Table S1: Tandem duplication events in grapes GASA genes

| Cluster number | Chromosome | Gene     | Start Site | End Site   |
|----------------|------------|----------|------------|------------|
| 1              | 18         | VvGASA11 | 20718815   | 20720279   |
|                | 18         | VvGASA12 | 20720304   | 20720676   |
| 2              | Un-        | VvGASA13 | 9775242    | 9775609    |
|                | Un-        | VvGASA14 | 9791751    | 9792551    |

Table S2: Synteny blocks of GASA genes within grape genome

| ID(1) | Chr | Start       | Stop       | Chr | Start       | Stop       | Gene 1       | Gene 2       |
|-------|-----|-------------|------------|-----|-------------|------------|--------------|--------------|
| 53    | 17  | 5814755     | 7662326    | 14  | 28457051    | 30137019   | VvGASA7      | VvGASA6      |
| 56    | 17  | 8423634     | 11518764   | 14  | 26536960    | 28478988   | VvGASA8      | VvGASA5      |
| 62    | 18  | 6826940     | 8000941    | 3   | 6548597     | 8827504    | VvGASA9      | VvGASA2      |
| 113   | 7   | 15058884    | 16256503   | 18  | 7338029     | 8296810    | VvGASA3      | VvGASA9      |
### Table S3: Primer sequences used in expression analysis of GASA genes in grape

| Gene    | Forward and reverse primer sequence (5'~3')          |
|---------|-----------------------------------------------------|
| VvGASA1 | GGCTTCTGCTTTTCTTGGGA                               |
|         | GGTGGTCATCTCGGTGTAG                                 |
| VvGASA2 | CTCCCTTCCTCTTCACCTCC                                |
|         | GCTTTTCCCACATCCGTCC                                 |
| VvGASA3 | GGTCACCACCCACACACG                                 |
|         | GCACCTCACCACACACTT                                  |
| VvGASA4 | CTCCACAGCCCCAACA                                    |
|         | AGGCACGCAACGCAAC                                  |
| VvGASA5 | CCAGCAATGAGGAGTATGTT                                |
|         | GGTGTCTTGTCTTTTGATAGT                               |
| VvGASA6 | TCTCTGGCTCTTCGC                                    |
|         | GGAACGCACAGGCAACTT                                  |
| VvGASA7 | GAATCCAAATCAAGGCCAC                                 |
|         | GGACCATACGACCCACTG                                  |
| VvGASA8 | CAAGACATAGATGGCGAGG                                 |
|         | CGACCCAGTTGGAAGAGAC                                 |
| VvGASA9 | TCTCCACCTGCTTTATTC                                  |
|         | GAGGGGCTTCATCTTTCT                                  |
| VvGASA10| AATGGATTCGCGGGGAG                                  |
|         | TCATGTTGCGTAGCAGG                                   |
| VvGASA11| CCTCTCTCACCACCTTTTC                                 |
|         | CATCCTGCTTTCCACCTACAAC                            |
| VvGASA13| TTATTTCTTCTGTGTGCA                                 |
|         | ACCCTCTTGGCTTTCC                                   |
| VvActin | GATTCGGTGATGGTGATGAGT                              |
|         | GACAATTTCCTCIAGCAGT                                 |