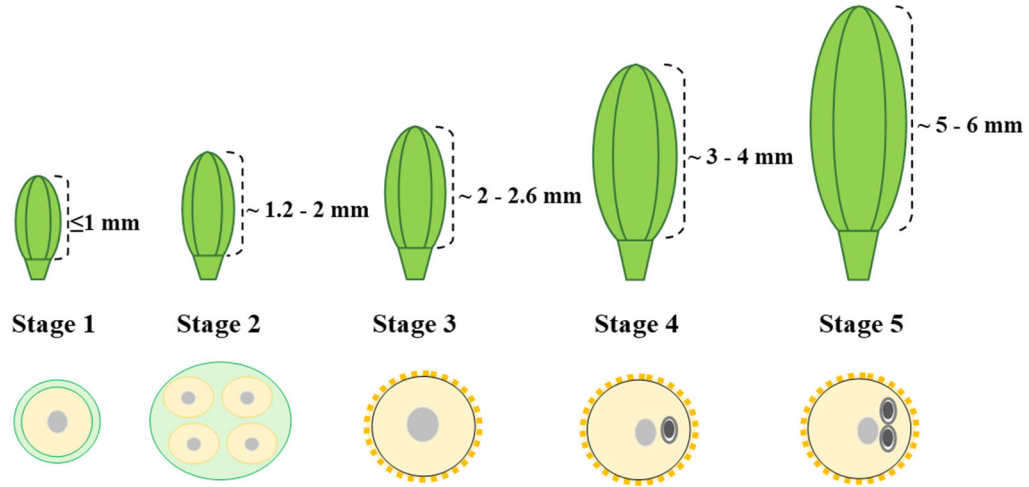
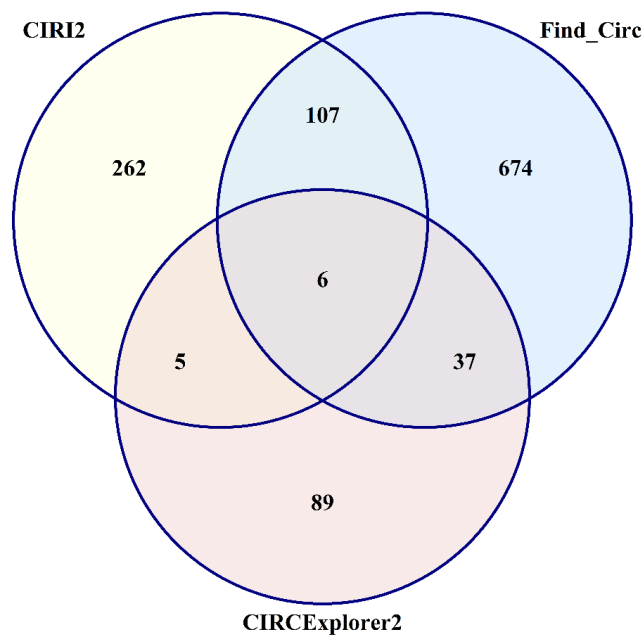


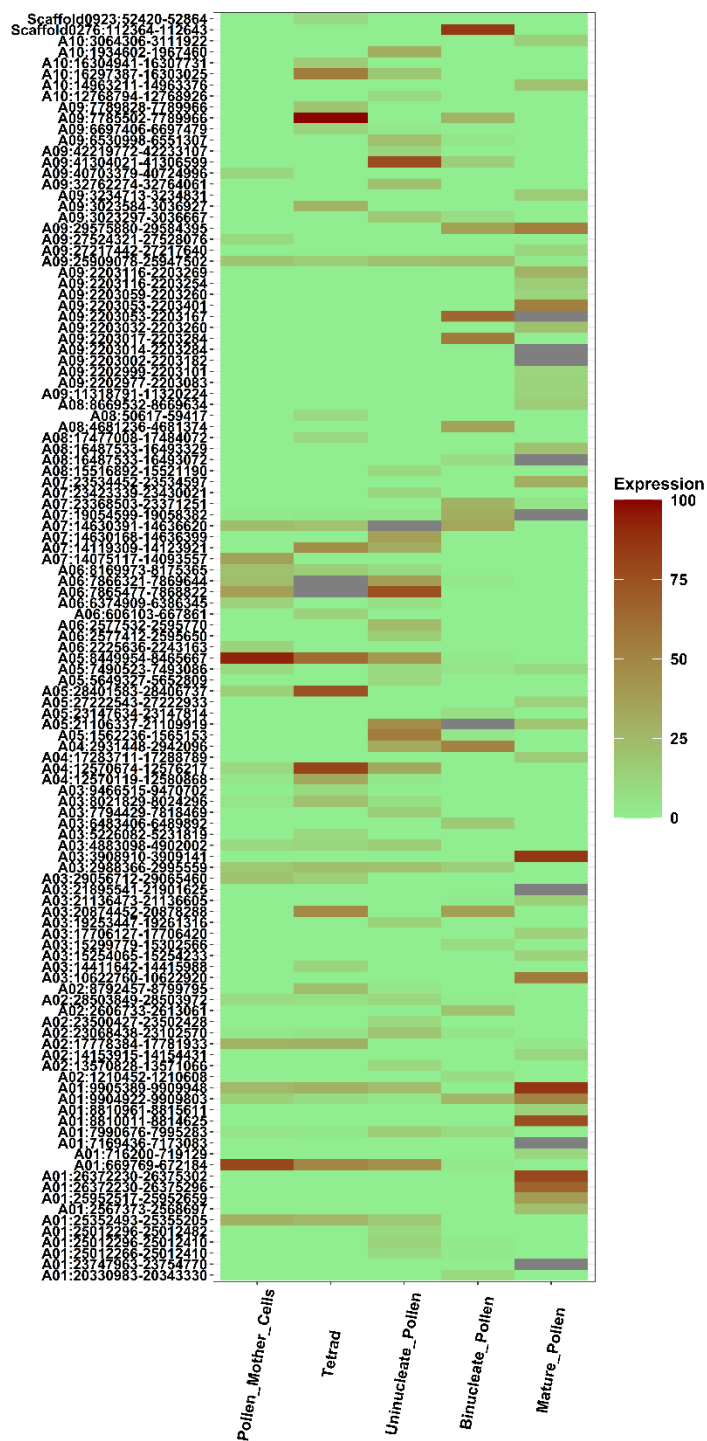
## Supplementary document



**Figure S1.** A schematic representation of floral buds at different developmental stages and their corresponding microspores. Stage 1: pollen mother cells, stage 2: tetrad, stage 3: uninucleate pollen, stage 4: binucleate pollen, and stage 5: mature pollen.



**Figure S2.** A Venn diagram of unique and shared circRNAs predicted by three algorithms: CIRCEplorer2, find\_circ, and CIRI2.



**Figure S3.** A heatmap showing the expression pattern of the top 60 ( $\alpha \geq 0.001$ ) differential expressed circRNAs during pollen development in *B. rapa*. Gray tiles represent the expression of more than 100.

## The nucleotide sequence of validated circular RNAs' junction

[F:] Forward primer, [R:] Reverse primer

**circRNA ID: A05:24735621-24735783**

**Gene name: BraA05g034940.3C**

### Exon 3: A05:24735622-24735783

TGTTTCCTTCCATCCAACCAGGGAAAGGGTCTTTGTAAAGTGCTTTCGATGAC[GCTAGGCCTTATAATAACCAC:R]  
AGGTACGTCC[CCTCTAGTGCTATTGATCATC:F]ATTTCTCCCATGCTTTTGTGAAGACATAAGTGTCTTGCCATC  
CATATGATCTCGCCC

### Exon 4: A05:24735849-24736050

TCTCTAGACCGAGATCCTTCATCTTCTGCGCCTCCTTTGATCTTGAGTACCTTCTTTCGAGCATCAAGAGCTAG  
CTTCAACTCTTTAGCAACATCTAATGCTTTCCTGTTTCCTTCAAGGAAGTTCTCGGTTGCTATAACAATCTCCATT  
GAGAATGGCTTCTCCATGATCCTTCCTTGTCTTTGTCCATTACATAAG

### Circular RNA junction:

[CCTCTAGTGCTATTGATCATC:F]ATTTCTCCCATGCTTTTGTGAAAACATAAGTGTCTTGCCATCCATATGATCT  
CGCCCTCTCTAGACCCTTTGTACGTGCTTTCGATGAC[GCTAGGCCTTATAATAACCAC:R]



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**circRNA ID: A03:5712452-5713124**

**Gene name: BraA03g013120.3C**

### exon2: A03:5712453-5712557

CTTGGATATGGTAAGTGCAGGGCTCCACTGCTCTTTCAGAATGTCAAGACAGATACTGCCGTTACTGTTGACATT  
CGGGTG[GTAAACCTTGGTGCGGAAAGA:R]AAC

### exon4: A03:5713030-5713099

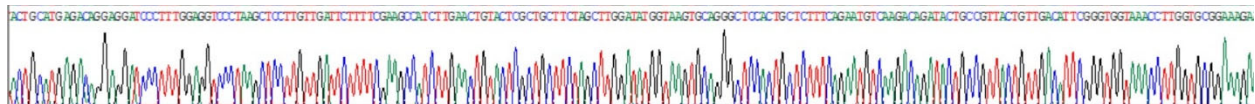
AGC[ACTGCATGAGACAGGAGGATC:F]CCTTTGGAGGTCCCTAAGCTCCTTGTTGATTCTTTTCGAAGCCAT

### Intron from end of exon 4:

CTTGAAGTGTACTCGCTGCTTCTAG

### Circular RNA junction:

[ACTGCATGAGACAGGAGGATC:F]CCTTTGGAGGTCCCTAAGCTCCTTGTTGATTCTTTTCGAAGCCATCTTGAAC  
TGTAAGTGTACTCGCTGCTTCTAGCTTGGATATGGTAAGTGCAGGGCTCCACTGCTCTTTCAGAATGTCAAGACAGATACT  
GCCGTTACTGTTGACATTCGGGTG[GTAAACCTTGGTGCGGAAAGA:R]



**circRNA ID: A01:29811-30193**

**Gene name: BraA01g000090.3C**

**Exon 3: A01:29812-29873**

TTCAACAACCTCCAGCTGACTCGGACTCTCTTACCAAT[GAAACAACCTTCTTCTCCTGCC:R]AG

**Exon 5: A01:30139-30193**

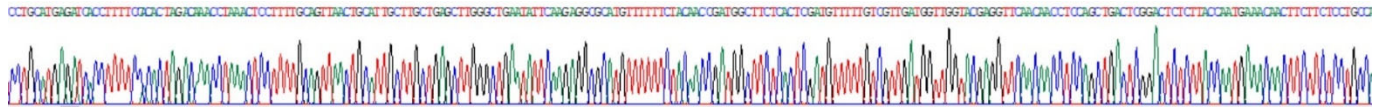
CC[CCTGCATGAGATCACCTTTTC:F]CACACTAGACAAACCTAAACTCCTTTTGCAG

**Exon 6: A01:30486-30593**

TTAACTGCATTGCTTGCTGAGCTTGGGCTGAATATTCAAGAGGCGCATGTTTTTCTACAACCGATGGCTTCTCAC  
TCGATGTTTTTGTGCTTGATGGTTGGTACGAGG

**Circular RNA junction:**

[CCTGCATGAGATCACCTTTTC:F]CACACTAGACAAACCTAAACTCCTTTTGCAGTTAACTGCATTGCTTGCTGAG  
CTTGGGCTGAATATTCAAGAGGCGCATGTTTTTCTACAACCGATGGCTTCTCACTCGATGTTTTTGTGCTTGATG  
GTTGGTACGAGGTTCAACAACCTCCAGCTGACTCGGACTCTCTTACCAAT[GAAACAACCTTCTTCTCCTGCC:R]



**circRNA ID: A06:3536171-3536581**

**Gene name: BraA06g006120.3C**

**Exon 7: A06:3536172-3536258**

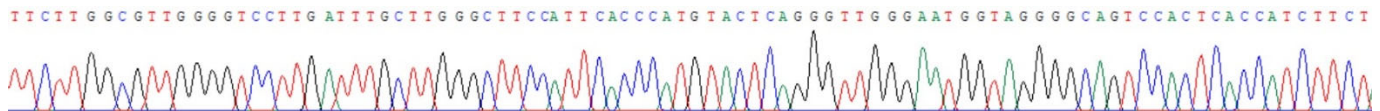
TTGGGCTTCCATTCACCCATGTACTCAGGGTTGGGAATGGTAGGG[GCAGTCCACTCACCATCTTCT:R]TCATCAT  
CCCAGTCCTCAGG

**Exon 9: A06:3536555-3536813**

[TTCTTGCGGTTGGGGTCCTTG:F]ATCTTCTTGGGTGGGAGAAGATCCCAGTCAGAGTACAGGCTACCGGTTTGCT  
TCTCAACATTGTCAATGAGAATGGTGTAAAGTAGCATCTGGGCGGAGGATGAACGTGTAGACATGGGTGAGCTGG  
TCAGTTTCACACGGAACATCCTTCTTGATCAGGTGGTTGGCGTCATTGTAGGTAAGGATAGCATGCACTTTCTTC  
GTGGTGTACCCACAGATATCGGGACCAAACATGATG

**Circular RNA junction:**

[TTCTTGCGGTTGGGGTCCTTG:F]ATTTGCTTGGGCTTCCATTTGGGCTTCCATTCACCCATGTACTCAGGGTTGGG  
AATGGTAGGG[GCAGTCCACTCACCATCTTCT:R]



**circRNA ID: A08:20496640-20496925**

**Gene name: BraA08g030040.3C**

**Exon 14: A08:20496470-20496710**

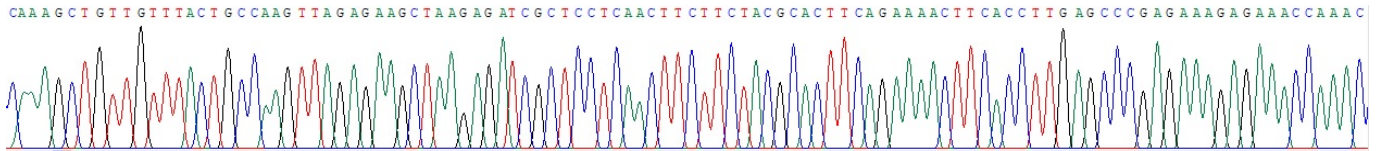
AGCTGAAGCGGTTCCCAACTCTAGCAAGTGATATAGCAGCTGCTGCAAACGAAGCTCTCGAAAGATTTCAGAGAC  
GAAAGCAGGAAAACGGTTCTGCGTCTCGTGGACATGGAATCCAGCTACCTCACGGTTGAGTTCTTCAGAAAAC  
TCACCTTGAGCCAGAGAAAGAGAAACCAAACCAGC[GAAATGCTCCACCACCAAAC:R]GCAGACATCCACTCCG  
ATAATCACTTCAGAAAGATCG

**Exon 15: A08:20496786-20496925**

ATCCAACGTGAGTGCGTACATAAACATGGTCTGTGACACATTGAGAATTTCTCTTC[CCAAAGCTGTTGTTTACTG  
C:F]CAAGTTAGAGAAGCTAAGAGATCGCTCCTCAACTTCTTCTACGCTCAAGTTGGCAGGAAAGAG

**Circular RNA junction:**

[CCAAAGCTGTTGTTTACTGC:F]CAAGTTAGAGAAGCTAAGAGATCGCTCCTCAACTTCTTCTACGCACTTCAGAA  
AACTTCACCTTGAGCCCGAGAAAGAGAAACCAAACCAGA[GAAATGCTCCACCACCAAAC:R]



**circRNA ID: A03:16540782-16540980**

**Gene name: BraA03g033430.3C**

**Exon 1 A03:16540030-16540800**

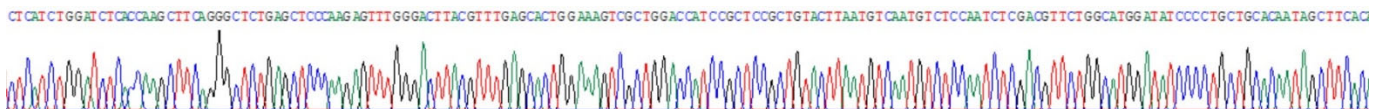
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GAGCACTGGAAAGTCGCTGGACCATCTGCTCCGCTGTACCTAATGTCAATGTCTCCAATCTCAACGTTTTGGCAT  
GGGTATCC[CCTGCTGCACAATAGCTTCAC:R]TGCATCCTTGTTCCCTGATGTTCCCTCTGATCTGCTTGAAGCTGAT  
GTTGGCAAGCTTAATCGTTGATGGTTTCTGCTTGTTACATTGGTTCCAAGGGCAGTACT.....

**Exon 2: A03:16540898-16541203**

ATGGGAAGTTTCTTGACAGTTGAAAGTCTGGTGACAGTTGTAACTCTCCAAGCTGCGTTTCCTTCACCATCGAAA  
GCTCCACCTCCGTTCAACTTAAAGCCATTAATGTTGCCAAAGACAATCCATGTGTCTTTCCTGGATCGCGTTAC  
CATCAGCTTTGACAGTGCCTTGAATGGTGATCTCGACTGGAGCTTTGCATGGACCC[CTCATCTGGATCTCACCAA  
GC:F]TTGAACTCTCCTTTTGGGATCACCCTCTGCTCGGTGTTGGAGATTGGCATGCTGTTGTAAATGCTTTCAGA  
AGTGC

**Circular RNA junction:**

[CTCATCTGGATCTCACCAAGC:F]TTTAGGGCTCTGAGTTCCCATGAGTTTGGGGCTCACGTTTGGGACTGGAAA  
GTCGCTGGACCATCTGCTCCGCTGTACCTAATGTCAATGTCTCCAATCTCAACGTTTTGGCATGGGTATCC[CCTG  
CTGCACAATAGCTTCAC:R]



**circRNA ID: A03:15254021-15254249**

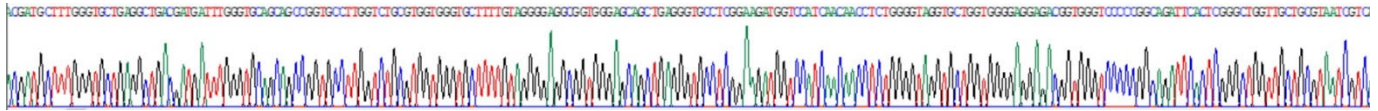
**Gene name: BraA03g030350.3C**

**Exon 1: A03:15253909-15254319**

TAGAGAGAGAAGAAGAAGAATCCGACGGCGGCAACAGTGCCGGCGATGGAGAGCTTCACATTAGTGGCGCTGC  
CGTCGAGTACCTCGGGGCCGGGGGTGGGTGCATCGGAAGATGGTCCATCAACAACCTCTGGGGTAGGTGCTGGT  
GGGGAGGAGACGGTGGGTCCCTCGGCAGATTCACCTCGG[GCTGGTTGCTGCGTAATCGTC:R]TTCGGCTGTTGGT  
TCCTCTGCCACAGGGG[ACGATGCTTTGGGTGCTGAGG:F]CTGACGATGATTTGGGTGCAGCAGCCGGTG  
CCTTGGTCTGCGTGGTGGGTGCTTTTGTAGGGGAGGCGGTGGGAGCAGCTGAGGGTGCCTCGGCAGCG  
AATGCGGTGGCCACGACCAAGGCCAATAGAGCCAATACGACAAATTGACGTGCCAT

**Circular RNA junction 1:**

[ACGATGCTTTGGGTGCTGAGG:F]CTGACGATGATTTGGGTGCAGCAGCCGGTGCCTTGGTCTGCGTGG  
TGGGTGCTTTTGTAGGGGAGGCGGTGGGAGCAGCTGAGGGTGCCTCGGAAGATGGTCCATCAACAACCT  
CTGGGGTAGGTGCTGGTGGGGAGGAGACGGTGGGTCCCCCGGCAGATTCACCTCGG[GCTGGTTGCTGCGTAATCG  
TC:R]



**circRNA ID: A03:1972950-1973522**

**Gene name: BraA03g004570.3C**

**Exon 4: A03:1972662-1972846**

TCTCTTCCTGAGACATGCCAGAGTGAATGCATATCGAGGGGAAATTGCATTGATAAGCAACTTGTTTCAGCTCCC  
CAGCTCTGCTAACGCTCTTCACAAAGATAACAACCTGATTGAAGTCCAATGCATCGAGAAGGTCATTCAACTTGC  
GTTTTTCTCCATCTCGCTCAGTTTGATGTAGTG

**Exon 5: A03:1972951-1973007**

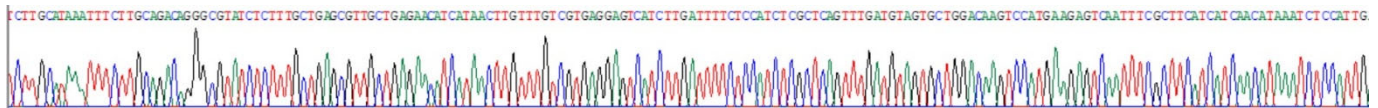
TGGACAAGTCCATGAAGAGTCAATTCGCTTCAT[CATCAACATAAATCTCCATTG:R]G

**Exon 6: A03:1973483-1973601**

[TCTTGCATAAATTTCTTGCAG:F]ACAGGGCGTATCTCTTTGCTGAGCGTTGCTGAGAACATCATAACTTGTTTGTG  
GTGAGGAGTCATCTTGAAAATCTCCTGCACATCCCTCCGCATGT

**Circular RNA junction:**

[TCTTGCATAAATTTCTTGCAG:F]ACAGGGCGTATCTCTTTGCTGAGCGTTGCTGAGAACATCATAACTTGTTTGTG  
GTGAGGAGTCATCTTGATTTTCTCCATCTCGCTCAGTTTGATGTAGTGCTGGACAAGTCCATGAAGAGTCAATTT  
CGCTTCAT[CATCAACATAAATCTCCATTG:R]



**circRNA ID: A06:1190076-1190251**

**Gene name: BraA06g001990.3C**

**Exon 4: A06:1190077-1190136**

CTTGTTCTTCAGTGTACTTAGATTCATCATCTTTGATC[TGTTTAAGACCTCCAATGGCAG:R]

**Exon 5: A06:1190204-1190251**

TTCAAAT[TCACGTTCCATCTCTTCAAGC:F]ATAGTCTTCCTCTTTGCAGCTGT

**Circular RNA junction:**

[TCACGTTCCATCTCTTCAAGC:F]ATAGTCTTCCTCTTTGCAGCTGTATCATCTTTGATC[TGTTTAAGACCTCCAATGGCAG:R]

