

**TRAIT RELATIONSHIPS IN SUGARCANE AT FINAL SELECTION STAGES
 BY**

Masri, M.I.*; Abd El-Shafi, M.A.* and El-Taib, A.B.A.**

* Agronomy Department, Faculty of Agric., Cairo Univ., Giza, Egypt

** Sugar Crops Res. Inst., ARC., Giza, Egypt

ABSTRACT

This study was conducted at Kom-Ombo Agricultural Research Station, Aswan Governorate to determine phenotypic and genotypic correlation coefficients among various traits in sugarcane (*Saccharum spp.*) and to analyze their interrelationships through path coefficient analysis. Other objectives were to determine broad-sense heritability and genetic advanced under selection for the traits studied (Stalk length, stalk diameter, stalk density, stalk weight, stalk number, cane yield, Brix, sucrose%, purity%, sugar recovery, and sugar yield). A total of 15 sugarcane genotypes that were selected during the final clonal selection stages and two check cultivars (PH 8013 and GT 54-9) were laid in a randomized complete block design during 2005/5006 (plant cane) and 2006 /2007 (first ratoon).

Results indicated that cane yield had a positive and significant correlation coefficients with stalk density, stalk weight and stalk number, however its correlation with stalk length and stalk diameter was positive but non significant in both plant cane and ratoon crop. Stalk weight had a positive correlation with stalk length, stalk diameter and stalk density. Stalk density had a negative and significant correlation with stalk length and stalk diameter in both crops. Brix and purity had a positive correlation with sugar recovery and with each other, however correlation between Brix and juice purity was increased in older crop from 0.196 to 0.785** at the phenotypic level and from 0.192 to 0.842** at the genotypic level. Correlation between cane yield and sugar recovery diminished in ratoon crop from 0.375** to -0.199 at the phenotypic level, and from 0.492 to -0.253 at the genotypic level. Sugar yield had a positive and significant correlation with cane yield and sugar recovery in both crops.

Path coefficient analysis indicated that stalk density was the primary direct determinant of stalk weight followed by stalk diameter and stalk length at the phenotypic and genotypic levels in both plant cane and ratoon crop. The direct effect of purity on sugar recovery was diminished in ratoon crop from 0.699 to 0.404 at the phenotypic level and from 0.793 to 0.390 at the genotypic level. The phenotypic and genotypic direct effects of Brix on sugar recovery were positive and about equal in magnitude in both plant cane and ratoon crop. Stalk weight had a large positive direct effect on cane yield followed by stalk number at the phenotypic and genotypic level in both crops. Cane yield was the primary direct determinant of sugar yield, while sugar recovery was secondary in determining sugar yield at the phenotypic and genotypic levels in both plant cane and ratoon crop.

Heritability estimates in each of plant cane and ratoon crop were relatively high for all studied traits. Maximum genetic advance (as percent of mean) in plant cane was observed For sugar yield (50.80 and 43.40) followed by stalk density (46.19 and 39.46), cane yield (43.81 and 37.43) and stalk weight (38.19 and 32.63) under 5 % and 10 % selection intensity, respectively . However in ratoon crop the highest values of genetic advance was observed for sugar yield (42.32 and 36.34), cane yield (38.82 and 33.33) and stalk weight (36.25 and 31.12) under 5 % and 10% selection intensity, respectively.