Comparative Study of Traits and Texture in Japonica×Indica Rice Hybrids and Their Parents

Ueno, Nanako (School: Notre Dame Seishin Gakuen Seishin Girls' High School)

Sallyqueen is a rice variety derived from a Nipponbare × BASMATI370 cross. Its grain length and width are approximately 1.15 and 0.73 times that of Nipponbare, respectively. Some grains were similar in size to those in Nipponbare. Additionally, amylose concentration, which has an impact on texture was 13.8%, suggesting that it was between its parental varieties. This study aimed to elucidate the genetic basis of these traits by analyzing their gene expression. Compared with Nipponbare, GW5 , which negatively regulates grain width, showed a 7.7 fold increase in expression in Sallyqueen, whereas GW8 , a positive regulator of grain width, exhibited a 0.5 fold increase. Further comparison between Sallyqueen grains of shorter and longer lengths revealed differential expression in GW5 (1.9 ×), GW8 (0.4 ×),and GS2 (1.5 ×), with the latter being involved in promoting grain length. These differences suggest that the regulation of these genes contributes to the observed variation in the grain size. Furthermore, I analyzed the expression levels of waxy genes involved in amylose synthesis. When compared with Nipponbare, Sallyqueen and Basmati370, Basmati370 expressed the most waxy genes. These findings highlight the role of GW5 GW8 , and GS2 in determining grain size and suggest that waxy gene plays a key role in texture differentiation. This study enhances our understanding of rice grain trait regulation and provides valuable insights into breeding programs aimed at developing rice varieties with desirable grain characteristics.

Awards Won: