**Supplemental File 1A**

Primers for cloning and Q-PCR

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| **Gene** | **Primer name** | **Sequence** |
| *KAN1 (At5g16560)* | KAN1g F | ACGCGTTGTTTGGATGTATGACATTAAGTAAGCTAT |
| *KAN1 (At5g16560)* | KAN1g R | GGATCCGCTTTCTCGTGCCAATCTGGTCTGCCTAA |
| *KAN1 (At5g16560)* | K1cDNA F | AGATCTAACAATGTCTATGGAAGGTGTTTTCCTAGAGAAAAC |
| *KAN1 (At5g16560)* | K1 cDNA R | GGATCCGCTTTCTCGTGCCAATCTGGTCTGCCTAA |
| *CLV3 (At2g27250)* | CLV3p F | GGAATTCCGGATTATCCATAATAAAAAC |
| *CLV3 (At2g27250)* | CLV3p R | CTGCAGGTTTTAGAGAGAAAGTGACTGAGTGA |
| *CLV3 (At2g27250)* | CLV3utr F | AAACCTGCAGGGATCCGCGGC |
| *CLV3 (At2g27250)* | CLV3p R | ATAGAATATCACTAGTTAATTATCATTGGTTTAAAGTTATAG |
| *WOX1 (At3g18010)* | WOX1p F | ggtaccTCAAAACCGGTTTTTATACGACAAGAC- |
| *WOX1 (At3g18010)* | WOX1p R | ggatccTTTGGTGTGTACTTAATTTATATGTATG |
| *WOX1 (At3g18010)* | WOX1g F | gcggcagcaagatctATGTGGACGATGGGTTACAACGAAG |
| *WOX1 (At3g18010)* | WOX1g R | atagaatatcactagtACGTCACTGATGATATACTACG |
| *PRS (At2g28610)* | PRSg F | agatctGCGTACGTGTGTACGTGAATGAAAT |
| *PRS (At2g28610)* | PRSg R | ggatccAGTTTGGTACTGTCTTGTTTGGAGT |
| *PRS (At2g28610)* | PRS FP (Q-PCR) | CAACTCCAAACAAGACAGTACCA |
| *PRS (At2g28610)* | PRS RP (Q-PCR) | ACATGAATGAAACACCTGCAGA |
| *WOX1 (At3g18010)* | WOX1 FP (Q-PCR) | GCCTCCTTCGTTGTAACCCA |
| *WOX1 (At3g18010)* | WOX1 RP (Q-PCR) | GCTGTCTCTCTCCCTTCTCC |
| *IAA20 (At2g46990)* | IAA20 FP (Q-PCR) | ATGTGCAATGAGAAGAGTCACG |
| *IAA20 (At2g46990)* | IAA20 RP (Q-PCR) | TCACAGTAGACAAGAACATCTCC |
| *ACT2 (At3g18780)* | ACT2 FP (Q-PCR) | CCTGTTCTTCTTACCGAGGC |
| *ACT2 (At3g18780)* | ACT2 RP (Q-PCR) | AATTTCCCGCTCTGCTGTTG |

**Supplemental File 1B**

Frequencies of phenotypes amongst transgenic plant lines

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| **Transgenic plants** | **No of T2 lines** | **T2 line phenotypes** |
| *ATML1>>REVr-2×VENUS* | 31 | 15 arrest or delay of organogenesis  8 partially or completely dorsalized leaves only  8 no phenotype |
| *UBQ10>>STTM 165/166* | 26 | 6 arrested organogenesis  20 partially or completely dorsalized leaves |
| *ATML1>>PHVr* | 50 | 4 arrest or delay of organogenesis  31 partially or completely dorsalized leaves  15 no phenotype |
| *ATML1>>KAN1-GFP* | 17 | 11 meristem arrest  6 partially or fully radialized organs only |
| *CLV3>>KAN1-2×GFP* | 32 | 10 mild change in organ position  10 meristem arrest only  12 leaf morphology change and meristem arrest |

**Supplemental File 1C**

List of parameter values used in simulations.

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| **Symbol** | **Value** | **Description** |
| *cA* | 0.001 | Auxin production |
| *dA* | 0.001 | Auxin degradation |
| *T* | 1.3 | Active transport of auxin (PIN1-dependent) |
| *D* | 0.002 | Passive transport of auxin |
| *cP* | 0.001 | PIN1 production |
| *dP* | 0.001 | PIN1 degradation |
| *VX* | 10.0 | Maximal production rate of polarising signal X |
| *KXA* | 10.0 | Hill constant for auxin activating X |
| *nXA* | 1 | Hill coefficient for auxin activating X |
| *KXR, KXK* | 0.1 | Hill constants for REV/KAN repressing X |
| *nXR, nXR* | 2 | Hill coefficients for REV/KAN repressing X |
| *dX* | 1.0 | Degradation of polarising signal X |
| *kp* | 0.9 | Relation of symmetric vs polarized PIN1 |
| *fp* | 0.3 | Ratio between PIN1 endo/exocytosis |