



FROM SEED TO PASTA IV

A Sustainable Durum Wheat Chain for Food Security and Healthy Lives

Selecting Desirable Durum Wheat Elite Lines for Diversification of Genetic Base and Release of Varieties in Pakistan

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Abstract: Pakistan is 15th most vulnerable country to climate change in the world. The sustainability of wheat production could be affected more in rainfed ecology due to climate change and erratic/low rain fall. Durum wheat is comparatively more drought tolerant and produce more yield than bread wheat under low precipitation. In addition, dietary habits are changing in Pakistan and demand for pasta products is growing day by day. In this changing scenario, durum wheat could be an appropriate alternative crop that can be grown in rainfed regions of Pakistan. In the present study, 50 elite durum wheat lines were tested in Alpha Lattice design for yield and other traits of importance on 4 different locations during 2020-21. Highly significant interaction was found between location and genotypes. Genotype no 6 were the best performing with yield 4637kg/ha and genotype no 23 were the least performer with 4100 kg/ha against local check in pooled ANOVA. These lines were selected for testing in advance yield trial during 2021-22 in randomized complete block design (RCBD) on one location. Genotype no 6 and 30 outcrossed the local check in Advance Yield Trial (AYT) with 6143 and 5698 kg/ha yield respectively. These genotypes will be tested in National Uniform Durum Yield Trial (NUDYT) across the whole country for their approval as variety or will be used in breeding program. varieties with higher grain quality trait, high yield and disease resistance to satisfy the public preferences.

Material method: 50 exotic elite lines of durum wheat of international durum yield nursery (IDYN) were evaluated for yield performance at four different locations (Islamabad, Bahawalpur, Tandojam and Faisalabad) of Pakistan using alpha Lattice Design was with two replications in 2020-21. Two Factorial pooled analysis was performed to test the significance level among genotypes. Top nine advance lines, including local check were evaluated again in Research area of NARC, Islamabad in RCBD during 2021-22. The differences among genotypes were examined by Analysis of Variance formulated by Steel *et al*, 1997 and ranked these genotypes on yield basis by the analysis of LSD at 5% probability level.

Results and Discussion: There were significant differences among the genotypes. Top Ten high yielding varieties were selected from IDYN (2020-21) and tested in ADYT (Advance Durum Yield Trial) in the next year 2021-2022. Genotype no 6 and 30 ranked first by showing highest mean of yield of 4637 and 6143.2 kg/ha respectively, performing best in all environments. In ADYT Genotype 6 and 30 outcrossed local check by showing average yield of 6143 and 5698.3 kg/ha yield respectively in 2021-2022. These genotypes will be tested in National Uniform Durum Yield Trial (NUDYT) across the whole country for their approval as variety or will be used in breeding program.

ADYT 2021-2022 ANOVA Table						
Source	DF	SS	MS	F	P	CV
Rep	2	219054	109527			8.94
Entry	9	6368106	707567	3.22	0.0166	
Error	18	3952423	219579			
Total	29	1.05E+07				

Means of Entry	IDYN (kg/ha)	ADYT (kg/ha)
Genotype no 6	4637	6143
Genotype no 30	4359	5698.3
Local Check	4085	5626.7

References: Reynolds, M. P., Quilligan, E., Aggarwal, P. K., Bansal, K. C., Cavalieri, A. J., Chapman, S. C., et al. (2016). An integrated approach to maintaining cereal productivity under climate change. *Glob.FoodSec.* 8,9–18.