[O43] High Quality Food and Ingredients

Chair: Yoji Nitta (Fukushima University, Japan)
Chair: Akiko Fujita (Satake Corporation, Japan)
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17:20 ～ 17:40

[O43-02]The Conditional Chalky Grain Mutant *floury endosperm11-2* (*flo11-2*) of Rice (*Oryza sativa* L.) is Useful for Studies on Chalkiness

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High temperature (HT) in a grain filling associated with climate change diminishes grain quality as well as productivity of rice (*Oryza sativa* L.). Chalky grain is one of the main visible damages caused by HT, which leads to lower milling efficiency, lower palatability, and lower grade and price of rice. The underlying mechanism of the chalkiness is complicated and largely unknown, preventing sophisticated development of resistant cultivars and effective agronomical practices. In this study, we isolated and characterized the *floury endosperm11-2* (*flo11-2*) mutant, which showed higher degree of chalkiness than wild type under field conditions with mean temperature of 28℃ in a grain filling but similar degree of chalkiness to the wild type under phytotron conditions with mean temperature of 24℃. The *flo11-2* mutant has an amino acid substitution on the 259th aspartic acid with valine in the conserved ATPase domain of plastid-localized 70 kDa heat shock protein 2 (cpHSP70-2). The in vitro and in vivo analyses on the cpHSP70-2 demonstrated that lowered ATPase and chaperone activities of cpHSP70-2 are involved with the chalkiness of the *flo11-2* mutant. Using this high sensitivity of the *flo11-2* mutant to HT, we demonstrated that daily maximum temperature was more causative than daily mean or minimum temperatures. Besides, the developmental stage around 20 days after flowering (DAF) was most sensitive to HT rather than the early stage up to 15 DAF. The *flo11-2* mutant is, therefore, a useful material for chalky grain research.