Poster Session | Crop Genetics and Physiology | P4: Poster Session

[P4] Crop Genetics and Physiology

2021年9月9日(木) 12:15 ～ 14:00 Room 4 (Poster) (Crop Genetics and Physiology)

12:15 ～ 13:00

[P4-11]Branched-Chain Amino Acid Aminotransferases (BCATs) Play Important Roles for the Induction of Autophagy in Leaf Senescence of Soybean

*Nominated for Presentation Awards

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We previously reported that autophagy plays an important role in nitrogen translocation from leaf senescence to sink organs in higher plants under starvation conditions (Nang et al 2011). Intracellular levels of free branched chain amino acids (BCAA) pool appeared to be involved in autophagy regulation in yeast and animal cells via the mTOR pathway. In this study, we focused on BCAA specific aminotransferase (BCAT), which catalyzes the last transamination step in the pathway of synthesis and initial step of degradation of BCAA, the induction of senescence and autophagy of shaded leaf. Leaf shading treatments resulted in a significant reduction of leaf chlorophyll content and photosynthesis II activity. We examined the roles of soybean BCAT in leaf senescence and autophagy of soybean. The expression profiles of mitochondrial and chloroplast BCAT genes and ATG-related genes in soybean are examined. GmBCATX and GmBCAT2 that localized in mitochondria, were significantly induced under shading leaves. Resultantly, the levels of BCAA pool under shading treatments decreased significantly. The Bispyribac sodium (BIS) treatment resulted in a reduction of proline contents due to the upregulation of ProDH expression. Amylase activities of vacuolar proteases were upregulated in soybean seedling in response to BIS treatment. It is suggested that the induction of GmProDH and vacuolar proteases are regulated in the same manner with autophagy induction via a reduced pool of BCAA. Immunoblot, immunoprecipitation of soybean tissue extracts by anti-BCAT antibodies will be discussed.