



SUPPELEMENTARY MATERIAL

Table S1: Table shows number of exons and introns present in each gene of *OsNPR1* gene.

| Gene ID | Exons | Introns |
|-----------------|-------|---------|
| <i>OsNPR1-1</i> | 1 | 0 |
| <i>OsNPR1-2</i> | 1 | 0 |
| <i>OsNPR1-3</i> | 1 | 0 |
| <i>OsNPR1-4</i> | 1 | 0 |
| <i>OsNPR1-5</i> | 1 | 0 |

Table S2: Table shows number of motifs present in each gene of *OsNPR1*

| Gene ID | Motif Number |
|-----------------|--|
| <i>OsNPR1-1</i> | 1,2,3,5,6,8, 9, 13, 14, 15,19 |
| <i>OsNPR1-2</i> | 1,2,3,5, 6,7 8, 9, 10, 11, 13, 14, 15, 20 |
| <i>OsNPR1-3</i> | 1,2,3,5,6, 7, 8, 9,10,11,12, 13, 15, 17, 18,19 |
| <i>OsNPR1-4</i> | 1, 2, 2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,16, 17 |
| <i>OsNPR1-5</i> | 1, 2, 2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,16, 17 |

Table S3: The table displays potato *NPR1* gene family members distribution among different groups based on phylogenetic analysis with Arabidopsis and few other crops.

| Group | Total Genes | <i>Oryza sativa</i> | Column 1 | <i>Daucus carota</i> | Column 2 | <i>Solanum tuberosum</i> | Column 3 | <i>Gossypium herbaceum</i> , | Column 4 | <i>Arabidopsis thaliana</i> | Column 5 |
|--------|-------------|---------------------|--|----------------------|------------------------------------|--------------------------|-----------------|------------------------------|--|-----------------------------|------------------------------------|
| Number | | No. of NPR1-1 genes | Gene ID | No. of NPR1-1 genes | Gene ID | No. of NPR1-1 genes | Gene ID | No. of NPR-1 genes | Gene ID | No. of NPR1-1 gene | Gene ID |
| 1 | 4 | 0 | | 0 | | 1 | <i>SINPR1-2</i> | 3 | <i>GbPGII-1</i> <i>GbPGII-2</i> <i>GbPGII-7</i> | | |
| 2 | 4 | 4 | <i>OsNPR1-2</i> <i>OsNPR1-3</i> <i>OsNPR1-4</i> <i>OsNPR1-5</i> | 0 | | 0 | | 0 | | 0 | |
| 3 | 9 | 0 | | 2 | <i>DcNPR1-1</i> <i>DcNPR1-2</i> | 1 | <i>SINPR1-1</i> | 4 | <i>GbPGII-5</i> <i>GbPGII-8</i> <i>GbPGII-3</i> <i>GbPGII-6</i> | 2 | <i>AtNPR1-2</i> <i>AtNPR1-4</i> |
| 4 | 1 | 0 | | 1 | <i>DcNPR1-4</i> | 0 | | 0 | | 0 | |
| 5 | 7 | 1 | <i>OsNPR1-1</i> | 1 | <i>DcNPR1-3</i> | | | 3 | <i>GbPGII-4</i> <i>GbPGII-9</i> <i>GbPGII-10</i> | 2 | <i>AtNPR1-1</i> <i>AtNPR1-3</i> |

Table S4: The ratio of mutations involving non-synonymous substitutions (Ka) to mutations involving synonymous substitutions (Ks) is shown as Ka/Ks. Time of duplication represented by T and MYA stand for million year ago.

| Seq1-Seq2 | Ka | Ks | Ka_Ks | T | MYA |
|---------------|----------|----------|----------|-------------|-------------|
| OsNPR1/OsNPR2 | 0.479204 | 1.765898 | 0.271365 | 112477608.9 | 112.4776089 |
| OsNPR1/OsNPR3 | 0.506865 | 1.391019 | 0.364384 | 88599922.74 | 88.59992274 |
| OsNPR1/OsNPR4 | 0.502308 | 1.404206 | 0.357717 | 89439879.68 | 89.43987968 |
| OsNPR1/OsNPR5 | 0.502308 | 1.404206 | 0.357717 | 89439879.68 | 89.43987968 |
| OsNPR2/OsNPR3 | 0.337466 | 1.691772 | 0.199475 | 107756194.9 | 107.7561949 |
| OsNPR2/OsNPR4 | 0.3395 | 1.694289 | 0.200379 | 107916524.3 | 107.9165243 |
| OsNPR2/OsNPR5 | 0.3395 | 1.694289 | 0.200379 | 107916524.3 | 107.9165243 |
| OsNPR3/OsNPR4 | 0.007123 | 0.015685 | 0.454148 | 999031.5868 | 0.999031587 |
| OsNPR3/OsNPR5 | 0.007123 | 0.015685 | 0.454148 | 999031.5868 | 0.999031587 |

Table S5: Description of putative *cis*-acting regulatory elements.

| No. | Motif Name | Function |
|-----|--------------|---|
| 1 | A-box | Involved in light responsiveness. |
| 2 | AACA_motif | Associated with endosperm-specific expression. |
| 3 | AAGAA-motif | May be involved in stress or hormone responses. |
| 4 | ABRE | ABA-responsive element; regulates genes in abscisic acid signaling. |
| 5 | ABRE3a | Variant of ABRE; enhances ABA responsiveness. |
| 6 | ABRE4 | Another ABRE variant involved in ABA signaling. |
| 7 | AC-II | Light-responsive <i>cis</i> -element. |
| 8 | AE-box | Light-responsive element; interacts with transcription factors. |
| 9 | ARE | Antioxidant response element; involved in stress response. |
| 10 | AT~TATA-box | Core promoter element; binds TATA-binding proteins. |
| 11 | Box 4 | Light-responsive element. |
| 12 | CAAT-box | Promoter element; involved in transcription efficiency. |
| 13 | CARE | Involved in salicylic acid responsiveness. |
| 14 | CCGTCC motif | Light and hormone-responsive motif. |
| 15 | CCGTCC-box | Same as above; bZIP transcription factor binding site. |
| 16 | CGTCA-motif | Jasmonic acid-responsive element. |
| 17 | DRE core | Dehydration and cold stress responsive element. |
| 18 | ERE | Ethylene-responsive element. |
| 19 | G-Box | Light, hormone, and stress-responsive element; binds bZIP and bHLH TFs. |
| 20 | G-box | Same as above; alternative name. |
| 21 | GARE-motif | Gibberellin-responsive element. |
| 22 | GATA-motif | Light-responsive element; binds GATA TFs. |

| | | | | |
|----|------------------|---|--|--|
| 23 | GC-motif | General transcription factor binding site (Sp1). | | |
| 24 | GT1-motif | Involved in light responsiveness. | | |
| 25 | LTR | Low-temperature responsive element. | | |
| 26 | MBS | MYB binding site; involved in drought inducibility. | | |
| 27 | MRE | Metal-responsive element. | | |
| 28 | MYB | Transcription factor binding site involved in stress and development. | | |
| 29 | MYC | JA-responsive element; bHLH TF binding site. | | |
| 30 | Myb | Alternate spelling of MYB motif. | | |
| 31 | Myb-binding site | MYB transcription factor binding site. | | |
| 32 | O2-site | Involved in zein gene expression in maize. | | |
| 33 | P-box | Gibberellin-responsive element. | | |
| 34 | STRE | General stress-responsive element. | | |
| 35 | Sp1 | Binds GC-rich motifs; involved in general transcription regulation. | | |
| 36 | TATA | Core promoter element; facilitates transcription initiation. | | |
| 37 | TATA-box | Same as above. | | |
| 38 | TCA | Salicylic acid-responsive element. | | |
| 39 | TCA-element | Same as above. | | |
| 40 | TCT-motif | Involved in light-responsive gene expression. | | |
| 41 | TGA-element | Auxin-responsive element. | | |
| 42 | TGACG-motif | Methyl jasmonate (MeJA) responsive element. | | |
| 43 | W box | WRKY TF binding site; involved in biotic/abiotic stress responses. | | |
| 44 | WRE3 | Another WRKY binding site; wound or pathogen-related expression. | | |
| 45 | WUN-motif | Wound-responsive element. | | |
| 46 | as-1 | Pathogen-responsive; binds bZIP TFs like TGA factors. | | |

Table S6: The *OsNPR1* genes GO annotations and its involvement in biological function, molecular process and cellular components.

| Gene_IDs | Category | Term Accession | Term Name |
|---------------|--------------------|----------------|---|
| <i>OsNPR1</i> | biological_process | GO:0009862 | Systemic acquired resistance, salicylic acid mediated signaling pathway |
| | biological_process | GO:2000022 | Regulation of jasmonic acid mediated signaling pathway |
| | biological_process | GO:2000031 | Regulation of salicylic acid mediated signaling pathway |
| | biological_process | GO:0050832 | Defense response to fungus |
| | biological_process | GO:0042742 | Defense response to bacteria |
| | molacular_process | GO:0033293 | Monocarboxylic acid binding |

| | | |
|---------------------|--------------|----------------------|
| molacular_process | GO:0043177 | Organic acid binding |
| cellular components | GOCC:1990524 | INA Complex |

Table S7: Expression of *NPR1* genes in rice in response to four treatments, showing statistically fold change value and pvalue of each treatment.

| Gene ID | Gene Name | T1.fC | T1, pValue | T2, fC | T2, pValue | T3, fC | T4, pValue | T4' fC | T4, pValue | T5, fC | T5, pValue |
|--------------|---------------|-------|-------------|--------|-------------|--------|-------------|--------|-------------|--------|-------------|
| Os01g0194300 | <i>OsNPR1</i> | 1.5 | 4.50E-04 | 1.8 | 1.07E-26 | 0.9 | 1.82E-04 | | | 1.1 | 0.020303157 |
| Os03g0767900 | <i>OsNPR2</i> | 0.6 | 0.222918087 | | | -0.3 | 0.3460047 | | | | |
| Os02g0667100 | <i>OsNPR3</i> | 0.9 | 0.298052301 | 0.3 | 0.565111514 | 0.2 | 0.801512672 | | | | |
| Os03g0667100 | <i>OsNPR4</i> | 0.5 | 0.358163358 | 0.2 | 0.336116266 | 0.4 | 0.119401515 | -0.2 | 0.999991062 | 0.1 | 0.969982164 |
| Os04g0667100 | <i>OsNPR5</i> | -0.3 | 0.470013784 | 0.2 | 0.597654687 | -0.1 | 0.741076392 | 0.2 | 0.999991062 | 0.4 | 0.602153745 |

Table S8: Description of miRNA accession numbers, their targeted genes and their fragments are given in this table.

| miRNA_Acc | Target_Acc. | Target_start | Target_end | miRNA_aligned_fragment |
|-----------------|-------------|--------------|------------|--------------------------|
| osa-miR5075 | OsNPR1-2 | 169 | 189 | UUCUCCGUCGCCGCCGUCCGC |
| osa-miR2864.2 | OsNPR1-3 | 1434 | 1454 | UUGUUUUGCAUUGUAUAGGUA |
| osa-miR2926 | OsNPR1-1 | 409 | 428 | AGGUCGUCGACGUUGGUGCU |
| osa-miR1846d-3p | OsNPR1-2 | 558 | 577 | UAUCCGGCGCCGCAGGGAGG |
| osa-miR5075 | OsNPR1-1 | 184 | 204 | UUCUCCGUCGCCGCCGUCCGC |
| osa-miR531a | OsNPR1-2 | 382 | 405 | CUCGCCGGGGCUGCGUGCCGCCAU |
| osa-miR531b | OsNPR1-2 | 386 | 405 | CUCGCCGGGGCUGCGUGCCG |

| | | | | |
|-------------------------|----------|------|------|--------------------------|
| osa-miR531c | OsNPR1-2 | 382 | 405 | CUCGCCGGGGCUGCGUGCCGCCAU |
| osa-miR166a-5p | OsNPR1-1 | 588 | 608 | GGAAUGUUGUCUGGUUCAA GG |
| osa-miR166d-5p | OsNPR1-1 | 588 | 608 | GGAAUGUUGUCUGGCUCGAGG |
| osa-miR166e-5p | OsNPR1-1 | 588 | 608 | GGAAUGUUGUCUGGUUCAA GG |
| osa-miR169i-5p.2 | OsNPR1-3 | 1695 | 1716 | UGGUGAUAAGGGUGUAGCUCUG |
| osa-miR171i-5p | OsNPR1-1 | 747 | 767 | AGGUAAUUGGCGUGCCUCAAUC |
| osa-miR2874 | OsNPR1-3 | 1251 | 1274 | AUGUGAACAGUGUCAACAGUGUC |
| osa-miR2926 | OsNPR1-1 | 193 | 212 | AGGUCGUCGACGUUGGUGCU |
| osa-miR395a | OsNPR1-1 | 135 | 155 | GUGAAGUGCUUGGGGGAACUC |
| osa-miR413 | OsNPR1-3 | 917 | 937 | CUAGUUUCACUUGUUCUGCAC |
| osa-miR5075 | OsNPR1-2 | 129 | 149 | UUCUCCGUCGCCGCCGUCCGC |
| osa-miR5075 | OsNPR1-1 | 340 | 360 | UUCUCCGUCGCCGCCGUCCGC |
| osa-miR530-5p | OsNPR1-1 | 1394 | 1413 | UGCAUUUGCACCUGCACCUA |
| osa-miR166b-5p | OsNPR1-1 | 588 | 608 | GGAAUGUUGUCUGGCUCGGGG |
| osa-miR166i-5p | OsNPR1-1 | 641 | 661 | AAUGCAGUUUGAUCCAAGAUC |
| osa-miR1847.1 | OsNPR1-3 | 925 | 945 | UGCAGUUUGCAGUUGUGGCAC |
| osa-miR1847.1 | OsNPR1-2 | 1490 | 1509 | UGCAGUUUGCAGUUGUGGCAC |
| osa-miR1860-3p | OsNPR1-1 | 939 | 960 | AUCUGGAAGCUAGGUUUUCUCU |
| osa-miR1860-5p | OsNPR1-2 | 753 | 773 | AGAAAACCAGCUUCCAGAUCU |
| osa-miR1861e | OsNPR1-2 | 485 | 506 | CGGUCUUGUGGCAAGAACUGAG |
| osa-miR1861k | OsNPR1-2 | 485 | 506 | CGGUCUUGUGGCAAGAACUGAG |
| osa-miR1861m | OsNPR1-2 | 485 | 506 | CGGUCUUGUGGCAAGAACUGAG |

| | | | | |
|-----------------------|----------|------|------|-------------------------|
| osa-miR2099-5p | OsNPR1-2 | 789 | 809 | UGAAUAUGUUUGUACAAGCUUU |
| osa-miR2275a | OsNPR1-1 | 1197 | 1218 | UUUGGUUCCUCCAUAUCUCA |
| osa-miR2275b | OsNPR1-1 | 1197 | 1218 | UUUGGUUCCUCCAUAUCUCA |
| osa-miR2927 | OsNPR1-3 | 66 | 88 | UGUCGUCGUCGAUGGAGCCCAUG |
| osa-miR395b | OsNPR1-1 | 135 | 155 | GUGAAGUGUUUGGGGGAACUC |
| osa-miR395d | OsNPR1-1 | 135 | 155 | GUGAAGUGUUUGGGGGAACUC |
| osa-miR395e | OsNPR1-1 | 135 | 155 | GUGAAGUGUUUGGGGGAACUC |
| osa-miR395g | OsNPR1-1 | 135 | 155 | GUGAAGUGUUUGGGGGAACUC |
| osa-miR395h | OsNPR1-1 | 135 | 155 | GUGAAGUGUUUGGGGGAACUC |
| osa-miR395i | OsNPR1-1 | 135 | 155 | GUGAAGUGUUUGGGGGAACUC |
| osa-miR395j | OsNPR1-1 | 135 | 155 | GUGAAGUGUUUGGGGGAACUC |
| osa-miR395k | OsNPR1-1 | 135 | 155 | GUGAAGUGUUUGGGGGAACUC |
| osa-miR395l | OsNPR1-1 | 135 | 155 | GUGAAGUGUUUGGGGGAACUC |
| osa-miR395m | OsNPR1-1 | 135 | 155 | GUGAAGUGUUUGGGGGAACUC |
| osa-miR395n | OsNPR1-1 | 135 | 155 | GUGAAGUGUUUGGGGGAACUC |
| osa-miR395p | OsNPR1-1 | 135 | 155 | GUGAAGUGUUUGGGGGAACUC |
| osa-miR395q | OsNPR1-1 | 135 | 155 | GUGAAGUGUUUGGGGGAACUC |
| osa-miR395r | OsNPR1-1 | 135 | 155 | GUGAAGUGUUUGGGGGAACUC |
| osa-miR395s | OsNPR1-1 | 135 | 155 | GUGAAGUGUUUGGGGGAACUC |
| osa-miR395y | OsNPR1-1 | 135 | 155 | GUGAAGUGUUUGGGGGAACUC |
| osa-miR437 | OsNPR1-2 | 1424 | 1444 | AAAGUUAGAGAAGUUUGACUU |
| osa-miR5075 | OsNPR1-2 | 415 | 435 | UUCUCCGUCGCCGCCGUCCGC |
| osa-miR5075 | OsNPR1-1 | 289 | 309 | UUCUCCGUCGCCGCCGUCCGC |

| | | | | |
|--------------------|----------|------|------|------------------------------|
| osa-miR5490 | OsNPR1-1 | 1439 | 1459 | UUGGAUUUUUUAUUUAGGACG G |
| osa-miR5524 | OsNPR1-1 | 20 | 40 | UGGAAAAUGUGUUCAUGACG G |
| osa-miR5809 | OsNPR1-2 | 406 | 425 | UCGUCGCCGGCGACCACAG C |
| osa-miR5816 | OsNPR1-3 | 240 | 263 | UAGGAGUGUUUGUAGGAGC GCCAC |
| osa-miR5832 | OsNPR1-1 | 405 | 425 | UUGGCGGAGCGGUUGCUGU CA |