**Table S1.** Gene ontology enrichment for genes with distinctive expression patterns during seed germination.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Pattern** | **GO ID** | **Term** | **Annotated** | **Significant** | **Expected** | **Fisher** | **FDR** | **cluster** |
| 1 | GO:0019684 | photosynthesis, light reaction | 271 | 45 | 4.02 | 1E-30 | 6E-27 | 3 |
| 1 | GO:0019682 | glyceraldehyde-3-phosphate metabolic pro... | 334 | 42 | 4.96 | 1E-26 | 2E-23 | 3 |
| 1 | GO:0042254 | ribosome biogenesis | 339 | 41 | 5.03 | 2E-25 | 3E-22 | 3 |
| 1 | GO:0015995 | chlorophyll biosynthetic process | 125 | 23 | 1.86 | 7E-19 | 8E-16 | 3 |
| 1 | GO:0006970 | response to osmotic stress | 833 | 48 | 12.37 | 6E-16 | 5E-13 | 3 |
| 1 | GO:0070838 | divalent metal ion transport | 209 | 24 | 3.1 | 9E-15 | 6E-12 | 3 |
| 1 | GO:0010256 | endomembrane system organization | 195 | 23 | 2.9 | 2E-14 | 1E-11 | 3 |
| 1 | GO:0006739 | NADP metabolic process | 186 | 23 | 2.76 | 5E-14 | 3E-11 | 3 |
| 1 | GO:0046686 | response to cadmium ion | 466 | 32 | 6.92 | 6E-13 | 3E-10 | 3 |
| 1 | GO:0009266 | response to temperature stimulus | 950 | 45 | 14.1 | 5E-12 | 2E-09 | 3 |
| 1 | GO:0009735 | response to cytokinin | 263 | 23 | 3.9 | 2E-11 | 6E-09 | 3 |
| 1 | GO:0010218 | response to far red light | 99 | 15 | 1.47 | 2E-11 | 7E-09 | 3 |
| 1 | GO:0019760 | glucosinolate metabolic process | 204 | 20 | 3.03 | 3E-11 | 1E-08 | 3 |
| 1 | GO:0010114 | response to red light | 104 | 15 | 1.54 | 4E-11 | 1E-08 | 3 |
| 1 | GO:0009637 | response to blue light | 128 | 15 | 1.9 | 8E-10 | 2E-07 | 3 |
| 1 | GO:0080147 | root hair cell development | 203 | 18 | 3.01 | 2E-09 | 4E-07 | 3 |
| 1 | GO:0009642 | response to light intensity | 282 | 21 | 4.19 | 2E-09 | 4E-07 | 3 |
| 1 | GO:0006833 | water transport | 141 | 15 | 2.09 | 3E-09 | 7E-07 | 3 |
| 1 | GO:0072330 | monocarboxylic acid biosynthetic process | 760 | 45 | 11.28 | 3E-09 | 7E-07 | 3 |
| 1 | GO:0009657 | plastid organization | 388 | 30 | 5.76 | 6E-09 | 1E-06 | 3 |
| 1 | GO:0055080 | cation homeostasis | 318 | 23 | 4.72 | 7E-09 | 1E-06 | 3 |
| 1 | GO:0080167 | response to karrikin | 128 | 14 | 1.9 | 7E-09 | 1E-06 | 3 |
| 1 | GO:0035304 | regulation of protein dephosphorylation | 140 | 14 | 2.08 | 2E-08 | 4E-06 | 3 |
| 1 | GO:0016126 | sterol biosynthetic process | 164 | 15 | 2.43 | 2E-08 | 4E-06 | 3 |
| 1 | GO:0016052 | carbohydrate catabolic process | 334 | 20 | 4.96 | 3E-08 | 5E-06 | 3 |
| 1 | GO:0042742 | defense response to bacterium | 398 | 23 | 5.91 | 3E-08 | 6E-06 | 3 |
| 1 | GO:0006084 | acetyl-CoA metabolic process | 85 | 11 | 1.26 | 5E-08 | 8E-06 | 3 |
| 1 | GO:0009744 | response to sucrose | 208 | 16 | 3.09 | 9E-08 | 1E-05 | 3 |
| 1 | GO:0016132 | brassinosteroid biosynthetic process | 118 | 12 | 1.75 | 2E-07 | 3E-05 | 3 |
| 1 | GO:0010155 | regulation of proton transport | 77 | 10 | 1.14 | 2E-07 | 3E-05 | 3 |
| 1 | GO:0009902 | chloroplast relocation | 104 | 11 | 1.54 | 4E-07 | 6E-05 | 3 |
| 1 | GO:0042335 | cuticle development | 49 | 8 | 0.73 | 6E-07 | 8E-05 | 3 |
| 1 | GO:0006094 | gluconeogenesis | 164 | 13 | 2.43 | 1E-06 | 1E-04 | 3 |
| 1 | GO:0006412 | translation | 495 | 23 | 7.35 | 2E-06 | 2E-04 | 3 |
| 1 | GO:0009825 | multidimensional cell growth | 111 | 11 | 1.65 | 2E-06 | 2E-04 | 3 |
| 1 | GO:0010196 | nonphotochemical quenching | 7 | 4 | 0.1 | 2E-06 | 2E-04 | 3 |
| 1 | GO:0071554 | cell wall organization or biogenesis | 880 | 33 | 13.07 | 2E-06 | 2E-04 | 3 |
| 1 | GO:0034284 | response to monosaccharide | 173 | 13 | 2.57 | 2E-06 | 2E-04 | 3 |
| 1 | GO:0006569 | tryptophan catabolic process | 79 | 9 | 1.17 | 3E-06 | 3E-04 | 3 |
| 1 | GO:0042737 | drug catabolic process | 137 | 11 | 2.03 | 7E-06 | 7E-04 | 3 |
| 1 | GO:0043481 | anthocyanin accumulation in tissues in r... | 113 | 10 | 1.68 | 7E-06 | 8E-04 | 3 |
| 1 | GO:0019344 | cysteine biosynthetic process | 205 | 24 | 1.54 | 6E-22 | 3E-18 | 4 |
| 1 | GO:0010035 | response to inorganic substance | 1358 | 43 | 10.22 | 2E-16 | 5E-13 | 4 |
| 1 | GO:0006970 | response to osmotic stress | 833 | 30 | 6.27 | 7E-13 | 1E-09 | 4 |
| 1 | GO:0042737 | drug catabolic process | 137 | 14 | 1.03 | 2E-12 | 2E-09 | 4 |
| 1 | GO:0010207 | photosystem II assembly | 157 | 14 | 1.18 | 1E-11 | 1E-08 | 4 |
| 1 | GO:0009657 | plastid organization | 388 | 21 | 2.92 | 3E-11 | 2E-08 | 4 |
| 1 | GO:0006364 | rRNA processing | 244 | 15 | 1.84 | 5E-10 | 3E-07 | 4 |
| 1 | GO:0007030 | Golgi organization | 177 | 13 | 1.33 | 9E-10 | 5E-07 | 4 |
| 1 | GO:0019682 | glyceraldehyde-3-phosphate metabolic pro... | 334 | 16 | 2.51 | 5E-09 | 2E-06 | 4 |
| 1 | GO:0010114 | response to red light | 104 | 10 | 0.78 | 6E-09 | 3E-06 | 4 |
| 1 | GO:0006598 | polyamine catabolic process | 36 | 7 | 0.27 | 8E-09 | 3E-06 | 4 |
| 1 | GO:0006754 | ATP biosynthetic process | 202 | 12 | 1.52 | 4E-08 | 2E-05 | 4 |
| 1 | GO:0006833 | water transport | 141 | 10 | 1.06 | 1E-07 | 4E-05 | 4 |
| 1 | GO:0042398 | cellular modified amino acid biosyntheti... | 55 | 7 | 0.41 | 2E-07 | 5E-05 | 4 |
| 1 | GO:0009266 | response to temperature stimulus | 950 | 24 | 7.15 | 2E-07 | 5E-05 | 4 |
| 1 | GO:0006544 | glycine metabolic process | 57 | 7 | 0.43 | 2E-07 | 6E-05 | 4 |
| 1 | GO:0052541 | plant-type cell wall cellulose metabolic... | 24 | 5 | 0.18 | 9E-07 | 2E-04 | 4 |
| 1 | GO:0015977 | carbon fixation | 12 | 4 | 0.09 | 2E-06 | 4E-04 | 4 |
| 1 | GO:0019760 | glucosinolate metabolic process | 204 | 11 | 1.53 | 3E-06 | 6E-04 | 4 |
| 1 | GO:0080147 | root hair cell development | 203 | 10 | 1.53 | 3E-06 | 7E-04 | 4 |
| 1 | GO:0015706 | nitrate transport | 206 | 10 | 1.55 | 4E-06 | 8E-04 | 4 |
| 1 | GO:0006006 | glucose metabolic process | 256 | 11 | 1.93 | 4E-06 | 8E-04 | 4 |
| 1 | GO:0042254 | ribosome biogenesis | 339 | 23 | 1.22 | 7E-19 | 3E-15 | 6 |
| 1 | GO:0009220 | pyrimidine ribonucleotide biosynthetic p... | 133 | 9 | 0.48 | 1E-09 | 3E-06 | 6 |
| 1 | GO:0046686 | response to cadmium ion | 466 | 12 | 1.68 | 1E-07 | 1E-04 | 6 |
| 1 | GO:0006096 | glycolytic process | 194 | 8 | 0.7 | 5E-07 | 5E-04 | 6 |
| 2 | GO:0009408 | response to heat | 297 | 23 | 1.81 | 4E-19 | 2E-15 | 1 |
| 2 | GO:0009644 | response to high light intensity | 223 | 19 | 1.36 | 1E-16 | 2E-13 | 1 |
| 2 | GO:0042542 | response to hydrogen peroxide | 194 | 17 | 1.18 | 3E-15 | 4E-12 | 1 |
| 2 | GO:0006457 | protein folding | 288 | 16 | 1.75 | 2E-11 | 3E-08 | 1 |
| 2 | GO:0010876 | lipid localization | 253 | 11 | 1.54 | 4E-07 | 4E-04 | 1 |
| 2 | GO:0048316 | seed development | 714 | 34 | 5.51 | 9E-18 | 4E-14 | 2 |
| 2 | GO:0019915 | lipid storage | 102 | 15 | 0.79 | 2E-15 | 4E-12 | 2 |
| 2 | GO:0050826 | response to freezing | 96 | 13 | 0.74 | 5E-13 | 7E-10 | 2 |
| 2 | GO:0090351 | seedling development | 245 | 15 | 1.89 | 6E-10 | 6E-07 | 2 |
| 2 | GO:0009415 | response to water | 423 | 18 | 3.27 | 5E-09 | 4E-06 | 2 |
| 2 | GO:0010182 | sugar mediated signaling pathway | 113 | 9 | 0.87 | 2E-07 | 2E-04 | 2 |
| 2 | GO:0097305 | response to alcohol | 611 | 19 | 4.72 | 4E-07 | 2E-04 | 2 |
| 2 | GO:0016114 | terpenoid biosynthetic process | 262 | 16 | 2.02 | 6E-07 | 3E-04 | 2 |
| 3 | GO:0009062 | fatty acid catabolic process | 218 | 9 | 0.64 | 1E-08 | 6E-05 | 5 |