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Saleem-2000: A New Wheat Variety For Normal/Late Planting In Irrigated Areas of NWFP

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Abstract: Saleem-2000 (PR-70) was first received as entry no.6 in Regional Bread Wheat Segregating Population (RBWSP) with the pedigree, CHAM-6/KITE/PGO and planted at CCRI (space planting was done in 9 m² plots). Single plant selection was made and the generation was advanced as entry no. 5045 at Hill Agriculture Research Station (HARS), Kaghan in 1995. In the year 1995-96 the entry was planted at CCRI as # 6025. It was selected as fix line on the basis of its plant type and disease reaction. From 1996-97 to 1998-99 it was tested among other lines at CCRI in preliminary yield trials, (A and B) and multi-location trials in NWFP. Randomized Complete Block Design (RCBD) was used with 3 replications. Each plot has six rows 25 cm apart and 5 m long. In 1999-2000 and 2000-2001 the line was evaluated in National Uniform Wheat Yield Trials (NUWYT) Islamabad for regional and national level testing . The variety has an edge in yield over the check varieties. It is high yielding and suitable for normal and late planting (which is a major reason for low yield) in irrigated areas of NWFP. Saleem-2000 has shown 1st position in six sites averages of NWFP both in Normal / Late Seeding Date Trials of NUWYT. Its Chapati quality is better than the existing varieties. The variety was approved in September 2000 by the Provincial Seed Council for the irrigated areas of NWFP and in 2001 by Variety Evaluation Committee (VEC) Islamabad for normal and late sowing irrigated areas of NWFP.

Key words: Wheat, Saleem-2000, grain yield, quality

INTRODUCTION

Spring wheat (*Triticum aestivum* L.) is the major staple food crop of Pakistan. It is contributing 72% of the calories and proteins in the Pakistan. It occupies 70% of the Rabi and 37% of the total cropped area in the country. The per capita consumption is 125 kg year⁻¹ which is the highest in the world.

Area under wheat crop has increased from 6.7 million hectares in 1980-81 to 8.093 million hectares in 2002-03. During the same period yield also increased from 1634 kg ha⁻¹ to 2354 kg ha⁻¹. The restricted expansion in wheat cropped area and slower growth rate in wheat productivity has made it harder for Pakistan to export this year in order to meet the needs of its growing population as compared to 1.7 million tons export in 2001-02. Wheat production was 19.235 million tones during 2002-03. Punjab is the dominant wheat producing province contributing 81% of the national wheat production, Sind 11, NWFP 5 and Baluchistan 3%.

Presently the variety Inqilab-91 is sown on 70-80% area of NWFP. Due to monoculture there is always a danger of crop failure if rust epidemic occurs. The current cultivars like Bakhtawar-92, Suleman-96 and Nowshera-96 etc. sown in NWFP are also showing mildly susceptible reaction to the yellow rust which may become susceptible

in the near future. This situation calls for urgent release of genetically different and high yielding wheat variety for irrigated areas of NWFP.

Cereal Crops Research Institute Pirsabak, Nowshera is a pioneer in developing wheat varieties to fulfill the need of the province. It has developed numerous wheat cultivars both for irrigated and rainfed areas of which Pak-81, Pirsabak-85, Khyber-87 in early nineties (Khan *et al.*, 1990 and 1992) and Nowshera-96, Suleman-96 in mid nineties became popular in NWFP. Moreover, quite a few wheat varieties like Mexipak-65, WL-711 and Sonalika were successfully introduced from Mexico and India, respectively (Bourlaug, 1965). Dera-98 was another success for warmer areas of NWFP (Nasir Uddin *et al.*, 2000).

Botanical Description And Other Characteristics Of The Variety

Plant height	75-80 cm
Growth habit	Semi erect
Flag leaf attitude	Erect
Auricle Colour	White
Head shape and colour	Yellow White
Head awniness	Awned
Seed colour and shape	Amber
1000 kernel weight	37 gm
Seeds per ear	70
Days to heading	126 days
Days to maturity	164 days

MATERIALS AND METHODS

Saleem-2000 was first received as entry no.6 in Regional Bread Wheat Segregating Population (RBWSP) with the pedigree, CHAM-6/KITE/PGO and planted at CCRI (space planting was done in 9 m² plots). Single plant selection was made and the generation was advanced as entry no. 5045 at Hill Agriculture Research Station (HARS), Kaghan in the same year. In the year 1995-96 the entry was planted at CCRI as # 6025. It was selected as fix line on the basis of its plant type, no of tillers, spike length, no of grains per spike and resistant type reaction to both YR and LR.

In 1996-97 and 1997-98 it was tested among other lines at CCRI in preliminary yield trials as entry # 2(A-Test-I) and entry #4 (B-Test-II). Randomized Complete Block Design (RCBD) was used with replications. Each plot has six rows 25 cm apart and 5 m long. The line (as entry #7) was promoted to Microplot trials based on its performance, to be tested in normal and late planting experiments at various irrigated locations of NWFP including CCRI. The same design (RCB) with 3 replications were used. In 1999-2000 the line was submitted to National Uniform Wheat Yield Trials (NUWYT) Islamabad for regional and national level testing of the line (as entry # 17) both in normal planting and late planting experiments. Randomized Complete Block Design with four replications was used. In 2000-2001 PR-70 was reevaluated in NUWYT trials to confirm the results of the previous year.

RESULTS AND DISCUSSION

The variety was received in 1994-95 from Cimmyt, Mexico as Regional Bread Wheat segregating population. Single plant selection was made and at the end fix line was selected among the progeny, which was subjected to various yield performance tests and finally after six years the line was approved as commercial cultivar for normal and late sowing, irrigated areas of NWFP (Table 1).

The data presents the preliminary yield trials in 1996-97 and 1997-98 respectively (Table 2). The results indicate that Saleem-2000 (PR-70) has given 19.00 and 8.0% increase over checks (Inqilab-91 and Bakhtawar-92) during 1996-97, while in 1997-98 it has given 48.0 and 21.0% more yield than the checks (Khyber-87 and Nowshera-96).

The performance of Saleem-2000 in Microplot trials during 1998-99 at five different locations of NWFP (Table 3). In normal sowing Saleem-2000 has shown 2 and 7% yield gain over checks (Bakhtawar-92 and Khyber-87). In late sowing Saleem-2000 out yielded checks by 3 and 13 % (B-92 and Khyb-87). On the basis of yield the Saleem-2000 was promoted for testing in National Uniform Yield Trials.

The data reveals that Saleem-2000 has shown 3 and 7% increase in yield over checks (Inqilab-91 and Bakhtawar-92) in 1999-2000, while 4 and 1% increase in yield over checks (Inqilab-91 and Bakhtawar-92) has been recorded in the year 2000-2001 (Table 4). The data pertains to the six locations/sites of NWFP used during the experimentations in the said years.

Table 1: Summary of Development History

Year	Generation/trial	Remarks
1994-95	Regional Bread Wheat segregating population (RBWSP)	Received as entry # 6
1995	F3	Sown in F3 as entry # 5045 at HARS Kaghan
1995-96	F4	Selected in F3 and sown in F4 as entry # 6025 and selected as fix line.
1996-97	A Trial-I	Entry # 2
1997-98	B Trial-II	Entry # 4
1998-99	MPT (Normal)	Entry # 7
1998-99	MPT (Short)	Entry # 7
1999-2000	NUWYT (Normal)	Entry # 17
1999-2000	NUWYT (Short)	Entry # 17
2000-2001	NUWYT (Short)	Entry # 7

Table 2: Yield performance of Saleem-2000 (PR-70) in A & B Normal duration station yield trials at CCRI, Pirsabak (NSR) 1996-97 and 1997-98

Year	Type of Trial	Yield Kg ha ⁻¹				
		PR 70	Check I	%INC. over check	Check II	%INC. over check
1996-97	A-I	4300	3600 Inq-91	19.00	3966 B-92	8.0
1997-98	B-II	4550	3075 Khy-87	48.00	3775 NSR-96	21.0

Table 3: Yield performance of Saleem-2000 (PR-70) in Microplot trials(Normal and Late sowing) conducted at five different locations of NWFP during 1998-1999

Locations	Normal Sowing Yield Kg ha ⁻¹			Late Sowing Yield Kg ha ⁻¹		
	PR-70	B-92 (Check-I)	Khyb-87 (Check-II)	PR-70	B-92 (Check-I)	Khyb-87 (Check-II)
CCRI, Pirsabak	4800	4267	3833	2767	3500	2567
Mardan	4133	4000	3400	2800	3167	3233
Tarnab	3123	2801	2512	2234	1745	1845
Seri Naurang	2784	3995	4228	3056	2550	2189
Mansehra	3000	2444	2778	1722	1622	1333
Average	3568	3501	3350	2516	2437	2233
% Increase over check	--	2.0	7.0	--	3.0	13.0

Table 4: Yield performance of Saleem-2000 (PR-70) in National Uniform Wheat Yield Trials (Normal sowing) conducted at different locations of NWFP during 1999-2000 and 2000-2001

Locations	Normal Sowing (1999-2000) Yield Kg ha ⁻¹			Late Sowing (2000-2001) Yield Kg ha ⁻¹		
	PR-70	Inq-91 (Check-I)	Bakh-87 (Check-II)	PR-70	Inq-91 (Check-I)	Bakh-87 (Check-II)
CCRI, Pirsabak	4375	4425	4500	5175	4700	5000
Mardan	5950	5275	5600	4200	4225	4450
Seri Naurang	5433	4775	4450	4418	3756	4140
A.U.Peshawar	2448	2542	2260	--	--	--
NIFA Tarnab	4825	4767	4550	4075	3925	4650
D.I.Khan	5208	5625	5042	4133	4092	3113
Mingora	--	--	--	2542	2980	2876
Average	4707	4568	4400	4091	3946	4038
% Increase over check		3.0	7.0		4.0	1.0

Table 5: Yield performance of Saleem-2000 (PR-70) in National Uniform Wheat Yield Trials (Late Sowing) conducted at different locations of NWFP during 1999-2000 and 2000-2001

Locations	Late Sowing (1999-2000) Yield Kg ha ⁻¹			Late Sowing (2000-2001) Yield Kg ha ⁻¹		
	PR-70	Inq-91 (Check-I)	Khyb-87 (Check-II)	PR-70	Inq-91 (Check-I)	Khyb-87 (Check-II)
CCRI, Pirsabak	3100	2600	2350	3925	3675	3425
Mardan	4675	3850	4250	3338	2400	2300
Seri Naurang	3604	3192	3298	4359	3332	3984
A.U.Peshawar	1604	1458	1479	--	--	--
NIFA Tarnab	4325	3875	4208	3750	3517	3593
D.I.Khan	2583	2917	3208	3549	3382	2505
Mingora	--	--	--	1052	1386	875
Average	3315	2982	3116	3329	2949	2780
% Increase over check		11.0	6.0		13.0	20.0

Table 6: Pool Analyses of Saleem-2000 (PR-70) in National Uniform Wheat Yield Trials Conducted at six sites of NWFP during 1999-2000 and 2000-2001

Line/Variety	(1999-2000) Yield Kg h ⁻¹				(2000-2001) Yield Kg ha ⁻¹			
	Normal	Late	Average	% Increase Over Check	Normal	Late	Average	% Increase Over Check
Saleem-2000 PR-70	4707	3315	4011		4091	3329	3710	
Inqilab-91	4568	2982	3775	6.0	3946	2949	3448	8.0
Bakh-92	4400	3116	3758	7.0	4038	2780	3409	9.0

In the year 1999-2000 Saleem-2000 has given 11 and 6% higher yields when compared with checks (Inqilab-91 and Khyber-87). In the year 2000-2001 Saleem-2000 has again out yielded checks (Inqilab-91 and Khyber-87) by 13 and 20% at six sites/locations in NWFP (Table 5).

The results of Pool Analyses of National Uniform Wheat Yield Trials (NUWYT) conducted during 1999-2000 and 2000-2001 are reported in Table 6. Saleem-2000 has given 6 and 7% increase over checks (Inqilab-91 and Bakhtawar-92). However, in 2000-2001 trials an increase of 8 and 9% has been recorded over checks (Inqilab-91 and Bakhtawar-92).

PR-70 possess complete resistance against stripe and leaf rusts reported by NARC and CDRI showing RRI for

Lr and Yr in 1999-2000 i.e. 5 (acceptable index) for Lr and 9 (desirable index) for Yr respectively. While in 2000-2001 CDRI report shows RRI index 6.1 for Lr, which is desirable index and no Yr has been reported.

PR-70 has earned 3rd position in NUWYT Trials (1999-2000 Normal/Late) on averages of six sites of N.W.F.P. In combined results of 27 sites through out the country, PR-70 has achieved 5th position in Normal and 4th position in Late Seeding Date Trials of NUWYT (1999-2000).

In 2000-2001 data reported by NARC shows that, Saleem-2000 (PR-70) has out yielded all varieties/lines in Late Seeding Date Trials of NUWYT through out the country while in combined trials (N/L) PR-70 has gained

3rd position. PR-70 has shown 1st position in six sites averages of NWFP both in Normal/Late Seeding Date Trials of NUWYT. Its Chapati quality is better than the existing varieties. The variety was approved in September 2000 by the Provincial Seed Council for the irrigated areas of NWFP and in 2001 by Variety Evaluation Committee (VEC) Islamabad for normal and late sowing irrigated areas of NWFP.

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