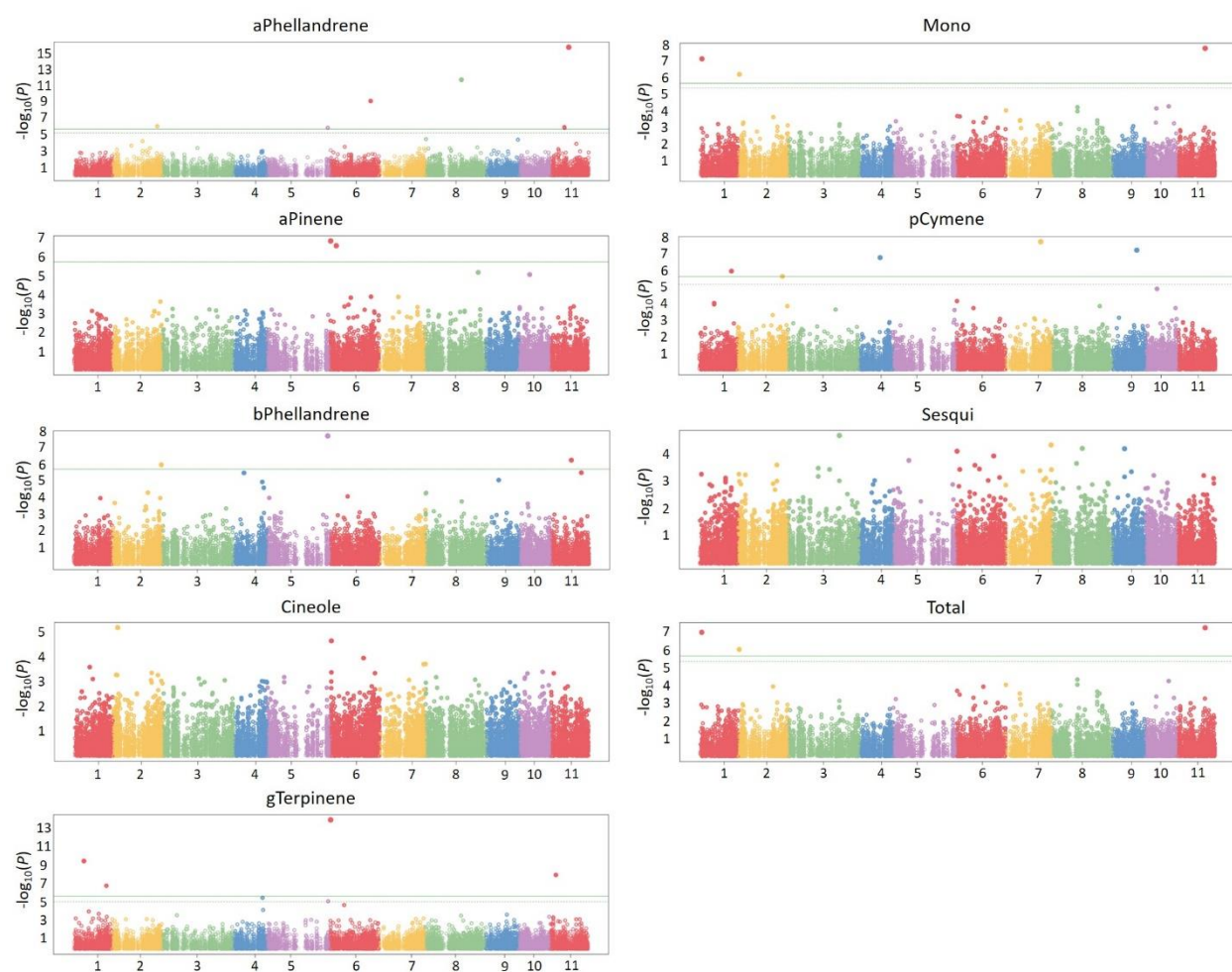


Figure S2. Manhattan plots of genome-wide association studies (GWAS) of nine different terpene traits in *Eucalyptus camaldulensis* using BLINK model. This analysis was conducted by using 25782 single nucleotide polymorphisms (SNPs) in 226 *E. camaldulensis* samples. The x-axes show the 11 chromosomes in *E. camaldulensis* and y-axes show the $-\log_{10}(P)$ value.

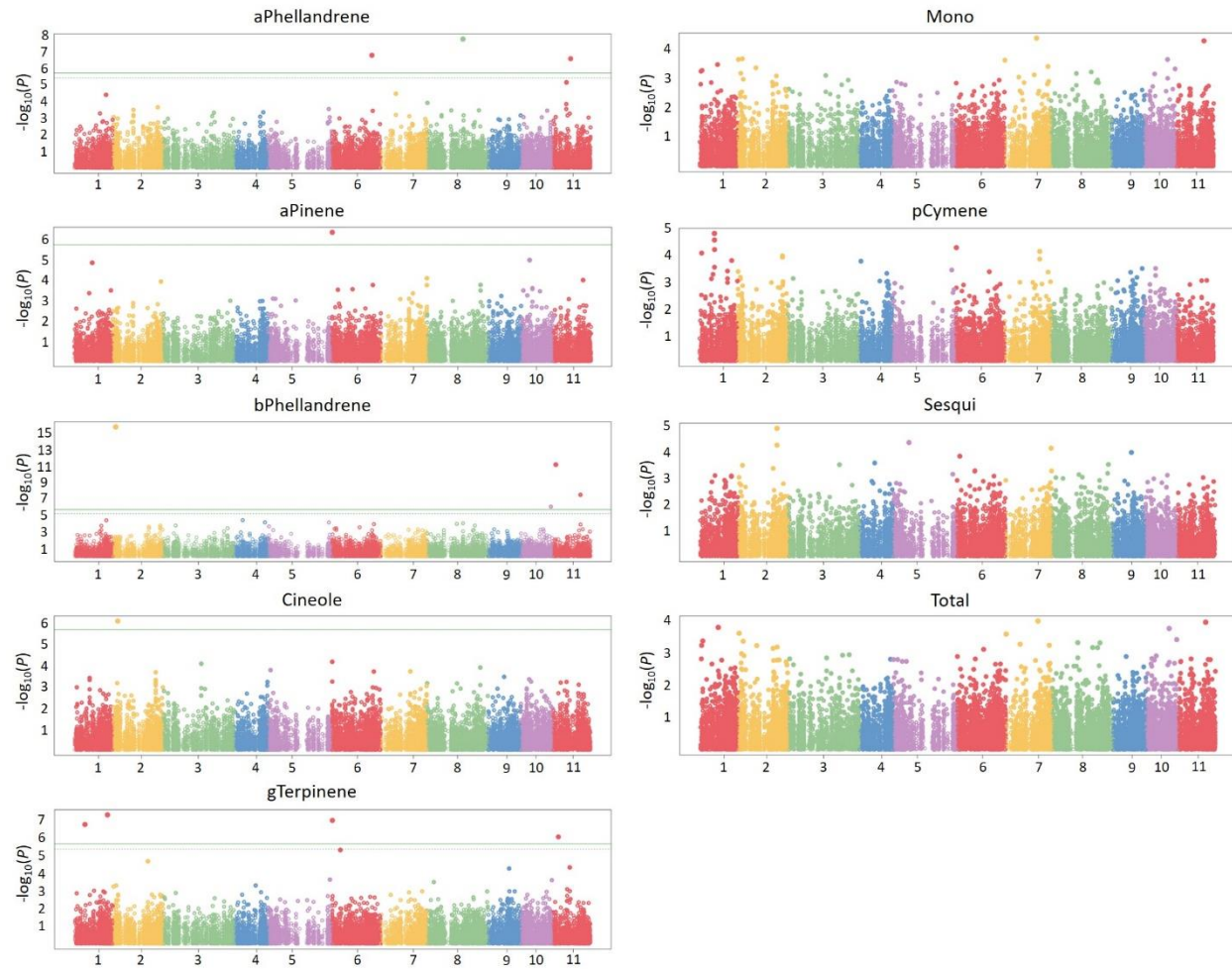


Figure S3. Manhattan plots of genome-wide association studies (GWAS) of different terpene traits in *Eucalyptus camaldulensis* MLMM model. This analysis was conducted by using 25782 single nucleotide polymorphisms (SNPs) in 226 *E. camaldulensis* samples. The x-axes show the 11 chromosomes in *E. camaldulensis* and y-axes show the $-\log_{10}(P)$ value.

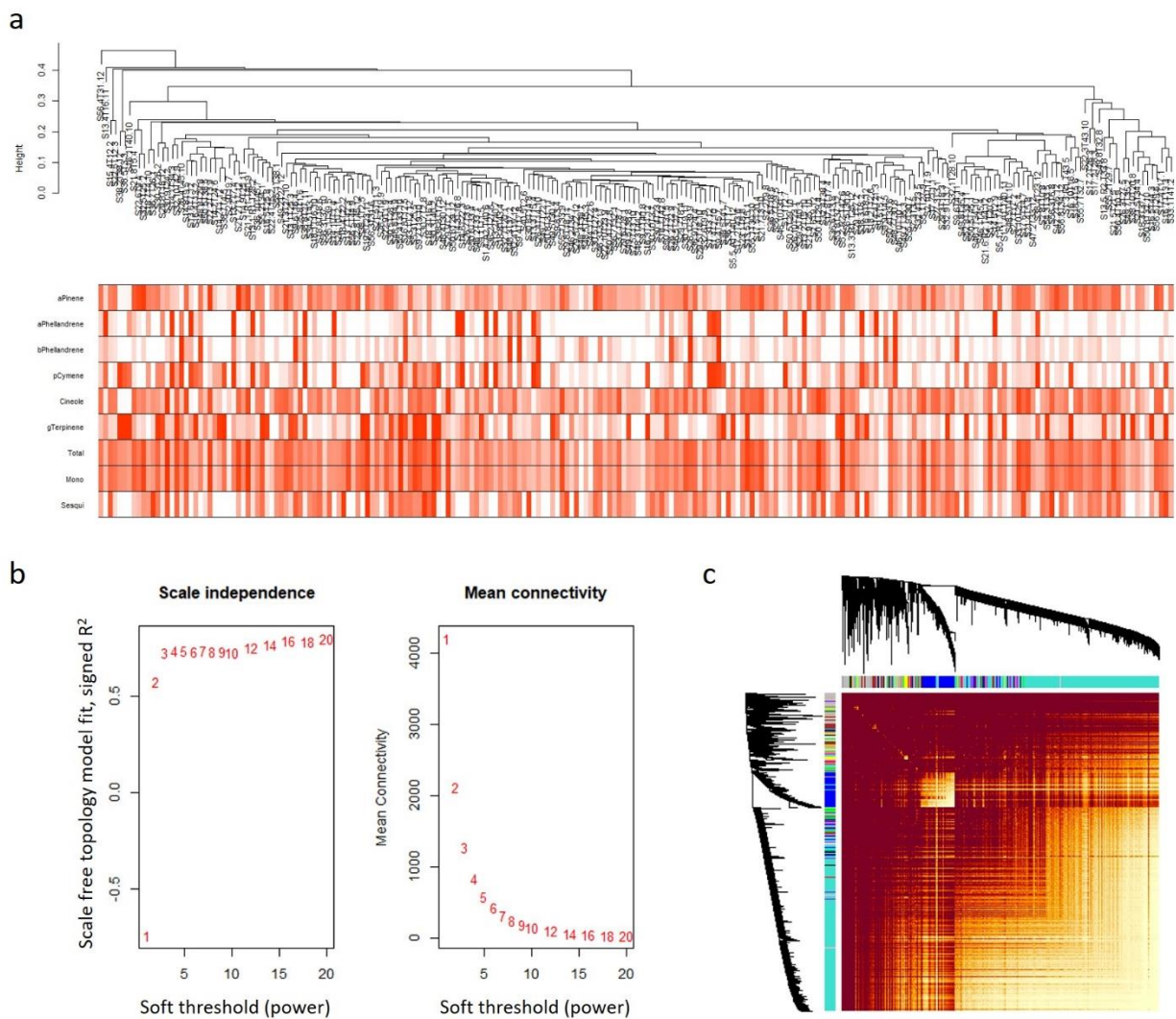


Figure S4. WGCNA analysis. (a) Sample dendrogram and heatmap indicating association of individual terpene traits with the samples. Darker color indicating stronger association. (b) Power of scale independence and mean connectivity of the WGCNA modules. (c) WGCNA network heatmap of genes. The color gradient, ranging from dark red to yellow, indicates the strength of the correlation (with dark red indicating low correlation and yellow indicating high correlation).

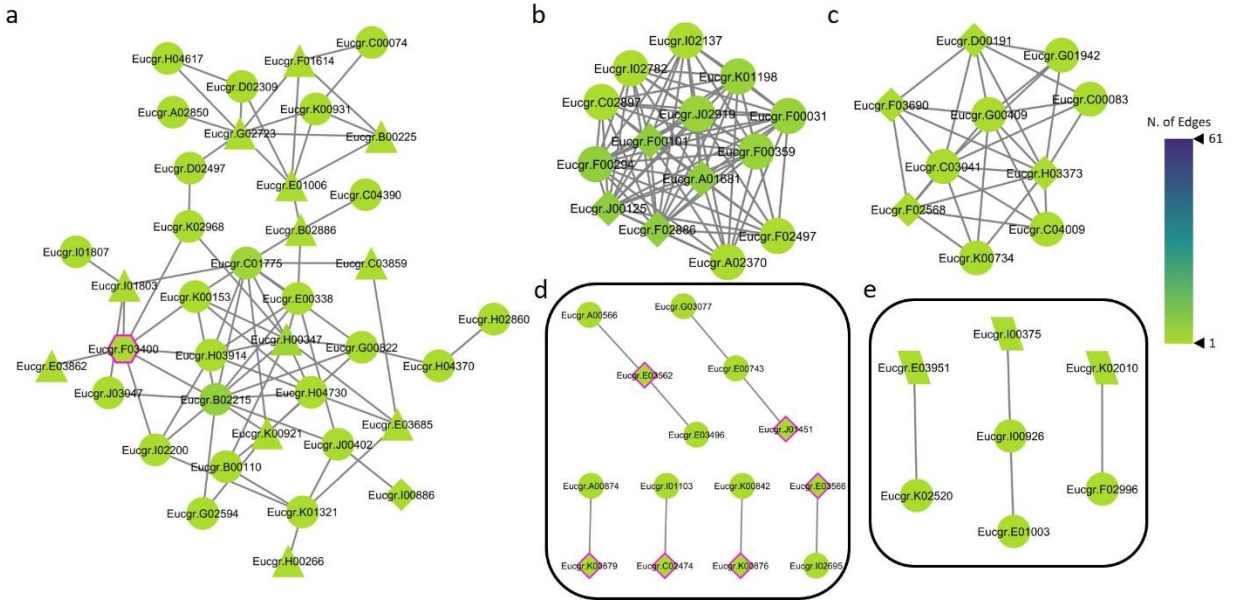


Figure S5. Genetic network of the trans-eQTL hotspots. Color scale indicates number of edges connected to a gene in the network. MLM hits matched with trans-eQTL hotspots indicated with triangle, GWAS hits with parallelogram, genes from the previous study by Kainer et al. 2019 with diamond, genes matched with both MLM and Kainer et al. 2019 study with hexagon. Terpene synthase genes were indicated with purple border and transcription factors (TFs) with cyan border.