Disruption of OsSEC3A increases the content of salicylic acid and induces plant defense responses in rice.

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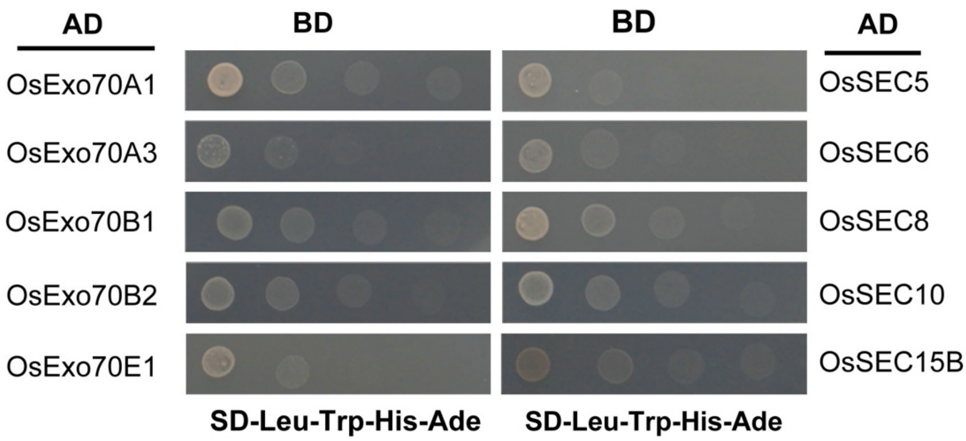
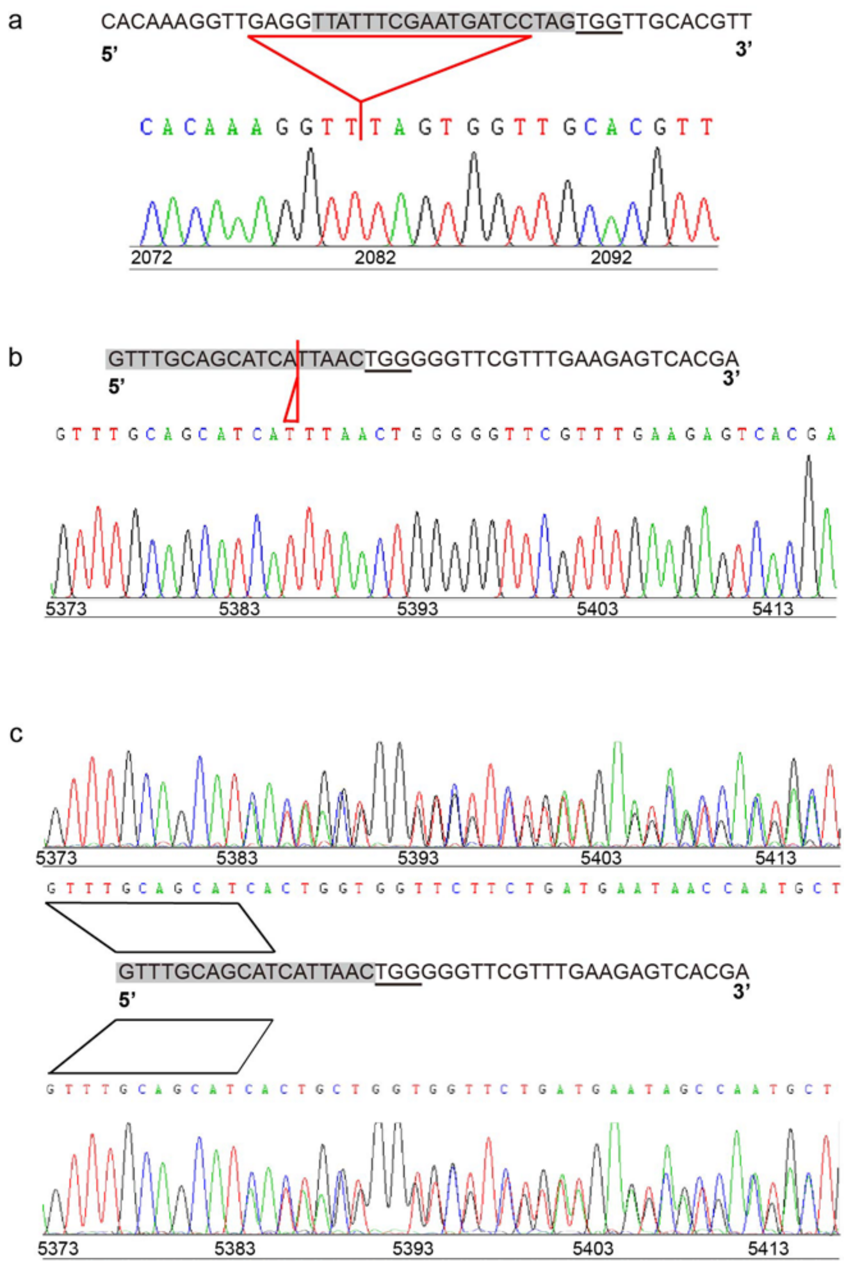
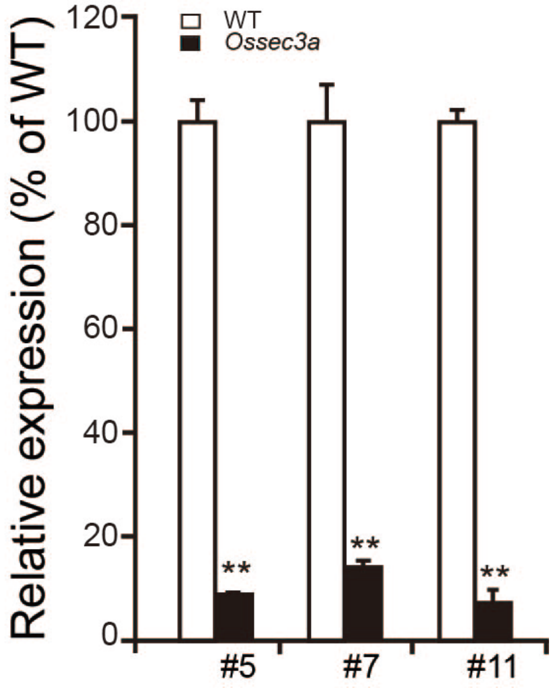
SUPPLEMENTARY DATA



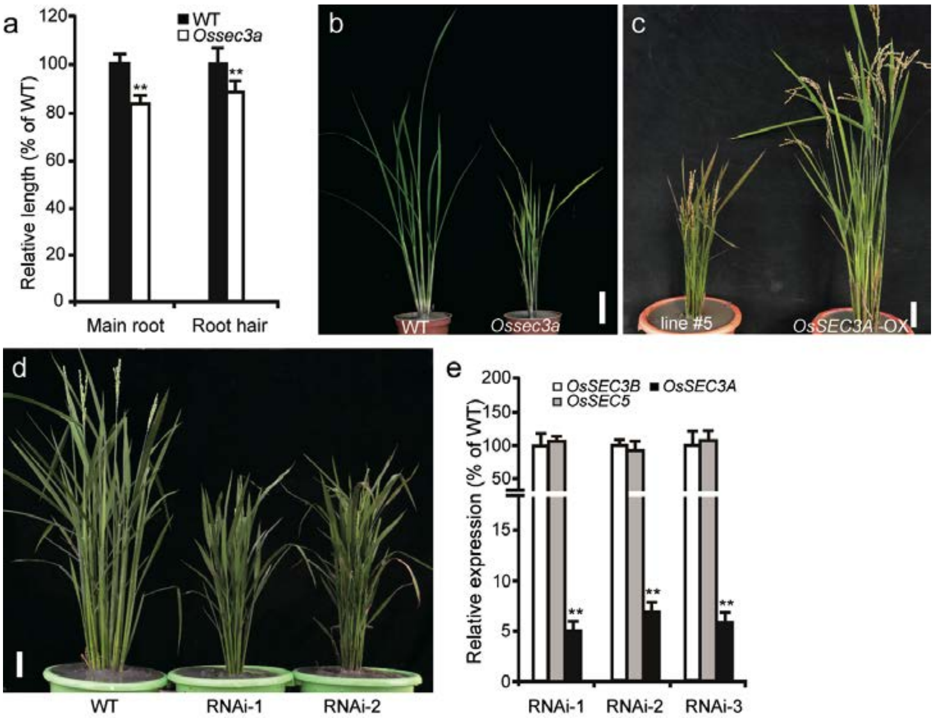
Supplementary Figure S1. Several exocyst subunits fused with AD displayed no auto-activation in our experiments.



Supplementary Figure S2. Alignment of mutations in *OsSEC3A* from chromatograms to the reference genome sequence. (a-b) Insert-cut indels. (c) Overlapping peaks appear after the presumed cleavage site in both directions, indicating sequence heterogeneity at the site.

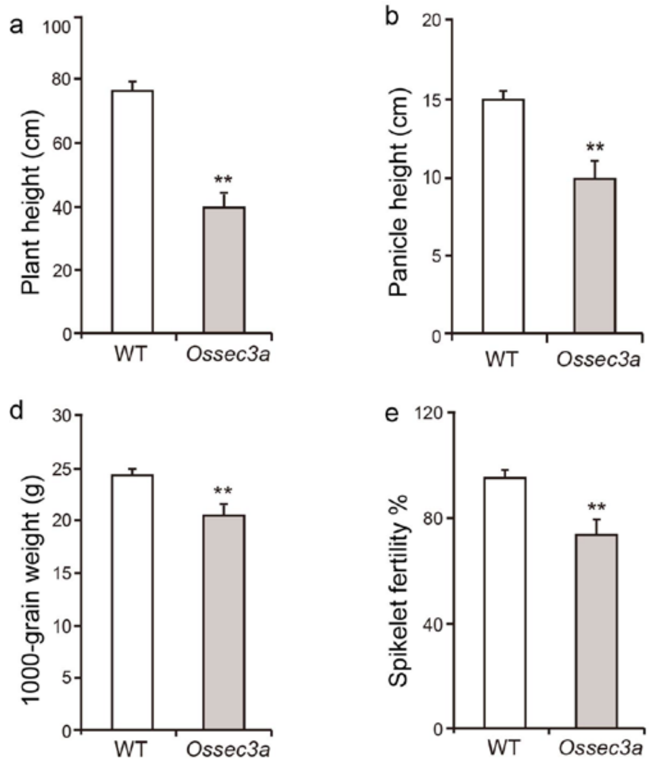


Supplementary Figure S3. qRT-PCR analysis of *OsSEC3A* in WT and *Ossec3a* plants (#5, #7, #11).

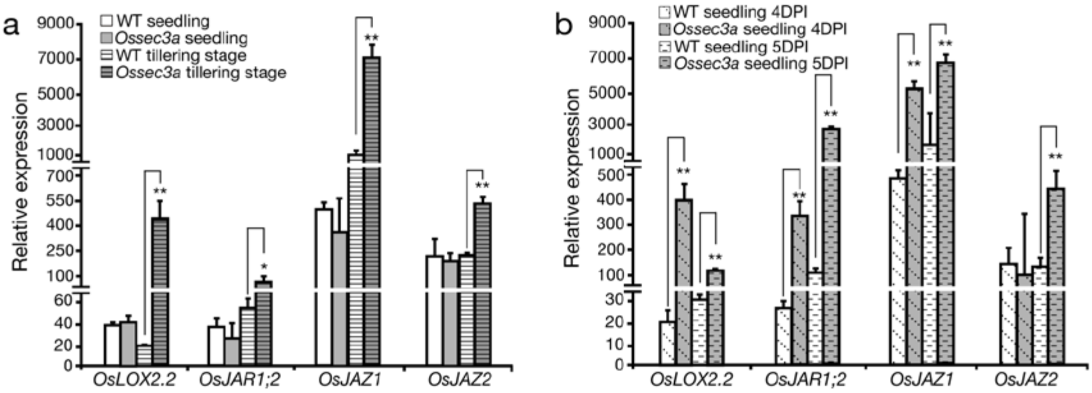


Supplementary Figure S4. Performance of whole plants (WT and transgenic lines) at different developmental stages.

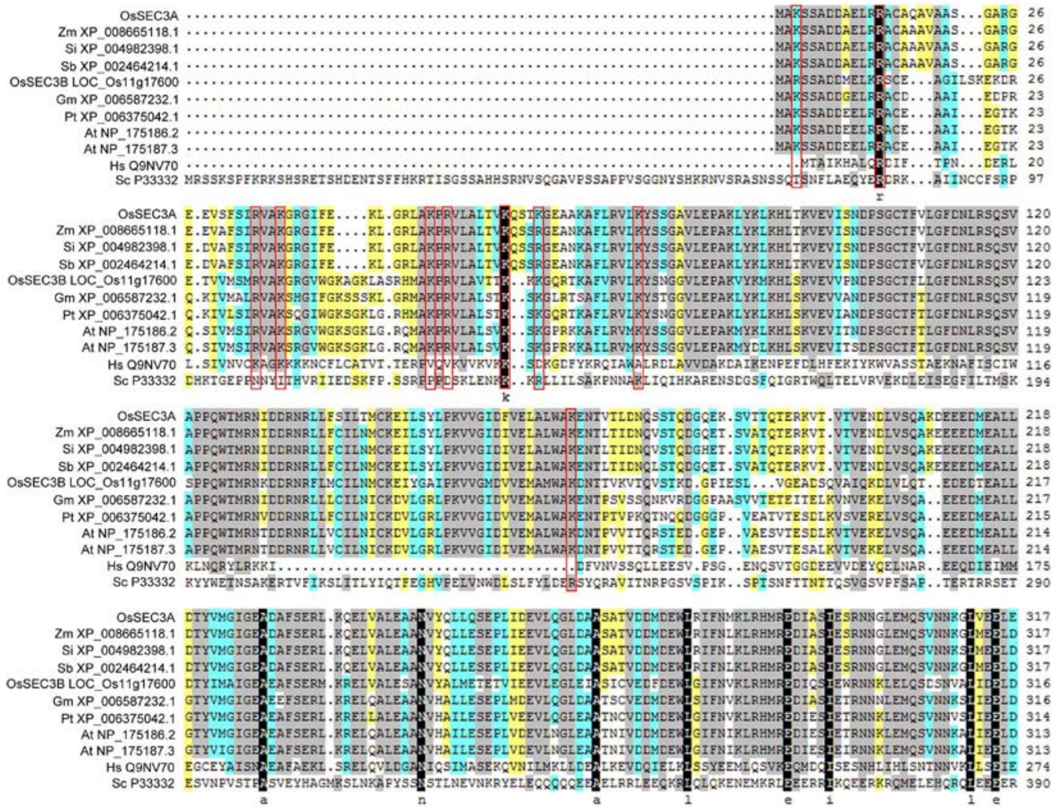
(a) Analysis of root and root hair length in WT and *Ossec3a* plants grown in liquid medium under greenhouse conditions. For all experiments, the longest main roots were observed. (b) Phenotypes of WT and *Ossec3a* mutant plants at the tillering stage. (c) The WT full-length cDNA of *OsSEC3A* completely rescued plant stature. (d) *OsSEC3A*-RNAi transgenic lines mimicked the phenotype of *Ossec3a* mutant plants. Scale bars = 10 cm in (b, c, d). (e) qRT-PCR of *OsSEC3A* and other exocyst subunit genes in WT and *OsSEC3A*-RNAi plants. Data are presented as mean ± standard error (n = 20). Significant differences were identified with Student's *t*-test (**p < 0.01).



Supplementary Figure S5. Agronomic traits (plant height, panicle length, tiller number, thousand-grain weight, and spikelet fertility) of wild-type and *Ossec3a* mutant plants. Data are presented as mean ± standard error (n = 20). Significance was determined with Student's *t*-test ($^{**}p < 0.01$).

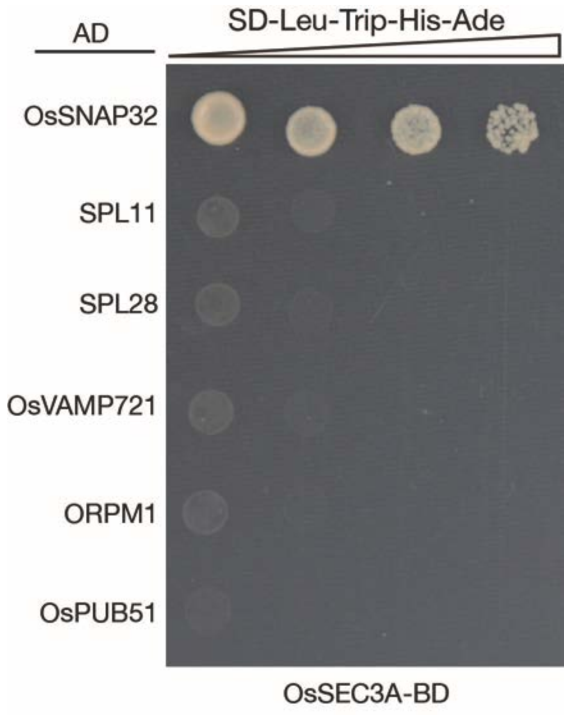


Supplementary Figure S6. qRT-PCR of jasmonic acid (JA) synthesis-related genes (*OsLOX2.2*, *OsJAR1;2*) and signaling pathway genes (*OsJAZ1*, *OsJAZ2*) in WT and *Ossec3a* seedling or tillering plants without (a) and with (b) *Magnaporthe oryzae* inoculation. Values are presented as the mean ± standard error of three independent experiments. Significant differences were determined with Student's *t*-test (*0.01 < *p* <0.05; ** *p* < 0.01).

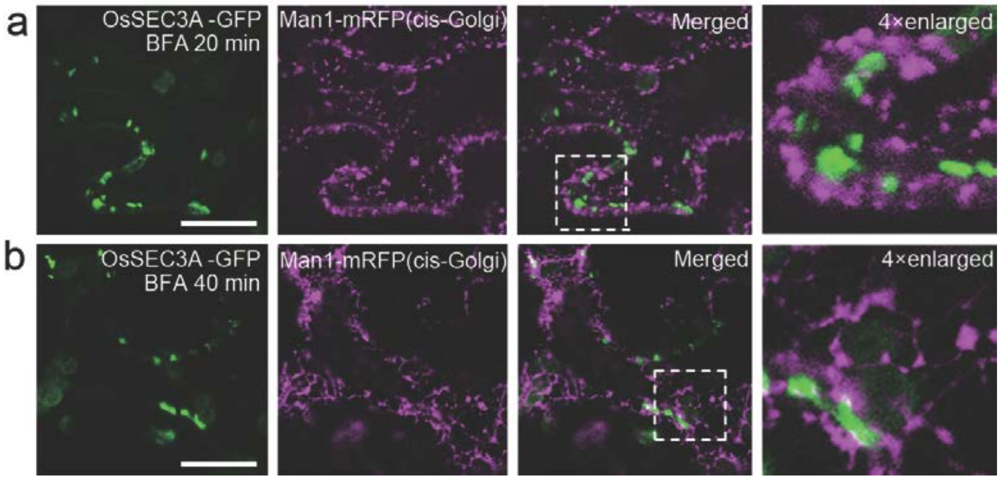


Supplementary Figure S7. Evolutionary analysis of OsSEC3A.

Sequence alignment of OsSEC3A with the equivalent regions of its homologs in different species. Conserved arginine/lysine residues predicted to be important for phosphoinositide binding are highlighted in red. Identical and similar amino acids are shaded in black (100%), grey (>75%), green (50%), or yellow (33%). The following abbreviations were used: Zm, *Zea mays*; Si, *Setaria italic*; Sb, *Sorghum bicolor*; Os, *Oryza sativa*; Gm, *Glycine max*; Pt, *Populus trichocarpa*; At, *Arabidopsis thaliana*; Hs, *Homo sapiens*; Sc, *Saccharomyces cerevisiae*.



Supplementary Figure S8. Interaction of OsSEC3A with a group of known immunity-and defense-related protein factors. Y2H assay in *S. cerevisiae*. Full-length OsSEC3A was ligated into pGBKT7 to generate the OsSEC3A-BD plasmid. Several exocyst constructs were fused with AD.



Supplementary Figure S9. BFA treatment of leaf epidermal cells coexpressing OsSEC3A-GFP and Man1-mRF. Scale bars = 10 μm.

Supplementary Table S1. Sequences of DNA oligonucleotides used in this study.

Primer Name	**Sequence**
OsSEC3A-Pro-F	CCATGATTAC**GAATTC**CAAGTTTTAGGCATGGTGTCA
OsSEC3A-Pro-R	CTCAGATCTA**CCATGG**TTGGGGAAGAGGGATGAGTT
OsSEC3A-MBP-F	CGACGGATCC**GAATTC**ATGGCGAAGTCGAGCGCG
OsSEC3A-MBP-R	TACCTGCAGG**GAATTC**CTAGAAGTTAGCAAGGACATC
OsSEC3A ^{N}(a.a. 1–450) -MBP-F	CGACGGATCC**GAATTC**ATGGCGAAGTCGAGCGCG
OsSEC3A ^{N} (a.a. 1–450) -MBP-R	TACCTGCAGG**GAATTC**CTAACAGCTCTTGTCCAGACTC
OsSEC3A ^{C}(a.a. 310–888) -MBP-F	CGACGGATCC**GAATTC**AAAGGACTCGTTGAAGAACT
OsSEC3A ^{C} (a.a.310–888) -MBP-R	TACCTGCAGG**GAATTC**CTAGAAGTTAGCAAGGACAT
qOsCATA-F	CAACCGCAACGTCGACAACTTCTT
qOsCATA-R	TTCACCGGCAGCATCAGGTAGTTT
qOsGSTF10-F	GCTTCTGTGCTCGAAGCCTA
qOsGSTF10-R	AGCAGACGGCATCTTCAGAG
qOsGSTU6-F	TACATCGACGAGGTGTTCCC
qOsGSTU6-R	TGCCTCTGAACACCGGAATC
qOsAOX1a-F	CTTCGCATCGGACATCCATTA
qOsAOX1a-R	TCCTCGGCAGTAGACAAACATC
qOsAOX1b-F	CCTGCTCAGTTCATCACCATCA
qOsAOX1b-R	GCATAAAACGGAGTGACAATAGC
qPO-C1-F	TAGAGGCCGTGTGCAATCAG
qPO-C1-R	GCTTGCACCTGTAGAGTCCC
qEDS1-F	CATTCCAAGAACGAGGACACTG
qEDS1-r	CAAGACTCAAGGCTAGAACCGA
qPAD4-F	AGGGGTTCTTGAGGCTGTGC

qPAD4-R	GCTGAGCTTGACGATGATGTG
qPAL-F	GCACATCTTGGAGGGAAGCT
qPAL-R	GCGCGGATAACCTCAATTTG
qPR1a-F	AGGGCGACTGCAAGCTGGTC
qPR1a-R	ACCACTGCTTCTCCGACACCC
qNPR1-F	GCTGGTGCTCGACTACCTCTACA
qNPR1-R	CAAGGACATCAAGGAGACGC
qPBZ1-F	TGATGGCTCCGGCCTGCGTC
qPBZ1-R	GGTCTTGTATGTGCTTCCCAC
OsLOX2.2-F	CCATCAGTGGACCGACATCA
OsLOX2.2-R	GAGTGGCCGGGTCATTGTCG
OsJAR1;2-F	GGATTGTTGATGGCGATACCT
OsJAR1;2-R	TGCCACCTTTCGTTATGACTTG
OsJAZ1-F	CTGGGACGCTGAAAGACACG
OsJAZ1-R	AACCTCTGCAGCGACACCTT
OsJAZ2-F	CCCCGCTGACCATCTTCTACGA
OsJAZ2-R	GCCTTCTTGTATGGTTCGCTCGT
qOsSEC3A-F	TGTCCCAAGCAAAGGATGAA
qOsSEC3A-R	AAATGCGTAACCACTCATCC
qOsSEC3B-F	TGTGGAGATGGCTATGTGGG
qOsSEC3B-R	GTCTTTCTGAATGGCAACTT
qOsSEC5F-F	CGTGGGAACATTAGAAAAGG
qOsSEC5R-R	CCTCCATTGACTTGTAAAGC
OsSEC3A-GFP-F	GCCCAGATCA**ACTAGT**ATGGCGAAGTCGAGCGC
OsSEC3A-GFP-R	TGCTCACCAT**GGATCC**GAAGTTAGCAAGGACATC
1305OsSEC3A-GFP-F	CGGAGCTAGC**TCTAGA**ATGGCGAAGTCGAGCGC

1305OsSEC3A-GFP-R	TCGAGACGTC**TCTAGA**GAAGTTAGCAAGGACATC
OsSEC3A-Crispr-1F	AGATGATCCGTGGCATTATTTCGAATGATCCTAGGTTTTAGAGCTATGC
OsSEC3A-Crispr-1R	GCATAGCTCTAAAACCTAGGATCATTCGAAATATGCCACGGATCATCT
OsSEC3A-Crispr-2F	AGATGATCCGTGGCAGTTTGCAGCATCATTAACGTTTTAGAGCTATGC
OsSEC3A-Crispr-2R	GCATAGCTCTAAAACGTTAATGATGCTGCAAACTGCCACGGATCATCT
1390OsSEC3A-CDS-F	TCTGCACTAGGTAC**CTGCAG**ATGGCGAAGTCGAGCGC
1390OsSEC3A-CDS-R	GGGGATCCGTCGAC**CTGCAG**CTAGAAGTTAGCAAGGACATC
OsSEC3A-RNAi1-F	TTACTTCTGCACTA**GGTACC**TGGGCATAGGTGAAGCAGAT
OsSEC3A-RNAi1-R	TAGAGCTCAGGCCT**GGTACC**CGCAAGCGATCAAGCAACTT
OsSEC3A-RNAi2-F	GAATTCCCGG**GGATCC**TGGGCATAGGTGAAGCAGAT
OsSEC3A-RNAi2-R	CGTAGTCGAC**GGATCC**CGCAAGCGATCAAGCAACTT
OsSEC3A-BD-F	GAATTCCCGG**GGATCC**GTATGGCGAAGTCGAGCGC
OsSEC3A-BD-R	GCAGGTCGAC**GGATCC**CTAGAAGTTAGCAAGGACATC
OsSEC3A (a.a. 1–160)-BD-F	GAATTCCCGG**GGATCC**GTATGGCGAAGTCGAGCGCG
OsSEC3A (a.a. 1–160)-BD-R	GCAGGTCGAC**GGATCC**CTACACAAAATCAATTCCAA
OsSEC3A (a.a. 190–510)-BD-F	GAATTCCCGG**GGATCC**GTCAAACTGAGAGGAAAGTAAC
OsSEC3A (a.a. 190–510)-BD-R	GCAGGTCGAC**GGATCC**CTAAGATACTGTTGAAGTGTCAGC
OsSEC3A$_C$ (a.a. 521–888)-BD-F	GAATTCCCGG**GGATCC**GTATCCCACTTCTTGTGGATGA
OsSEC3A$_C$ (a.a. 521–888)-BD-R	GCAGGTCGAC**GGATCC**CTAGAAGTTAGCAAGGACATCT
OsSNAP32-AD-F	GGAGGCCAGT**GAATTC**ATGAGCGGGAGG

	AGATCGTT
OsSNAP32-AD-R	CACCCGGGTG**GAATTC**TTATTTTCCAAGC AGACGGCG
OsPUB51-AD-F	GGAGGCCAGT**GAATTC**ATGGAGATCGAG GAGGCGGG
OsPUB51-AD-R	CACCCGGGTG**GAATTC**CTAACTCTTTGTT CTCCAGTC
OsRPM1-AD-F	GGAGGCCAGT**GAATTC**ATGCATACTGAG GTAGGGATCA
OsRPM1-AD-R	CACCCGGGTG**GAATTC**TCATATGGCGGC CGTTCTTT
SPL11-AD-F	GGAGGCCAGT**GAATTC**ATGGCCGGCGAC CGAG
SPL11-AD-R	CACCCGGGTG**GAATTC**TCATACAACCATA GGGTATTGAG
SPL28-AD-F	GGAGGCCAGT**GAATTC**ATGGCGGGCG CGGTGTCGGC GCT
SPL28-AD-R	CACCCGGGTG**GAATTC**TCATATAAGTCTC AGTTCGTAT
OsVAMP721-AD-F	CATCGATACG**GGATCC**ATATGGGGCAGC AGTCGCTGAT
OsVAMP721-AD-R	CGAGCTCGAT**GGATCC**TCACTTGCACTT GAAGCCAT
OsExo70A1-AD-F	CATCGATACG**GGATCC**ATATGGAGACCCT TGCGCAGC
OsExo70A1-AD-R	CGAGCTCGAT**GGATCC**TCAAGTACGCTC TTGTTTTC
OsExo70A3-AD-F	CATCGATACG**GGATCC**ATATGGTGGTGGC GGCGGCGGC
OsExo70A3-AD-R	CGAGCTCGAT**GGATCC**TCAGCGCTTCTG CTCCCCCCAT
OsExo70B1-AD-F	CATCGATACG**GGATCC**ATATGGCGGAGG ACGGCGAGGAGA
OsExo70B1-AD-R	CGAGCTCGAT**GGATCC**TCACTTGGACAC TCCTTCAAAC
OsExo70B2-AD-F	CATCGATACG**GGATCC**ATATGGCTGGCAT GGAGGATACT
OsExo70B2-AD-R	CGAGCTCGAT**GGATCC**TTAGCCTGGGTG GGAGGCAGT
OsExo70E1-AD-F	CATCGATACG**GGATCC**ATATGATGGCTGC TGAGTTAATT
OsExo70E1-AD-R	CGAGCTCGAT**GGATCC**CTACAATGTTTTT TGAGCTCCT

OsSEC5-AD-F	CATCGATACG**GGATCC**ATATGGCGAGCG ACAGCGACGT
OsSEC5-AD-R	CGAGCTCGAT**GGATCC**TCATCGACGCCG CCTCGAG
OsSEC6-AD-F	CATCGATACG**GGATCC**ATATGGAGGATCT GGGCATCGA
OsSEC6-AD-R	CGAGCTCGAT**GGATCC**TTACTGTCCAAG CTTGCTCCAT
OsSEC8-AD-F	GGAGGCCAGT**GAATTC**ATGAGCCGCACC GGCGGCCG
OsSEC8-AD-R	CACCCGGGTG**GAATTC**TTAATGGCCCAA AATCTGAGAG
OsSEC10-AD-F	CATCGATACG**GGATCC**ATATGGAGTTCAA CAGCACACCA
OsSEC10-AD-R	CGAGCTCGAT**GGATCC**CTATTCAGCCATG ATACTGTTT
OsSEC15bN-AD-F	CATCGATACG**GGATCC**ATATGACTGCTCA GACCAAGAAGA
OsSEC15bN-AD-R	CGAGCTCGAT**GGATCC**TCACTTTTTTAGA AGCTTTAGAG
OsSNAP32-GST-F	TGGATCCCCG**GAATTC**ATGAGCGGGAGG AGATCGTT
OsSNAP32-GST-R	GTCGACCCGG**GAATTC**TTATTTTCCAAGC AGACGGCG
OsExo70A1-GST-F	TGGATCCCCG**GAATTC**ATGGAGACCCTT GCGCAGC
OsExo70A1-GST-R	GTCGACCCGG**GAATTC**TCAAGTACGCTC TTGTTTTC
OsExo70B1-GST-F	TGGATCCCCG**GAATTC**ATGGCGGAGGAC GGCGAGGAGA
OsExo70B1-GST-R	GTCGACCCGG**GAATTC**TCACTTGGCACT CCTTCAAAC
NLuc-OsSEC3A$_C$-F	CGGGGGAC**GAGCTC**GGTACCATCCCACT TCTTGTGGATGA
NLuc-OsSEC3A$_C$-R	ACGAGATCTG**GTCGAC**GAAGTTAGCAAG GACATCT
CLuc-OsSNAP32-F	ACGCGTCCCGGGGC**GGTACC**ATGAGCGG GAGGAGATCGTT
CLuc-OsSNAP32-R	AGCTCTGCAG**GTCGAC**TTATTTTCCAAGC AGACGGCG
CLuc-OsSEC5-F	ACGCGTCCCGGGGC**GGTACC**ATGGCGAG CGACAGCGACGT
CLuc-OsSEC5-R	AGCTCTGCAG**GTCGAC**TCATCGACGCCG CCTCGAG

CLuc-OsSEC6-F	ACGCGTCCCGGGGC**GGTACC**ATGGAGGATCTGGGCATCGA
CLuc-OsSEC6-R	AGCTCTGCAG**GTCGAC**TTACTGTCCAAGCTTGCTCCAT
CLuc-OsSEC15bN-F	ACGCGTCCCGGGGC**GGTACC**ATGACTGCTCAGACCAAGAAGA
CLuc-OsSEC15bN-R	AGCTCTGCAG**GTCGAC**TCACTTTTTTAGAAGCTTTAGAG