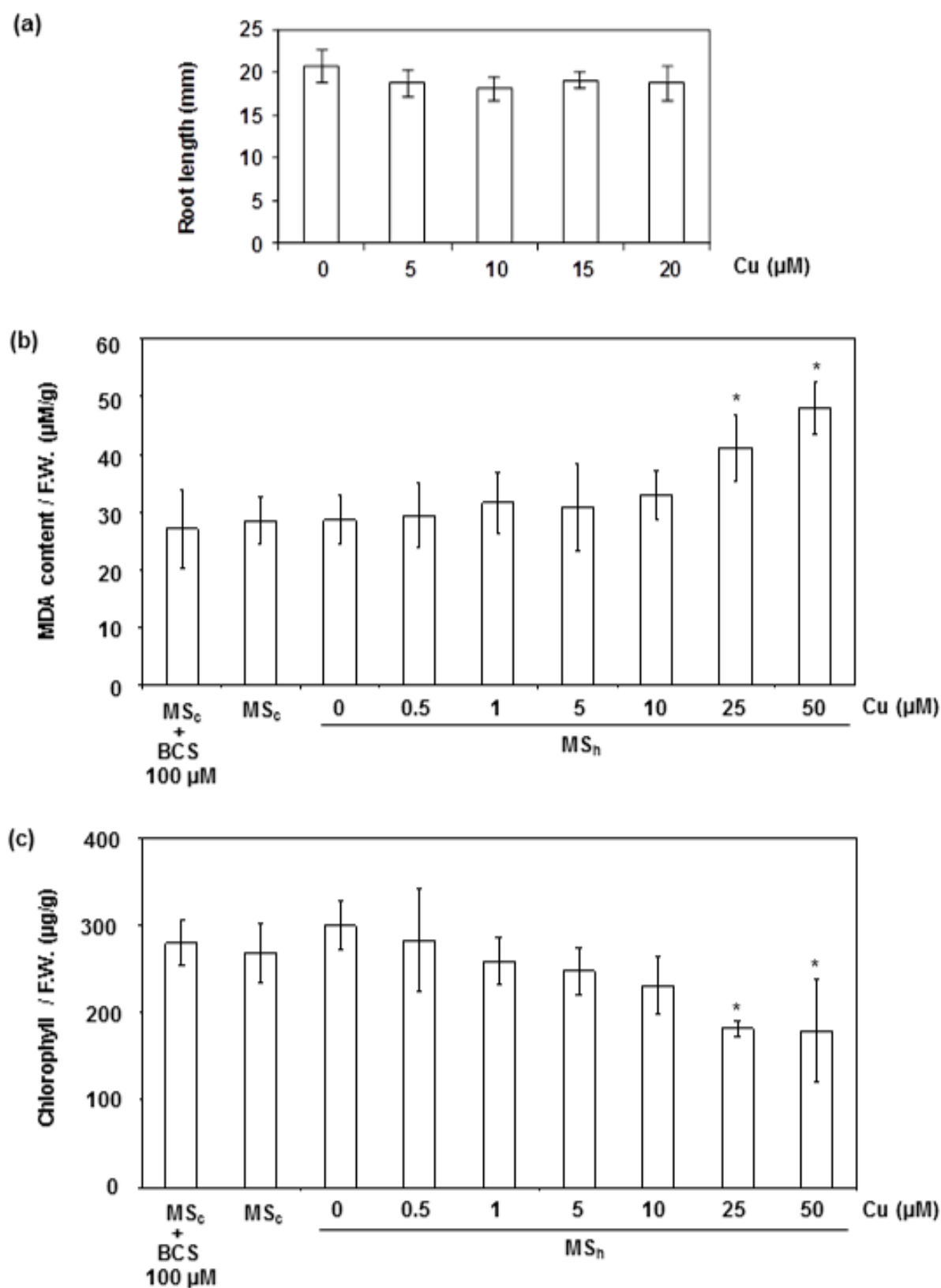
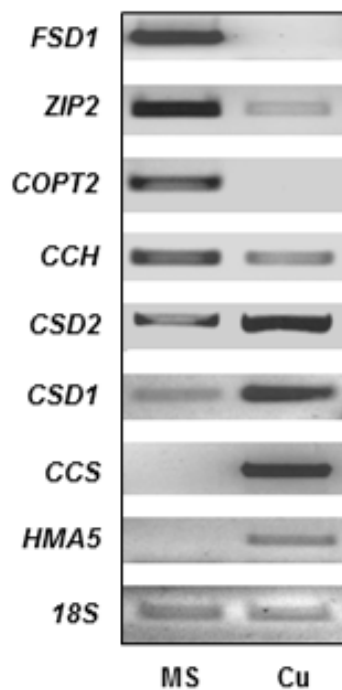




**Figure S1. Root length, MDA and chlorophyll contents in *Arabidopsis* seedlings grown on different Cu-supplemented media.** a) Root length of 6-day-old WT seedlings grown on commercial MS medium with different Cu concentrations. b) Quantification of lipid peroxidation as the MDA content of 6-day-old WT seedlings grown on MS media (commercial,  $\text{MS}_c$ ; homemade,  $\text{MS}_h$ ) supplemented with BCS or Cu, as indicated. Values are the means  $\pm$  SD of at least four biological replicates. c) Quantification of the total chlorophyll content of the same seedlings used in (b). Values are the means  $\pm$  SD of at least three biological replicates. F.W., fresh weight. Asterisks represent significant differences in relation to Cu 0.5  $\mu\text{M}$  ( $P < 0.05$ ).



**Figure S2.** Visual symptoms of the *Arabidopsis* plants grown in soil in different Cu-supplemented media. Plants were grown for around 6 weeks in homemade MS with levels of deficiency (0  $\mu\text{M}$ ), sufficiency (2.5  $\mu\text{M}$ ) and excess (100  $\mu\text{M}$ ) Cu.



**Figure S3. Validation of the microarray analysis conditions.** Expression of the indicated genes. The total RNA from 6-day-old WT seedlings grown on commercial MS medium without (MS) and with Cu 10  $\mu$ M (Cu) was isolated and retrotranscribed to cDNA. The corresponding sqPCR products are shown with *18S* rRNA as the loading control.

**FSD1**

tttttccactatgttccatataatctctatcacagtttttaggtacattgtagaaattgggataagatacgtca  
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aaattataattttataaatgcttttatagtattgaaaaataagatgatttttttttttttaataaccggatt  
ggctgatccacttatgatgactcaaatgttattaagtttcaagacaatttatgatgacacaaatcacaaat  
gagtcaatagtagccacgaagccagaaaaaaaatgtactacaaaaagataatgatagtagtacaatatgat  
acgtcgtagtgcacatgtacgacacaactcgattaccaaaaagcagagccatccaaccataaaactcaa  
aacacacagattccactggcgtgtgtctctcctcacttcactcgtccttgaaacttgaggtagtactgattcta  
tctctcatccacatcttagttcatgttcgagtttctctggtctcttactctttcacctagaaaatttggtt  
ggtctcccaacaacataaacgcagatgtatacattttcatgtgtctttgtgaaggatattgattcatttttt  
gggcaaatagataatcaattcaatgctatgttttgtctgaaatgtgcagcttcaattacaaaga

**miR398b**

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ataatgaatgccacataacttgctcgtgtactacacaattgttgtggtgttattgtgtactacccaatcc  
attcattgtctgtgtatttatagtttccagcatgtttgagacaaacccaaaactcaaaatgtaataacaag  
aagatatcaaataatcatgaaggtag

**ZIP2**

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gcaaatctcacaacaagaaagtcacacactgtactacaaacacccaaaatatataaacattacactaataatg  
ttcatgaagtgaagaaaaagcacaacacaaacaaataactaaa

**COPT2**

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tcaaattattagatttattctaaattaaaattagatattctgtgtaaattatttattataccaacgcaaa  
gaagattagacgaagagggcatggagttgtaattgtgtatcatgcaataaggtaaaatactatatatatat  
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aaacctattacattagtagtacc

**YSL2**

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ggttagtgtgtttcagaccaacaacatatatcaaccgcgtctgtctttttatctgaaaaacgtgtgtttt  
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caatatcactaatatgagattctctcttcttcttcttcttcttcttccatcttacgccaaacctcgagctctgc  
gaatcattcgattctcagattcgcatattttcttgcgaattcgctaggtcctaaacggttggttccgtgtac  
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caa

**CCH**

ttttggcaaaacaatccgtgaaaaggacacattatttatgtatcaatacaccccactacctagtcacct  
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acatataatatattgtgttttattgttcatgatattcttttagaaagcttgaaaataaaatattaggataaa  
aatagttttctctaagttcatagtcaaaatactactatctaataaaaagtaaaccttgattgaccccatata  
tataaaaattaggtaattgtgtactgcaacaaaacatgtgttagtacaaggagacctcatagaattctttgt

**Figure S4. Promoters of the putative genes bearing Cu deficiency-responsive *cis* regulatory elements.** The 500 bp upstream of the transcriptional start of each gene are shown. Red letters indicate the 5' UTR regions and blue letters denote introns. The GTAC boxes are underlined.

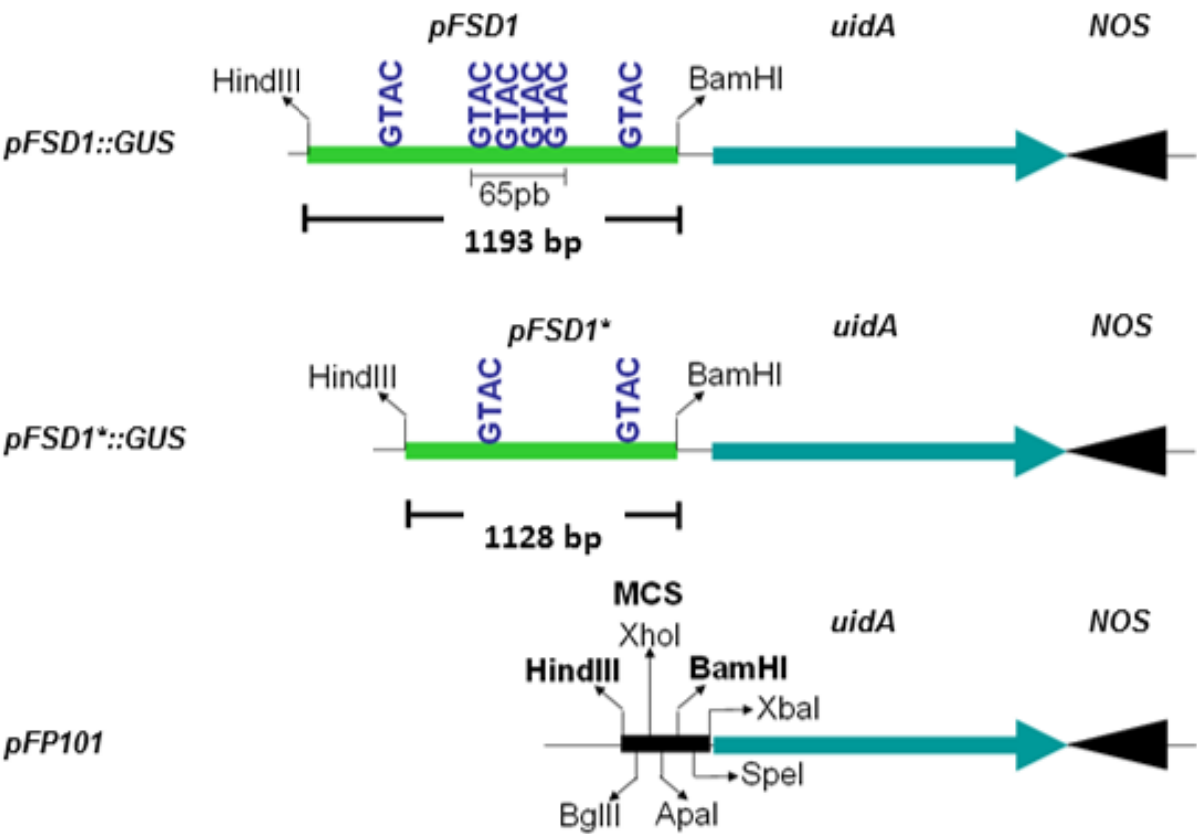
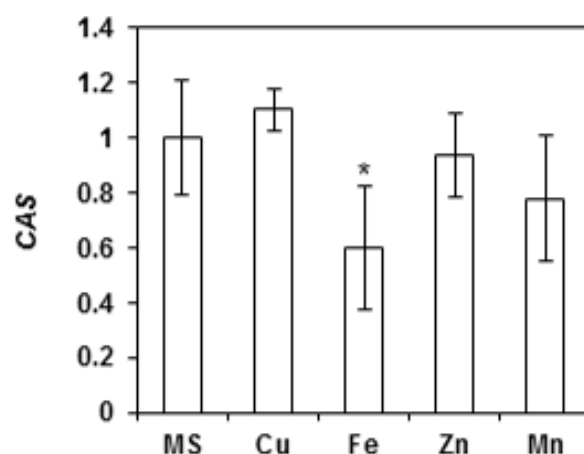


Figure S5. Schematic representation of the constructs used to test the putative *cis* regulatory element in the *FSD1* promoter.



**Figure S6. Expression of the CAS gene in the *Arabidopsis* seedlings grown on different metal-deficient media.** The total RNA from 6-day-old WT seedlings grown on homemade MS media without the indicated metals (BCS 100  $\mu$ M and ferrozine 300  $\mu$ M were added for the Cu- or Fe-deprived media, respectively) was isolated and retrotranscribed to cDNA. The mRNA amounts were measured by qPCR with specific primers and were normalized to the UBQ10 expression. mRNA levels are expressed as relative units to the MS medium. Values are the means  $\pm$  SD of at least three biological replicates. The asterisk represents a significant difference in relation to MS medium ( $P < 0.05$ ).

**Table S1. Functional categories and genes overrepresented under high Cu.** The microarray analysis results from the 6-day-old *Arabidopsis* WT seedlings grown on commercial MS media without (Low Cu) and with Cu 10 µM (High Cu). The number of the GTAC boxes is indicated for a promoter region of 500 bp upstream of the transcriptional start. The ratio value is the median log<sub>2</sub> ratio in the high vs. the low Cu levels in the microarray analysis.

| Gene annotation                                              | Gene name             | Mips code        | N° GTACs | Ratio        |
|--------------------------------------------------------------|-----------------------|------------------|----------|--------------|
| <b>Ion homeostasis</b>                                       |                       |                  |          |              |
| <b>Cu chaperone for SOD</b>                                  | <i>CCS</i>            | <b>At1g12520</b> | <b>1</b> | <b>2.642</b> |
| Afadin/alpha-actinin-binding protein response to cadmium ion |                       | At5g57410        |          | 1.046        |
| <b>Response to stress</b>                                    |                       |                  |          |              |
| <b>Cu/Zn superoxide dismutase</b>                            | <i>CSD2</i>           | <b>At2g28190</b> |          | <b>3.410</b> |
| Cu/Zn superoxide dismutase                                   | <i>CSD1</i>           | At1g08830        | 2        | 2.496        |
| <b>Succinate dehydrogenase 1-2</b>                           | <i>SDH1-2</i>         | <b>At2g18450</b> |          | <b>2.204</b> |
| Peroxidase superfamily protein                               |                       | At1g49570        | 1        | 2.148        |
| Putative DRE2B / AP2 domain-containing transcription factor  | <i>DRE2B/ERF48</i>    | At2g40340        |          | 2.142        |
| <b>Respiratory burst oxidase, putative / NADPH oxidase</b>   | <i>RbohI</i>          | <b>At4g11230</b> |          | <b>2.001</b> |
| Similar to dormancy-associated protein DRM1                  |                       | At2g33830        |          | 1.810        |
| LEA protein                                                  | <i>M10</i>            | At2g41280        |          | 1.706        |
| Dormancy-associated protein                                  | <i>DRM1</i>           | At1g28330        |          | 1.606        |
| AREB/ABF transcription factor                                | <i>ABF1</i>           | At1g49720        |          | 1.502        |
| Acyl-coa:diacylglycerol acyltransferase (DGAT)               | <i>ABX45</i>          | At2g19450        | 1        | 1.412        |
| Conversion of farnesyl diphosphate into (Z)-gamma-bisabolene | <i>TPS13</i>          | At4g13300        |          | 1.405        |
| Unknown protein                                              |                       | At1g21520        |          | 1.386        |
| Aspartyl protease family protein                             |                       | At1g65240        |          | 1.309        |
| Conversion of farnesyl diphosphate to (Z)-gamma-bisabolene   | <i>TPS12</i>          | At4g13280        |          | 1.212        |
| Aldehyde dehydrogenase 5f1                                   | <i>ALDH5F1/SSADH1</i> | At1g79440        |          | 1.065        |
| Protein marker for oxidative stress response                 |                       | At2g21640        | 1        | 1.049        |
| Rare-cold-inducible 2a                                       | <i>RCI2A</i>          | At3g05880        | 2        | 1.013        |
| Unknown protein involved in response to oxidative stress     |                       | At1g73120        | 1        | 1.002        |
| <b>DNA repair and modification</b>                           |                       |                  |          |              |
| <b>Histone deacetylase</b>                                   | <i>HDA18</i>          | <b>At5g61070</b> | <b>2</b> | <b>1.871</b> |
| Variant in methylation                                       | <i>VIM4/ORTH4</i>     | At1g66040        |          | 1.687        |
| Histone serine kinase (H3-S10 specific)                      | <i>AUR3</i>           | At2g45490        | 2        | 1.657        |
| Zn finger protein (RING type C3HC4 finger)                   | <i>ORTH5</i>          | At1g66050        |          | 1.604        |
| Helicase                                                     |                       | At5g07810        | 2        | 1.220        |
| DNA methylation on cytosine                                  | <i>VIM3/ORTH1</i>     | At5g39550        |          | 1.199        |
| SC35-like splicing factor                                    | <i>SCL28</i>          | At5g18810        | 1        | 1.187        |
| High mobility group (HMG1/2) family protein                  |                       | At4g11080        | 2        | 1.179        |
| Pyridine nucleotide-disulphide oxidoreductase family protein |                       | At5g22140        |          | 1.077        |
| Endonuclease                                                 | <i>MUS81</i>          | At4g30870        | 2        | 1.069        |
| Nuclease                                                     |                       | At3g01410        | 2        | 1.053        |
| Haspin-related                                               | <i>Haspin</i>         | At1g09450        |          | 1.041        |
| <b>Cell division</b>                                         |                       |                  |          |              |
| <b>Putative mitotic checkpoint protein (WD-40 repeats)</b>   | <i>BUB3.2</i>         | <b>At1g49910</b> |          | <b>2.190</b> |
| Similar to myosin II                                         |                       | At1g61450        | 2        | 1.814        |
| Phragmoplast orienting kinesin                               | <i>POK1</i>           | At3g17360        |          | 1.787        |
| Mitotic-like cyclin                                          | <i>CYC3B/CYC2BAT</i>  | At5g11300        | 2        | 1.697        |
| Chromosome-associated kinesin-related                        |                       | At5g33300        |          | 1.594        |
| Kinesin motor protein-related                                |                       | At2g36200        | 2        | 1.586        |
| DNA topoisomerase                                            | <i>SPO11-2</i>        | At1g63990        |          | 1.550        |
| Kinesin-like atpase                                          | <i>ATK4</i>           | At5g27000        |          | 1.526        |
| Kinesin motor protein-related                                |                       | At5g02370        |          | 1.520        |
| Putative mitotic checkpoint protein (WD-40 repeats)          |                       | At1g69400        | 1        | 1.404        |
| Kinesin motor protein-related                                |                       | At1g20060        | 2        | 1.367        |
| Protein kinase-related similar to spindle checkpoint protein |                       | At5g05510        |          | 1.365        |
| Similar to kinesin                                           |                       | At5g23910        |          | 1.314        |
| <i>Arabidopsis</i> homologue of separase; peptidase          | <i>AESP</i>           | At4g22970        |          | 1.228        |
| Dp-e2f-like 2                                                | <i>DEL2</i>           | At5g14960        |          | 1.217        |
| Kinesin motor protein-related KLP2 protein                   |                       | At3g44050        |          | 1.155        |
| V-SNARE protein family                                       | <i>VAMP713</i>        | At5g11150        | 1        | 1.142        |
| Kinesin motor protein-related                                |                       | At2g22610        |          | 1.088        |
| <b>Signal transduction</b>                                   |                       |                  |          |              |

|                                                                |                     |                  |          |              |
|----------------------------------------------------------------|---------------------|------------------|----------|--------------|
| Calcium-binding EF hand family protein                         |                     | At3g59450        | 2        | 3.210        |
| <b>Circadian rhythm response regulator</b>                     | <b><i>PRR5</i></b>  | <b>At5g24470</b> | <b>2</b> | <b>2.529</b> |
| Putative NADPH oxidase calcium/Fe-binding                      |                     | At4g11230        | 2        | 2.089        |
| <b>RNA-binding protein</b>                                     | <b><i>GRP7</i></b>  | <b>At2g21660</b> |          | <b>1.845</b> |
| NPK1-related protein kinase 3                                  | <i>MAPKKK12</i>     | At3g06030        | 3        | 1.806        |
| NPK1-related protein kinase 2                                  | <i>ANP2/MAPKKK2</i> | At1g54960        |          | 1.623        |
| Zn finger protein (RING type C3HC4 finger)                     | <i>ORTH5</i>        | At1g66050        | 1        | 1.604        |
| Concanavalin A-like lectin protein kinase family protein       |                     | At5g55830        | 1        | 1.508        |
| Root hair specific 10 protein serine/threonine kinase activity | <i>RHS10/PERK13</i> | At1g70460        |          | 1.460        |
| E2F transcription factor that regulates cell cycle             | <i>DEL3 /E2L2</i>   | At3g01330        |          | 1.459        |
| NAC domain containing protein                                  | <i>NAC044</i>       | At3g01600        |          | 1.353        |
| Zn finger protein (RING type C3HC4 finger)                     | <i>ATL8</i>         | At1g76410        |          | 1.342        |
| Member of the WNK family of protein kinases                    | <i>WNK9</i>         | At5g28080        | 1        | 1.307        |
| Zinc finger protein-related                                    |                     | At1g49920        | 1        | 1.268        |
| Zn finger protein (B-box type)                                 |                     | At1g28050        |          | 1.188        |
| Protein kinase superfamily protein                             |                     | At4g11890        |          | 1.125        |
| Bzip protein (basic region/leucine zipper)                     |                     | At1g53490        | 1        | 1.015        |

**Table S2. Functional categories and genes overrepresented under low Cu.** The microarray analysis results of the 6-day-old *Arabidopsis* WT seedlings grown on commercial MS media without (Low Cu) and with Cu 10 µM (High Cu). The number of the GTAC boxes is indicated for a promoter region of 500 bp upstream of the transcriptional start. The ratio value is the median log<sub>2</sub> ratio in the high vs. the low Cu levels in the microarray analysis.

| Gene annotation                                             | Gene name           | MIPS code        | N° GTACs | Ratio         |
|-------------------------------------------------------------|---------------------|------------------|----------|---------------|
| <b>Ion homeostasis</b>                                      |                     |                  |          |               |
| Zn transporter                                              | <i>ZIP2</i>         | At5g59520        | 5        | -3.243        |
| <b>High affinity Cu transporter</b>                         | <i>COPT2</i>        | <b>At3g46900</b> | <b>4</b> | <b>-2.860</b> |
| Oligopeptide transporter (yellow stripe-like)               | <i>YSL2</i>         | At5g24380        | 4        | -2.593        |
| Cu chaperone                                                | <i>CCH</i>          | At3g56240        | 4        | -1.819        |
| Oligopeptide transporter (yellow stripe-like)               | <i>YSL3</i>         | At5g53550        | 1        | -1.452        |
| Nicotianamine synthase                                      | <i>NAS1</i>         | At5g04950        | 1        | -1.417        |
| Nicotianamine synthase                                      | <i>NAS2</i>         | At5g56080        | 1        | -1.201        |
| Metallothionein-like protein 1C                             | <i>MT1C</i>         | At1g07610        | 0        | -1.187        |
| Iron-responsive transporter                                 | <i>IRT1</i>         | At4g19690        | 3        | -1.167        |
| K <sup>+</sup> efflux antiporter family protein             | <i>KEA3</i>         | At4g04850        | 0        | -1.123        |
| <b>Response to stress</b>                                   |                     |                  |          |               |
| <b>Fe superoxide dismutase</b>                              | <i>FSD1</i>         | <b>At4g25100</b> | <b>6</b> | <b>-3.834</b> |
| Putative thionin                                            |                     | At1g66100        | 0        | -1.570        |
| Amino acid-polyamine transporter                            |                     | At3g54830        | 2        | -1.415        |
| Nodulin mtn21 family protein                                |                     | At2g37460        | 1        | -1.378        |
| Cytochrome P450                                             | <i>CYP85</i>        | At3g44970        | 0        | -1.377        |
| Glutaredoxin family protein                                 |                     | At1g64500        | 0        | -1.352        |
| Putative cytochrome P450                                    | <i>CYP71B36</i>     | At3g26320        | 0        | -1.316        |
| Putative peroxidase                                         |                     | At5g58390        | 1        | -1.293        |
| FAD-binding domain-containing protein                       |                     | At4g20820        | 0        | -1.275        |
| Peroxin11 gene family                                       | <i>PEX11B</i>       | At3g47430        | 1        | -1.272        |
| Cox19-like CHCH family protein                              |                     | At5g09570        | 1        | -1.207        |
| Putative disease resistance protein (TIR-NBS class)         |                     | At3g04210        | 2        | -1.188        |
| Putative cytochrome P450                                    | <i>CYP71B11</i>     | At5g25120        | 0        | -1.111        |
| Cytochrome P450                                             | <i>CYP706A1</i>     | At4g22690        | 3        | -1.047        |
| Nodulin mtn21 family protein                                |                     | At3g28070        | 0        | -1.037        |
| L-ascorbate oxidase, putative                               |                     | At5g21100        | 1        | -0.998        |
| <b>Sulphur metabolic process</b>                            |                     |                  |          |               |
| S-adenosylmethionine-dependent methyltransferase            |                     | At5g38020        | 1        | -1.763        |
| S-adenosylmethionine-dependent methyltransferase            |                     | At5g37990        | 0        | -1.744        |
| <b>Cytochrome p450 enzyme</b>                               | <i>CYP79F1/BUS1</i> | <b>At1g16410</b> | <b>1</b> | <b>-1.568</b> |
| Cytochrome p450 enzyme                                      | <i>CYP83A1</i>      | At4g13770        | 2        | -1.353        |
| Isopropylmalate dehydrogenase 1                             | <i>IMD1</i>         | At5g14200        | 0        | -1.309        |
| Flavin-monooxygenase glucosinolate s-oxygenase 1            | <i>FMO GS-OX1</i>   | At1g65860        | 1        | -1.240        |
| Methylthioalkylmalate synthase                              | <i>MAM1/IMS3</i>    | At5g23010        | 0        | -1.236        |
| Flavin-containing monooxygenase family protein              | <i>FMO GS-OX3</i>   | At1g62560        | 0        | -1.234        |
| Glutathione transferase belonging (phi class)               | <i>GSTF11</i>       | At3g03190        | 3        | -1.157        |
| Methionine-oxo-acid transaminase                            | <i>BCAT4</i>        | At3g19710        | 3        | -1.054        |
| UDP-glucuronosyl/UDP-glucosyl transferase family protein    | <i>UGT78D2</i>      | At5g17050        | 3        | -1.035        |
| UDP-glucuronosyl/UDP-glucosyl transferase family protein    | <i>UGT74C1</i>      | At2g31790        | 0        | -1.015        |
| Bile acid:sodium symporter family protein                   | <i>BASS5</i>        | At4g12030        | 1        | -1.084        |
| <b>Cell growth</b>                                          |                     |                  |          |               |
| <b>PLC-like phosphodiesterases superfamily</b>              | <i>GDPD6</i>        | <b>At5g08030</b> | <b>1</b> | <b>-2.068</b> |
| Paclobutrazol resistance transcription factor               | <i>PRE1/BHLH136</i> | At5g39860        | 0        | -1.630        |
| Lipid transfer protein (LTP) family protein                 |                     | At5g48490        | 0        | -1.577        |
| Lipid transfer protein (LTP) family protein                 |                     | At5g13900        | 1        | -1.571        |
| <b>Putative beta-expansin/allergen protein</b>              | <i>EXPB3</i>        | <b>At4g28250</b> | <b>1</b> | <b>-1.504</b> |
| Alpha-expansin gene family                                  | <i>EXPA8</i>        | At2g40610        | 2        | -1.405        |
| Auxin-responsive family protein                             |                     | At1g29440        | 3        | -1.282        |
| Auxin-responsive family protein                             |                     | At1g29430        | 1        | -1.271        |
| Triacylglycerol lipase                                      | <i>ATLL1</i>        | At1g45201        | 2        | -1.250        |
| Auxin-responsive family protein                             |                     | At5g27780        | 1        | -1.237        |
| Naringenin-chalcone synthase, regulation of auxin transport | <i>CHS</i>          | At5g13930        | 0        | -1.214        |
| Auxin-responsive protein                                    |                     | At1g29460        | 0        | -1.183        |
| Auxin-responsive family protein                             |                     | At5g18030        | 0        | -1.107        |
| Auxin-responsive family protein                             |                     | At5g18020        | 0        | -1.077        |
| Putative similar to lipase                                  |                     | At2g42690        | 0        | -1.032        |

|                                                                                                                   |                |                  |          |               |
|-------------------------------------------------------------------------------------------------------------------|----------------|------------------|----------|---------------|
| Root meristem growth factor 9                                                                                     | <i>RGF9</i>    | At5g64770        | 0        | -1.019        |
| Naringenin 3-dioxygenase / flavanone 3-hydroxylase                                                                | <i>F3'H</i>    | At3g51240        | 1        | -1.014        |
| GDSL-like lipase/acylhydrolase superfamily protein                                                                |                | At1g29660        | 0        | -1.001        |
| <b>Signal transduction</b>                                                                                        |                |                  |          |               |
| <b>Target CSD1 and CSD2 and cytc oxidase family members</b>                                                       | <i>miR398b</i> | <b>At5g14545</b> | <b>7</b> | <b>-3.516</b> |
| Flowering-time gene CONSTANS (CO)                                                                                 | <i>COL2</i>    | At3g02380        | 0        | -1.730        |
| Target several TCP family members factor transcription TCP2/4                                                     | <i>miR319a</i> | At4g23713        | 0        | -1.689        |
| <b>Alpha Carbonic Anhydrase 1</b>                                                                                 | <i>ACA1</i>    | <b>At3g52720</b> | <b>2</b> | <b>-1.674</b> |
| Target both APS and AST family members sulphate adeniltransferases APS1/3/4 and SO <sub>2</sub> transporter AST68 | <i>miR395e</i> | At1g69795        | 0        | -1.627        |
| Myb-related transcription factor                                                                                  | <i>LHY1</i>    | At1g01060        | 3        | -1.594        |
| EXS (ERD1/XPR1/SYG1) family protein                                                                               | <i>PHO1;H1</i> | At1g68740        | 1        | -1.581        |
| Myb-family transcription repressor                                                                                | <i>CCA1</i>    | At2g46830        | 0        | -1.569        |
| Speckle-type POZ protein-related                                                                                  |                | At3g56230        | 2        | -1.537        |
| <b>Chloroplast-localised calcium sensor</b>                                                                       | <i>CAS</i>     | <b>At5g23060</b> | <b>5</b> | <b>-1.497</b> |
| Monofunctional aspartate kinase                                                                                   | <i>AK3</i>     | At3g02020        | 0        | -1.449        |
| Calcium-binding protein annexin                                                                                   | <i>ANN7</i>    | At5g10230        | 0        | -1.408        |
| Myb family transcription factor                                                                                   | <i>LCL5</i>    | At3g09600        | 1        | -1.377        |
| Ankyrin repeat family protein                                                                                     |                | At5g54720        | 0        | -1.376        |
| Chaperone dnaj-domain superfamily protein                                                                         |                | At4g09350        | 0        | -1.237        |
| Ubiquitin-conjugating enzyme variant 1 (PTHR11621:SF1)                                                            | <i>FAD4</i>    | At4g27030        | 1        | -1.207        |
| Target several HD-ZIPIII family members including PHV, PHB, REV, ATHB-8, and ATHB-15                              | <i>miR165a</i> | At1g01183        | 0        | -1.183        |
| Concanavalin A-like lectin protein kinase family protein                                                          |                | At4g02420        | 3        | -1.115        |
| Protein kinase family protein                                                                                     | <i>CRK21</i>   | At4g00970        | 0        | -1.078        |
| Protein kinase family protein                                                                                     |                | At5g38990        | 0        | -1.062        |
| Target several HAP2 family members                                                                                | <i>miR169i</i> | At3g26812        | 0        | -1.034        |
| Protein kinase family protein                                                                                     |                | At1g54820        | 0        | -1.037        |

**Table S3. The CuAt database.** The presence of putative Cu-binding sites (CuBS) is indicated according to Andreini et al., 2008. The number of the GTAC boxes is indicated for a promoter region of 500 bp upstream of the transcriptional start. The asterisks represent  $\geq 3$  GTACs in  $\leq 65$  pb. The ratio value is the median  $\log_2$  ratio in high vs. low Cu levels in the microarray analysis. The genes of the same families but not related to Cu are indicated in grey.

| Gene name                        | MIPS code | TAIR | ATLAS | ENSEMBL | KEGG | PubMed | CuBS | N° GTACs | Ratio  |
|----------------------------------|-----------|------|-------|---------|------|--------|------|----------|--------|
| <b>Cu Transporters</b>           |           |      |       |         |      |        |      |          |        |
| <b>COPT-type transportes</b>     |           |      |       |         |      |        |      |          |        |
| COPT1                            | AT5G59030 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 4*       | -0.337 |
| COPT2                            | AT3G46900 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 4*       | -2.860 |
| COPT3                            | AT5G59040 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 3        | ---    |
| COPT4                            | AT2G37925 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0        | ---    |
| COPT5                            | AT5G20650 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0        | -0.014 |
| COPT6                            | AT2G26975 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1        | -0.896 |
| <b>Cu ATPases</b>                |           |      |       |         |      |        |      |          |        |
| HMA1                             | AT4G37270 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0        | -0.305 |
| HMA2                             | AT4G30110 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0        | ---    |
| HMA3                             | AT4G30120 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0        | ---    |
| HMA4                             | AT2G19110 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1        | -0.253 |
| HMA5                             | AT1G63440 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0        | 0.826  |
| PAA1/HMA6                        | AT4G33520 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1        | 0.122  |
| PAA2/HMA8                        | AT5G21930 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0        | -0.031 |
| RAN1/HMA7                        | AT5G44790 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 3        | -0.306 |
| <b>Others</b>                    |           |      |       |         |      |        |      |          |        |
| <b>ZIPs</b>                      |           |      |       |         |      |        |      |          |        |
| ZIP1                             | AT3G12750 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0        | -0.032 |
| ZIP2                             | AT5G59520 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 5*       | -3.243 |
| ZIP3                             | AT2G32270 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1        | 0.212  |
| ZIP4                             | AT1G10970 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0        | 0.415  |
| ZIP5                             | AT1G05300 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0        | 0.663  |
| ZIP6                             | AT2G30080 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1        | -0.268 |
| ZIP7                             | AT2G04032 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1        | ---    |
| ZIP8                             | AT5G45105 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1        | ---    |
| ZIP9                             | AT4G33020 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0        | ---    |
| ZIP10                            | AT1G31260 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1        | ---    |
| ZIP11                            | AT1G55910 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 4        | -0.549 |
| ZIP12                            | AT5G62160 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0        | ---    |
| <b>Cu chelators transporters</b> |           |      |       |         |      |        |      |          |        |
| YSL1                             | AT4G24120 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0        | -0.737 |
| YSL2                             | AT5G24380 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 4*       | -2.593 |
| YSL3                             | AT5G53550 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1        | -1.452 |
| YSL4                             | AT5G41000 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0        | ---    |
| YSL5/PDE321                      | AT3G17650 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1        | -0.116 |
| YSL6                             | AT3G27020 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0        | -0.028 |
| YSL7                             | AT1G65730 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1        | 0.195  |
| YSL8                             | AT1G48370 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 2        | 0.286  |
| FRD3                             | AT3G08040 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1        | -0.592 |
| <b>Others</b>                    |           |      |       |         |      |        |      |          |        |
|                                  | AT2G37920 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0        | -0.065 |
| <b>Cuprochaperones</b>           |           |      |       |         |      |        |      |          |        |
| ATX1                             | AT1G66240 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 3        | -0.203 |
| CCH                              | AT3G56240 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 4*       | -1.819 |
| CCS                              | AT1G12520 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1        | 2.642  |
| COX17                            | AT3G15352 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0        | 0.176  |
| HCC1                             | AT3G08950 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0        | -0.210 |
| NAKR2                            | AT2G37390 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0        | 0.362  |

|                   |           |      |       |         |      |        |      |    |        |
|-------------------|-----------|------|-------|---------|------|--------|------|----|--------|
| NAKR3             | AT3G53530 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1  | 0.916  |
|                   | AT1G53030 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0  | -0.124 |
|                   | AT2G28660 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0  | 0.400  |
|                   | AT1G29100 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 2  | ---    |
|                   | AT3G02960 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 2  | ---    |
|                   | AT3G48970 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0  | -0.407 |
|                   | AT1G06330 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1  | ---    |
|                   | AT3G21490 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1  | ---    |
|                   | AT5G24580 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 2  | 0.011  |
|                   | AT4G27590 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | ---    |
|                   | AT5G37860 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1  | ---    |
|                   | AT3G24450 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0  | 0.241  |
|                   | AT2G36950 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1  | -0.055 |
|                   | AT1G30473 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1  | ---    |
|                   | AT5G27690 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1  | -0.185 |
|                   | AT1G29000 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 3  | ---    |
| HIP21             | AT5G17450 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1  | -0.256 |
|                   | AT5G60800 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1  | 0.279  |
|                   | AT3G05220 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 3  | 0.172  |
|                   | AT5G03380 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1  | -0.232 |
|                   | AT3G06130 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0  | 0.084  |
|                   | AT4G08570 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 8* | ---    |
|                   | AT1G63950 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0  | ---    |
|                   | AT4G39700 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1  | 0.666  |
|                   | AT4G23882 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1  | ---    |
|                   | AT5G26690 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1  | ---    |
| HIP25             | AT2G18196 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0  | 0.639  |
|                   | AT1G23000 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 2  | 0.359  |
| HIP20             | AT4G35060 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0  | -0.540 |
|                   | AT1G71050 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1  | ---    |
| HIP22             | AT5G50740 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1  | -0.275 |
|                   | AT1G56210 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0  | 0.260  |
|                   | AT5G19090 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 3  | -0.176 |
|                   | AT1G01490 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0  | -0.309 |
|                   | AT1G22990 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0  | -0.044 |
| NAKR1/NPCC6       | AT2G28090 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 2  | ---    |
|                   | AT3G05920 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1  | 0.364  |
| HIP27             | AT5G02600 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1  | 0.688  |
|                   | AT5G66110 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0  | 0.662  |
| Cu chelators      |           |      |       |         |      |        |      |    |        |
| Metallothioneins  |           |      |       |         |      |        |      |    |        |
| MT1A              | AT1G07600 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1  | -0.144 |
| MT1B              | AT5G56795 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | ---    |
| MT1C              | AT1G07610 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0  | -1.187 |
| MT2A              | AT3G09390 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 3  | 0.378  |
| MT2B              | AT5G02380 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0  | -0.046 |
| MT3               | AT3G15353 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | -0.268 |
|                   | AT2G23240 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | ---    |
|                   | AT2G42000 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | ---    |
|                   | AT2G20110 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | 1.042  |
| Others            |           |      |       |         |      |        |      |    |        |
| ITP/LEA           | AT1G54410 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | 1.026  |
| NAS1              | AT5G04950 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | -1.417 |
| NAS2              | AT5G56080 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | -1.201 |
| NAS3              | AT1G09240 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 2  | -1.038 |
| NAS4              | AT1G56430 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | -0.924 |
| Targets           |           |      |       |         |      |        |      |    |        |
| Ethylene receptor |           |      |       |         |      |        |      |    |        |
| ETR1              | AT1G66340 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | 0.142  |

**Cu/Zn superoxide dismutases**

|      |           |      |       |         |      |        |      |   |       |
|------|-----------|------|-------|---------|------|--------|------|---|-------|
| CSD1 | AT1G08830 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 2 | 2.496 |
| CSD2 | AT2G28190 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0 | 3.410 |
| CSD3 | AT5G18100 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1 | 0.003 |

**Blue copper proteins or cupredoxins**

***Plastocyanin***

|       |           |      |       |         |      |        |      |   |        |
|-------|-----------|------|-------|---------|------|--------|------|---|--------|
| PETE1 | AT1G76100 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0 | -0.362 |
| PETE2 | AT1G20340 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0 | -0.031 |

***Plantacyanin***

|      |           |      |       |         |      |        |      |   |       |
|------|-----------|------|-------|---------|------|--------|------|---|-------|
| ARPN | AT2G02850 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 2 | 1.933 |
|------|-----------|------|-------|---------|------|--------|------|---|-------|

***Others***

|           |           |      |       |         |      |        |      |   |        |
|-----------|-----------|------|-------|---------|------|--------|------|---|--------|
| BCB/SAG14 | AT5G20230 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 2 | 0.752  |
| UCC3      | AT3G60280 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0 | ---    |
|           | AT1G21090 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 4 | 0.275  |
|           | AT3G28958 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | ---    |
|           | AT5G07475 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1 | -0.174 |
|           | AT2G31050 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0 | ---    |
|           | AT2G26720 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1 | ---    |
|           | AT3G60270 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0 | ---    |
|           | AT5G26330 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0 | ---    |
|           | AT1G72230 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1 | -0.282 |
|           | AT3G27200 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0 | 0.010  |
|           | AT1G22480 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0 | 0.281  |
|           | AT2G15780 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | ---    |
|           | AT2G15770 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 3 | ---    |
|           | AT2G32300 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 2 | -0.484 |
|           | AT2G44790 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | 0.562  |
|           | AT5G14345 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  |   | ---    |
| ENODL1    | AT5G53870 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | ---    |
| ENODL2    | AT4G27520 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 2 | -0.145 |
| ENODL3    | AT4G28365 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | ---    |
| ENODL4    | AT4G32490 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | ---    |
| ENODL5    | AT3G18590 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | ---    |
| ENODL6    | AT1G48940 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | ---    |
| ENODL7    | AT1G79800 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | ---    |
| ENODL8    | AT1G64640 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 2 | 0.144  |
| ENODL9    | AT3G20570 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | -0.159 |
| ENODL10   | AT5G57920 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | ---    |
| ENODL11   | AT2G23990 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | ---    |
| ENODL12   | AT4G30590 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | ---    |
| ENODL13   | AT5G25090 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | 0.180  |
| ENODL14   | AT2G25060 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | 0.011  |
| ENODL15   | AT4G31840 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | 0.165  |
| ENODL16   | AT3G01070 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | 0.202  |
| ENODL17   | AT5G15350 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | 0.017  |
| ENODL18   | AT1G08500 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | 0.358  |
| ENODL19   | AT4G12880 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | -0.018 |
| ENODL20   | AT2G27035 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | -0.027 |
| ENODL22   | AT1G17800 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 2 | ---    |
| ENODL21   | AT5G14345 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | ---    |
|           | AT3G17675 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | ---    |
|           | AT3G52055 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | ---    |
|           | AT4G01505 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 2 | ---    |
|           | AT4G01380 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 4 | ---    |
|           | AT3G53330 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | ---    |
|           | AT2G15340 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 2 | ---    |

**Cytochrome c oxidase**

|      |           |      |       |         |      |        |     |   |     |
|------|-----------|------|-------|---------|------|--------|-----|---|-----|
| COX1 | ATMG01360 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 0 | --- |
| COX2 | ATMG00160 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 1 | --- |

|                                                      |           |      |       |         |      |        |      |    |        |
|------------------------------------------------------|-----------|------|-------|---------|------|--------|------|----|--------|
| COX3                                                 | ATMG00730 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | ---    |
| COX6B2                                               | AT1G22450 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | -0.103 |
| COX10                                                | AT2G44520 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 2  | 0.139  |
| COX19-1                                              | AT1G66590 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1  | 0.057  |
| COX19-2                                              | AT1G69750 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0  | 0.020  |
| CYTC-2                                               | AT5G64400 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1  | -0.023 |
|                                                      | AT1G02160 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1  | 0.171  |
|                                                      | AT3G06310 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1  | -0.221 |
|                                                      | AT5G18920 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0  | -0.270 |
|                                                      | AT5G09570 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1  | -1.207 |
|                                                      | AT5G18800 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0  | -0.054 |
|                                                      | AT4G10040 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | -0.494 |
|                                                      | AT1G22840 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | 0.119  |
|                                                      | ATMG01280 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | ---    |
|                                                      | AT1G02410 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0  | -0.022 |
|                                                      | AT2G07695 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | ---    |
|                                                      | AT5G40382 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | ---    |
|                                                      | AT5G61310 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | 0.012  |
|                                                      | AT2G47380 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | 0.130  |
|                                                      | AT2G07687 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | -0.006 |
|                                                      | AT5G58005 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 2  | -0.058 |
|                                                      | AT4G28060 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | -0.017 |
|                                                      | AT1G32710 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | ---    |
|                                                      | AT5G57815 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | -0.033 |
|                                                      | AT4G37830 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | 0.154  |
| CCMH<br>CCDA                                         | AT4G21105 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | 0.001  |
|                                                      | AT5G45040 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | 0.229  |
|                                                      | AT3G15640 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 3  | 0.285  |
|                                                      | AT1G52710 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | 0.673  |
|                                                      | AT1G80230 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | 0.098  |
|                                                      | AT3G27240 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 2  | 0.063  |
|                                                      | AT5G40810 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | -0.046 |
|                                                      | AT1G15220 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | -0.007 |
|                                                      | AT5G54290 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 2  | -0.534 |
|                                                      | AT1G10865 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | ---    |
| TG1                                                  | AT3G62370 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | -0.182 |
|                                                      | AT1G51980 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 3  | -0.288 |
|                                                      | AT1G14450 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | 0.064  |
|                                                      | AT3G33103 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | ---    |
|                                                      | AT3G51790 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | 0.090  |
|                                                      | AT5G05830 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | -0.083 |
|                                                      | AT2G37950 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 5* | 0.359  |
|                                                      | AT2G02960 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 2  | 0.035  |
|                                                      | AT5G59000 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 5  | 0.121  |
|                                                      | AT1G32720 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | ---    |
| PPR40<br>SBP1<br>SBP2/EDA38<br>SBP3<br>SURF1/EMB3121 | AT1G29620 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | ---    |
|                                                      | AT2G34120 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | ---    |
|                                                      | AT2G14270 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | ---    |
|                                                      | AT3G16890 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | ---    |
|                                                      | AT4G14030 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | -0.162 |
|                                                      | AT4G14040 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 2  | 0.394  |
|                                                      | AT3G23800 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | 0.289  |
|                                                      | AT3G17910 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | 0.147  |
|                                                      | AT2G07815 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | ---    |
|                                                      | AT1G62020 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | 0.145  |
|                                                      | AT1G52360 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | -0.099 |
|                                                      | AT5G25450 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 2  | ---    |
|                                                      | AT1G49380 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | -0.606 |
|                                                      | AT5G16060 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | -0.041 |
|                                                      | AT4G21192 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | ---    |

|                                                     |           |      |       |         |      |        |      |   |        |
|-----------------------------------------------------|-----------|------|-------|---------|------|--------|------|---|--------|
| ABCI2/CCB206                                        | ATMG00110 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 5 | ---    |
| ABCI3/CCB256                                        | ATMG00900 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | ---    |
| CCB382                                              | ATMG00830 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | ---    |
| CCB452                                              | ATMG00180 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | ---    |
| ABCI4                                               | AT2G07681 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | ---    |
| ABCI5                                               | AT2G07771 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | ---    |
|                                                     | AT2G07768 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | ---    |
| CCB203                                              | ATMG00960 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | ---    |
| COB                                                 | ATMG00220 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | ---    |
|                                                     | AT1G05720 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | 0.185  |
|                                                     | AT1G48510 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | ---    |
|                                                     | AT1G27470 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 2 | 0.352  |
|                                                     | AT5G51220 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | -0.127 |
|                                                     | AT2G01090 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | -0.118 |
|                                                     | AT4G32470 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 3 | 0.035  |
|                                                     | AT1G15120 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | 0.009  |
|                                                     | AT5G13430 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | -0.228 |
|                                                     | AT5G13440 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | -0.043 |
|                                                     | AT3G52730 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | 0.108  |
|                                                     | AT5G05370 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | -0.029 |
|                                                     | AT3G10860 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | 0.086  |
|                                                     | AT5G18540 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | 1.187  |
|                                                     | AT3G62400 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | 0.080  |
| <b>Diamine oxidase</b>                              |           |      |       |         |      |        |      |   |        |
| AO1                                                 | AT4G14940 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1 | -0.067 |
|                                                     | AT4G12280 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 2 | ---    |
|                                                     | AT1G31710 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0 | -0.712 |
|                                                     | AT3G43670 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1 | -0.516 |
|                                                     | AT1G62810 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0 | 0.168  |
|                                                     | AT1G31670 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0 | ---    |
|                                                     | AT4G12270 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0 | ---    |
|                                                     | AT1G31690 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1 | ---    |
|                                                     | AT2G42490 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 2 | -0.231 |
|                                                     | AT4G12290 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 4 | ---    |
| LDL3                                                | AT4G16310 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | ---    |
| PAO1                                                | AT5G13700 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 3 | -0.922 |
| PAO2                                                | AT2G43020 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | 0.153  |
| PAO3                                                | AT3G59050 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | 0.056  |
| PAO4                                                | AT1G65840 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | 0.277  |
| PAO5                                                | AT4G29720 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 2 | -0.252 |
|                                                     | AT3G43820 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | ---    |
|                                                     | AT3G23530 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | -0.192 |
|                                                     | AT3G23510 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | 0.033  |
| LDL2                                                | AT3G13682 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | 0.150  |
| LSD1                                                | AT1G62830 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 2 | -0.253 |
| FLD                                                 | AT3G10390 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | -0.181 |
|                                                     | AT1G56000 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | -0.346 |
|                                                     | AT1G57770 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 2 | -0.291 |
|                                                     | AT3G09580 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | -0.038 |
|                                                     | AT5G14220 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 3 | -0.263 |
| <b>Blue oxidases or multicopper oxidases (MCOS)</b> |           |      |       |         |      |        |      |   |        |
| <b>Ascorbate oxidases</b>                           |           |      |       |         |      |        |      |   |        |
|                                                     | AT4G39830 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 2 | 0.349  |
|                                                     | AT5G21100 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1 | -0.998 |
|                                                     | AT5G21105 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 2 | 0.012  |
| APX1                                                | AT1G07890 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | -0.242 |
| APX2                                                | AT3G09640 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | -0.238 |
| APX3                                                | AT4G35000 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | -0.012 |
| APX4                                                | AT4G09010 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | -0.038 |

|                   |           |      |       |         |      |        |      |   |        |
|-------------------|-----------|------|-------|---------|------|--------|------|---|--------|
| APX5              | AT4G35970 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | -0.167 |
| APX6              | AT4G32320 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | 0.064  |
| sAPX              | AT4G08390 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | -0.355 |
| tAPX              | AT1G77490 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | -0.037 |
| SRG1              | AT1G17020 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | -0.631 |
|                   | AT1G75270 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 2 | -0.081 |
|                   | AT1G29160 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | 0.449  |
| <b>Laccases</b>   |           |      |       |         |      |        |      |   |        |
| LAC1              | AT1G18140 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 5 | -0.224 |
| LAC2              | AT2G29130 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1 | 0.151  |
| LAC3              | AT2G30210 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1 | 0.044  |
| LAC4              | AT2G38080 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0 | 0.219  |
| LAC5              | AT2G40370 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1 | -0.393 |
| LAC6              | AT2G46570 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0 | ---    |
| LAC7              | AT3G09220 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0 | -0.305 |
| LAC8              | AT5G01040 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1 | ---    |
| LAC9              | AT5G01050 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1 | ---    |
| LAC10             | AT5G01190 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1 | ---    |
| LAC11             | AT5G03260 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1 | -0.157 |
| LAC12             | AT5G05390 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0 | ---    |
| LAC13             | AT5G07130 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1 | ---    |
| LAC14             | AT5G09360 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0 | ---    |
| LAC15             | AT5G48100 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 2 | ---    |
| LAC16             | AT5G58910 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 2 | ---    |
| LAC17             | AT5G60020 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1 | -0.064 |
| <b>Others</b>     |           |      |       |         |      |        |      |   |        |
| LPR1              | AT1G23010 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 3 | ---    |
| LPR2              | AT1G71040 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1 | -0.288 |
| SKS1              | AT4G25240 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 3 | 0.245  |
| SKS2              | AT5G51480 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0 | ---    |
| SKS3              | AT5G48450 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0 | 0.025  |
| SKS4              | AT4G22010 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1 | -0.012 |
| SKS5              | AT1G76160 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0 | 0.409  |
| SKS6              | AT1G41830 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0 | -0.299 |
| SKS7              | AT1G21860 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0 | ---    |
| SKS8              | AT1G21850 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1 | ---    |
| SKS9              | AT4G38420 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0 | -0.311 |
| SKS10             | AT4G28090 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0 | ---    |
| SKS11             | AT3G13390 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1 | ---    |
| SKS12             | AT1G55570 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1 | ---    |
| SKS13             | AT3G13400 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1 | ---    |
| SKS14             | AT1G55560 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1 | ---    |
| SKS15             | AT4G37160 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 3 | -0.416 |
| SKS16             | AT2G23630 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 3 | ---    |
| SKS17             | AT5G66920 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0 | 0.098  |
| SKS18             | AT1G75790 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 2 | ---    |
| SKU5              | AT4G12420 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0 | 0.168  |
|                   | AT1G33660 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | -0.331 |
|                   | AT1G06650 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 2 | -0.073 |
|                   | AT1G06620 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 3 | -0.292 |
|                   | AT1G06640 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | 0.063  |
| <b>Regulators</b> |           |      |       |         |      |        |      |   |        |
| <b>SPLs</b>       |           |      |       |         |      |        |      |   |        |
| SPL1              | AT2G47070 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 2 | -0.039 |
| SPL2              | AT5G43270 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | 0.094  |
| SPL3              | AT2G33810 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | 0.456  |
| SPL4              | AT1G53160 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 3 | ---    |
| SPL5              | AT3G15270 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 3 | ---    |
| SPL6              | AT1G68170 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | 0.092  |

|                     |           |      |       |         |      |        |     |     |        |
|---------------------|-----------|------|-------|---------|------|--------|-----|-----|--------|
| SPL7                | AT5G18830 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 0   | -0.191 |
| SPL8                | AT1G02065 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 1   | 0.135  |
| SPL9                | AT2G42200 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 3   | ---    |
| SPL10               | AT1G27370 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 3   | -0.364 |
| SPL11               | AT1G27360 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 1   | -0.184 |
| SPL12               | AT3G60030 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 1   | 0.124  |
| SPL13B              | AT5G50670 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 0   | -0.315 |
| SPL13A              | AT5G50570 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 0   | -0.477 |
| SPL14               | AT1G20980 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 2   | 0.353  |
| SPL15               | AT3G57920 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 1   | ---    |
|                     | AT1G76580 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 1   | 0.013  |
| <b>miRNAs</b>       |           |      |       |         |      |        |     |     |        |
| MIR397A             | AT4G05105 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 6*  | ---    |
| MIR397B             | AT4G13555 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 6*  | ---    |
| MIR398A             | AT2G03445 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 0   | ---    |
| MIR398B             | AT5G14545 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 7*  | ---    |
| MIR398C             | AT5G14565 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 8*  | ---    |
| MIR408              | AT2G47015 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 10* | ---    |
| MIR857A             | AT4G13554 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 4*  | ---    |
| <b>Others</b>       |           |      |       |         |      |        |     |     |        |
| <b>Reductases</b>   |           |      |       |         |      |        |     |     |        |
| FRO1                | AT1G01590 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 0   | ---    |
| FRO2/FRD1           | AT1G01580 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 1   | -0.426 |
| FRO3                | AT1G23020 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 0   | 0.485  |
| FRO4                | AT5G23980 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 0   | ---    |
| FRO5                | AT5G23990 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 0   | ---    |
| FRO6                | AT5G49730 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 3   | ---    |
| FRO7                | AT5G49740 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 3   | ---    |
| FRO8                | AT5G50160 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 0   | -0.474 |
| <b>Unclassified</b> |           |      |       |         |      |        |     |     |        |
|                     | AT1G50480 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 2   | -0.045 |
|                     | AT4G14890 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 0   | -0.357 |
|                     | AT1G50780 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 1   | ---    |
|                     | AT4G32590 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 0   | 0.060  |
|                     | AT3G07480 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 0   | 0.065  |
|                     | ATCG00730 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 2   | ---    |
|                     | AT1G10630 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 1   | 0.072  |
|                     | AT5G04590 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 0   | -0.612 |
|                     | AT5G50370 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 1   | 0.035  |
|                     | AT3G52930 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 0   | -0.114 |
|                     | AT2G36460 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 0   | 0.022  |
|                     | AT2G04400 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 1   | 0.122  |
|                     | AT2G14170 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 1   | 0.555  |
|                     | AT2G30970 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 1   | -0.235 |
|                     | AT5G14760 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 1   | -0.933 |
|                     | AT2G20420 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 1   | -0.125 |
|                     | AT3G52300 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 0   | 0.046  |
|                     | AT4G21140 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 2   | 0.189  |
|                     | AT2G25670 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 0   | 0.049  |
|                     | AT4G29890 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 0   | -0.060 |
|                     | AT5G55200 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 1   | -0.305 |
|                     | AT1G36390 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 0   | -0.011 |
|                     | AT4G32610 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 0   | -0.051 |
|                     | AT4G05400 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 1   | -0.060 |
|                     | AT2G27730 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 1   | 0.106  |
|                     | AT4G12340 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 1   | 0.043  |
|                     | AT1G45063 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 4*  | ---    |
|                     | AT5G52720 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 0   | ---    |
|                     | AT5G52700 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | --- | 1   | ---    |

|      |           |      |       |         |      |        |      |    |        |
|------|-----------|------|-------|---------|------|--------|------|----|--------|
| CRD1 | AT5G52710 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 2  | ---    |
|      | AT5G52680 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | ---    |
|      | AT5G52670 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | ---    |
|      | AT5G52730 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 3  | ---    |
|      | AT3G20180 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | ---    |
|      | AT1G63960 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | ---    |
|      | AT5G52690 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | ---    |
|      | AT5G52770 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 2  | ---    |
|      | AT5G52740 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | ---    |
|      | AT4G05030 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1  | ---    |
|      | AT3G25855 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | ---    |
|      | AT3G23940 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | 0.309  |
|      | AT3G56940 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | -0.125 |
|      | AT3G13930 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | -0.196 |
|      | AT2G30870 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | ---    |
|      | AT4G08550 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | ---    |
|      | AT5G17710 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | -0.118 |
|      | AT2G01918 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | ---    |
|      | AT4G36400 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | 0.130  |
|      | AT4G20260 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | 0.443  |
| CUTA | AT5G20720 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | 0.124  |
|      | AT2G33740 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0  | 0.155  |
|      | AT3G61440 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | -0.065 |
|      | AT5G17920 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | 0.033  |
|      | AT1G66200 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | -0.313 |
|      | AT5G37600 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | -0.119 |
|      | AT3G17820 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | 0.023  |
|      | AT3G23410 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | -0.466 |
|      | AT1G74230 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | 0.025  |
|      | AT5G61030 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | -0.286 |
|      | AT4G13850 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 5* | 0.395  |
|      | AT2G39450 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | -0.187 |
|      | AT5G66190 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | -0.222 |
|      | AT1G60950 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | 0.110  |
|      | AT1G35720 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | 0.030  |
|      | AT1G19570 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | -0.217 |
|      | AT1G48030 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | -0.074 |
|      | AT1G79440 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | 1.065  |
|      | AT1G65930 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | 0.237  |
|      | AT3G16250 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | -0.569 |
|      | AT1G51390 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 2  | -0.090 |
|      | AT2G15290 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | -0.015 |
|      | AT1G62380 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | -0.388 |
|      | AT5G63400 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 2  | 0.078  |
|      | AT1G48605 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | 1.432  |
|      | AT2G26170 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 2  | -0.562 |
|      | AT1G61570 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | 0.196  |
|      | AT1G30510 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | -0.136 |
|      | AT4G05390 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | -0.157 |
|      | AT4G13940 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | 0.450  |
|      | AT5G37510 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | -0.116 |
|      | AT3G01440 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | -0.694 |
|      | AT1G14150 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | -0.083 |
|      | AT1G56070 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | -0.031 |
|      | AT2G43400 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 4  | 0.546  |
|      | AT1G76760 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 3  | -0.068 |
|      | AT5G03300 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | -0.005 |
|      | AT4G26970 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | -0.482 |
|      | AT2G05710 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | -0.088 |
|      | AT4G35830 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | 0.193  |

|       |           |      |       |         |      |        |      |    |        |
|-------|-----------|------|-------|---------|------|--------|------|----|--------|
| MIA40 | AT3G13772 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 2  | 0.068  |
|       | AT2G01770 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | ---    |
|       | AT4G19680 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | ---    |
|       | AT3G09260 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | -0.619 |
|       | ATCG00540 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | ---    |
|       | AT3G04120 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | 0.203  |
|       | AT2G05990 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | 0.461  |
|       | AT1G32550 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | -0.031 |
|       | AT1G72330 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | 0.996  |
|       | AT5G03570 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 2  | ---    |
|       | AT5G14070 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | 0.082  |
|       | AT3G54660 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 4* | -0.126 |
|       | AT1G02920 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | -0.625 |
|       | AT1G02930 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | -0.853 |
|       | AT2G30860 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | 0.017  |
|       | AT1G28480 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | -0.653 |
|       | AT1G80600 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | -0.037 |
|       | AT5G23395 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0  | 0.241  |
|       | AT5G13490 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | -0.192 |
|       | AT1G14980 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 2  | 0.054  |
|       | AT1G79530 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | -0.096 |
|       | AT2G38270 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | -0.250 |
|       | AT5G18170 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | 0.083  |
|       | AT5G07440 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | 0.701  |
|       | AT1G50940 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | -0.179 |
|       | AT5G43430 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | 0.024  |
|       | AT2G21870 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | 0.219  |
|       | AT5G08670 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | -0.170 |
|       | AT5G08680 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | -0.600 |
|       | AT5G08690 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | 0.084  |
|       | ATCG01060 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | ---    |
|       | AT4G03280 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | 0.091  |
|       | AT3G55440 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | -0.220 |
|       | AT3G55010 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | 0.131  |
|       | AT5G17170 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | -0.477 |
|       | AT5G49555 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | -0.125 |
|       | AT3G44190 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 4  | 0.184  |
|       | AT5G22140 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | 1.077  |
|       | AT5G20080 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | -0.104 |
|       | AT1G15140 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 2  | 0.019  |
|       | AT4G20820 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | -1.275 |
|       | AT5G44360 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | ---    |
|       | AT5G44410 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | -0.662 |
|       | AT4G20860 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | -0.306 |
|       | AT2G34810 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | ---    |
|       | AT5G44380 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | -0.587 |
|       | AT4G20830 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 3  | 0.223  |
|       | AT4G20840 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | ---    |
|       | AT5G44400 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | -1.308 |
|       | AT1G26410 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 2  | ---    |
|       | AT1G26400 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | ---    |
|       | AT1G34575 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | ---    |
|       | AT1G30730 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 3  | -0.355 |
|       | AT1G30720 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | -0.106 |
|       | AT1G26390 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | ---    |
|       | AT1G30710 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | ---    |
|       | AT1G11770 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | ---    |
|       | AT1G26380 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 3  | -0.793 |
|       | AT5G44390 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | -0.452 |
|       | AT1G30760 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | 0.071  |

|       |           |      |       |         |      |        |      |    |        |
|-------|-----------|------|-------|---------|------|--------|------|----|--------|
| HIP26 | AT5G44440 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | ---    |
|       | AT1G30740 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | ---    |
|       | AT1G30700 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | -1.015 |
|       | AT1G26420 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | ---    |
|       | AT5G23310 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | 0.107  |
|       | AT5G51100 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | 0.275  |
|       | AT4G19690 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 3  | -1.143 |
|       | AT1G10960 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | -0.580 |
|       | AT2G27510 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | 0.151  |
|       | AT5G10000 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | ---    |
|       | AT5G60010 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | ---    |
|       | AT3G45810 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | ---    |
|       | AT4G25100 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | -3.893 |
|       | AT5G63530 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1  | -0.303 |
|       | AT4G38580 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1  | 0.794  |
|       | AT3G16700 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | 0.365  |
|       | AT4G15940 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | -0.253 |
|       | AT2G35612 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | ---    |
|       | AT2G47880 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | -0.395 |
|       | AT1G77370 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | -0.072 |
|       | AT5G20500 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | 0.136  |
|       | AT5G40370 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | 0.333  |
|       | AT3G21460 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | ---    |
|       | AT5G01420 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 3  | 0.555  |
|       | AT5G06470 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 2  | ---    |
|       | AT5G13810 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | -0.242 |
|       | AT5G58530 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | 0.131  |
|       | AT4G28730 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | -0.338 |
|       | AT1G32760 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 2  | 0.047  |
|       | AT1G06830 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | -0.543 |
|       | AT4G10630 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | ---    |
|       | AT5G03870 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 2  | -0.002 |
|       | AT1G64500 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | -1.352 |
|       | AT2G41330 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | -0.307 |
|       | AT3G57070 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | -0.459 |
|       | AT5G39865 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | ---    |
|       | AT3G28850 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0  | -0.391 |
|       | AT1G03850 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | -0.153 |
|       | AT3G11920 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 3  | ---    |
|       | AT5G42150 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | 0.079  |
|       | AT1G13440 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | 0.168  |
|       | AT5G24770 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 2  | -0.699 |
|       | AT2G33210 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 2  | -0.250 |
|       | AT1G31490 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 3  | ---    |
|       | AT3G45740 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | -0.007 |
|       | ATCG00210 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | ---    |
|       | ATCG00590 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | ---    |
|       | AT4G33680 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | 0.052  |
|       | AT2G05620 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | -0.462 |
|       | AT2G36530 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | 0.119  |
|       | AT3G09820 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | 0.004  |
|       | AT3G56350 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | ---    |
|       | AT2G19500 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | ---    |
|       | AT4G29740 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | -0.432 |
|       | AT5G56970 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | ---    |
|       | AT3G16430 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 2  | ---    |
|       | AT3G58610 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | 0.031  |
|       | AT3G15020 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0  | -0.015 |
|       | AT1G53240 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 4* | -0.106 |
|       | AT3G17240 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1  | 0.165  |

|          |           |      |       |         |      |        |      |   |        |
|----------|-----------|------|-------|---------|------|--------|------|---|--------|
| Obsolete | AT4G19380 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 2 | ---    |
|          | AT4G28570 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | -0.159 |
|          | AT3G10920 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | -0.040 |
|          | AT3G16460 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 2 | -0.447 |
|          | AT2G34790 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | 0.205  |
|          | AT1G49240 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | 0.337  |
|          | AT1G01980 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | ---    |
|          | AT1G55780 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0 | ---    |
|          | AT2G36880 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | -0.209 |
|          | AT1G64600 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | 0.191  |
|          | AT4G21090 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | -0.023 |
|          | AT3G08580 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | 0.216  |
|          | AT3G23990 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | 0.066  |
|          | AT4G05450 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 2 | 0.021  |
|          | AT2G01520 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 3 | 0.096  |
|          | AT2G01530 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | -0.244 |
|          | AT1G24360 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 2 | 0.114  |
|          | AT2G37660 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | 0.350  |
|          | AT3G29250 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | -0.687 |
|          | AT4G26965 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | 0.033  |
|          | AT5G19550 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 3 | 0.105  |
|          | AT3G27380 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | 0.123  |
|          | AT5G40650 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | -0.170 |
|          | AT5G65165 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | ---    |
|          | AT2G19940 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | -0.049 |
|          | AT5G44070 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | -0.223 |
|          | AT1G80770 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | -0.024 |
|          | AT4G23670 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | -0.161 |
|          | AT3G45770 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 2 | 0.036  |
|          | ATCG00580 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | ---    |
|          | ATCG00270 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | ---    |
|          | AT4G32360 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | 0.020  |
|          | AT4G37100 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 1 | -0.417 |
|          | AT4G11230 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 2 | 2.089  |
|          | AT1G19230 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | -0.707 |
|          | AT4G25090 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | ---    |
|          | AT3G09200 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | 0.093  |
|          | AT1G67090 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | 0.260  |
|          | AT1G07750 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | -0.644 |
|          | AT4G36700 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 2 | ---    |
|          | AT5G51010 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | -0.343 |
|          | AT1G54500 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | -0.072 |
|          | AT4G01850 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | -0.040 |
|          | AT4G25650 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | -0.061 |
|          | AT2G22830 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 2 | 0.149  |
|          | AT5G08300 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | 0.014  |
|          | AT5G23250 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | 0.068  |
|          | AT3G63190 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 2 | 0.339  |
|          | AT3G16420 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 2 | ---    |
|          | AT4G04950 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | -0.288 |
|          | AT4G10000 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 2 | -0.122 |
|          | AT5G03880 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | -0.235 |
|          | AT4G39740 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | 0.486  |
|          | AT4G15670 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 4 | 0.244  |
|          | AT3G62930 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | -0.218 |
|          | AT5G18600 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | -0.090 |
|          | AT1G03020 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | ---    |
|          | AT2G20270 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | 0.076  |
|          | AT4G15680 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 3 | 0.069  |
|          | AT4G15660 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 3 | 0.176  |

|           |      |       |         |      |        |      |   |        |
|-----------|------|-------|---------|------|--------|------|---|--------|
| AT4G15700 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 3 | 0.223  |
| AT4G15690 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | 0.135  |
| AT5G63030 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | 0.201  |
| AT3G11773 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 3 | ---    |
| AT5G11930 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 2 | ---    |
| AT4G33040 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | -0.265 |
| AT2G47870 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 1 | ---    |
| AT3G62960 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 2 | ---    |
| AT2G30540 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 2 | -0.476 |
| AT3G62950 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 2 | 0.516  |
| AT1G43560 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | 0.245  |
| AT1G57720 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | 0.247  |
| AT4G26780 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 2 | -0.112 |
| AT4G34900 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | ---  | 0 | -0.224 |
| ArthMp109 | TAIR | ATLAS | ENSEMBL | KEGG | PUBMED | CuBS | 0 | ---    |

**Table S4. The oligonucleotides used in the cloning and sqPCR experiments.**

| Primer name            | Primer sequence (5' to 3')               |
|------------------------|------------------------------------------|
| 18S F                  | TGGGATATCCTGCCAGTAGTCAT                  |
| 18S R                  | CTGGATCCAATTACCAGACTCAA                  |
| ACTIN F                | GGCGATGAAGCTCAATCCAAACG                  |
| ACTIN R                | GGTCACGACCAGCAAGATCAAGACG                |
| CCH F                  | GGTATGTCATGCCAAGGCTGC                    |
| CCH R                  | GGCTTAGTCTCGGCTTCTGCG                    |
| CCS F                  | GGCATCAATTCTCAGGTCAG                     |
| CCS R                  | CCATCGATTATTAAACCTTACTGGCCACG            |
| COPT2 F                | AAGTTGGTATGTCATGCCAA                     |
| COPT2 R                | ATATCAATGTCAAATGACTCAA                   |
| CSD1 F                 | CAGCAGTGAGGGTGTACG                       |
| CSD1 R                 | GCCCTGGAGACCAATGATG                      |
| CSD2 F                 | GCTGCCACCAACACAATCC                      |
| CSD2 R                 | GAGCGGCGTCAAGCCAATC                      |
| FSD1 F                 | GCTTCAAGTGCTGTCACC                       |
| FSD1 R                 | CAAGCCAGGCCCAGCCAG                       |
| FSD1 <i>Bam</i> HI R   | TTTGGATCCAGCAGCCATTCTTTGTAATTGA          |
| FSD1 <i>Hind</i> III F | TTTAAGCTTGGAGTGAAGCTATATAT               |
| FSD1 F                 | GCTTCAAGTGCTGTCACC                       |
| FSD1 R                 | CAAGCCAGGCCCAGCCAG                       |
| FSD1-4GTAC F           | ATAGTAGCCACGAAGCCAGCGACACAACCTCGATTACCAA |
| FSD1-4GTAC R           | TTGGTAATCGAGTTGTGTCGCTGGCTTCGTGGCTACTAT  |
| HMA5 F                 | GGCTATCAAAGCGTCTCCCTGG                   |
| HMA5 R                 | CCTCCAATAGTCTATCATAGC                    |
| ZIP2 F                 | GGCAGTGAAAGAGGAAGG                       |
| ZIP2 R                 | CCTATGGGACTCGATATC                       |

**Table S5. The oligonucleotides used in the qPCR experiments.**

| Primer name | Primer sequence (5' to 3') |
|-------------|----------------------------|
| BUS1 F      | AAACGCCGAAAAACATCATC       |
| BUS1 R      | CAAGCCAATCTTCAACAGCA       |
| CAS F       | TGCTTCATCGACCATGGATA       |
| CAS R       | CGGCGTAAGATCACCTTTGT       |
| CCH F       | AAGTTGGTATGTCATGCCAA       |
| CCH R       | ATATCAATGTCAAATGACTCAA     |
| CCS F       | TCTCCACGTCTCTTGGGACTTT     |
| CCS R       | AGCTGAGGCATGGCTCGAT        |
| COPT2 F     | CCTTTCGTATTTGGTGATGCT      |
| COPT2 R     | AAACACCTGCGTTAAAGGAC       |
| CSD1 F      | CATCATTGGTCTCCAGGGCT       |
| CSD1 R      | GACCTCCTTATTACATCAAT       |
| CYP706A1 F  | CTGGATACAGGGGAAGTCCA       |
| CYP706A1 R  | AAGAGACGACGATCGCAAGT       |
| FSD1 F      | ACCGAAGACCAGATTACATA       |
| FSD1 R      | TGGCACTTACAGCTTCCCAA       |
| GUS F       | TTTGAAGCCGATGTCACGCCGT     |
| GUS R       | ACAAACGGTGATACGTACACT      |
| RbohI F     | CACTCAGTGCCTTTTCGATGA      |
| RbohI R     | CCAGTGATTCCCACAGGAGT       |
| SDH1-2 F    | GGTGCCTTCGAGTTGCGTCG       |
| SDH1-2 R    | CCCTGCCGAAGGAGGAGCTG       |
| SDH1-2 F2   | AAGACGTGGGACAGTTTTTG       |
| SDH1-2 R2   | CTTCCCAATACCCCAATGTG       |
| UBQ10 F     | TAATCCCTGATGAATAAGTGTTCTAC |
| UBQ10 R     | AAAACGAAGCGATGATAAAGAAG    |