

Surveying the Relations Among Traits Affecting Root Yield and Sugar Content in O-type Lines of Sugar Beet for Winter Sowing

M. Niazian¹, A. Rajabi², R. Amiri*³, M.R. Orazizadeh⁴, and H. Sharifi⁵

1. M.Sc. Student of Plant breeding of College of Abouraihan, University of Tehran, Iran
- 2,4. Assistant professor and academic member, respectively, of Sugar Beet Seed Institute, Karaj, Iran,
3. ***Corresponding Author:** Associate professor of College of Abouraihan, University of Tehran, Iran, (ramiri@ut.ac.ir)
5. Academic member of Dezful Agricultural Research Center, Dezful, Iran

Received: 6 July 2011

Accepted: 13 October 2010

Abstract

In order to determine the most important traits influencing root yield and sugar content of autumn-sown sugar beet monogerm O-type lines, 49 genotypes (O-types and hybrids) were evaluated in a triple lattice design with three replicates at Safiabad Agricultural Research Center, Dezful, Iran in 2008-2009. Following an analysis of variance, statistical analyses such as simple correlation coefficients among the traits were administered on treatment means. Factor analysis divided all the studied parameters into five factors: white sugar content, yield, root morphological characteristics, resistance to bolting and *Cercospora* leaf spot. Root diameter, resistance to *Cercospora*, crown height, root shape, alpha-amino nitrogen, potassium and extraction coefficient of sugar were identified as the most important traits in stepwise regression analysis for root yield as the dependent variable. In forward regression analysis for sugar content as the dependent variable, the most important traits were found to be molassed sugar, crown height and resistance to bolting, respectively. Path analysis indicated that root diameter, root shape and alpha-amino nitrogen had direct positive effects and cercospora resistance, crown height, potassium and white sugar content had direct negative effects on root yield. Also, the direct effect of crown height on sugar content was positive and that of molassed sugar and cercospora resistance was negative. Cluster analysis demonstrated that the genotypes of cluster 2 were superior in the traits affecting root yield, whereas the genotypes of cluster 1 were superior with respect to the traits influencing white sugar content and extraction coefficient of sugar. Therefore, the genotypes of the latter cluster could be used to increase white sugar content and extraction coefficient of sugar and hence decrease the impurities such as sodium, potassium and alpha amino nitrogen.

Keywords: *Bolting, Cercospora, Factor analysis, Stepwise regression, Sugar beet, Winter-sowing*