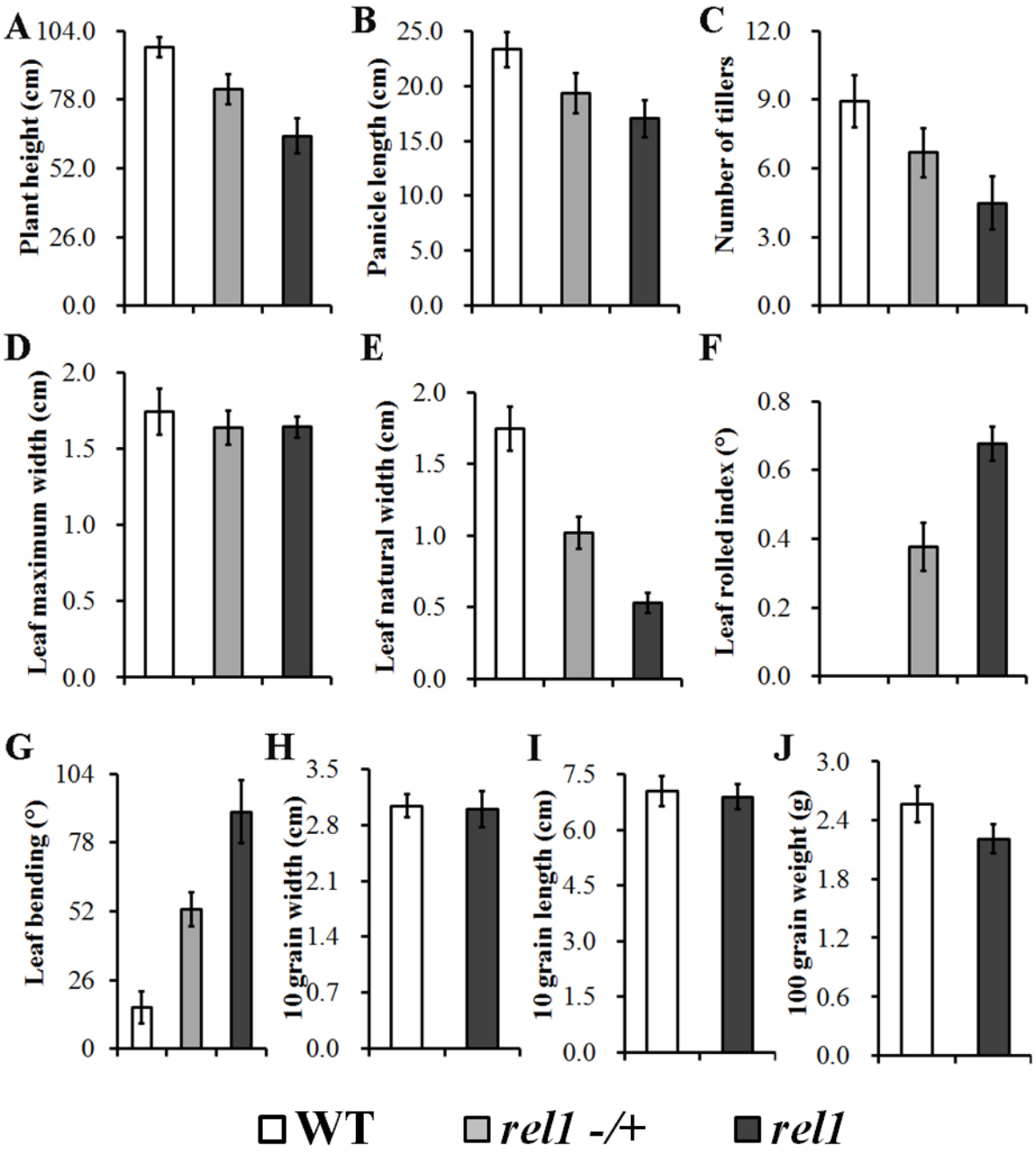
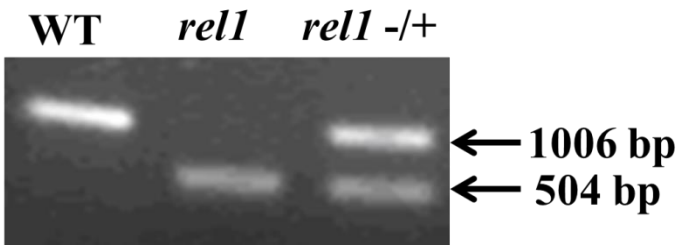
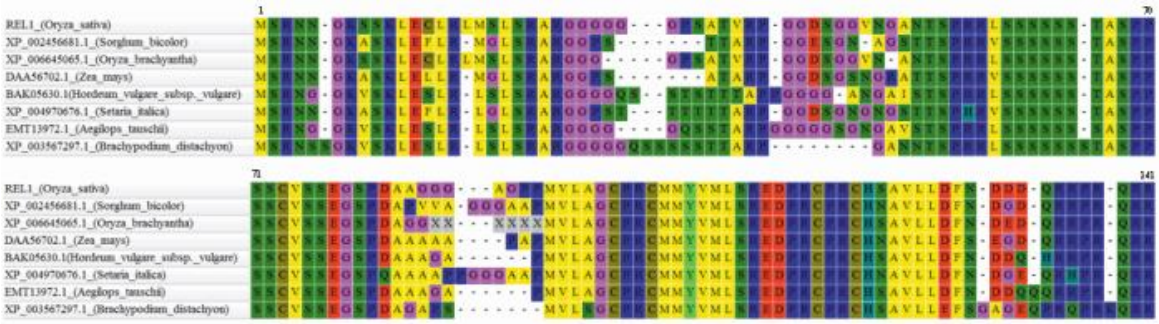


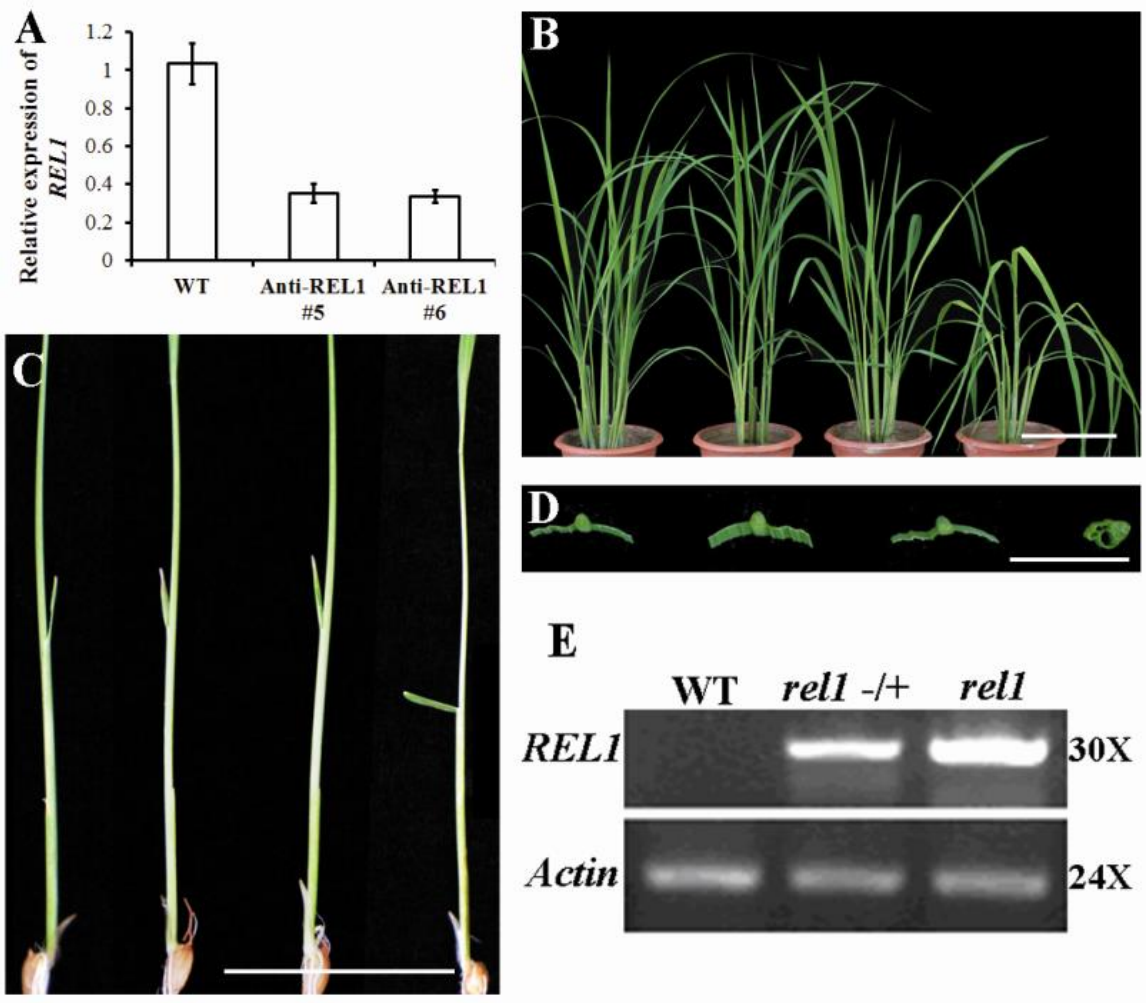

**Supplemental Figure S1**. Statistical analysis of agronomic traits in *rel1* mutants. A to G, Statistical analysis of wild type, *rel1* heterozygote (*rel1* -/+) and homozygote (*rel1*) mutants in plant height (A), panicle length (B), number of tillers (C), leaf maximum width (D), leaf natural width (E), leaf rolling index (F) and leaf bending (G). More than 20 plants were used in statistic at flowering period. H to J, Statistical analysis of grain width (H), grain length (I) and grain weight (J) in wild type and *rel1* mutants. Seeds from more than 10 plants were used after harvest.



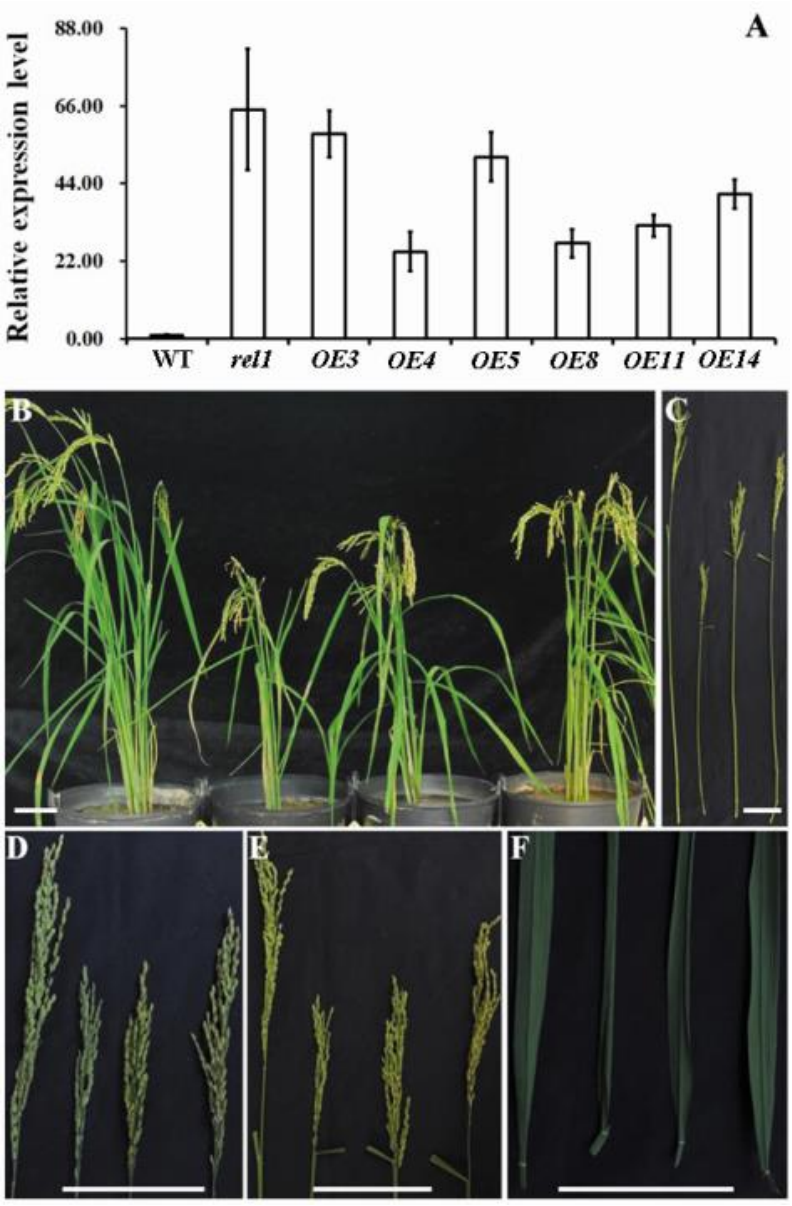

**Supplemental Figure S2**.Genotyping of wild type, *rel1* heterozygote and homozygote mutants. The one-weeks-old leaves from wild type, *rel1* heterozygote and homozygote were used for genotype identification.



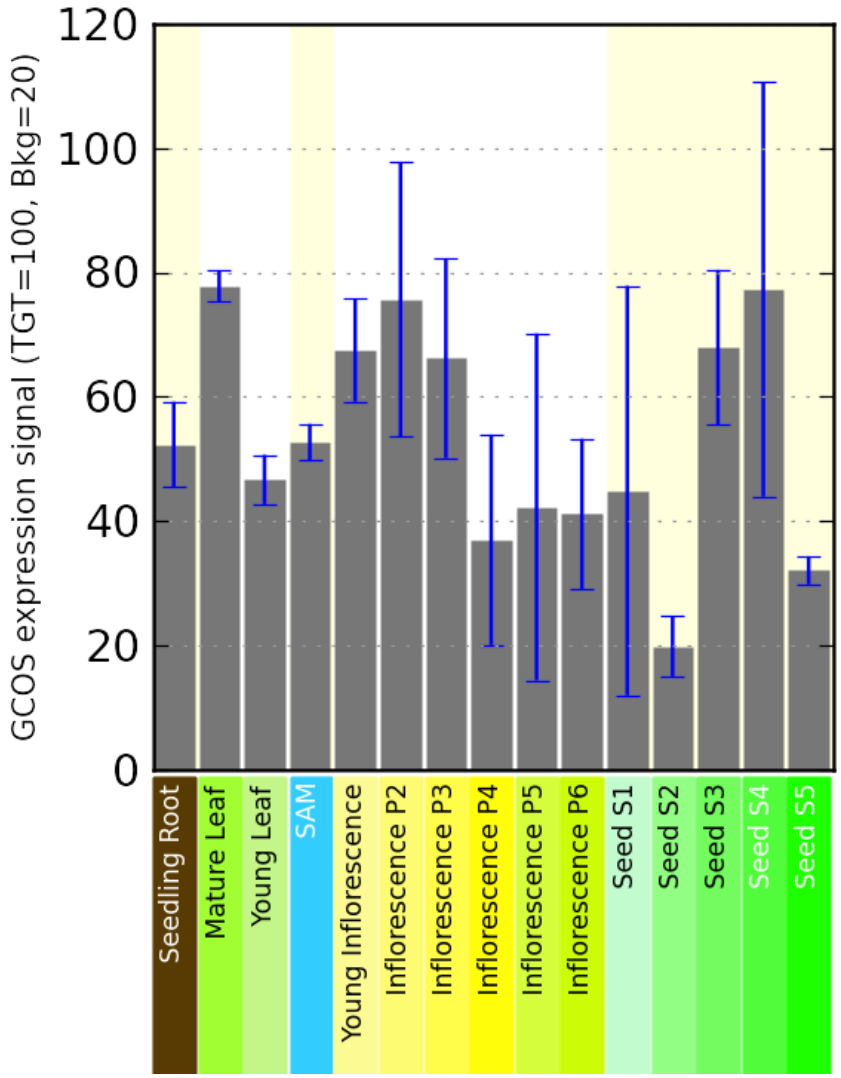

**Supplemental Figure S3**.Alignment of REL1-like proteins among monocot plants. Sequence alignment of the REL1-like proteins with various monocot plants by using MEGA 6.06 software. The NCBI accession number and species of REL1-like proteins are listed on the parentheses.



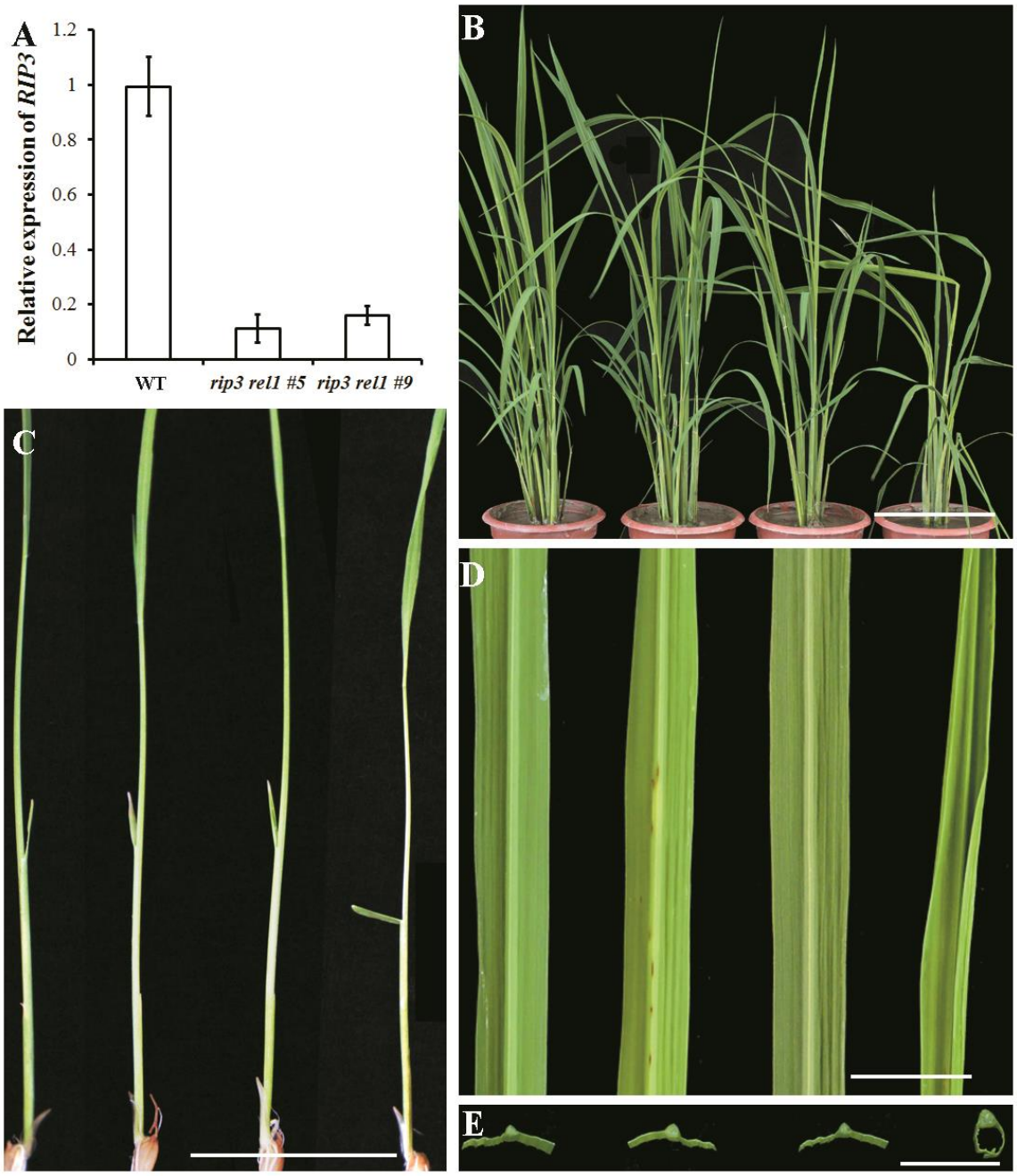

**Supplemental Figure S4**.Knockdown of *REL1* in wild type incapable of showing apparent phenotype. A, Relative expression of *REL1* in WT, anti-REL1 line 5 and 6, and *rel1* mutant. B, Phenotype of wild type (left), Anti-*REL1* (transgenic line 5 and 6, middle) and *rel1* mutant (right). Two-months-old plants were observed. C, Leaf bending phenotype of wild type (left), Anti-*REL1* (transgenic line 5 and 6, middle) and *rel1* mutant (right) seedlings. D, Leaf section of the (B) with the wild type (left), Anti-*REL1* (transgenic line 5 and 6, middle) and *rel1* mutant (right). E, expression of *REL1* in wild type, *rel1* heterozygote (*rel1* -/+) and homozygote was determined by the semi quantitative RT-PCR. Total RNA was extracted from two-weeks-old leaves, and this experiment repeated more than three biological repeats. X, PCR cycles. B and C, bar is 10 cm. D, bar is 1 cm.




**Supplemental Figure S5**.Overexpression of *REL1* leads to a *rel1*-like phenotype. A, Identification of *REL1* overexpressing plants. The relative expression levels of *REL1* in wild type, *rel1* mutant and *OEs* were determined by qRT-PCR. Two-weeks-old leaves were used in this experiment. Values are the means ± SD with more than three biological repeats. B, Phenotype of wild type (left), *rel1* mutant (middle) and *OEs* (*OE-3* and *OE-5*, right) at the heading stage. C to F, Observation of agronomic traits of *OE* plants in plant height (C), panicle length (D), leaf bending (E) and leaf rolling (F). From left to right is wild type, *rel1*, *OE-3* and *OE-5*, respectively. B to F, Bar = 10 cm.




**Supplemental Figure S6**. Expression pattern of *REL1* in various tissues and stages. The expression values of *REL1* was taken from the microarray collection at the BAR website (http://bar.utoronto.ca/interactions/). The chart shows the relative expression of *REL1* in the different tissues and stages (colorful panels at the bottom).




**Supplemental Figure S7.** Knockdown of *RIP3* in *rel1* capable of rescuing *rel1* mutant phenotype. A, Relative expression of *RIP3* in the wild type and *rip3 rel1* double mutants. B to E, Phenotype of wild type, *rel1* and *rip3 rel1* double mutant in the tiller stage (B), leaf bending in the seedling stage (C), leaf rolling from tiller stage (D) and leaf section (E) which was derived from (D). B to E, from left to right is wild type, *rip3 rel1* line 5 and line 9, and *rel1* mutant, respectively. B and C, bar is 10 cm. D and E, bar is 1 cm.

**Supplementary Table S1**. Primers used in this study.

| Experiments | Name | Sequence of Primers (5'-3') | Annotation/vector |
|---|---|---|---|
| Flanking of T-DNA of *rel1* | *TR1* | 5'-ATgCCATCATTgCgATAAAgg-3′ | T-DNA right border primer#1 |
| | *TR2* | 5′-AgATgCCTCTgCCgACAgTg-3′ | T-DNA right border primer#2 |
| | *TR3* | 5′-TCgTggAAAAAgAAgACgTTC-3′ | T-DNA right border primer#3 |
| | *AD2-4* | 5′-NgACgA(g/C)(A/T)gANA(A/T)CAA-3′ | Degenerate primer |
| | *rel1-72833* | 5′-CgAgATAATgCAggAgTACAA-3′ | SP-Primer |
| | *rel1-39208* | 5′-ATTAATCggCAATAggTCTC-3′ | SP-Primer |
| | *TDNA7777* | 5′-TCgTggAAAAAgAAgACgTTC-3′ | SP-Primer of T-DNA |
| | *TDNA10622* | 5′-gCCACAACCTgAACCCgAAgAA-3′ | SP-Primer of T-DNA |
| Antisense for *REL1* | *REL1-anti-f* | 5'-ggCCgAgCTCCggTgCATgATgTACgTgAT-3' | P1301Ubinos |
| | *REL1-anti-r* | 5'-ggCCggTACCgCACgCAAgAAACAggTCTA-3' | |
| Over-expression of *REL1* | *REL1-OE-f* | 5'-ggCCTCTAgAATgAgCAggAACAACggCAAg-3' | P1301Ubinos |
| | *REL1-OE-r* | 5'-ggCCgTCgACTCACCggCgTTggCgCggg-3' | |
| Promoter of *REL1* | *REL1pro-f* | 5'-ggCCAAgCTTCACAAgACCCATATAAgAgCAggCgATT-3′ | p1300GUSnos |
| | *REL1pro-r* | 5'-ggCCgTCgACCCTCgCCgCCTCCACCAACACCACCTCCgA-3′ | |
| cGFP fusion REL1 | *REL1-Cgfp-f* | 5'-CggAATTCCg TCATgAgCAggAACAACggC-3' | P35s-MCS-T35s |
| | *REL1-Cgfp-r* | 5'-ggggTACCCC TCACCggCgTTggCgCgggC-3' | |
| Y2H for REL1-interacting proteins | *y2h_REL1-f* | 5'-ggCCggATCCATgAgCAggAACAACggCAAg-3' | pGBKT7 |
| | *y2h_REL1-r* | 5'-AAAACTgCAgTCACCggCgTTggCgCggg-3' | pGBKT7 |
| | *y2h_RIP1-f* | 5'-CCggAATTCATgCAggAgTTCCACCCCgT-3' | LOC_Os06g17410, pGADT7 |
| | *y2h_RIP1-r* | 5'-CgCggATCCCTACggCAggTAgATCgTgCC-3' | LOC_Os06g17410, pGADT7 |
| | *y2h_RIP2-f* | 5'-CCggAATTCATgAgCTgTgAgTTCTTCCTCCCT-3' | LOC_Os10g30850, pGADT7 |
| | *y2h_RIP2-r* | 5'-CgCggATCCTCACTTgATACggTACTCgTAAATg-3' | LOC_Os10g30850, pGADT7 |
| | *y2h_RIP3-f* | 5'-CCggAATTCATggCCgTCTCTgTCCgTTg-3' | LOC_Os03g04020, pGADT7 |
| | *y2h_RIP3-r* | 5'-CgCggATCCCTACTTCCACTCgTgCgTgTCg-3' | LOC_Os03g04020, pGADT7 |

| | | | |
|---|---|---|---|
| | *y2h_RIP4-f* | 5'-CCggAATTCATggCAAAgCATggCgTTg-3’ | LOC_Os01g71340, pGADT7 |
| | *y2h_RIP4-r* | 5'-CgCggATCCTTAgAAATTgATggAgTATgCCggC-3’ | LOC_Os01g71340, pGADT7 |
| | *y2h_RIP5-f* | 5'-CCggAATTCATgACggTggAggTgACgTggg-3’ | LOC_Os06g37150, pGADT7 |
| | *y2h_RIP5-r* | 5'-CgCggATCCCTATAgCCTggCgACgAggCC-3’ | LOC_Os06g37150, pGADT7 |
| | *y2h_RIP6-f* | 5'-CCggAATTCATggCgTCTCCggCCA-3’ | LOC_Os12g43380, pGADT7 |
| | *y2h_RIP6-r* | 5'-CgCggATCCTTATgggCAgAAgACgACTTggTAg-3’ | LOC_Os12g43380, pGADT7 |
| | *y2h_RIP7-f* | 5'-CCggAATTCATggCATTCAgTAgCAAAgCTTg-3’ | LOC_Os03g16950, pGADT7 |
| | *y2h_RIP7-r* | 5'-CgCggATCCTTAgCggTgCACAACgATCTTg-3’ | LOC_Os03g16950, pGADT7 |
| qRT-PCR | *Os01g64380-f* | 5'-CgTCgCCgTCgTAgCTTTAA-3’ | LOC_Os01g64380 |
| | *Os01g64380-r* | 5'-ACTgAAACgCgAAATTATTACCTAgAC-3’ | LOC_Os01g64380 |
| | *OS01g64390-f* | 5'-ACgAgACgACgggTAATCCA-3’ | LOC_OS01g64390 |
| | *OS01g64390-r* | 5'-ACTTCCTCTgTCgCgTgAA-3’ | LOC_OS01g64390 |
| | *REL1-f1* | 5'-CAACggCAAgAgTTCCAAgCT-3’ | LOC_Os01g64380 |
| | *REL1-r1* | 5'-CTCCgACgACACgCACgA-3’ | LOC_Os01g64380 |
| | *REL1-f2* | 5'-CCACCAACACgTCgAACTgC-3’ | LOC_Os01g64380 |
| | *REL1-r2* | 5'-TggAACTCTTgCCgTTgT-3’ | LOC_Os01g64380 |
| | *actin-f* | 5'-AgCAACTgggATgATATggA-3’ | X16280 |
| | *actin-r* | 5'-CAgggCgATgTAggAAAgC-3’ | X16280 |
| | *DLT-f* | 5'-TgCggATACTCAACgCCATCA-3’ | LOC_Os06g03710 |
| | *DLT-r* | 5'-ACTCgCCgACTCCggTgATC-3’ | LOC_Os06g03710 |
| | *D2-f* | 5'-AgCTgCCTggCACTAggCTCTACAgATCAC-3’ | LOC_Os01g10040 |
| | *D2-r* | 5'-ATgTTgTCggAgATgAgCTCgTCggTgAgC-3’ | LOC_Os01g10040 |
| | *D11-f* | 5'-AgTgAAgAgggAgCATgAAggCAT-3’ | LOC_Os04g39430 |
| | *D11-r* | 5'-ATCTgCAgggCTgAAATTgTTggg-3’ | LOC_Os04g39430 |
| | *OsDWARF-f* | 5'-ATggTgTTggTggCgATTggggTggTTg-3’ | LOC_Os03g40540 |

| | | | |
|---|---|---|---|
| | *OsDWARF-r* | 5'-ATgTTgTTCCgCCCCAggATgTCCAgCA-3’ | LOC_Os03g40540 |
| | *OsDWARF4-f* | 5'-TTCATggAgCAgCACATCgC-3’ | LOC_Os03g12660 |
| | *OsDWARF4-r* | 5'-CgggTAgCTgCACTCgAACA-3’ | LOC_Os03g12660 |
| | *OsBZR1-f* | 5'-CgTCgCCCACCTACAACCTC-3’ | LOC_Os07g39220 |
| | *OsBZR1-r* | 5'-TCgCCCAAATCgCAgCAT-3’ | LOC_Os07g39220 |
| | *IBH1-f* | 5'-CCgAACCCTAACCCTAgCgT-3’ | LOC_Os04g56500 |
| | *IBH1-r* | 5'-AggCCAgCATgTgCTTCgT-3’ | LOC_Os04g56500 |
| | *OsBU1-f* | 5’-AAgCTTTAgCTCCAgCCACC-3’ | LOC_Os06g12210 |
| | *OsBU1-r* | 5’-CCTgggCTgTTgTgATCCAT-3’ | LOC_Os06g12210 |
| | *OsBLE-f* | 5’-AggACggTgCTgTTCTCTTg-3’ | LOC_Os05g03150 |
| | *OsBLE-r* | 5’-gCAACAACATACATgggTTTTCC-3’ | LOC_Os05g03150 |
| | *OsBRI-f* | 5’-TCAgAACAACTACCTCACCggCg-3’ | LOC_Os01g52050 |
| | *OsBRI-r* | 5’-gCCggTTgCTCgCCAAA-3’ | LOC_Os01g52050 |
| | *OsRAVL-f* | 5’-ACCTCgATAACCCACATCCg-3’ | LOC_Os04g49230 |
| | *OsRAVL-r* | 5’-gAAggCAgCAgACggAAgAT-3’ | LOC_Os04g49230 |