

Description of Additional Supplementary Files

File Name: Supplementary Data 1

Topologies obtained from three types of gene families, namely families for which (i) *R. chiliantha* and other Juglandaceae species have two gene copies; (ii) *R. chiliantha* has two gene copies while the other Juglandaceae species has one copy; and (iii) *R. chiliantha* has one gene copy while the other Juglandaceae species has two copies. aBS: Ultrafast bootstrap (UFBoot) support (%) value.

File Name: Supplementary Data 2

Description: Annotation result of DNA repair and recombination genes in seven Juglandaceae species.

File Name: Supplementary Data 3

Description: Results of the orthogroup analysis for DNA repair and recombination genes in seven Juglandaceae species.

File Name: Supplementary Data 4

Description: RNA-seq data for 54 DNA repair and recombination genes in two tissues (leaf and flower bud) of *Rhoiptelea chiliantha*.

File Name: Supplementary Data 5

Description: Numbers of ancestral genes on homoeologous chromosome pairs.

File Name: Supplementary Data 6

Description: Information on the Juglandaceae subgenomes assigned by intraspecific collinear blocks.

File Name: Supplementary Data 7

Description: Results from MSCquartet analysis when the two subgenomes were assigned by homoeologous chromosomes.

File Name: Supplementary Data 8

Description: Results from MSCquartets analysis when the two subgenomes were assigned by intraspecific collinear blocks.

File Name: Supplementary Data 9

Description: Gene function and duplication type for BUSCO genes classified as multi-copy genes in *Rhoiptelea chiliantha*.