



Introduction of new varieties of durum wheat by the private sector in cooperation with the International Maize and Wheat Improvement Center (CIMMYT)

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Introduction

Durum wheat shows better adaptability to semi-arid like Iran than bread wheat varieties and produces a better product. It is necessary to obtain durum wheat cultivars that can mitigate adverse effects of drought stress on yield and showing positive response to extra available water. (Marti & Slafer, 2014). The cultivars introduced from improved genotypes and germplasms of international cereal research centres (CIMMYT and ICARDA) have played an effective role in increasing Iran wheat yield (Ahmadi *et al.*, 2021). On the other hand, the bilateral cooperation between the country's research institutions by using the facilities of the private sector leads to the improvement and acceleration of the research findings.

Results and Discussion

Irrigation increased grain yield in the first year but did not have a significant effect on it in the second season (Table 2) due to higher rainfall at the end of cropping cycle. All genotypes were earlier than check (Sana) in terms of DHE and DMA in both cropping season. D3 was early heading genotype showed lowest DHE where as D1 and D2 genotypes had lowest DMA; both were the early maturing genotypes. Also, the D3 genotype had the highest amount of GFP among the genotypes (Table 3). D1 and D2 genotypes had the highest grain yield in both stress and irrigation conditions. Genotypes D3 and D4 had higher yield in stress condition than in irrigation condition. Therefore, the two latest are suitable for stress conditions (Figure 1).

Table 2: Effect of Year, Stress, and Genotype levels on Days to Heading (DHE), Days to Physiological Maturity (DMA), Grain Filling Period (GFP), and Grain Yield (GY).

		DHE	DMA	GFP	GY
Year		**	ns	**	**
Stress		**	**	**	**
Y×S		**	**	ns	**
Genotype		**	**	**	**
G×Y		**	**	**	ns
G×S		**	ns	ns	*
G×Y×S		**	ns	ns	**
2022-3	Stress	175.9 b	214.0 c	38.13 c	7.073 b
	Normal	176.1 b	217.6 b	41.47 b	9.519 a
2023-4	Stress	167.1 c	207.8 d	40.73 b	7.371 b
	Normal	177.8 a	222.1 a	44.33 a	7.255 b

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Materials and methods

The germplasm present in this study screened from a special nursery of durum wheat from the CIMMYT. After multiplication and preliminary evaluation during 2021-2022 cropping season, four genotypes selected from the present study along with the Sana cultivar as check over 2022-2023 and 2023-2024 cropping cycle under TDS condition and conventional irrigation. The experiment was conducted using a split plot model and randomized complete block design with three replications. The study was conducted in the research field of Baladarband seed company, Kermanshah, Iran. The main plot was two levels of stress (TDS) and conventional irrigation; the sub plots included four genotypes D1, D2, D3, and D4 (table 1) plus Sana cultivar as check. The measured traits include Days to Heading (DHE), Days to Physiological Maturity (DMA), Grain Filling Period (GFP) and Grain Yield (GY).

Conclusion

the results of our experiment showed that genotypes D1 and D2 are suitable for drought stress conditions at the TDS with a positive response to excess water or higher rainfall. In contrast, and genotypes D3 and D4 produce better grain yield exclusively in TDS conditions negative response to irrigation at the end of the season due to lodging.

The genotypes of this study are nominate for releasing. The D1 genotype (with proposed name of Shahin) and D3 genotype (with proposed name of Nila) selected for distinct (DUS) and value for cultivation and use (VCU), uniformity and stability, DFUS test by Seed and Plant Certification and Registration Institute. Regarding high yield potential, can use as alternative of present varieties

Table 3. Mean comparisons of the interaction effect of year×genotype on DHE, DMA, and GFP.

years	genotypes	DHE	DMA	GFP
2022-3	D1	175.0 c	213.5 de	38.5 d
	D2	176.2 b	214.7 cd	38.5 d
	D3	174.3 d	216.8 ab	42.5 b
	D4	176.0 b	216.5 ab	40.5 c
	Sana	178.5 a	217.5 a	39.0 d
2023-4	D1	172.3 f	214.7 cd	42.3 b
	D2	172.7 ef	213.2 e	40.5 c
	D3	170.2 g	215.5 bc	45.3 a
	D4	173.0 e	213.8 de	40.8 c
	Sana	174.0 d	217.7 a	43.7 b

References

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- Marti, J., & Slafer, G. A. (2014). Bread and durum wheat yields under a wide range of environmental conditions. *Field Crops Research*, 156, 258-271.

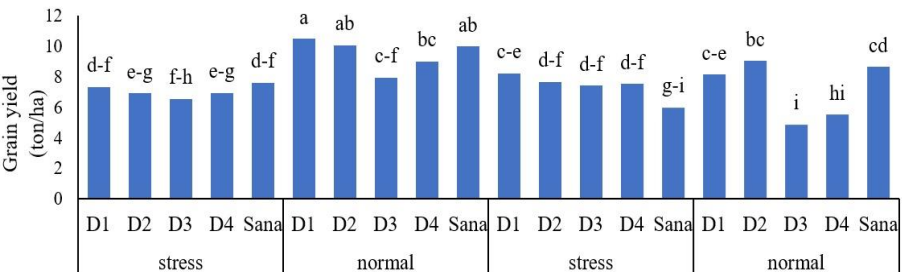


Figure 1: Mean comparisons of the interaction effect of year × stress × genotype on grain yield