

DROUGHT STRESS EFFECTS ON SEED YIELD AND YIELD COMPONENTS OF BARLEY CULTIVARS

Marziyeh Maktoobian*¹, Somayeh barati, Reza Esmaeili, Ali Soleymani

*Corresponding author email:maktoobianm@yahoo.com

INTRODUCTION

Barley (*Hordeum vulgare* L.), due to its drought resistance, is one of the most widely grown crops in arid and semiarid regions of the world (Ghazi et al. 2007 and Kinaci and Kinaci, 2005). Drought stress during different stages of growth in rainfed and terminal stages in irrigated cereals is the primary limitation to reduced performance of these crops (Siosemardeh et al. 2006). A demand for cultivars better suited to environmentally-friendly or low-input management systems is likely to arise (L.e Gouis et al., 1999; Soleymani et al., 2011). Also, selection of appropriate genotypes for drought tolerance has been the main challenge of agricultural scientists throughout these years. So, the aim of this research is evaluating seed yield and yield components of barley cultivars to different irrigation treatments.

MATERIAL AND METHODS

In order to evaluate seed yield, biological yield and harvest index of barley s cultivars in different treatments of drought stress an experiment was conducted as a split plot arrangement based on randomized complete block design with 3 replications at experimental agriculture farm of Islamic Azad University, Khorasgan (Esfahan) branch, in Esfahan. Irrigation treatments as a main plot were arranged on the basis of evaporation from pan evaporation (including irrigation after 70, 90 and 110 mm evaporation from pan), and sub plots were included 4 cultivars (Nosrat, Reihan 03, Valfajr and Yosef). The amount of cultivated seed was evaluated on the basis of 400 seeds per m. The irrigation was done normally from plantation until the beginning of reproductive stage. In each plot, 20 lines were used. The length of each line was 6 m and its width was 3 m. Hand weeding was done for irradiation of weeds. Because of soil richment on P and K, for providing N element, N fertilizer was applied in two split (half of it was used before planting and half of it was used one week before anthesis stage). In the experiment, total number of tiller per plant, plant height, the number of spike per m^2 , the number of seed per spike, a thousand seed weight, seed yield, biological yield and harvest index was evaluated. The Multiple Range Test of Duncan performed the separation of means. All statistics was performed with MSTATC program.

RESULTS AND DISCUSSION

Irrigation had significant influence on plant height, the number of spike per m^2 , a thousand seed weight, seed yield and harvest index. Cultivar had significant effect on plant height, the number of spike per m^2 , seed yield. Plant height, the number of seed per spike, seed yield, biological yield and harvest index. Plant height, the number spike per m^2 , seed yield, biological yield and harvest index was significantly influenced by irrigation and cultivar interaction. Nouri-Ganbalani et al. (2009) reported that genotype had significant effect on plant height, a thousand grain weight and grain yield. The maximum total number of tiller per plant, plant height, the number of spike per m^2 was obtained in irrigation on the basis of 70 mm evaporation from evaporation pan. The number of seed per spike, a thousand seed weight also decreased significantly from irrigation on the basis of 70 mm to 110 mm evaporation from evaporation pan. Nouri-Ganbalani et al. (2009) concluded that drought stress had significant influence on plant height, grain yield, harvest index and a thousand grain weight. Irrigation on the basis of 70 mm evaporation from evaporation pan also had obtained the highest biological yield and harvest index. This yield reduction in drought stress condition can be attributed to stomata closure (Masoud et al., 2005), stomata resistance (Golestani and Assad, 1998) and a decrease in the absorption of photosynthetic active radiation (Pshibytko, 2003). There was no significant differences in total number of tiller per plant, the number of seed per spike and a thousand seed weight between cultivars. The maximum plant height and the number of spike per m^2 were related to Nosrat and Valfajr respectively. Valfajr had no significant difference in

number of spike per m^2 with other cultivars except Reihan 03. Yosef and Reihan 03 also obtained the maximum the number of seed per spike (29.84) and a thousand seed weight (39.12) respectively. Both two cultivars had no significant differences with other cultivars. The highest and the lowest seed yield was related to Nosrat and Reihan 03, respectively. The maximum biological yield was obtained in cultivation of Nosrat. This cultivar had no significant differences with other cultivars except Reihan 03. The highest and the lowest harvest index was related to Nosrat (39.88%) and Reihan 03 (28.46%), respectively. Reihan 03 had significant differences with all cultivars. A demand for varieties better suited to environmentally-friendly or low-input management systems is likely to arise (Bertholdsson, 1999).
Key words: Drought stress, seed yield, yield components, barley, cultivar.

REFERENCES

- Amini AR, and Soleymani A, 2012. Influence of drought stress on seed yield, biological yield and harvest index of different cultivars of barley. *Research on Crops*. 13(2): 472-474.
- Mousavi M, Soleymani A, and Shams M, 2012. Changes in yield and yield components of three cultivars of Barley under different nitrogen levels in Isfahan region. *Intl. J. Agri. Crop Sci*. 4(19): 1433-1435.
- Soleymani A, and Shahrajabian MH, 2012. Effects of cut off irrigation in different growth stages on yield and yield components of rapeseed cultivars. *International Journal of Biology*. 4(4): 75-78.



The 1st International Conference on New Ideas in Agriculture
Islamic Azad University Khorasgan Branch
26-27 Jan. 2014, Isfahan, Iran

