

Evaluation of Susceptibility of Some Phenological Stages of Wheat Genotypes in Response to Drought Stress

Ahmad Naderi^{1*} and Mohammad Reza Eslahi²

- 1- ***Corresponding Author:** Associate Professor, Agricultural, Educational and Resource Research Center of Khuzestan, Agricultural Research, Education and Extension Organization, Ahvaz, Iran (ah_naderi36@yahoo.com)
- 2- Assistant Professor, Agricultural, Educational and Resource Research Center of Khuzestan, Agricultural Research, Education and Extension Organization, Ahvaz, Iran

Received: 2 September, 2016

Accepted: 8 July, 2018

Abstract

Background and Objectives

Wheat is the most important crop in Khuzestan province. Under such a condition wheat experiences drought stress in response to both low water resource limitation and respiration. Determination of tolerant traits, is one of the most important goals in wheat breeding programs under stress conditions. This research was carried-out to study the susceptibility of some phenological stages of wheat genotypes based on grain yield and its components.

Materials and Methods

The research was conducted in split plot experiment using complete randomized block design with three replications, in 2010-11 and 2011-12 cropping seasons. The main plots included full irrigation as the check and irrigation withholding at tillering, stem elongation, heading and grain filling stages, and the sub plots consisted of four wheat genotypes. Days to some phenological stages, grain yield and yield components were measured. Planting seeds of each genotype was conducted based on 400 seeds per square meter in six planting lines with six meters in length and 20 cm spacing between lines. By monitoring the meteorological forecast, in case of probability of rainfall, for protection of the field from possible rain, a metal guard with 1.2m height and covered with transparent polyethylene was used.

Results

The effect of year was not significant for any of the studied traits. The effect of irrigation stress treatment on grain yield and its components was significant. Except for biological yield and number of grain per spike, the differences between genotypes were significant for all traits, and the interaction of irrigation \times genotype treatment for all traits studied in this study was significant. Results indicated that grain yield in normal irrigation was 4919 Kg/ha and in irrigation withholding at tillering, stem elongation, heading and grain filling growth stages were 4109, 4442, 3988 and 4455 Kg/ha respectively. Heading stage was evaluated as the highest susceptible, for biological yield, grain yield, harvest index, grain per spike and grain per unit area with susceptibility indices of 1.47, 1.39, 1.33, 4.80 and 1.75 respectively.

Discussion

According to the results of this study, due to the more severe effect of drought stress on grain

yield at spike emergence stage, irrigation is important at this stage. In the absence of irrigation at the mentioned stage, yield reduction will be higher than non-irrigation at other stages. Thus, based on susceptibility index, compared to other stages, heading and grain filling stages were evaluated as the highest and lowest susceptible stages in response to water deficit respectively.

Keywords: Biological yield, Heading, Susceptibility index