A Comparison of Sugar Metabolism in Sugarcane Genotypes Adapted to Louisiana and Hawaii. (C02-lingle083303-Oral)

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Abstract:

Different strategies of sugarcane (Saccharum sp. hybrids) breeding programs in Hawaii and Louisiana produce very different genotypes. Hawaiian genotypes are adapted to two-year production cycles and produce high tonnage in a tropical environment. Louisiana genotypes are adapted to a 9-month growing season and have early sucrose accumulation. We compared sucrose metabolism in internodes 2 and 18 from the top of four Hawaii (HI) and two Louisiana (LA) genotypes. Sucrose concentration in Internode 2 was similar in all genotypes. Sucrose concentration in Internode 18 was significantly higher in LA than HI genotypes, and there was a significantly higher sucrose to total sugar ratio in LA genotypes. While soluble enzyme activities were different among genotypes, the differences were not consistent between LA and HI genotypes. Cell wall acid invertase activities in both internodes were significantly greater in LA than in HI internodes. This result suggests that the higher activity of cell wall acid invertase enhances sucrose unloading into the internode tissue. Thus, the cell wall invertase gene may be a good candidate for improving sucrose accumulation in sugarcane.

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