



Research Information

Two new rainfed wheat varieties for Afghanistan

Qudratullah Soofizada¹, Elias Mohmand², M. H. Azmatyar¹, Rajiv Sharma^{2*}

¹Agricultural Research Institute of Afghanistan, ²International Maize & Wheat Improvement Centre

*Corresponding author: Rajiv Sharma (E-mail: rk.sharma@cgiar.org)

Abstract

Two new rainfed bread wheat varieties have been released in Afghanistan in 2017. The two genotypes were introduced into Afghanistan through Semi-Arid Wheat Screening Nursery and Semi-Arid Wheat Yield Trial during 2012-13 and 2013-14. The two entries were tested at several rainfed locations in Afghanistan viz., Herat, Takhar and Mazar over a period of three years. Both the varieties on average of three years yielded 10 to 18% higher than the check varieties used. The two varieties possess agronomic traits of height and maturity comparable to current popular rainfed wheat varieties. The two varieties are also resistant to all the prevalent races of rusts in Afghanistan.

Key words: wheat, rainfed, Afghanistan, CIMMYT, yield

Introduction

Wheat is central to Afghanistan's food security as well as to Afghanistan's economy. Agriculture accounts for over 30% of Afghanistan's GDP and wheat accounts for about 60% of agricultural output (Khan & Joya, 2013). Additionally, on an average wheat provides 60% of daily caloric intake for Afghans. Therefore, ensuring wheat sufficiency will ensure food and economic security for Afghans and Afghanistan. Afghanistan has never been able to harvest sufficient wheat for its ever increasing population (Fig. 1). Though Ministry of Agriculture, Irrigation & Livestock (MAIL) and other stakeholders have been making concerted efforts to increase Afghan wheat productivity, however it still remains much lower (FAOSTAT, 2017) compared to other countries in the region (APR, 2014) for several reasons viz., lack of suitable varieties for different agro-climatic regions and production domains, an impoverished irrigation infrastructure, immature input and output markets, non-availability of adequate quality extension services at farmers' doorstep on time etc. Agricultural Research Institute of Afghanistan (ARIA) of MAIL and International Maize &

Wheat Improvement Centre (CIMMYT) have been working together to provide farmers with best of wheat related technology and have contributed to the development of large number of varieties and production technologies to meet farmers' demands. However, in the light of emerging threats like new races of diseases, climate change etc., these technologies need continuous updating. This document reports identification and release of two new rainfed wheat varieties for cultivation in Afghanistan.

Material and Methods

Every year in consultation with ARIA, CIMMYT introduces over 1000 new wheat genotypes into Afghanistan through various trials and nurseries. These trials and nurseries are then tested at several locations in Afghanistan to identify promising genotypes for release as varieties. The two varieties being reported were introduced from CIMMYT, Mexico (Table 1) in the years 2012-13 and 2013-14 respectively as part of Semi-Arid Wheat Screening Nursery (SAWSN) and Semi-Arid Wheat Yield Trial (SAWYT). After introduction, these entries were tested at several locations viz., Mazar, Herat, Kunduz, Takhar and

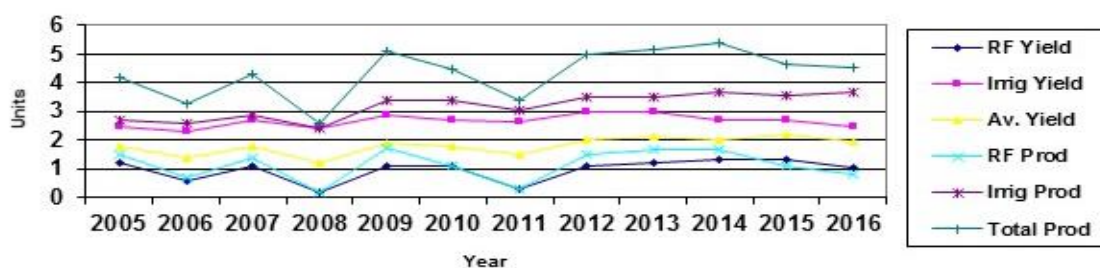


Fig. 1. Total, Rainfed (RF) & Irrigated (Irrig) wheat prod (production in million tons) & Rainfed (RF), Irrigated (Irrig) and Average (Av.) Yield (tons/ha) trends in Afghanistan from 2005 to 2016.

Table 1. Parentage and trial locations of the two varieties released in Afghanistan.

No.	Introduction		Locations *		
	Source and year	Parentage	2013-14	2014-15	2015-16
1	SAWSN (2012-13)	MTRWA92.161/PRINIA/5/SERI*3//RL6010/4*YR/3/PASTOR/4/BAV92	MZR, HRT, TKR		
2	SAWYT (2013-14)	KA/NAC//TRCH/3/DANPHE #1	HRT, KBL, KDZ, TKR	MZR, HRT, TKR	

*MZR: Mazar; HRT: Herat; TKR: Takhar; KDZ: Kunduz; KBL: Kabul

Table 2. Testing years and average yield superiority of the two rainfed wheat varieties released in Afghanistan.

No.	Years of testing and yield (kg/ha) obtained			% Superiority over check varieties over three years' testing					
	2013-14	2014-15	2015-16	Check Variety	%	Check Variety	%	Check Variety	%
1	3076	3714	4148	Lalmi 02	12	Diana 96	11.6		
2	2464	4159	4223	Lalmi 02	10	Lalmi 04	12	Diana 96	18

Kabul along with check varieties for a period of three years (Table 2). The plot size comprised of six rows of six meters each and the trials were raised following recommended agronomic practices.

Results and Discussion

Both the varieties were tested extensively in rainfed region in Afghanistan over a three year period. The first variety managed to yield 12% higher than very popular variety Lalmi 02 and about 11.6% higher than the old rainfed wheat variety Diana 96. This shows that variety has very high yield potential in rainfed regions of Afghanistan. It matured in about 154 days on an

average during the three years of testing. The maturity period is comparable to other rainfed varieties (Table 3). Variety was also found resistant to all major diseases in Afghanistan and was resistant to Ug99 at Kenya.

The second variety also proved its worth in several trials conducted for three years at rainfed locations of Afghanistan. Overall, it yielded 10 to 18% higher than the various checks used. The variety matured in 150 days compared to 150 to 153 of various checks and attained a height of 86 cm (Table 3). Variety was found resistant to all diseases under Afghan conditions as well as in Kenya conditions.

Table 3. Summary of various traits of the two varieties released in Afghanistan.

Aspect	1	2
Source	SAWYT	SAWSN
Target Environment	Rainfed whole country	
Proposed by	ARIA	
Days to heading	120	112
Days to maturity	154	150
Plant height (cm)	86	86
1000 kernel weight	35	33
Average yield (Kg/ha)	3681	3615
Potential yield (the highest yield obtained at any location during the three years of testing) (Kg/ha)	6272	6525
Yellow rust Afghanistan	5R	5MR
Stem rust Kenya	20 MSS	5MSS

References

APR (2014) Agricultural Prospects Report, MAIL, Kabul.
FAOSTAT (2017) <http://faostat3.fao.org/download/Q/QC/E>
Khan F and Joya O (2013) Afghanistan economic

update. Afghanistan economic update. Washington DC ; World Bank. <http://documents.worldbank.org/curated/en/2013/10/18433329/afghanistan-economic-update-poverty-reduction-economic-management>