### Supporting Information

**Supplementary Table 1** The summary of AP2/ERF genes in 63 plants.

| Species                          | ERF/DREB | AP2 | RAV | Others |
|----------------------------------|----------|-----|-----|--------|
| *Actinidia chinensis*            | 237      | 32  | 4   | 0      |
| *Aegilops tauschii*              | 159      | 23  | 10  | 1      |
| *Amborella trichopoda*           | 63       | 8   | 1   | 0      |
| *Arabidopsis halleri*            | 127      | 13  | 6   | 3      |
| *Arabidopsis lyrata*             | 128      | 13  | 6   | 1      |
| *Arabidopsis thaliana*           | 125      | 13  | 5   | 0      |
| *Beta vulgaris*                  | 73       | 10  | 3   | 1      |
| *Brachypodium distachyon*        | 132      | 23  | 4   | 2      |
| *Brassica napus*                 | 454      | 32  | 21  | 10     |
| *Brassica oleracea*              | 243      | 23  | 9   | 9      |
| *Brassica rapa*                  | 242      | 21  | 12  | 8      |
| *Chlamydomonas reinhardtii*      | 17       | 1   | 0   | 1      |
| *Corchorus capsularis*           | 86       | 10  | 2   | 0      |
| *Cucumis sativus*                | 119      | 16  | 2   | 0      |
| *Daucus carota*                  | 179      | 18  | 4   | 4      |
| *Dioscorea rotundata*            | 71       | 12  | 1   | 1      |
| *Glycine max*                    | 308      | 40  | 4   | 1      |
| *Gossypium raimondii*            | 228      | 27  | 8   | 0      |
| *Helianthus annuus*              | 258      | 28  | 4   | 2      |
| *Hordeum vulgare*                | 134      | 14  | 8   | 0      |
| *Leersia perrieri*               | 119      | 22  | 4   | 1      |
| *Lupinus angustifolius*           | 200      | 30  | 4   | 0      |
| *Manihot esculenta*              | 159      | 27  | 7   | 0      |
| *Medicago truncatula*            | 185      | 24  | 2   | 0      |
| *Musa acuminata*                 | 208      | 41  | 14  | 10     |
| *Nicotiana attenuata*            | 174      | 20  | 2   | 4      |
| *Oryza barthii*                  | 96       | 15  | 2   | 2      |
| *Oryza brachyantha*              | 74       | 17  | 1   | 1      |
| *Oryza glaberrima*               | 113      | 20  | 3   | 1      |
| *Oryza glumipatula*              | 123      | 20  | 3   | 1      |
| *Oryza sativa* spp. indica (93-11) | 134  | 24  | 4   | 2      |
| *Oryza sativa* spp. indica (MH63) | 113  | 22  | 4   | 2      |
| *Oryza sativa* spp. indica (ZS97) | 109  | 23  | 3   | 1      |
| *Oryza longistaminata*           | 37       | 7   | 0   | 4      |
| *Oryza meridionalis*             | 120      | 22  | 4   | 1      |
| *Oryza nivara*                   | 133      | 24  | 4   | 2      |
| *Oryza punctata*                 | 123      | 25  | 4   | 2      |
| *Oryza rufipogon*                | 129      | 22  | 3   | 0      |
| Species                          | Value1 | Value2 | Value3 | Value4 |
|---------------------------------|--------|--------|--------|--------|
| *Oryza sativa* spp. *japonica*  | 107    | 19     | 4      | 0      |
| *Ostreococcus lucimarinus*      | 7      | 1      | 0      | 0      |
| *Panicum hallii* fil2           | 142    | 23     | 5      | 0      |
| *Panicum hallii* hal2           | 145    | 25     | 5      | 0      |
| *Phaseolus vulgaris*            | 153    | 23     | 2      | 1      |
| *Physcomitrella patens*         | 137    | 8      | 2      | 6      |
| *Populus trichocarpa*           | 177    | 29     | 3      | 1      |
| *Prunus persica*                | 104    | 16     | 4      | 1      |
| *Selaginella moellendorffii*    | 90     | 10     | 4      | 4      |
| *Setaria italica*               | 138    | 23     | 4      | 0      |
| *Solanum lycopersicum*          | 142    | 17     | 2      | 7      |
| *Solanum tuberosum*             | 184    | 12     | 2      | 2      |
| *Sorghum bicolor*               | 147    | 21     | 3      | 0      |
| *Theobroma cacao*               | 100    | 16     | 3      | 1      |
| *Trifolium pratense*            | 141    | 15     | 2      | 4      |
| *Triticum aestivum*             | 476    | 61     | 26     | 3      |
| *Triticum dicoccoides*          | 258    | 38     | 18     | 0      |
| *Triticum urartu*               | 33     | 15     | 2      | 1      |
| *Vigna angularis*               | 163    | 16     | 3      | 1      |
| *Vigna radiata*                 | 117    | 12     | 0      | 1      |
| *Vitis vinifera*                | 114    | 16     | 3      | 0      |
| *Zea mays*                      | 190    | 21     | 5      | 6      |
### Supplementary Table 2 The summary of micro-exons in AP2 domains and AP2/ERF genes.

| Species                  | Micro-exons in AP2 domains | Micro-exons in genes | Ratio   |
|--------------------------|----------------------------|----------------------|---------|
| Actinidia chinensis      | 59                         | 64                   | 92.2%   |
| Aegilops tauschii        | 33                         | 46                   | 71.7%   |
| Amborella trichopoda     | 13                         | 15                   | 86.7%   |
| Arabidopsis halleri      | 28                         | 32                   | 87.5%   |
| Arabidopsis lyrata       | 30                         | 73                   | 41.1%   |
| Arabidopsis thaliana     | 32                         | 37                   | 86.5%   |
| Beta vulgaris            | 22                         | 22                   | 100.0%  |
| Brachypodium distachyon  | 43                         | 48                   | 89.6%   |
| Brassica napus           | 79                         | 121                  | 65.3%   |
| Brassica oleracea        | 40                         | 53                   | 75.5%   |
| Brassica rapa            | 31                         | 40                   | 77.5%   |
| Chlamydomonas reinhardtii| 4                          | 6                    | 66.7%   |
| Corchorus capsularis     | 17                         | 22                   | 77.3%   |
| Cucumis sativus          | 38                         | 41                   | 92.7%   |
| Daucus carota            | 41                         | 54                   | 75.9%   |
| Dioscorea rotundata      | 17                         | 24                   | 70.8%   |
| Glycine max              | 93                         | 104                  | 89.4%   |
| Gossypium raimondii      | 53                         | 59                   | 89.8%   |
| Helianthus annuus        | 65                         | 76                   | 85.5%   |
| Hordeum vulgare          | 24                         | 34                   | 70.6%   |
| Leersia perrieri         | 22                         | 40                   | 55.0%   |
| Lupinus angustifolius    | 50                         | 60                   | 83.3%   |
| Manihot esculenta        | 53                         | 58                   | 91.4%   |
| Medicago truncatula      | 40                         | 47                   | 85.1%   |
| Musa acuminata           | 102                        | 135                  | 75.6%   |
| Nicotiana attenuata      | 46                         | 49                   | 93.9%   |
| Oryza barthii            | 24                         | 44                   | 54.5%   |
| Oryza brachyantha        | 33                         | 53                   | 62.3%   |
| Oryza glaberrima         | 33                         | 41                   | 80.5%   |
| Oryza glumipatula        | 28                         | 38                   | 73.7%   |
| Oryza sativa spp. indica (93-11) | 40 | 49 | 81.6% |
| Oryza sativa spp. indica (MH63) | 40 | 49 | 81.6% |
| Oryza sativa spp. indica (ZS97) | 41 | 45 | 91.1% |
| Oryza longistaminata     | 19                         | 45                   | 42.2%   |
| Oryza meridionalis       | 24                         | 36                   | 66.7%   |
| Oryza nivara             | 32                         | 44                   | 72.7%   |
| Oryza punctata           | 31                         | 39                   | 79.5%   |
| Oryza rufipogon          | 29                         | 43                   | 67.4%   |
| Oryza sativa spp. japonica | 44 | 47 | 93.6% |
| Panicum hallii fil2      | 43                         | 46                   | 93.5%   |
| Panicum hallii hal2      | 46                         | 49                   | 93.9%   |
| Phaseolus vulgaris       | 54                         | 62                   | 87.1%   |
| Species                     | Raw | Cured | Recovery (%) |
|----------------------------|-----|-------|--------------|
| *Physcomitrella patens*    | 8   | 13    | 61.5%        |
| *Populus trichocarpa*      | 52  | 62    | 83.9%        |
| *Prunus persica*           | 33  | 35    | 94.3%        |
| *Selaginella moellendorffii* | 14 | 49    | 28.6%        |
| *Setaria italica*          | 38  | 45    | 84.4%        |
| *Solanum lycopersicum*     | 40  | 65    | 61.5%        |
| *Solanum tuberosum*        | 33  | 36    | 91.7%        |
| *Sorghum bicolor*          | 40  | 46    | 87.0%        |
| *Theobroma cacao*          | 33  | 36    | 91.7%        |
| *Trifolium pratense*       | 30  | 44    | 68.2%        |
| *Triticum aestivum*        | 100 | 115   | 87.0%        |
| *Triticum dicoccoides*     | 55  | 88    | 62.5%        |
| *Triticum urartu*          | 17  | 31    | 54.8%        |
| *Vigna angularis*          | 30  | 38    | 78.9%        |
| *Vigna radiata*            | 22  | 44    | 50.0%        |
| *Vitis vinifera*           | 30  | 43    | 69.8%        |
| *Zea mays*                 | 31  | 41    | 75.6%        |
### Supplementary Table 3: The summary of MIKC genes and micro-exons in 63 plants.

| Species                          | MIKC genes | Micro-exons in K-box | Micro-exons in MIKC genes |
|---------------------------------|------------|----------------------|----------------------------|
| Actinidia chinensis             | 53         | 96                   | 98                         |
| Aegilops tauschii               | 37         | 63                   | 67                         |
| Amborella trichopoda            | 15         | 28                   | 31                         |
| Arabidopsis halleri             | 29         | 39                   | 41                         |
| Arabidopsis lyrata              | 34         | 61                   | 75                         |
| Arabidopsis thaliana            | 38         | 66                   | 67                         |
| Beta vulgaris                   | 26         | 50                   | 51                         |
| Brachypodium distachyon         | 32         | 57                   | 59                         |
| Brassica napus                  | 138        | 241                  | 262                        |
| Brassica oleracea               | 63         | 107                  | 122                        |
| Brassica rapa                   | 79         | 126                  | 131                        |
| Corchorus capsularis            | 7          | 14                   | 16                         |
| Cucumis sativus                 | 6          | 11                   | 11                         |
| Daucus carota                   | 5          | 9                    | 11                         |
| Dioscorea rotundata             | 19         | 31                   | 32                         |
| Glycine max                     | 85         | 149                  | 156                        |
| Gossypium raimondii             | 46         | 81                   | 82                         |
| Helianthus annuus               | 54         | 97                   | 99                         |
| Hordeum vulgare                 | 33         | 50                   | 56                         |
| Leersia perrieri                | 32         | 57                   | 69                         |
| Lupinus angustifolius           | 24         | 36                   | 42                         |
| Manihot esculenta               | 36         | 68                   | 68                         |
| Medicago truncatula             | 35         | 68                   | 70                         |
| Musa acuminata                  | 54         | 86                   | 93                         |
| Nicotiana attenuata             | 34         | 64                   | 64                         |
| Oryza barthii                   | 34         | 56                   | 66                         |
| Oryza brachyantha               | 31         | 53                   | 76                         |
| Oryza glaberrima                | 29         | 50                   | 56                         |
| Oryza glutipatula               | 33         | 58                   | 70                         |
| Oryza sativa spp. indica (93-11)| 31         | 54                   | 62                         |
| Oryza sativa spp. indica (MH63) | 31         | 49                   | 52                         |
| Oryza sativa spp. indica (ZS97)| 31         | 52                   | 55                         |
| Oryza longistaminata            | 25         | 44                   | 51                         |
| Oryza meridionalis              | 32         | 59                   | 64                         |
| Oryza nivara                    | 30         | 50                   | 57                         |
| Oryza punctata                  | 34         | 57                   | 67                         |
| Oryza rufipogon                 | 34         | 57                   | 68                         |
| Oryza sativa spp. japonica      | 36         | 59                   | 62                         |
| Panicum hallii fil2             | 37         | 65                   | 67                         |
| Panicum hallii hal2             | 37         | 64                   | 68                         |
| Phaseolus vulgaris              | 28         | 49                   | 51                         |
| Physcomitrella patens           | 6          | 10                   | 12                         |
| Plant Species                  | Value 1 | Value 2 | Value 3 |
|-------------------------------|---------|---------|---------|
| *Populus trichocarpa*         | 50      | 97      | 102     |
| *Prunus persica*              | 32      | 63      | 66      |
| *Selaginella moellendorfii*   | 8       | 10      | 14      |
| *Setaria italica*             | 22      | 39      | 39      |
| *Solanum lycopersicum*        | 30      | 57      | 61      |
| *Solanum tuberosum*           | 28      | 51      | 52      |
| *Sorghum bicolor*             | 35      | 63      | 65      |
| *Theobroma cacao*             | 32      | 58      | 60      |
| *Trifolium pratense*          | 23      | 37      | 42      |
| *Triticum aestivum*           | 125     | 207     | 217     |
| *Triticum dicoccoides*        | 60      | 103     | 113     |
| *Triticum urartu*             | 20      | 30      | 32      |
| *Vigna angularis*             | 27      | 45      | 54      |
| *Vigna radiata*               | 24      | 37      | 44      |
| *Vitis vinifera*              | 28      | 50      | 52      |
| *Zea mays*                    | 45      | 69      | 71      |
Supplementary Fig. 1 The alignments of micro-exons in AP2 domains among multiple species. Gene from nine species were marked in nine colors; A: The alignment of micro-exons (R1M1) among nine species; B: The alignment of micro-exons (R1M2 and R1M3) among six species; C: The alignment of micro-exons (R2M1) among six species. Sequences encoded by micro-exons were marked above the alignments.
Supplementary Fig. 2 The gene structures of MIKC genes in MH63. Thirty-one MIKC genes are shown. Blue, yellow and red colors demonstrate UTR, CDS and micro-exons of the gene structures, respectively.
Supplementary Fig. 3 The gene expressions and domains in MIKC genes via MADS-box domains. The left column demonstrates 13 MIKC subfamilies, the middle heatmap represents gene expression levels with Z-score of log2(TPM+1), and the right chart illustrates MADS-box domain and K-box domain in MIKC genes.