

(A)

Up-regulated genes

DEGs number

K 89-90 DAT

K 66-67 DAT

T 89-90 DAT

T 66-67 DAT

(B)

Down-regulated genes

DEGs number

K 89-90 DAT

K 66-67 DAT

T 89-90 DAT

T 66-67 DAT

(C)

Up-regulated biological processes

photosynthesis

photosynthesis, light reaction

organonitrogen compound biosynthetic process

photosynthesis, light harvesting

photosynthesis, light harvesting in photosystem I

peptide metabolic process

translation

peptide biosynthetic process

tetrapyrrole biosynthetic process

porphyrin-containing compound biosynthetic process

Koshihikari 66-67 DAT

(D)

Down-regulated biological processes

carbohydrate metabolic process

cellular carbohydrate metabolic process

glucan metabolic process

cellular glucan metabolic process

carbohydrate biosynthetic process

polysaccharide biosynthetic process

cellular carbohydrate biosynthetic process

cellular polysaccharide metabolic process

glucan biosynthetic process

energy reserve metabolic process

Koshihikari 66-67 DAT

(E)

Up-regulated biological processes

phosphorylation

protein phosphorylation

phosphorus metabolic process

phosphate-containing compound metabolic process

protein modification process

cellular protein modification process

protein autophosphorylation

cell surface receptor signaling pathway

organonitrogen compound metabolic process

macromolecule modification

Koshihikari 89-90 DAT

(F)

Down-regulated biological processes

small molecule metabolic process

lipid metabolic process

isoprenoid biosynthetic process

energy reserve metabolic process

glycogen metabolic process

terpenoid biosynthetic process

lipid biosynthetic process

cellular lipid metabolic process

isoprenoid metabolic process

terpenoid metabolic process

Koshihikari 89-90 DAT

(G)

Up-regulated biological processes

vesicle-mediated transport

protein localization

nitrogen compound transport

protein transport

establishment of protein localization

macromolecule localization

Golgi vesicle transport

cellular localization

organonitrogen compound metabolic process

cellular protein localization

Takanari 66-67 DAT

(H)

Down-regulated biological processes

photosynthesis

photosynthesis, light reaction

plastid organization

photosynthesis, light harvesting

chloroplast organization

response to light stimulus

generation of precursor metabolites and energy

regulation of photosynthesis

response to radiation

pigment biosynthetic process

Takanari 66-67 DAT

(I)

Up-regulated biological processes

vesicle-mediated transport

protein localization

nitrogen compound transport

protein transport

establishment of protein localization

cellular localization

macromolecule localization

cellular protein localization

cellular macromolecule localization

intracellular transport

Takanari 89-90 DAT

(J)

Down-regulated biological processes

photosynthesis

plastid organization

chloroplast organization

photosynthesis, light reaction

response to light stimulus

response to radiation

regulation of photosynthesis

small molecule metabolic process

response to abiotic stimulus

photosynthesis, light harvesting

Takanari 89-90 DAT

Differentially expressed genes (DEGs) with (A) up- and (B) downregulation under chronic O₃ conditions were detected in Koshihikari and Takanari at 66–67 and 89–90 days after the beginning of treatment (DAT) in 2020. The DEG intersections among the four groups of the combination of two cultivars at two growth stages were visualized by connecting groups with plots. The numbers in the columns represent the number of DEGs for each intersection. The positively (C, E, G, I) and negatively (D, F, H, J) enriched GO terms associated with biological process with the top-10 lowest *p*-values are shown for (C–F) Koshihikari and (G–J) Takanari at 66–67 and 89–90 DAT, respectively. Horizontal columns represent the number of DEGs included in enriched GO terms.