



University of Zabol

Graduate School

Faculty of Agriculture

Department of Plant Breeding and Biotechnology

The Thesis Submitted for Ph.D Degree in the field of Plant breeding

**Assessment of different selection indices in single cross
hybrids of corn under saline and normal conditions**

Supervisor:

Dr. Barat Ali Fakheri

Dr. M. solouki

Advisors:

Dr. N. Mahdinezhad

Dr. Saeed Khavari Khorasani

By:

Hamid Reza Osmani Roudi

Summer 2022

Abstract

The yield in agricultural plants has little heredity and is strongly affected by environmental conditions, so the selection of desirable genotypes based on yield for its genetic improvement may have low efficiency due to environmental effects. Selection based on the appropriate index can be one of the effective methods for indirect selection to simultaneously improve performance components and ultimately performance. Performance is a complex trait that has low heritability, that's why selection based on selection index is one of the effective methods for indirect selection to improve performance. In order to investigate the selection indices to improve the yield of corn, an experiment with 14 fodder corn singlecross hybrids (including 12 promising hybrids and 2 commercial singlecross hybrid varieties 704 and 715 as controls) in the form of a randomized complete block design with 4 replications in both saline and non-saline conditions and It was carried out in agricultural research stations of Mashhad and Abbasabad Tangleshor in 2016. The results of composite statistical variance analysis indicated the existence of a very significant difference between the two saline and non-saline environments in terms of most of the examined traits ($p \leq 0.01$). Stepwise regression was used to reduce the measured data and calculate the selection indices. The traits of fodder yield, dry fodder yield, total number of leaves, number of ears, plant height and number of days to pollination were selected from the regression model. Based on these results, a total of 77.84% and 76.90% of changes related to yield were justified in non-stress conditions and used in the calculation of selection indices. The relative efficiency of selection and the expected benefit were higher in the optimal indices compared to Pesk-Baker. The highest relative efficiency of selection in non-stress conditions was estimated in index number 5 (hybrids no. 3, 5, 2, 8 and 6) and in salt stress conditions in index no. 4 (hybrids no. 13, 3, 4, 10 and 8). . In addition, in both conditions without stress and salt stress, genotype number 2 was selected as the best genotype by most of the studied selective indices.

Keywords: heritability, Pesekbaker, salinity stress