

Comparison of old and new dryland wheat cultivars in response to different planting dates

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Extended Abstract

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Introduction

Sowing date is the variable with the largest effect on crop growth and its yield (Hundal et al., 1997). Planting the suitable variety at the right time results in flowering phase when the risk for freeze damage is the lowest and before the onset of heat stress during flowering and grain filling stages (Khichar & Niwas, 2006). Adequate soil moisture especially in dryland conditions is also important. Correctly matching the time at which growth stages of crop occur with the favorable environmental conditions is the key to maximizing growth and yield (Dadashi & Khajehpour, 2004). Thus, growers need to choose the appropriate varieties for a specific planting time for achieving the optimal flowering period, which can lead to the highest possible yields. Early planting can improve crop establishment but may cause early flowering, which increases the risk for frost damage. Early planting is more prone to pests and diseases damages. Delayed planting will reduce yield and growth as flowering and maturity stages may occur in hot, dry conditions. Generally, planting time varies depending on the climatic condition of the region and the variety to be grown. Different varieties of wheat are sensitive to changes in environmental conditions where the crop is grown. Therefore, it is necessary to study the genotype \times environment interaction to identify varieties

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which are stable in different environments, especially under dryland farming. Wheat (*Triticum aestivum* L.) is the third most important crop in the world after rice (*Oryza sativa* L.) and corn (*Zea mays* L.). The rising population and the rapid growth of economy worldwide are expected to result in an increased demand for wheat in the following decades.

Materials and Methods

This experiment was conducted as split plot based on a complete randomized block design (CRBD) with three replications at the Dryland Research Station of North Khorasan, Shirvan during the growing season of 2015-2016. The main and sub factors were allocated to planting dates (October 2 (T_1), November 1 (T_2) and December 1 (T_3)) and seven cultivars (including Sardari (old cultivar), Sabalan (old cultivar), Ohadi (modern cultivar), Homa (modern cultivar), Karim (modern cultivar), Azar II (old cultivar) and Prav (modern cultivar) respectively. Investigated traits were plant height, number of days till flowering, number of days till maturity, number of fertile spike per m^2 , number of grain per spike, number of grain per m^2 , 1000-kernel weight, grain yield, biological yield and harvest index. Analysis of variance (ANOVA) was performed to determine if significant differences existed among the means of treatments. Multiple comparison tests were conducted to detect the significant effects of the treatments using the Duncan test.

Results and discussion

Results showed that the simple effect of planting date on plant height, days to flowering, days to maturity was significant. Plant height, days to flowering, days to maturity, No. of grain per m^2 , 1000-grain weight, grain yield and biological yield were significantly affected by cultivar. Interaction effect between planting date and cultivar had significant effect on No. of fertile spike per m^2 , No. of grain per m^2 , 1000-kernel weight and grain yield. The highest and the lowest number of grain per m^2 were observed for Ohadi+ T_2 with 4149 grain. m^{-2} and Karim+ T_1 with 1309 grain. m^{-2} , respectively. The highest biological yield was related to Ohadi with 3465 kg.ha⁻¹. The maximum and the minimum grain yields were obtained from Ohadi+ T_2 with 1639 kg.ha⁻¹ and Karim+ T_1 with 297.8 kg.ha⁻¹, respectively. Growth parameters, yield and yield components of wheat cultivars were significantly influenced by planting time and cultivar. Early plantings experienced low early season temperatures, resulting in reduced biomass and yield. Conversely, late plantings coincided with higher summer temperatures, which reduced time for cultivars to reach maturity. The November 1 planting date gave the highest yield as compared to the other planting dates. The early or late planting significantly reduced the crop yield and yield components. The maximum yield and yield components were achieved with Ohadi cultivar.

Keywords: No.days till flowering stage, Biological yield, Grain yield, Growth duration

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