Supplementary Figure S1

A *ANAC082*

```
  1 GTTCTGGCTCGTCCTTCACGCCACTCTCTCCTATATCTCTCTCTCGCTCTCCTCCCCCTT

 61 TCCGCCGATCGTCCTTTCCCCACCGTCGAGTTTTTCCCTATCCATCTCCGGGCTTTACGT

121 TGCACACCAGATGTCTGTTGATCTCTGCAAGAAGAATCCATCTTTTCTTTGGTGTGACTG
                M  S  V  D  L  C  K  K  N  P  S  F  L  W  C  D  C
                M  S  V  D  L  C  K  K  N  P  S  F  L  W  C  D  C

                         T
                         ↓
181 TGGTTATATGAGCAGGGGGAGGTTGTGGTGTTTTCAGATTATCCTCTTCAGGCACTGGAC
     G  Y  M  S  R  G  R  L  W  C  F  Q  I  I  L  F  R  H  W  T
     G  Y  M  S  R  G  E  V  V  V  F  S  D  Y  P  L  Q  A  L  T

241 TTGACTTGTCTTCAATTCCTCGACTTCTCTCTCTTTCTTCTTCTCCTCTCTTCTTTCTCG
     *
     *

301 TTTCTCTGTTTTTTTTTTCTGCTTGATTTGATCAAAGGGTATTCGTTTCTGCTGCTCCTG

361 TTTACTGTGAACTTGAAGACTAAGTTTTCTTTGCTAAACTCTCACTTTACTGGTGAAGAG

421 TTTACAGAAGATTGTTCAAAGTTTTCCCCTTTGGATTCTTCGCCAATGGGGAA
```

B *ANAC096*

```
  1 TTAGGAAAAATCATTCCTTAATCACTCTCGAAGCTTTCACACCAATATTACTTCCTTACT

 61 ACATCTCTTCATTTTAAAGATTTGTTAGTTACTTTTTTTTTTTGTTATTGTACGAAATAA

                            A                       G
                            ↓                       ↑
121 TTTGTTTTCTTTCAGACAATGTTCTTGTCACACAAAGAATACAATCGACTTGACTTGCAA
                      M  F  L  S  H  K  E  Y  N  R  L  D  L  Q
                      M  F  L  V  T  Q  R  I  Q  S  T  G  L  A  I

181 TTTTTTCTAAACAACAAATCCAGCATCGAGAAAAGTTTCTATTTTTGGATTTTCCAAATA
    F  F  L  N  N  K  S  S  I  E  K  S  F  Y  F  W  I  F  Q  I
      F  S  K  Q  Q  I  Q  H  R  E  K  F  L  F  L  D  F  P  N  I

241 TTAACAGTTATAGCTTCGTGACTTCAAGAAATATCCATTTCAAGATTATTTAACCTTTTT
    L  T  V  I  A  S  *
      N  S  Y  S     S  *

301 TTGTCTAGCAAGTCATCGTATTCTACTTTGTTGTTGCAAATGGGAAGTTCATG
```

C *ARF4*

```
  1 GGAGAAAGGGAGAGTGTAGGTGTGGGTTCTGTTCTGTCTTGGCTTTGTCTCCCCCGCTTA

 61 TCTCTCCCTCTCTTTCTCTCTCTCTCTCTCTTTCCACTAAATTGTTTTTTTTTTGCTCTT

121 TAAAAAGTATATTTTTTTCCAATCTGCAAATTTTAGTCTATGTCTGTTCCTTGTGCTCCC
                                          M  S  V  P  C  A  P
                                          M  S  V  P  C  A  P

                                                              T
181 TCTTCTCAGTACCTGCAAATGGAGGAAGAAGAATCCTTCTCTGAAACCCTTGTTCTCATT
    S  S  Q  Y  L  Q  M  E  E  E  E  S  F  S  E  T  L  V  L  I
    S  S  Q  Y  L  Q  M  E  E   K  N  P  S  L  K  P  L  F  S  F

241 TGATTCCTCCTTCCTCTCTCTTCTTCTCTCTCTGTCTCTGATTCGTTATTCCACACTTAT
    *
    *

301 GACTCATCTTTCCCGTCAATAGCTAAGTTTGCCTCTTCTTTGTGAAATTTAGCTGAAAAA

361 GGAGAGGAATTCCGAATTCTGTCACTTCAAAGCTCGAATTTTGCAAACTTTCCTTTGATG

421 GGTTTTACTTGTTTTGTTGTAATCTGATTAAAAATAGAAACTTTTTGTTTTCTTCTTGTC

481 TCCTTTTGCTCTTAAAAGAGAAGCTTTTTCAATGGAATTTGACTTGAATACTGAGATTGC

541 GGAG
```

D *ATMPK20*

```
  1 TCTCTCTCCTTTCATTTTCACTACTTCTTCGTCTCTCTCTCTCTCTCTCTCTCTCTCT

 61 CTGTATCCCTTGTGTGTCGGTGATCAGATCTCGTGCCGACGAAAACGTGCGTCTAAAGCA

121 ATGCTGTTCGCACTCTGCTATCTTCAATTCCTCGATTTATCTTGAACTGCGATTGTTTGT

181 TGTTGTTTCGATTTCGTTGGGGGTAATTGGGTGAATTAGAGAGGTGAATGAGAAATTCGC
                                                    M  R  N  S  P
                                                    M  R  N  S  P

241 CTGCGATTCTGTCTCTGTCGGTGATCGATTGCCGGAGCAGAACCAGGTCGGATTCTAGCT
      A  I  L  S  L  S  V  I  D  C  R  S  R  T  R  S  D  S  S  F
      A  I  L  S  L  S  V   S  I  A  G  A  E  P  G  R  I  L  A

                        T
301 TCGCCATTTGGAGTAGTGGTCGATGGGGCCAATGCGGCTGATCTGAATTTCTATTTCCCT
      A  I  W  S  S  G  R  W  G  Q  C  G  *
    S  P  F  G  V  V  C  R  W  G  Q  C  G  *

361 CCCCCCAATTCAGATCGAATTCTAGGGTTCTTCTAATTCCTGGGTTTTTAGTCTGTGTTT

421 CAATTGAGTCACGATGCAGCAAGATAATCGCAAAAAG
```

E *CIPK6*

```
  1 ATCCGACGGCAAAAGGAGAATTAAGATTTTTAACTTTAAACGAGAGTTTCGTTTATTTAC

 61 TCAAAAATTTACTTCTGAAATCTCTATTTGAATTTCGGGGAAAAAAATCCTAAGTAAGGG

121 AATGCAGAGAGATGGTCGGAGTATCGCCGGTGAAGACTAAGCTGTGTGATCGGTTTAACC
                M  V  G  V  S  P  V  K  T  K  L  C  D  R  F  N  R
                M  V  G  V  S  P  V  K  T  K  L  C  I  G  L  T

                                                  A
                                                  ↓
181 GATCCGTCGGCGGCAGGAATTGCCACCGGAAACACGTCGAGGACGGGTGATCCAGTTTTC
      S  V  G  G  R  N  C  H  R  K  H  V  E  D  G  *
    D  P  S  A  A  G  I  A  T  G  N  T  S  R  T  G  *

241 TAAACTCTCGTCTCTCGAATTCTTCGAAGATATCGAAAAACTGTAAATCTTTTTTTTCTT

301 CTACTTTTTTACAAAATTCTCTAATCATCGTTGTAAAGTAAAAAACCATGGTCGGAGCAA

361 AACCGGTGGAGAATGGATCTGACGGTGGTAGTAGTACG
```

F *CIPK23*

```
  1 TAATTTAACTTTTAAATTCCTTCCACCATCGAATCACAATCTCTCTCTCTCTCGCTTGCT

 61 GTTACTCGCTTTTTCCCAGAACCGGCTTCGATTTTTCTAAAGCAGCCGAAATTTACGATT

121 CCCAGAATTTTCCCTACTGACAAAATTTCACTTCAAATACAAATCTCGTCTTCATGAGTC

181 TTCTTCTTCGTCCAAATTGAATTTTCTCCGCACACGAGAGTTGAATTTTGATTTTCGGCT

241 GTTTATATGGTCTCCGGTCCCTTAGGGTTTTAATTCTTCTGCAGATCTCTCACGATGAGC
                                                      M  S
                                                      M  S

                                        C
                                        ↓
301 GTTGCGAAATCCCAAGTATGGCAGCCATGCAAGAAGAAGAGGTCCTCCTCCTGATTCAAT
    V  A  K  S  Q  V  W  Q  P  C  K  K  K  R  S  S  S  *
    V  A  K  S  Q  V  W  Q  P  C  N  E  E  E  V  L  S  *

361 AGAGATCTATCTATATATATATAAGAGACCGAGATATATATATAGAGAGAGAGATGGCTT

421 CTCGAACAACGCCTTCACGATCG
```

G *DIC1*

```
  1 AATCTCACCTTCTCTCTCCCTCTCTATAACAAACATTAATACACACACCAAAAAAAAACC

                  G
 61 TGTTTATGTCTCAAAGATCTCTGATTCCTCATTCTTCTTCTATAGCTTTTGGTCTCCATT
        M  S  Q  R  S  L  I  P  H  S  S  S  I  A  F  G  L  H  S
        M  S  Q  E  I  S  D  S  S  F  F  F  Y  S  F  W  S  P  F

121 CTCATCTCTTAATCTCCAGTGAGATCAGCTCCAATTCTAACTGGTCTCTCTAAATAAAAA
      H  L  L  I  S  S  E  I  S  S  N  S  N  W  S  L  *
     S  S  L  N  L  S  E  I  S  S  N  S  N  W  S  L  *

181 ACAGAAATAAAAATCCAACCTTTTTCAATTTTCGTTCAATTTTCCCGGAAAAAAAAGCGA

241 TCCTTTTGATTTTTCGATTTCTCCAAGTAACAATTCAAAATGGGTCTAAAGGGTTTTGCT

301 GAAGGAGGAATAGCTTCG
```

H *OTLD1*

```
  1 GACGGTTTAAAAAAAAAAAAAAACATTTCCTCTCAATTTTTTTTTCAATCAAACAAAAAAA

 61 AATCATCGCTCCCAATTTTACATTCTTCTTCTCGCCAAACCCTAATTGTTTCGATTTCTG

121 CTACATTCTTCCGGAAACTTGTTCTATCTCTGACGGATCTCGAATCGGTATTCTCAGCTG

181 CTGAAATCTCCGGGGAATGCAGAGAACGTTTTGCTGCGAGGTGGAGAACGGTTGGAAGGA
                    M  Q  R  T  F  C  C  E  V  E  N  G  W  K  E
                    M  Q  R  T  F  A  A  R  W  R  T  V  G  R  N

                                 T
241 ATCCCTCTCTCAAGGGATTGTTATCGTAGGTCCTAAAGCAAGAACTAGGGACAAACCTTG
     S  L  S  Q  G  I  V  I  V  G  P  K  A  R  T  R  D  K  P  W
      P  S  L  K  G  L  L  S  L  V  L  K  Q  E  L  G  T  N  L  G

       A
       ↓
301 GGATATTCTCTAATCTTTCATCTTTGATTAGGACAGCAAAGACTTAAGAAGCAGCATGAC
     D  I  L  *
      N  I  L  *

361 TCGGATTTTGGTTCAAAGAGGTTCATCAGGCAGTTCTTCCAACT
```

I *At1g67480*

```
   1 ACGAAGCAGAAGACAGAACCCAAAAACCGACAAAGTTCCCCTATTCTCTCGAAAATTCAT

  61 TACTTCTAAAGATGGATGTTGTAGGTGGCTGATGACTCTTCTTCCCTAGCATGACCTTTA
                                                      M  T  F  I
                                                      M  T  F  I

 121 TTGATACAGAGATGTGTATGAGAAGAAACAACATCAATTTAACAACAGTCATAGATTCTA
       D  T  E  M  C  M  R  R  N  N  I  N  L  T  T  V  I  D  S  N
       D  T  E  M  C  M  R  R  N  N  I  N  L  T  T  V  I  D  S  N

                                                   A
                                                   ↓
 181 ACGAAGCCATTGGTATGGAACATGAATTAGATTCTGCTAGACATCAATATTCTTCAGTGC
       E  A  I  G  M  E  H  E  L  D  S  A  R  H  Q  Y  S  S  V  L
       E  A  I  G  M  E  H  E  L  D  S  A  R  T  S  I  F  F  S  A

 241 TCACTGCAATTCCATTCTTCTCCGCTACATTGTTTATTCCTCTCTCTTTGAAAATCACTA
       T  A  I  P  F  F  S  A  T  L  F  I  P  L  S  L  K  I  T  I
     H  C  N  S  I  L  L  R  Y  I  V  Y  S  S  L  F  E  N  H  Y

 301 TACGTGACGGGTTTCACGAAAGTCTTTAATAACATTTCCATACACAAAACACAAATAGTT
       R  D  G  F  H  E  S  L  *
     T    D  G  F  H  E  S  L  *

 361 TAGAGATTTGTTCTTAGGGAGATTTAGCTATCTCTCTGTTCAAAAGATTGGTCTAAAGAT

 421 GCAAGCTTTTGCTTTAAGTGGGAAGAAAAGGATTGTGAATCACGGCATGTG
```

J *At3g15430*

```
   1 GATTTCAATTGTACGTTTTTCAATCGAAAGTTTTCTCCTTTTTGAGGGATTTGTTTAGTT

  61 TGATTGATTGTGGATTGTTCTGTTCTTCGTTGCAGTTCGAAGAATCTGGCGTGTTCAGGT

                                                      A
                                                      ↓
 121 GGATTGATTCTTGCGATCTGACCCTTCTCATGATTAGTTTCCGATCTTCGAATAGACCAA
                                   M  I  S  F  R  S  S  N  R  P  T
                                   M  I  S  F  R  S  S  N  R  P  N

 181 CTGCGAGATTCTCATCTATAACTCCGTTTTCCTATTCGATTTCTTATCTCTTTCTACCAT
       A  R  F  S  S  I  T  P  F  S  Y  S  I  S  Y  L  F  L  P  S
     C  E  I  L  I  Y  N  S  V  F  L  F  D  F  L  S  L  S  T  I

 241 CCAACGTGTTCTTCATACATTACTTCAATTGCTCTCGATTTCGCCTCAAAATCTGATCCT
       N  V  F  F  I  H  Y  F  N  C  S  R  F  R  L  K  I  *
     Q  R  V  L  H  T  L  L  Q  L  L  S  I  S  P  Q  I  *

 301 CTAGTAGCTTGAAGCAACCCAAAGTCTCGTCCTTTACGTTCAATTAGGTCATTTTGAAAC

 361 CCTGTTCTTAGAATTAGGAAGGGAAGAAATGGCTGATCGAAACTGTTTG
```

K *At3g55050*

```
   1 CGCGACTATCGGTTTTGATTTGTATTAGTAATCATCTTGCTAATCTTTCCCCCTCATTGA

  61 TCTGAAATCGAATGATGGATTATTATTCTACTCCAAGCTTTTGAAATAAGGAACCCTATT

 121 TCTTTCATCTAATCCTCGATTTCATCAGATTAATGTTGTTTACATTTGTGAATGCGTGTT
                                       M  L  F  T  F  V  N  A  C  L
                                       M  L  F  T  F  V  N  A  C  L

 181 TGAATTCTGAATCCTGGGTTTGTGGAGTTGGAATTGAGTCTGACAAGAAGATTGGGTTTC
       N  S  E  S  W  V  C  G  V  G  I  E  S  D  K  K  I  G  F  L
       N  L  N  P  G  F  V  E  L  E  L  S  L  T  R  R  L  G  F

           T                                 T
 241 TTCATAATATAGTTATAAGCACTGATTTGATGAACGATTTGATAGCTGGTTCTTTTGGTT
       H  N  I  V  I  S  T  D  L  M  N  D  L  I  A  G  S  F  G  *
    F  I  Y  I  V  I  S  T  D  L  M  N  D  F  D  S  W  F  F  G  *

 301 GAGACATGTGAATTATGGTATCTACAACATTTAGGAGAATTGTATCGCCTTGTTGGAGAC

 361 CTTTTGGTATTGGAGAAGATTCTAGTCCTGGTAGTGA
```

L *At4g10170*

```
   1 ATCACAAAGATAAACATCTCAAACAAAAAGCTCACACATGACCCAAGAACCCTAGAGAGA

  61 AGAAGAAGAGGAATGAGAGAATTCATCCTCGATTTTGAAGACATCGCCGAAGGATTTTGT
                   M  R  E  F  I  L  D  F  E  D  I  A  E  G  F  C
                   M  R  D     S  S  S  I  L  K  T  S  P  K  D  F  V

 121 TGGTACTTTCTTCTTCTCTTTGACTTTCTCTCTGACTCCATCATCTCAATTTCTCTCTTC
    W  Y  F  L  L  L  F  D  F  L  S  D  S  I  I  S  I  S  L  F
     G  T  F  F  F  S  L  T  F  S  L  T  P  S  S  Q  F  L  S  S

           T
 181 TTCTTTGCTCTAATCACAGACTTCTCTTCTTTCCTCTTCTGTCTCAATTTGATTTCTTAA
    F  F  A  L  I  T  D  F  S  S  F  L  F  C  L  N  L  I  S  *
     S  F  A  L  I  T  D  F  S  S  F  L  F  C  L  N  L  I  S  *

 241 AAAAACAAAAAAAAAAGATGGGTTTAATCAAGAACACAGT
```

M *At4g12790*

```
   1 AACAAACCAAAAAACTGAAGCTCTTGAAATTTCCTCTCTTCTTCTTTTGCTTGAGCTTTA

  61 GGTTTTGAGAGCAAAGAAAAACGAAGACGCGTCAAAGGTACTGAAATGTGTCTATTGCTT

                                                    A
                                                    ↓
 121 CTTGCTTCTGGTTTATGGGTCCCTGCGACATTTTGAGAGTGTTGTTTGGTTTAGGTGTCT
                     M  G  P  C  D  I  L  R  V  L  F  G  L  G  V  W
                     M  G  P  C  D  I  L  R  V  I  V  W  F  R  C  L

                                                 A
                                                 ↑
 181 GGTGTATTGCTTATATAACTGTTGCAATCTTTGCGTCTTTTAAGAATCTTTCACTGTATTT
       C  I  A  Y  I  T  V  A  I  F  A  S  F  R  I  F  H  C  I  C
     V  Y  C  L  Y  N  C  C  N  L  C  V  L  R  I  F  H  C  I  C

 241 GTTAATTTCAAGAGCTTTTGTGGAGAGGTTCTGCTTGCTTGCTACAATGGGTTACGCCCA
       *
       *

 301 GCTAGTTATTGGTCCAGCAGGCAGTGGAAAGT
```

N *At5g02480*

```
   1 TAATCCAATCTTCTTCTTACATAAACACCTCTCCTCCCCCACCGTTTCCAAAAGAGAGAA

  61 GCTTTCTCACTAACACCAAAAACAAGTCTTTGAAGAAGAATAAAAAGATTGGATTTTGAT

 121 AAGTTTAGTGAAAATGGGGGAGCTTTTGTGTTCTTCACTGTGGAACCCGTCACGATTCAT

 181 TGTTGCTTCTCTCAAAAGGTATTTTCTGGGTTTAGCTTCTTAGAGGTTCTTCGTTCTTAA

 241 AGGTCTGTTTTTTTTTAGGTTGTGATACTTTGAATGTAAAAAAGGGAAGATTTTTAGTTT

                                                 T
                                                 ↓
 301 CGATATGTATATCTCTCGGATGGGTTTGAGTCGGAGTTTCCCGCCGCTTTTTGGGGGATT
        M  Y  I  S  R  M  G  L  S  R  S  F  P  P  L  F  G  G  F
        M  Y  I  S  R  M  G  L  S  R  S F  P  A  A  F  W  G  I

 361 TCGGGAAATTCTAGGGTTAGGGTTGGATATTGTCTTCCTCTAGCAGTCTCTGCCACTTTT
      R  E  I  L  G  L  G  L  D  I  V  F  L  *
     S  G  N  S  R  V  R  V  G  Y  C  L  L  *

 421 AAAATCTCTTCATCTTTCTTTGAGAGTGAAAGAGGTTTTTTTATTTGTTTGTGTCTTCCT

 481 GGGAATCGAGATTCTGGATCTTAATCAATATGTGGGTTAATTGGGAGATCTGGGATTTGG

 541 GAGATCTTGTGGTGGATTGAAGAAAAAGCAAGGTTGTAGATTTTGAAAAATGAAAGGTTC

 601 AATTCTTACTGTTTTGTC
```

O *At5g27920*

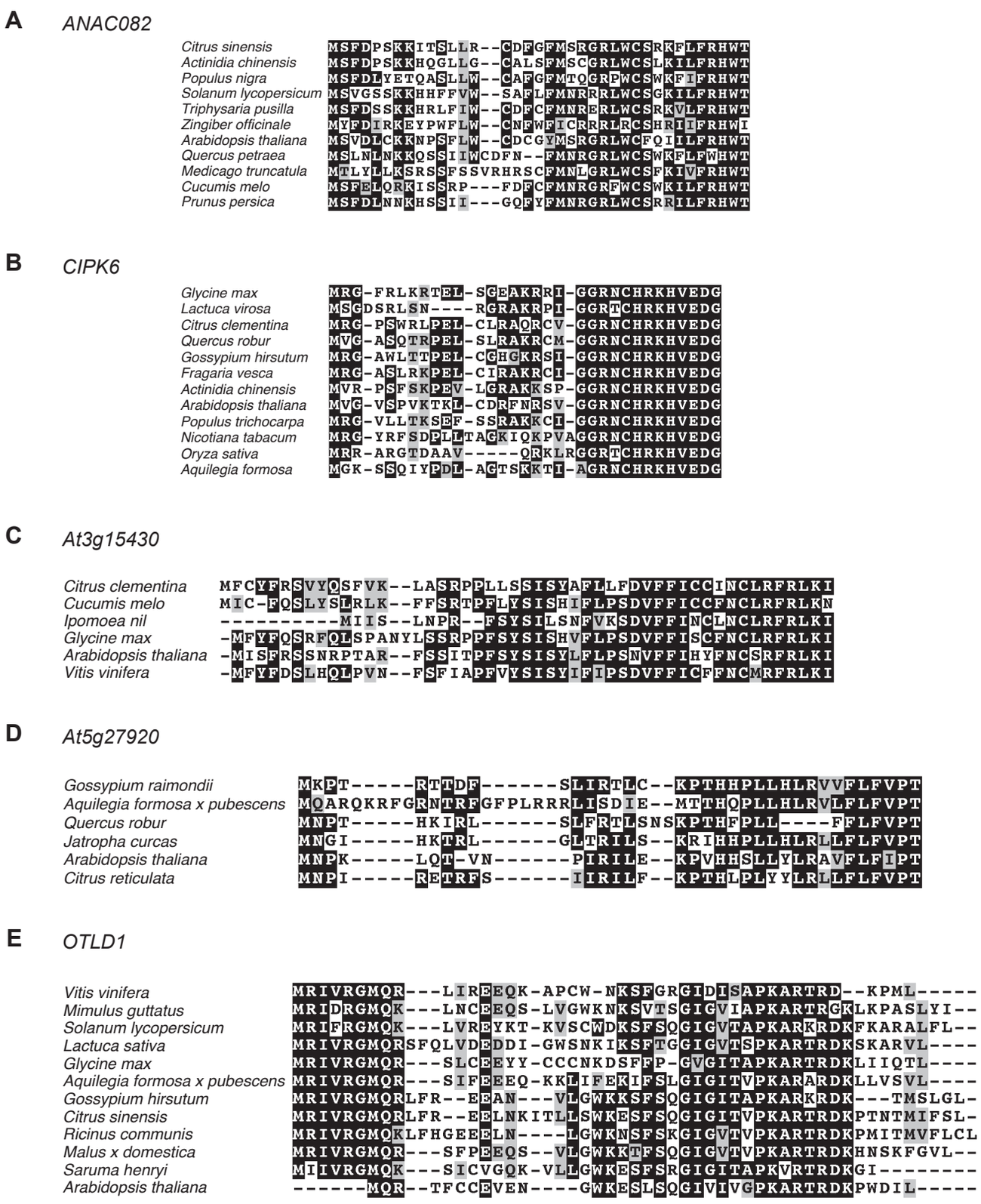
```
  1 GAGGTTCGGTTTTGTTTTTTCCCACCGGAAAGTCTCCGACTAATCGGCGTGATGAACCCG
                                                      M  N  P
                                                      M  N  P

                    A
 61 AAACTGCAAACCGTTAACCCAATTCGGATCTTAGAAAAACCGGTTCACCACTCTCTACTC
    K  L  Q  T  V  N  P  I  R  I  L  E  K  P  V  H  H  S  L  L
    K  L  Q  T  V  K P  N  S  D  L  R  K  T  G  S  P  L  S  T  L

121 TATCTCCGAGCTGTGTTTCTCTTTATTCCGACTTAAAAAAAAGCTTCAAATTTTTCCGA
    Y  L  R  A  V  F  L  F  I  P  T  *
       S  P  S  C  V  S  L  Y  P  T  *

181 TTTCGAATCCATTAGAGAAAACACATTTCTTTCTCCTTAAAAAGTTTCTTTTTGTTGTTG

241 TTGTGTGTTTATTTCTGGTTCTGTTGCAAAAATGTCGACGTC
```

P *At5g63640*

```
  1 AATCTGATTTTAAGGAATTAATCTCTATTTGCCAAAGAAGAGGCGCAAAGGCTCCGTCTT

 61 TTTTCTTCTTCTTGTTTCTGTGTTACCGATCTGGCTCTGTCTTCTTCTTCTTCTTCTTCT

121 TCTTCTTCTTCTTCTTCTTCTTCTTCGTTTACGTCTCTGTGAAATGCTCAAGCTGATTAG
                                                    M  L  K  L  I  R
                                                    M  L  K  L  I  G

                                                                T
181 GGTTTATCAACTTTTTCTCAACTTTCTTGTTATCTCCTTCGTTATCCTCTCTGTCTTCTC
     V  Y  Q  L  F  L  N  F  L  V  I  S  F  V  I  L  S  V  F  S
      F  I  N  F  F  S  T  F  L  L  S  P  S  L  S  S  L  S F  S

241 AGCTTAGCAGCTATTGTGCATTTGAAGCTGTACTCGGAAGAAAAGCCCATAGAAGAGTCA
     A  *
     A  *

301 AATATAACAAAAAATGGCTGCGGAGCTTGT
```

Supplementary Figure S1. Nucleotide sequences of the 5′-UTRs and amino acid sequences of the CPuORFs analyzed in this study. (A-P) The 5′-UTRs of *ANAC082* (A), *ANAC096* (B), *ARF4* (C), *ATMPK20* (D), *CIPK6* (E), *CIPK23* (F), *DIC1* (G), *OTLD1* (H), *At1g67480* (I), *At3g15430* (J), *At3g55050* (K), *At4g10170* (L), *At4g12790* (M), *At5g02480* (N), *At5g27920* (O), and *At5g63640* (P). The nucleotide sequences of the CPuORFs are shown in bold. The deduced amino acid sequences of the WT and fs mutant CPuORFs are indicated. The nucleotide sequences of other uORFs are underlined. The nucleotides that were deleted and inserted in the frameshift mutants are shaded. A white letter in a black box indicates the substituted nucleotide in the fs mutants (B, H, M). The 5′-parts of the main coding sequences that were contained in the reporter constructs are boxed.

Supplementary Figure S2



Supplementary Figure S2. Alignments of the homology groups of the newly identified sequence-dependent CPuORFs. Amino acid sequences of the *ANAC082* (A), *CIPK6* (B), *At3g15430* (C), *At5g27920* (D), or *OTLD1* (E) CPuORFs and their putative orthologs were aligned using ClustalW2 (http://www.ebi.ac.uk/Tools/msa/clustalw2/), and visualized using Boxshade ver 3.21 (http://www.ch.embnet.org/software/BOX_form.html).

Supplementary Table S1. List of primers used for cloning of the 5′-UTRs.

Gene	Primer name	Direction	Primer sequence [a)]
ANAC082	ANAC082 P1	Forward	5′-TCCTCTAGAGTTCTGGCTCGTCCTTCA-3′
	ANAC082 P2	Reverse	5′-TCTGTCGACTTCCCCATTGGCGAAGAATCC-3′
ANAC096	ANAC096 P1	Forward	5′-TCCTCTAGATTAGGAAAAATCATTCCTTAATCACTCTCG-3′
	ANAC096 P2	Reverse	5′-TCTGTCGACCATGAACTTCCCATTTGCAACAAC-3′
ARF4	ARF4 P1	Forward	5′-TCCTCTAGAGGAGAAAGGGAGAGTGTAG-3′
	ARF4 P2	Reverse	5′-TCTGTCGACTCCGCAATCTCAGTATTCAAGT-3′
ATMPK20	ATMPK20 P1	Forward	5′-TCCTCTAGATCTCTCTCCTTTCATTTTCACTACTTC-3′
	ATMPK20 P2	Reverse	5′-TCTGTCGACTTTTTGCGATTATCTTGCTGCAT-3′
CIPK6	CIPK6 P1	Forward	5′-TCCTCTAGATCCGACGGCAAAAGGAGAA-3′
	CIPK6 P2	Reverse	5′-TCTGTCGACGTACTACTACCACCGTCA-3′
CIPK23	CIPK23 P1	Forward	5′-TCCTCTAGATAATTTAACTTTTAAATTCCTTCCACCATCGA-3′
	CIPK23 P2	Reverse	5′-TCTGTCGACGATCGTGAAGGCGTTGTT-3′
DIC1	DIC1 P1	Forward	5′-TCCTCTAGAAATCTCACCTTCTCTCTCCCT-3′
	DIC1 P2	Reverse	5′-TCTGTCGACGAAGCTATTCCTCCTTCAG -3′
OTLD1	OTLD1 P1	Forward	5′-TCCTCTAGACGGTTTAAAAAAAAAAAAAACATTTCCTCTCA-3′
	OTLD1 P2	Reverse	5′-TCTGTCGACGAGTTGGAAGAACTGCCTGAT-3′
At1g67480	At1g67480 P1	Forward	5′-TCCTCTAGACGAAGCAGAAGACAGAACCCAA-3′
	At1g67480 P2	Reverse	5′-TCTGTCGACCACATGCCGTGATTCACAATCCT-3′
At3g15430	At3g15430 P1	Forward	5′-TCCTCTAGATTTCAATTGTACGTTTTTCAATCGAAAG-3′
	At3g15430 P2	Reverse	5′-TCTGTCGACAAACAGTTTCGATCAGCCAT-3′
At3g55050	At3g55050 P1	Forward	5′-TCCTCTAGACGCGACTATCGGTTTTGATTTG-3′
	At3g55050 P2	Reverse	5′-TCTGTCGACTCACTACCAGGACTAGAATCTTCT-3′
At4g10170	At4g10170 P1	Forward	5′-TCCTCTAGATCACAAAGATAAACATCTCAAACAAAAAGCTCA-3′
	At4g10170 P2	Reverse	5′-TCTGTCGACACTGTGTTCTTGATTAAACCCATCT-3′
At4g12790	At4g12790 P1	Forward	5′-TCCTCTAGAACAAACCAAAAAACTGAAGCTCTTGA-3′
	At4g12790 P2	Reverse	5′-TCTGTCGACTTTCCACTGCCTGCT-3′
At5g02480	At5g02480 P1	Forward	5′-TCCTCTAGATAATCCAATCTTCTTCTTACATAAACACCT-3′
	At5g02480 P2	Reverse	5′-TCTGTCGACAAAACAGTAAGAATTGAACCTTTC-3′
At5g27920	At5g27920 P1	Forward	5′-TCCTCTAGAGAGGTTCGGTTTTGTTTTTTCCCA-3′
	At5g27920 P2	Reverse	5′-GACGTCGACATTTTTGCAACAGA-3′
At5g63640	At5g63640 P1	Forward	5′-TCCTCTAGAATCTGATTTTAAGGAATTAATCTCTATTTGCCA-3′
	At5g63640 P2	Reverse	5′-TCTGTCGACACAAGCTCCGCAGCCATT-3′

[a)] The restriction sites added for cloning are underlined.

Supplementary Table S2. List of primers used for introduction of the frameshift mutations.

Gene	Type of mutation	Primer name	Direction	Primer sequence [a)]
ANAC082	1-nt insertion	ANAC082 fs for1	Forward	5′-GCAGGGGTGAGGTTGTGGT-3′
		ANAC082 fs rev1	Reverse	5′-CCACAACCTCACCCCTGCT-3′
	1-nt deletion	ANAC082 fs for2	Forward	5′-CAGGCACTGACTTGACTTGTCT-3′
		ANAC082 fs rev2	Reverse	5′-GACAAGTCAAGTCAGTGCCTGAA-3′
ANAC096	1-nt insertion and 1-nt substitution	ANAC096 fs for1	Forward	5′-AGTCACACAAAGAATACAATCGACTgGACTTGC-3′
		ANAC096 fs rev1	Reverse	5′-GTCGATTGTATTCTTTGTGTGACTAAGAACATTG-3′
	1-nt deletion	ANAC096 fs for2	Forward	5′-AACAGTTATGCTTCGTGACTTCAAG-3′
		ANAC096 fs rev2	Reverse	5′-TGAAGTCACGAAGCATAACTGTTAATATTTGG-3′
ARF4	1-nt insertion and 1-nt deletion	ARF4 fs for1	Forward	5′-CCTTCTCTGAAACCCTTGTTCTCATTTTGATTCCT-3′
		ARF4 fs rev1	Reverse	5′-GAACAAGGGTTTCAGAGAAGGATTCTTCTCCTCCA-3′
ATMPK20	1-nt deletion	ATMPK20 fs for1	Forward	5′-CTCTGTCGGTATCGATTGCCGGAGCAGAA-3′
		ATMPK20 fs rev1	Reverse	5′-CTCCGGCAATCGATACCGACAGAGA-3′
	1-nt insertion	ATMPK20 fs for2	Forward	5′-GGAGTAGTGTGTCGATGGGGCCAAT-3′
		ATMPK20 fs rev2	Reverse	5′-CAGCCGCATTGGCCCCATCGACACACTACT-3′
CIPK6	1-nt deletion	CIPK6 fs for1	Forward	5′-AGACTAAGCTGTGTATCGGTTTAACC-3′
		CIPK6 fs rev2	Reverse	5′-AAACCGATACACAGCTTAGTCTTCA-3′
	1-nt insertion	CIPK6 fs for2	Forward	5′-TCGAGGAACGGGTGATCCAGTTTTC-3′
		CIPK6 fs rev2	Reverse	5′-AACTGGATCACCCGTTCCTCGACGTG-3′
CIPK23	1-nt insertion and 1-nt deletion	CIPK23 fs for1	Forward	5′-AACGAAGAAGAGGTCCTCTCCTGATTCA-3′
		CIPK23 fs rev1	Reverse	5′-GGAGAGGACCTCTTCTTCGTTGCATGGCT-3′
DIC1	1-nt insertion	DIC1 fs for1	Forward	5′-CCTGTTTATGTCTCAAGAGATCTCTGATTCCTCATT-3′
		DIC1 fs rev1	Reverse	5′-GAGGAATCAGAGATCTCTTGAGACATAAACA-3′
	1-nt deletion	DIC1 fs for2	Forward	5′-CCATTCTCATCTCTTAATCTCAGTGAGATCA-3′
		DIC1 fs rev2	Reverse	5′-CCAGTTAGAATTGGAGCTGATCTCACTGAGATTAAGAGAT-3′
OTLD1	1-nt deletion	OTLD1 fs for1	Forward	5′-AATGCAGAGAACGTTTGCTGCGA-3′
		OTLD1 fs rev1	Reverse	5′-CGCAGCAAACGTTCTCTGCATT-3′
	1-nt substitution	OTLD1 fs for2	Forward	5′-TCTCTCAAGGGATTGTTATCGTtGGTCCTAAAGCA-3′
		OTLD1 fs rev2	Reverse	5′-AGTTCTTGCTTTAGGACCaACGATAACAAT-3′
	1-nt insertion	OTLD1 fs for3	Forward	5′-CCTTGGGAATATTCTCTAATCTTTCATCT-3′
		OTLD1 fs rev3	Reverse	5′-TTTGCTGTCCTAATCAAAGATGAAAGATTAGAGAATATTCCCAAGGT-3′

At1g67480	1-nt insertion	At1g67480 fs for1 At1g67480 fs rev1	Forward Reverse	5′-AGATTCTGCTAG[A]ACATCAATATTCTTCAGT-3′ 5′-CTGAAGAATATTGATGT[T]CTAGCAGAATCTA-3′
	1-nt deletion	At1g67480 fs for2 At1g67480 fs rev2	Forward Reverse	5′-GAAAATCACTATACTGACGGGTTTCA-3′ 5′-GAAACCCGTCAGTATAGTGATTTTCA-3′
At3g15430	1-nt insertion	At3g15430 fs for1 At3g15430 fs rev1	Forward Reverse	5′-CGAATAGACCAAA[C]TGCGAGATT-3′ 5′-TCTCGCAG[T]TTGGTCTATTCG-3′
	1-nt deletion	At3g15430 fs for2 At3g15430 fs rev2	Forward Reverse	5′-GATTTCGCCTCAAATCTGATCCT-3′ 5′-GGATCAGATTTGAGGCGAAATC-3′
At3g55050	1-nt deletion	At3g55050 fs for1 At3g55050 fs rev1	Forward Reverse	5′-AATGCGTGTTTGAATCTGAATCCTG-3′ 5′-CAGGATTCAGATTCAAACACGCATT-3′
	1-nt insertion	At3g55050 fs for2 At3g55050 fs rev2	Forward Reverse	5′-TGACAAGAAGATTGGGTTTCTTCATA[T]ATATAGTTATAAGCA-3′ 5′-AAATCAGTGCTTATAACTATAT[A]TATGAAGAAACCCAATCT-3′
	1-nt insertion and 1-nt deletion	At3g55050 fs for3 At3g55050 fs rev3	Forward Reverse	5′-AACGA[T]TTTGATAGCTGGTTCTTTGGTTGAGA-3′ 5′-AATTCACATGTCTCAACCAAAGAACCAGCTATCAAA[A]TCGTT-3′
At4g10170	1-nt deletion	At4g10170 fs for1 At4g10170 fs rev1	Forward Reverse	5′-GGAATGAGAGATTCATCCTCGAT-3′ 5′-CGAGGATGAATCTCTCATTCCT-3′
	1-nt insertion	At4g10170 fs for2 At4g10170 fs rev2	Forward Reverse	5′-CTCTCTTCTTCTT[T]TGCTCTAATCACA-3′ 5′-GTGATTAGAGCA[A]AAGAAGAAGAGAGA-3′
At4g12790	1-nt insertion	At4g12790 fs for1 At4g12790 fs rev1	Forward Reverse	5′-GACATTTTGAGAGTG[A]TTGTTTGGTTTAG-3′ 5′-CTAAACCAAACAA[T]CACTCTCAAAATGTC-3′
	1-nt deletion and 1-nt substitution	At4g12790 fs for2 At4g12790 fs rev2	Forward Reverse	5′-CTTTGCGTCTTaAGAATCTTTCACTGT-3′ 5′-AAATTAACAAATACAGTGAAAGATTCTtAAGACGCAAAGA-3′
At5g02480	1-nt insertion	At5g02480 fs for1 At5g02480 fs rev1	Forward Reverse	5′-GTTTGAGTCGGAG[T]TTTCCCG-3′ 5′-CGGGAAA[A]CTCCGACTCAAAC-3′
	1-nt deletion	At5g02480 fs for2 At5g02480 fs rev2	Forward Reverse	5′-GATATTGTCTCCTCTAGCAGTCTCT-3′ 5′-AGAGACTGCTAGAGGAGACAATATC-3′
At5G27920	1-nt insertion	At5G27920 fs for1 At5G27920 fs rev1	Forward Reverse	5′-GCAAACCGTTA[A]ACCCAATTC-3′ 5′-GAATTGGGT[T]TAACGGTTTGCA-3′
	1-nt deletion	At5G27920 fs for2 At5G27920 fs rev2	Forward Reverse	5′-GCTGTGTTTCTCTTTATCCGACTTAA-3′ 5′-TTAAGTCGGATAAAGAGAAACACAGC-3′
At5g63640	1-nt deletion	At5g63640 fs for1 At5g63640 fs rev1	Forward Reverse	5′-CTCAAGCTGATAGGGTTTATCA-3′ 5′-GATAAACCCTATCAGCTTGAG-3′
	1-nt insertion	At5g63640 fs for2 At5g63640 fs rev2	Forward Reverse	5′-CTCTGTC[T]TTCTCAGCTTAGCA-3′ 5′-GCTAAGCTGAGAA[A]GACAGAGA-3′

[a)] The nucleotides that were inserted in the frameshift mutants are boxed. Shaded letters denote the positions of deletion mutations, in which a nucleotide between the shaded nucleotides was deleted. Lowercase letters indicate substituted nucleotides.

Supplementary Table S3. List of primers used for introduction of the codon substitutions into the *ANAC082* CPuORF.

Mutation	Primer name	Direction	Primer sequence [a)]
ΔAUG	ANAC082 ΔAUG1 for	Forward	5′-GCACACCAGAaGTCTGTTGATCT-3′
	ANAC082 ΔAUG1 rev	Reverse	5′-GATCAACAGACtTCTGGTGTGCAA-3′
	ANAC082 ΔAUG2 for	Forward	5′-GACTGTGGTTATAaGAGCAGG-3′
	ANAC082 ΔAUG2 rev	Reverse	5′-CCTGCTCtTATAACCACAGTCA-3′
K7A	ANAC082 K7A for	Forward	5′-CTCTGCgcGAAGAATCCATCTTTTCTTTGGTGT-3′
	ANAC082 K7A rev	Reverse	5′-GATGGATTCTTCgcGCAGAGATCAACAGACA-3′
K8A	ANAC082 K8A for	Forward	5′-CTCTGCAAGgcGAATCCATCTTTTCTTTGGTGTGA-3′
	ANAC082 K8A rev	Reverse	5′-GATGGATTCgcCTTGCAGAGATCAACAGACA-3′
S11A	ANAC082 S11A for	Forward	5′-GAAGAATCCAgCTTTTCTTTGGTGTGA-3′
	ANAC082 S11A rev	Reverse	5′-CACCAAAGAAAAGcTGGATTCTTCTTGCA-3′
W14A	ANAC082 W14A for	Forward	5′-CCATCTTTTCTTgcGTGTGACTGTGGTTA-3′
	ANAC082 W14A rev	Reverse	5′-GTCACACgcAAGAAAAGATGGATTCTTCTTGCA-3′
C15A	ANAC082 C15A for	Forward	5′-CTTTTCTTTGGgcTGACTGTGGTTATATGAGCA-3′
	ANAC082 C15A rev	Reverse	5′-CCACAGTCAgcCCAAAGAAAAGATGGA-3′
C17A	ANAC082 C17A for	Forward	5′-GGTGTGACgcTGGTTATATGAGCA-3′
	ANAC082 C17A rev	Reverse	5′-CATATAACCAgcGTCACACCAAAGA-3′
R22A	ANAC082 R22A for	Forward	5′-TATATGAGCgcGGGGAGGTTGTGGT-3′
	ANAC082 R22A rev	Reverse	5′-AACCTCCCCgcGCTCATATAACCA-3′
R24A	ANAC082 R24A for	Forward	5′-AGGGGGgcGTTG TGGTGTTTTCAGTTA-3′
	ANAC082 R24A rev	Reverse	5′-AAACACCACAACgcCCCCCTGCTCAT-3′
R24R	ANAC082 R24R for	Forward	5′-GAGCAGGGGGcGaTTGTGGTGTTT-3′
	ANAC082 R24R rev	Reverse	5′-CACCACAAtCgCCCCCTGCTCATAT-3′
W26A	ANAC082 W26A for	Forward	5′-GCAGGGGAGGTTGgcGTGTTTTCAGATTAT-3′
	ANAC082 W26A rev	Reverse	5′-TCTGAAAACACgcCAACCTCCCCTGCTCAT-3′
C27A	ANAC082 C27A for	Forward	5′-GGGAGGTTGTGGgcTTTTCAGAT-3′
	ANAC082 C27A rev	Reverse	5′-GAGGATAATCTGAAAAgcCCACAACCT-3′
Q29A	ANAC082 Q29A for	Forward	5′-GGTTGTGGTGTTTTgcGATTATCCTCTT-3′
	ANAC082 Q29A rev	Reverse	5′-GCCTGAAGAGGATAATCgcAAAACACCACAA-3′
I30A	ANAC082 I30A for	Forward	5′-GGTTGTGGTGTTTTCAGgcTATCCTCTT-3′
	ANAC082 I30A rev	Reverse	5′-GCCTGAAGAGGATAgcCTGAAAACACCACAA-3′
F33A	ANAC082 F33A for	Forward	5′-GATTATCCTCgcCAGGCACTGGACT-3′
	ANAC082 F33A rev	Reverse	5′-GTGCCTGgcGAGGATAATCTGA-3′
R34A	ANAC082 R34A for	Forward	5′-TCTTCgcGCACTGGAACTTTGACTTGTCTTC-3′
	ANAC082 R34A rev	Reverse	5′-GACAAGTCAAAGTTCCAGTGCgcGAAGAGGAATAA-3′
R34R	ANAC082 R34R for	Forward	5′-CAGATTATCCTCTTCcGaCACTGGACTT-3′
	ANAC082 R34R rev	Reverse	5′-GGAATTGAAGACAAGTCAAGTCCAGTGtCgGAAGA-3′
H35A	ANAC082 H35A for	Forward	5′- CCTCTTCAGGgcCTGGACTTGACTTGT-3′
	ANAC082 H35A rev	Reverse	5′-CGAGGAATTGAAGACAAGTCAAGTCCAGgcCCTGAAGA-3′
W36A	ANAC082 W36A for	Forward	5′-AGGCACgcGACTTGACTTGTCTTCAAT-3′
	ANAC082 W36A rev	Reverse	5′-CAAGTCAAGTCgcGTGCCTGAAGAG-3′
T37A	ANAC082 T37A for	Forward	5′-AGGCACTGGgCTTGACTTGTC-3′
	ANAC082 T37A rev	Reverse	5′-CAAGTCAAGcCCAGTGCCTGAA-3′

[a)] Lowercase letters indicate substituted nucleotides.

Supplementary Table S4. List of primers used for introduction of the codon substitutions into the *CIPK6* CPuORF.

Mutation	Primer name	Direction	Primer sequence [a)]
ΔAUG	CIPK6 ΔAUG for	Forward	5′-TGCAGAGAGAaGGTCGGAGTA-3′
	CIPK6 ΔAUG rev	Reverse	5′-ACTCCGACCtTCTCTCTGCATT-3′
S5A	CIPK6 S5A for	Forward	5′-GTCGGAGTAgCGCCGGTGAA-3′
	CIPK6 S5A rev	Reverse	5′-CACCGGCGcTACTCCGACCA-3′
K8A	CIPK6 K8A for	Forward	5′-CGCCGGTGgcGACTAAGCTGTGTGA-3′
	CIPK6 K8A rev	Reverse	5′-GCTTAGTCgcCACCGGCGATACTC-3′
L11A	CIPK6 L11A for	Forward	5′-GAAGACTAAGgcGTGTGATCGGTTTAAC-3′
	CIPK6 L11A rev	Reverse	5′-CCGATCACACgcCTTAGTCTTCAC-3′
R14A	CIPK6 R14A for	Forward	5′-GCTGTGTGATgcGTTTAACCGATCCGTC-3′
	CIPK6 R14A rev	Reverse	5′-CGGTTAAACgcATCACACAGCTTAGTC-3′
R17A	CIPK6 R17A for	Forward	5′-CGGTTTAACgcATCCGTCGGC-3′
	CIPK6 R17A rev	Reverse	5′-CGACGGATgcGTTAAACCGATC-3′
G20A	CIPK6 G20A for	Forward	5′-GATCCGTCGcCGGCAGGAAT-3′
	CIPK6 G20A rev	Reverse	5′-ATTCCTGCCGGCGACGGATC-3′
G21A	CIPK6 G21A for	Forward	5′-CGTCGGCGcCAGGAATTGCCA-3′
	CIPK6 G21A rev	Reverse	5′-CAATTCCTGgCGCCGACGGAT-3′
R22A	CIPK6 R22A for	Forward	5′-GGCGGCgcGAATTGCCACC-3′
	CIPK6 R22A rev	Reverse	5′-TGGCAATTCgcGCCGCCGAC-3′
R22R	CIPK6 R22R for	Forward	5′-GGCGGCcGcAATTGCCACC-3′
	CIPK6 R22R rev	Reverse	5′-TGGCAATTgCgGCCGCCGAC-3′
R26A	CIPK6 R26A for	Forward	5′-GGAAATTGCCACgcGAAACACGTC-3′
	CIPK6 R26A rev	Reverse	5′-ACGTGTTTCgcGTGGCAATTCCTG-3′
R26R	CIPK6 R26R for	Forward	5′-GGAAATTGCCACaGaAAACACGTC-3′
	CIPK6 R26R rev	Reverse	5′-ACGTGTTTtCTtTGGCAATTCCTG-3′
K27A	CIPK6 K27A for	Forward	5′-TGCCACCGGgcACACGTCGAG-3′
	CIPK6 K27A rev	Reverse	5′-TCGACGTGTgcCCGGTGGCAAT-3′
H28A	CIPK6 H28A for	Forward	5′-CACCGGAAAgcCGTCGAGGAC-3′
	CIPK6 H28A rev	Reverse	5′-TCCTCGACGgcTTTCCGGTGGCAA-3′
V29A	CIPK6 V29A for	Forward	5′-CGGAAACACGcCGAGGACGGGT-3′
	CIPK6 V29A rev	Reverse	5′-CGTCCTCGgCGTGTTTCCGGT-3′
E30A	CIPK6 E30A for	Forward	5′-AAACACGTCgcGGACGGGTGAT-3′
	CIPK6 E30A rev	Reverse	5′-CACCCGTCCgcGACGTGTTTC-3′
D31A	CIPK6 D31A for	Forward	5′-ACGTCGAGGcCGGGTGATCCA-3′
	CIPK6 D31A rev	Reverse	5′-ATCACCCGgCCTCGACGTGTT-3′
G32A	CIPK6 G32A for	Forward	5′-GTCGAGGACGcGTGATCCAGTT-3′
	CIPK6 G32A rev	Reverse	5′-CTGGATCACgCGTCCTCGACGT-3′

[a)] Lowercase letters indicate substituted nucleotides.

Supplementary Table S5. List of primers used for introduction of the codon substitutions into the *At3g15430* CPuORF.

Mutation	Primer name	Direction	Primer sequence [a)]
ΔAUG	AT3G15430 ΔAUG for	Forward	5′-CCCTTCTCAaGATTAGTTTCCGA-3′
	AT3G15430 ΔAUG rev	Reverse	5′-CGGAAACTAATCtTGAGAAGGGT-3′
S6A	AT3G15430 S6A for	Forward	5′-GTTTCCGAgCTTCGAATAGACCAA-3′
	AT3G15430 S6A rev	Reverse	5′-GGTCTATTCGAAGcTCGGAAACT-3′
R13A	AT3G15430 R13A for	Forward	5′-CTGCGgcATTCTCATCTATAACTCCGTTTTCCTA-3′
	AT3G15430 R13A rev	Reverse	5′-GAGTTATAGATGAGAATgcCGCAGTTGGTCTA-3′
S16A	AT3G15430 S16A for	Forward	5′-CGAGATTCTCAgCTATAACTCCGTTTTCCTA-3′
	AT3G15430 S16A rev	Reverse	5′-CGGAGTTATAGcTGAGAATCTCGCA-3′
P19A	AT3G15430 P19A for	Forward	5′-GATTCTCATCTATAACTgCGTTTTCCTATTCGA-3′
	AT3G15430 P19A rev	Reverse	5′-GGAAAACGcAGTTATAGATGAGAATCTC-3′
F20A	AT3G15430 F20A for	Forward	5′-CTCCGgcTTCCTATTCGATTTCTTATCTCT-3′
	AT3G15430 F20A rev	Reverse	5′-GAAATCGAATAGGAAgcCGGAGTTATAGATGAGA-3′
Y22A	AT3G15430 Y22A for	Forward	5′-CCGTTTTCCgcTTCGATTTCTTATCTCTTTCTA -3′
	AT3G15430 Y22A rev	Reverse	5′-GATAAGAAATCGAAgcGGAAAACGGAGTTA-3′
S23A	AT3G15430 S23A for	Forward	5′-CCGTTTTCCTATgCGATTTCTTATCTCTTTCTA-3′
	AT3G15430 S23A rev	Reverse	5′-GAGATAAGAAATCGcATAGGAAAACGGAGTTA-3′
I24A	AT3G15430 I24A for	Forward	5′-GTTTTCCTATTCGgcTTCTTATCTCTTTCTA-3′
	AT3G15430 I24A rev	Reverse	5′-TAGAAAGAGATAAGAAgcCGAATAGGAAAAC-3′
F28A	AT3G15430 F28A for	Forward	5′-CGATTTCTTATCTCgcTCTACCATCCAA-3′
	AT3G15430 F28A rev	Reverse	5′-TTGGATGGTAGAgcGAGATAAGAAATCG-3′
S31A	AT3G15430 S31A for	Forward	5′-CTCTTTCTACCAgCCAACGTGTTC-3′
	AT3G15430 S31A rev	Reverse	5′-GAACACGTTGGcTGGTAGAAAGAG-3′
N32A	AT3G15430 N32A for	Forward	5′-TCTACCATCCgcCGTGTTCTTCAT-3′
	AT3G15430 N32A rev	Reverse	5′-ATGAAGAACACGgcGGATGGTAGA-3′
F34A	AT3G15430 F34A for	Forward	5′-TCCAACGTGgcCTTCATACATTACTTCAA-3′
	AT3G15430 F34A rev	Reverse	5′-AAGTAATGTATGAAGgcCACGTTGGATGG-3′
I36A	AT3G15430 I36A for	Forward	5′-CCAACGTGTTCTTCgcACATTACTTC-3′
	AT3G15430 I36A rev	Reverse	5′-GAAGTAATGTgcGAAGAACACGTTGG-3′
N40A	AT3G15430 N40A for	Forward	5′-CTTCATACATTACTTCgcTTGCTCTCGATTT-3′
	AT3G15430 N40A rev	Reverse	5′-AAATCGAGAGCAAgcGAAGTAATGTATGAAG-3′
R43A	AT3G15430 R43A for	Forward	5′-CTTCAATTGCTCTgcATTTCGCCTCAA-3′
	AT3G15430 R43A rev	Reverse	5′-TTGAGGCGAAATgcAGAGCAATTGAAG-3′
R43R	AT3G15430 R43R for	Forward	5′-CTTCAATTGCTCTaGgTTTCGCCTCAA-3′
	AT3G15430 R43R rev	Reverse	5′-TTGAGGCGAAAcCtAGAGCAATTGAAG-3′
R45A	AT3G15430 R45A for	Forward	5′-TGCTCTCGATTTgcCCTCAAAATCTG-3′
	AT3G15430 R45A rev	Reverse	5′-CAGATTTTGAGGgcAAATCGAGAGCA-3′
R45R	AT3G15430 R45R for	Forward	5′-TGCTCTCGATTTaGaCTCAAAATCTG-3′
	AT3G15430 R45R rev	Reverse	5′-CAGATTTTGAGtCtAAATCGAGAGCA-3′
H48A	AT3G15430 H48A for	Forward	5′-TCGCCTCAAAgcCTGATCCTCTAGT-3′
	AT3G15430 H48A rev	Reverse	5′-ACTAGAGGATCAGgcTTTGAGGCGA-3′

[a)] Lowercase letters indicate substituted nucleotides.

Supplementary Table S6. List of primers used for introduction of the codon substitutions into the *At5g27920* CPuORF.

Mutation	Primer name	Direction	Primer sequence [a)]
ΔAUG	AT5G27920 ΔAUG for	Forward	5′-TCGGCGTGAaGAACCCGAAA-3′
	AT5G27920 ΔAUG rev	Reverse	5′-TCGGGTTCtTCACGCCGATT-3′
T7A	AT5G27920 T7A for	Forward	5′-CTGCAAgCCGTTAACCCAA-3′
	AT5G27920 T7A rev	Reverse	5′-GGGTTAACGGcTTGCAGTTTC-3′
P10A	AT5G27920 P10A for	Forward	5′-GCAAACCGTTAACgCAATTCGGATC-3′
	AT5G27920 P10A rev	Reverse	5′-CCGAATTGcGTTAACGGTTTGCA-3′
I11A	AT5G27920 I11A for	Forward	5′-CCGTTAACCCAgcTCGGATCTTAGAAAAAC-3′
	AT5G27920 I11A rev	Reverse	5′-GATCCGAgcTGGGTTAACGGTTTGCA-3′
R12A	AT5G27920 R12A for	Forward	5′-CCCAATTgcGATCTTAGAAAAACCGGTTCA-3′
	AT5G27920 R12A rev	Reverse	5′-GGTTTTTCTAAGATCgcAATTGGGTTAACGGTT-3′
L14A	AT5G27920 L14A for	Forward	5′-CGGATCgcAGAAAAACCGGTTCACCA-3′
	AT5G27920 L14A rev	Reverse	5′-CCGGTTTTTCTgcGATCCGAATTGGGTTA-3′
K16A	AT5G27920 K16A for	Forward	5′-GGATCTTAGAAgcACCGGTTCACCA-3′
	AT5G27920 K16A rev	Reverse	5′-GAACCGGTgcTTCTAAGATCCGAA-3′
H19A	AT5G27920 H19A for	Forward	5′-GAAAAACCGGTTgcCCACTCTCTACT-3′
	AT5G27920 H19A rev	Reverse	5′-GAGAGTGGgcAACCGGTTTTTCT-3′
S21A	AT5G27920 S21A for	Forward	5′-GTTCACCACgCTCTACTCTATCT-3′
	AT5G27920 S21A rev	Reverse	5′-GATAGAGTAGAGcGTGGTGAAC-3′
L22A	AT5G27920 L22A for	Forward	5′-CACCACTCTgcACTCTATCTCCGAGCTGT-3′
	AT5G27920 L22A rev	Reverse	5′-GGAGATAGAGTgcAGAGTGGTGAACC-3′
L23A	AT5G27920 L23A for	Forward	5′-CCACTCTCTAgcCTATCTCCGAGCTGTGT-3′
	AT5G27920 L23A rev	Reverse	5′-CGGAGATAGgcTAGAGAGTGGTGAACC-3′
R26A	AT5G27920 R26A for	Forward	5′-CTACTCTATCTCgcAGCTGTGTTTCT-3′
	AT5G27920 R26A rev	Reverse	5′-GAAACACAGCTgcGAGATAGAGTAGA-3′
R26R	AT5G27920 R26R for	Forward	5′-ACTCTATCTCaGgGCTGTGTTTCTCT-3′
	AT5G27920 R26R rev	Reverse	5′-ACACAGCcCTGAGATAGAGTAGAGA-3′
F29A	AT5G27920 F29A for	Forward	5′-GAGCTGTGgcTCTCTTTATTCCGACTTA-3′
	AT5G27920 F29A rev	Reverse	5′-CGGAATAAAGAGAgcCACAGCTCGGA-3′
F31A	AT5G27920 F31A for	Forward	5′-CTGTGTTTCTCgcTATTCCGACTTAAAAAAAAAGCTTC-3′
	AT5G27920 F31A rev	Reverse	5′-GTCGGAATAgcGAGAAACACAGCTC-3′
P33A	AT5G27920 P33A for	Forward	5′-GCTGTGTTTCTCTTTATTgCGACTTAA-3′
	AT5G27920 P33A rev	Reverse	5′-GTCGcAATAAAGAGAAACACAGCT-3′
T34A	AT5G27920 T34A for	Forward	5′-CTCTTTATTCCGgCTTAAAAAAAAAGCTTC-3′
	AT5G27920 T34A rev	Reverse	5′-GAAGCTTTTTTTTTAAGcCGGAATAAAGAG-3′

[a)] Lowercase letters indicate substituted nucleotides.

Supplementary Table S7. List of primers used for introduction of the codon substitutions into the *OTLD1* CPuORF.

Mutation	Primer name	Direction	Primer sequence [a)]
ΔAUG	OTLD1 ΔAUG for	Forward	5′-CCGGGGAAaGCAGAGAACGTT-3′
	OTLD1 ΔAUG rev	Reverse	5′-GTTCTCTGCtTTCCCCGGAGAT-3′
E8A	OTLD1 E8A for	Forward	5′-TGCTGCGcGGTGGAGAAC-3′
	OTLD1 E8A rev	Reverse	5′-GTTCTCCACCgCGCAGCAA-3′
W13A	OTLD1 W13A for	Forward	5′-GAGAACGGTgcGAAGGAATCC-3′
	OTLD1 W13A rev	Reverse	5′-GATTCCTTCgcACCGTTCTCC-3′
S16A	OTLD1 S16A for	Forward	5′-TGGAAGGAAgcCCTCTCTCAAGGGA-3′
	OTLD1 S16A rev	Reverse	5′-TCCCTTGAGAGAGGgcTTCCTTCCA-3′
S18A	OTLD1 S18A for	Forward	5′-GGAATCCCTCgCTCAAGGGATT-3′
	OTLD1 S18A rev	Reverse	5′-AATCCCTTGAGcGAGGGATTCC-3′
G20A	OTLD1 G20A for	Forward	5′-CCTCTCTCAAGcGATTGTTATCGTA-3′
	OTLD1 G20A rev	Reverse	5′-TACGATAACAATCgCTTGAGAGAGG-3′
I21A	OTLD1 I21A for	Forward	5′-TCTCAAGGGgcTGTTATCGTAGGTCCTAA-3′
	OTLD1 I21A rev	Reverse	5′-TTAGGACCTACGATAACAgcCCCTTGAGA-3′
I23A	OTLD1 I23A for	Forward	5′-AGGGATTGTTgcCGTAGGTCCTAAAGCAA-3′
	OTLD1 I23A rev	Reverse	5′-GGACCTACGgcAACAATCCCTTGA-3′
K27A	OTLD1 K27A for	Forward	5′-GTAGGTCCTgcAGCAAGAACTAGG-3′
	OTLD1 K27A rev	Reverse	5′-CTAGTTCTTGCTgcAGGACCTACG-3′
R29A	OTLD1 R29A for	Forward	5′-GTCCTAAAGCAgcAACTAGGGACAAA-3′
	OTLD1 R29A rev	Reverse	5′-TTTGTCCCTAGTTgcTGCTTTAGGAC-3′
R29R	OTLD1 R29A for	Forward	5′-GTCCTAAAGCAcGcACTAGGGACAAA-3′
	OTLD1 R29A rev	Reverse	5′-TTTGTCCCTAGTgCgTGCTTTAGGAC-3′
R31A	OTLD1 R31A for	Forward	5′-AAAGCAAGAACTgcGGACAAACCTTG-3′
	OTLD1 R31A rev	Reverse	5′-AACGGTTTGTCCgcAGTTCTTGCTTT-3′
R31R	OTLD1 R31R for	Forward	5′-AAAGCAAGAACTcGaGACAAACCTTGG-3′
	OTLD1 R31R rev	Reverse	5′-CCAAGGTTTGTCtCgAGTTCTTGCTTT-3′
K33A	OTLD1 K33A for	Forward	5′-CTAGGGACgcACCTTGGGATAT-3′
	OTLD1 K33A rev	Reverse	5′-CCCAAGGTgcGTCCCTAGTTC-3′
L38A	OTLD1 L38A F	Forward	5′-AACCTTGGGATATTgcCTAATCTTTCATC-3′
	OTLD1 L38A R	Reverse	5′-GATGAAAGATTAGgcAATATCCCAAGGTT-3′

[a)] Lowercase letters indicate substituted nucleotides.

Supplementary Table S8. List of primers used for generation of the other mutants of the *OTLD1* CPuORF.

Construct	Primer name	Direction	Primer sequence [a)]	Template
ΔPWDI	DPWDI for DPWDI rev	Forward Reverse	5′- TAAAGCAAGAACTAGGGACAAACTCTAATCTTTCATCTTTGA-3′ 5′- TAAATCAAAGATGAAAGATTAGAGTTTGTCCCTAGTTCTTGCT-3′	35S::*OTLD1*-UTR(WT):RLUC
ΔWDIL	DWDIL for DWDIL rev	Forward Reverse	5′-GGGACAAACCTTAATCTTTCATCTTTGATTAGGACAGCA-3′ 5′-CAAAGATGAAAGATTAAGGTTTGTCCCTAGTTCTTGCTT-3′	35S::*OTLD1*-UTR(WT):RLUC
ΔPWDIL	DPWDIL for DPWDIL rev	Forward Reverse	5′-GAACTAGGGACAAATAATCTTTCATCTTTGATTAGGACAGCA-3′ 5′-CAAAGATGAAAGATTATTTGTCCCTAGTTCTTGCTTTAGGA-3′	35S::*OTLD1*-UTR(WT):RLUC
fs2	OTLD1 fs2 for OTLD1 fs2 rev	Forward Reverse	5′-CTAGGGACAAAACCTTGGGATA-3′ 5′-CCCAAGGTTTTGTCCCTAGTTCT-3′	35S::*OTLD1*-UTR(WT):RLUC 35S::*OTLD1*-UTR(fs):RLUC
fs2 ΔPWDI	fs2 DPWDI for fs2 DPWDI rev	Forward Reverse	5′-GCAAGAACTAGGGACAAAACTCTA-3′ 5′-TAGAGTTTTGTCCCTAGTTCTTGCT-3′	35S::*OTLD1*-UTR(ΔPWDI):RLUC 35S::*OTLD1*-UTR(fs):RLUC
fs2 ΔWDIL	fs2 DWDIL for fs2 DWDIL rev	Forward Reverse	5′-GCAAGAACTAGGGACAAAACCTTAATCT-3′ 5′-GGTTTTGTCCCTAGTTCTTGCT-3′	35S::*OTLD1*-UTR(ΔWDIL):RLUC 35S::*OTLD1*-UTR(fs):RLUC
fs2 ΔPWDIL	fs2 DPWDIL for fs2 DPWDIL rev	Forward Reverse	5′-GCAAGAACTAGGGACAAAATAATCTTTCA-3′ 5′-GAAAGATTATTTTGTCCCTAGTTCTTGCT-3′	35S::*OTLD1*-UTR(ΔPWDIL):RLUC 35S::*OTLD1*-UTR(fs):RLUC
Stop39A	Stop39A for Stop39A rev	Forward Reverse	5′-GGGATATTCTCgcATCTTTCATCTTTG-3′ 5′-GATGAAAGATgcGAGAATATCCCAAG-3′	35S::*OTLD1*-UTR(WT):RLUC
fs Stop39A	fs Stop39A for fs Stop39A rev	Forward Reverse	5′-GGGAATATTCTCgcATCTTTCATCTTTG-3′ 5′-GATGAAAGATgcGAGAATATTCCCAAG-3′	35S::*OTLD1*-UTR(fs):RLUC

[a)] The nucleotides that were inserted in the frameshift mutants are boxed. Shaded letters denote the positions of deletion mutations, in which sequences between the shaded nucleotides were deleted. Lowercase letters indicate substituted nucleotides.