

**STUDY OF THE PERFORMANCE AND GENETIC  
STABILITY OF SOME SUGAR BEET VARIETIES GROWN  
IN A NEWLY RECLAIMED SOILS**

**BY**

**Hassan Abd-Allah Abd El-Rahman Hassan**

*B.Sc. Agric. (Agron.), Fac. of Agric.,  
Fayoum University, Egypt, (2013)*

**The Requirements for the Degree  
of Master Science**

**In  
Agricultural Sciences  
(Agronomy)**

**Agronomy Department  
Faculty of Agriculture  
EI-FAYOUM UNIVERSITY**

**2020**



كلية الزراعة  
Faculty of Agriculture



وحدة ضمان الجودة  
Quality Assurance Unit



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**Supervision Committee:**

**1-Prof. Dr. Mohamed Desouki Hassan Dewdar**

Professor of plant breeding, Faculty of Agriculture, El-Fayoum University.

Signature .....

**2-Prof. Dr. Samier Kamel Ali Ismail**

Professor and head of Agronomy, Faculty of Agriculture, El-Fayoum University.

Signature.....

**3-Dr. Ali Abd Allah Ali Mekdad**

Associate professor of Agronomy, Faculty of Agriculture, El-Fayoum University.

Signature.....

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**Approved by:**

**1-Prof. Dr. Afaf Mohamed Tolba**

Professor of Agronomy, Faculty of Agriculture, Ain Shams University.

Signature .....

**2-Prof. Dr. Kamal Hassan Ghallab**

Professor of statistical and plant breeding, Faculty of Agriculture, Vice dean of the Institute for Research and Strategic Studies of the Nile Basin Countries, Fayoum University.

Signature .....

**3-Prof. Dr. Mohamed Desouki Hassan Dewdar**

Professor of plant breeding, Faculty of Agriculture, El-Fayoum University.

Signature .....

**4-Prof. Dr. Samier Kamel Ali Ismail**

Professor and head of Agronomy, Faculty of Agriculture, El-Fayoum University.

Signature.....

Date of Examination: / /2020

## ABSTRACT

*To develop high yielding genotypes and to develop cultivars which can be adapted to a range of divers environments, this present study was conducted to determine the magnitude of genotype x environment interaction, and to estimate the phenotypic and genotypic stability of eight genotypes in a newly reclaimed soils at fayoum Governorate, according to Eberhart and Russell, 1966 and Tai, 1971 models. Eight genotypes of sugar beet were used namely ; Baikal, Universe, Avantga, Serenada, Capel, Bts 301, Athos poly and Saucona, which grown in randomized complete block design with three replications over nine environments, involving three sowing dates; 1<sup>st</sup> September., 1<sup>st</sup> October and 1<sup>st</sup> November at three seasons; 2015/2016, 2016/2017 and 2017/2018. Three sowing dates x three seasons provided a total of nine environments. Pooled analysis of variance revealed that the mean squares among the genotypes were highly significant for all studied traits. Highly significant variation for G×E interactions and environment linear were observed for all the studied traits, suggesting that all studied traits in sugar beet genotypes are highly influenced by changing in the environment. G × E interactions (linear) component of variation of stability were also significant for all studied traits, except for brix and purity percentages, revealing the differential response of the genotypes, to various agro-climates. Results showed that the early sowing date of 1<sup>st</sup> September had significant effect on all traits studied and gave highest mean performances for most traits, followed by 1<sup>st</sup> October sowing date then 1<sup>st</sup> November sowing date, whereas the obtained values were (31.26 ton/fad.) for root yield, (9.31 ton / fad.) for top yield and (5.76 ton / fad.) for sugar yield trait. Results of stability analysis revealed that some of the eight sugar beet genotypes were judged as phenotypic and genotypic stable for most traits studied and had variable adaptability to different environments. At the same time, the genotype Bts 301 gave the highest mean values compared with the other genotypes under study for most traits over all studied environments, as well as the genotypes; Saucona, Serenada, Capel and Universe were stable for root yield, top yield and sugar ttraits according to (mean,  $b_i$ ,  $s^2_{di}$ ,  $\lambda_i$  and  $a_i$ ) statistics. Based on the previous results, the study recommended that the genotypes; Saucona, Serenada, Capel, Universe and Bts 301 were more stable and increased in yield of root and sugar, so it is recommend to use these genotypes in different plating dates under the conditions of fayoum region. These genotypes may be utilized as donors in sugar beet*

*improvement program for target ecosystem.*

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*Key words: Phenotypic and genotypic stability, sowing dates, genotypic x environments, sugar beet.*