

Chaba Thongpaiyai 2011: The Genetics Variance-Covariance Structure of Energy-Cane Breeding Population. Master of Science (Plant Breeding), Major Field: Plant Breeding, Faculty of Agriculture at Kamphaeng Saen. Thesis Advisor:
Associate Professor Prasert Chatwachirawong, M.S. 101 pages.

The experiments were conducted at the sub-station of Cane and Sugar Industry Promotion Center Region 1, Panomtuan district, Kanchanaburi province in both early and late rainy season during September 2008 to November 2010. The objectives of this study were to estimate the quantitative genetic parameters of yield and components, and to determine the most effective factors on sugar yield in TByEFC energy-cane population. Each planting season used 9x9 triple lattice design with 81 entries that separated into 3 groups, viz. 25, 54 and 2 entries for parental, progeny and standard variety group, respectively. The sugarcane plants were harvested at 10 month after planting in both planted and the first ratoon crop-cycles. Twenty-two traits including stalk length (STKLN), stalk diameter (STKDIA), stalk weight (STKWT), the number of stalks (STKNO), cane yield (CYLD), brix value at 8, 10 months and at laboratory (BRIX8M, BRIX10M and BRIXLB), polarity (POL), fiber content (FIBER), purity (PUR), commercial cane sugar (CCS), sugar yield (SYLD), internode length (INTLN), the number of internodes (INTNO), the number of leaves (LFNO), leaf width (LFWD), leaf length (LFLN), leaf module (LFMOD), single leaf area (SAREA), plant leaf area (PAREA) and leaf area index (LAI), were measured. The results explored that genotypic variance had the largest amount in all traits. Broad-sense heritability were quite high in 5 triats (LFWD, LFMOD, FIBER, SAREA and STKDIA). Narrow-sense heritability had relative high in LFLN, LFNO and PAREA, but relative low in sugar yield and its component. Results obtained from path analysis revealed that STKNO gave the highest direct positive effect on CYLD, followed by STKDIA and STKWT. CYLD had high correlation and direct positive effect on sugar yield. Therefore, the criterion of variety selection in energy-cane breeding program should be focus on STKNO, STKDIA and STKWT.

Student's signature

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