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Contemporary Research in Breeding Sugar Cane Genotypes

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Perspective

The sugarcane varieties that are available now are obtained as a result of complex crossing between diverse genetic species of Sugar cane. There have been several limitations for the genetic improvement and development of modern sugar cane varieties that include the genome size and its complexity. The genetic diversity can be estimated from morphological traits, pedigree record and the molecular markers. Selection and breeding of sugar cane is based on the morphological traits, uniformity, yield stability, adaptation ability, and high yielding potential as revealed by the plant characterization. Sugar cane is used not only for sugar production but also for jaggery; therefore, the high yielding clones are required for sustained production. In one of the recent studies Co 0232, CoLk 94184 and CoSe 03234 sugar cane varieties were identified to be superior to other sugar cane varieties based on the sugar cane yield, rationing potential and ratoon yield. With regards to sugar cane juice quality including sugar recovery, yield and sucrose percentage three genotypes were identified namely Co 0232, CoLk 94184 and CoSe 03234. The sugar cane varieties of Co 0232, CoLk 94184 and CoSe 03234 were identified as best in yielding ability and juice content and quality content, in plant cane as well as in ratoon [1].

Sugar cane is one of the most prominent and important commodities in the international market. Brazil, India, United States, Western Europe, Thailand and Australia are the largest sugarcane producers. Low productivity of the sugar cane and low sugar yield are the major bottle necks to the sugar production. The solution lies in cultivating high yielding sugar cane varieties. For successful breeding of the sugar cane varieties, wide genetic diversity in the form of local germplasms are needed is required. Papua, Sulawesi is the center of genetic diversity of sugar cane. One of the recent studies focused on the exploration and collection of sugarcane germplasms and clones derived from local seed, wild clones among which morphological variability could be observed in terms of stem color, stem wax, and eye bud shape [2].

Introduction of new varieties into the different countries makes the varieties susceptible to local diseases such as red rot, whip smut, mosaic and rust and other forms of disease. However, some varieties such as SPF-234 (S. sinensis) was found to be resistant to red rot and rationed better than other varieties with each stool producing several stalks. However, the fiber content was high with poor sugar recovery. Most of the imported varieties were susceptible to pests and diseases. Therefore, it was emphasized to plan the breeding of the sugar cane using the local varieties than imported varieties [3].

Sugar cane is considered as one of the most important cash crops of the world because this crop has high economic value due to greater household demand as food and beverage and in pharmaceutical industry. In a recent study it was noted that development of sugar cane varieties that is tolerant to dry agro-ecological conditions could substantially increase sugar production. The study revealed that the genotype of the sugarcane has significant role in the growth and the yield performance. Late maturing genotypes could not yield more than control varieties. The early maturing varieties of PI-Pringu and PI-CYZ were found to be promising [4].

Recent studies reported dry resistant varieties such as HCW 438, HCW 40, HCW 440, and GMP 4. Cenning variety was reported as early ripe variety, and is generally used to identify early ripe sugarcane varieties. The sugar cane clones of Clones MLG 18/21/14, MLG 18/42/15 and MLG 18/41/5 were reported to have productivity of up to 35 t/ha with sucrose content up to 38% and were used to develop sugarcane resistant to dry land with concomitant highest productivity, sucrose content, and sugar yield. However multiple location testing were recommended before the release of new high-yielding variety for dry land application [5].

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