

## Description of Additional Supplementary Files

Title: Supplementary Data 1.

Description: Details of the sequencing data of three *Papaver* species.

Title: Supplementary Data 2.

Description: Assembly statistics at different stages.

Title: Supplementary Data 3.

Description: Summary of the peaks in Ks distribution and the time estimation.

Title: Supplementary Data 4.

Description: The detail of genes on BIA biosynthesis pathway in *P. somniferum* and *P. setigerum*.

Title: Supplementary Data 5.

Description: The morphinan biosynthesis pathway related gene alignments and gene expression in three *Papaver* genomes based on BlastP.

Title: Supplementary Data 6.

Description: The protein family enrichment of expanded families in *P. setigerum* by FunRich.

Title: Supplementary Data 7.

Description: The protein family enrichment of expanded families in *P. somniferum* by FunRich.

Title: Supplementary Data 8.

Description: The protein family enrichment of expanded families in *P. rhoeas* by FunRich.

Title: Supplementary Data 9.

Description: The fasta file of promoter sequence of genes in the BIA gene cluster.

Title: Supplementary Data 10.

Description: The motifs predicted by FIMO for BIA gene promoters.