**S2 Table. Down-regulated genes that enriched in GO annotations**

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| --- | --- | --- | --- | --- |
| **Accession** | **Gene Name** | **Function** | **Log2FC** | **expression** |
| **Hydrolase activity (27)** |
| AT5G26000 | TGG1/BGLU38 | Myrosinase (Glycoside Hydrolase Family 1)glucosinolate metabolic pathway | -1.83 | Guard cell, phloem cells of stamen |
| AT5G25980 | TGG2/BGLU37 | Myrosinase (thioglucoside glucohydrolase)glucosinolate metabolic pathway | -1.35 | Phloem cells of stamen |
| AT5G48375 | TGG3/BGLU39 | thioglucosidase activityglucosinolate metabolic pathway | -1.35 | Flower |
| AT1G02640 | BXL2 | β-xylosidase (Glycosyl hydrolase family 3)secondary cell wall metabolism | -1.01 | Flower |
| AT5G20250 | RS6/DIN10 | raffinose synthase 2 (Glycosyl hydrolase family 36)seed imbibition protein | -1.28 | Mature pollen |
| AT3G57520 | RS2/SIP2 | raffinose synthase 2seed imbibition protein | -1.21 | Mature pollen |
| AT3G63380 | ACA12 | Ca2+ ATPaseInflorescence growth and seed setting | -1.17 | Guard cell |
| AT3G57330 | ACA11 | Ca2+ ATPaseSA-Dependent PCD Pathway | -1.02 | Mature pollen |
| AT1G80660 | AHA9 | H+ ATPase/ | -1.18 | Anther |
| AT2G07560 | AHA6 | H+ ATPase/ | -1.23 | Mature pollen |
| AT3G52310 | ABCG27 | ABC transporter/ | -1.30 | - |
| At1G26130 | --- | ATPasemale gametophyte development | -1.40 | Mature pollen |
| AT3G10740 | ASD1/ARAF | β-galactosidase (Glycoside hydrolases family 51) cell wall loosening | -1.28 | Anther  |
| AT4G16190 | RD19 | cysteine proteaseresponsive to dehydration | -1.04 | - |
| AT2G03980 | GDSL-like | GDSL-motif esterase/acyltransferase/lipase/ | -1.06 | Mature pollen |
| AT1G33811 | GDSL-like | GDSL-motif esterase/acyltransferase/lipase/ | -2.65 | - |
| AT2G02970 | APY6 | Apyraseanther dehiscence and pollen exine pattern formation | -1.10 | Mature pollen  |
| AT2G22980 | SCPL13 | serine-type carboxypeptidase/ | -1.04 | - |
| AT1G04600 | XIA | Myosin-like proteinPollen tube growth  | -1.03 | Pollen tube |
| AT3G19960 | ATM1 | Myosin-like protein/ | -1.44 | Stamen |
| AT3G01310 | VIP1/VIH2 | ATP-grasp kinaseRegulates the synthesis of inositol pyrophosphate | -1.05 | Flower |
| AT5G57050 | ABI2 | protein phosphatase 2CRegulation anion channels of guard cell | -1.03 | Guard cell |
| AT5G02230 | HAD | Haloacid dehalogenase-like hydrolase/ | -1.03 | Mature pollen |
| AT3G44400 | --- | Disease resistance protein/ | -1.09 | Mature pollen |
| AT5G38850 | --- | Disease resistance protein/ | -1.09 | - |
| AT3G62820 | --- | Pectinesterase methylesterase inhibitionCell wall rigidity | -2.04 | - |
| AT4G16680 | --- | P-loop containing nucleoside triphosphate hydrolases/ | -1.24 | - |
| **Ion transporter (10)** |
| AT1G11260 | STP1 | Sugar transporter 1regulate the uptake of sugars | -1.81 | Guard cell of leaf |
| AT3G19930 | STP4 | Sugar transporter 4responding to environmental stress | -1.13 | Anther and mature pollen |
| AT2G47600 | MHX1 | Na+/Ca2+ antiporter cellular metal and/or proton homeostasis | -1.10 | Flower  |
| AT3G51860 | CAX3 | cation exchanger 3regulation of ion homeostasis | -1.11 | Guard Cell |
| AT1G26130 | ALA12 | ATPase/ | -1.40 | Mature pollen |
| AT3G52310 | ABCG27 | ABC transporter/ | -1.30 | - |
| AT4G30110 | HMA2 | ATPasepollen germination | -1.07 | Anther |
| At4G23700 | CHX17 | Cation/H+ exchanger 17reduced seed set | -1.13 | Anther |
| AT4G01010 | CNGC13 | Cyclic nucleotide gated channel family/ | -1.20 | - |
| AT1G24400 | LHT2 | Amino acid transportmale gametophyte development | -1.02 | Flower |
| **Genes related to water deprivation (5)** |
| AT5G66400 | RAB18 | dehydrin protein familyABA and drought response | -5.88  | Guard cells in flower |
| AT3G50970 | LTI30 | dehydrin protein familypositively regulates drought stress  | -4.14  | Stamen and guard cell |
| AT4G25480 | DREB1A | AP2 transcription factordrought stress in the flower  | -1.15  | - |
| AT2G18050 | HIS1-3 | Histone 1drought stress in leaf | -1.12  | Guard cell in leaf |
| AT5G57050 | ABI2 | protein phosphatase 2Cdrought stress in leaf | -1.03  | Guard cell |
| **Genes related to auxin response (7)** |
| AT2G46070 | ATMPK12 | MAP protein kinase root elongation | -1.43 | Guard cell in stamen |
| AT1G16510 | SAUR41 | Small Auxin Upregulated 41cell expansion | -1.07 | Vascular leaf |
| AT2G01200 | IAA32 | auxin inducible gene familymale gametophyte development | -1.95 | - |
| AT3G48360 | BT2 | BTB and TAZ Domain Proteinlater stages of male gametophyte development  | -1.50 | Mature pollen |
| AT4G37610 | BT5 | BTB and TAZ Domain Proteinlater stages of male gametophyte development | -1.10 | Mature pollen |
| AT4G27260 | GH3.5/WES1 | gretchen hagen3Camalexin biosynthesis | -1.03 | Trichome and flower |
| AT5G54510 | GH3.6/DFL1 | gretchen hagen3/ | -1.79 | - |