



University of Zabol
Graduate School

Faculty of Agriculture
Department of Plant Breeding and Biotechnology
The Thesis Submitted for the Degree of Ph.D.

**Location of genomic regions related to salt stress in
'Nore/Tremois' double haploid lines of barley**

Supervisor:

Dr. M. Selouki
Dr. B.A. Fakheri

Advisors:

Dr. R. Aghnoum
Dr. N. Mahdinezhad

By:

M. Khamari

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Abstract

Most agricultural traits have low heritability and are controlled by a large number of genes or QTL. Therefore, their control and engineering is problematic. Salt tolerance is one of the complex traits. In this research, in order to locate QTLs related to salinity stress and determine the contribution of each QTL in the phenotypic diversity of the relevant trait, 136 double haploid lines of barley along with their parents Nure and Tremois in the crop year 1400-1999 in one year and Domkan, In the research center of Zahak city and the educational farm of Tehran University of Agriculture and Natural Resources (Karaj), it was investigated in the form of alpha lattice design in two replications under normal and salinity stress conditions. The examined traits included all phenological, morphological and physiological traits including chlorophyll density, leaf relative humidity and leaf proline content. After measuring the traits, first statistical analyzes including simple and compound variance analysis, simple correlation between traits, multi-step regression (step by step), decomposition into main factors with the help of SAS software version 9/ 0 was done. The results of analysis of variance indicated that there was a significant difference between the lines in two conditions of normal and salt stress in both locations for most of the examined traits. QTL analysis was done using QTL cartographer ver 2.5 software and with Using the map related to molecular markers obtained from 118 double haploid lines of barley was done. This map consisted of 543 SSR, STS-SNP and DArT markers with a length of 1141 and an average distance of 2.8 cm. A total of 188 QTLs were obtained for the examined traits in both Zabol and Tehran locations (65 QTLs for normal conditions, 59 QTLs for salinity stress and 64 QTLs for the average of the two conditions). The phenotypic variance justified by these QTLs ranged from 0.062 to 0.214 percent. The highest and the lowest related to the chlorophyll density traits were obtained in the stress condition in Zabol location and the day until Panjehdehi in the average of the two conditions in Tehran location. LOD ranged from 2.44 to 6.432. And the highest and lowest LOD were related to traits of day to greening under normal conditions in Zabol location and day to pawing in the average of two conditions in Tehran location.

Keywords: Barley, agronomic traits, phenological traits, physiological traits, Kyotl.