

SUSTAINABLE BIOENERGY SUGARCANE BREEDING AND CULTIVAR DEVELOPMENT

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The growing demand for ethanol as a renewable source of energy brings several challenges for the sugarcane genetic breeding programs. The IAC Sugarcane Breeding Program has giving priority, not only to the increase of the agroindustrial productivity but also to the development of new genotypes with high capacity of primary energy production which is based on the total cane energy given by biomass and its composition in fiber, sucrose and reductor sugars.

Strategies that encompass clone selection, phenotyping and genotyping were applied at advanced stages of the IAC Sugarcane Breeding Program Experimental Net conducted to identify genotypes that full fill the agroenergetic profile given by the “primary energy” parameter.

Moreover, applying the combined selection process in the breeding early stages has allowed the identification and selection of parents with more efficiency in the production of high potential bioenergy progenies. Therefore, 60 families are being studied in two sites (Ribeirão Preto and Jaú) in relation to the biometric and technological traits. The family means was quantified through the weight of each progeny and primary energy production (PE). The fiber% range varied from 14.06 to 17.24 among families and from 12.39 to 20.11 between individuals. These index signs the need for the development of new methodologies that identify transgressive progenies as also the wideness of genetic base through the use of wild germoplasm in introgression programs. The present work, in its current stage have identified the sample size that is representative of the families in relation to the quality parameters

(Pol%, Fiber%), which will boost the harvest of the trials that is done mechanical without straw burning.

A genetic introgression program between commercial varieties and *Saccharum spontaneum* accessions were initiated to promote the introduction of new genes for biomass production, disease and pest resistance, and adaptation to the Brazilian cerrado conditions. In this direction, three different populations were planted at Ribeirão Preto (march 2011) totalizing 1215 progenies that will be characterized and evaluated in the next two growing cycles. After the characterization and selection phase, the genotypes will be introduced in the germplasm active bank to introduce bioenergetic traits through hybridization. One of the most drawbacks in such case is the flowering synchronism of the wild germplasm with the modern varieties. Different photoperiod trials are being applied in the Photoperiod facility which allowed the identification of the ideal conditions for the flowering synchronism. The photoperiod facility is unique in Brazil and was built with financial support from the BIOEN-Fapesp Project, at the Sugarcane Center, Ribeirão Preto, SP, Brazil. Submitted to different trials, several genotypes of a group of 52, responded to the artificial induction, started in September 2010, where the natural conditions were not favourable. Seventeen genotypes, flourish with 100 days of anticipation and with many viable pollen, which allowed until now, 8 crosses. Thus, it is possible to induce artificially the flowering in Brazil, even in adverse natural photoperiod conditions, and to perform crosses in February and March. All these integrated strategies will contribute to the development of genotypes with high bioenergy potential.

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