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Pirsabak Barani-04: A New Candidate Wheat Variety for Cultivation in the Province of NWFP

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Abstract: The wheat variety, Pirsabak Barani-04, was first tested at CCRI Pirsabak in 2001-02 in HRWYT trial. The strains which were high yielding and resistant to diseases were again tested in B-VI trial at CCRI Pirsabak and at ARI Tarnab in 2002-03. These strains were further screened and those selected were further tested under microplot trials at different locations i.e. CCRI Pirsabak, ARS, Serai Naurang (Bannu) and at ARS, Buffa (Mansehra), in the North West Frontier Province during 2003-04. The results of HRWYT, B-VI at CCRI and ARI Tarnab and Microplots at CCRI, Serai Naurang and Mansehra during 2001-02 to 2003-04 confirmed its superiority in higher yield and diseases resistance. Because of its higher yield and resistance to yellow and leaf rust, this variety has shown overall better performance and has been termed as candidate variety. Its seed has been multiplied and sent to the NUWYT, CDRI and FSC&RD. The line/cross MUNIA/CHTO/ / AMSEL has been named as Pirsabak Barani-04 and is recommended for sowing from 1st to 15th December in NWFP under irrigated as well as rainfed conditions.

Key words: Wheat (*Triticum aestivum* L), variety, high yield, disease resistance, NWFP

INTRODUCTION

The North West Frontier Province (NWFP) of Pakistan comprises of several agro-ecological zones having different climates. In mountainous areas such as upper Swat, Hazara, Aurakzai and Chitral, neither true spring wheat nor winter or facultative types of wheat give high yield. In plain areas such as Swabi, Mardan, and Peshawar, spring wheat is grown but popular wheat cultivars are susceptible to most common wheat diseases, particularly the stripe and leaf rust. To overcome the twin problem of poor winter hardiness in mountainous areas and disease susceptibility in plain areas, wheat program at Cereal Crops Research Institute (CCRI) Pirsabak has concentrated on CIMMYT lines/strains derived from spring and winter crosses.

The broad genetic make-up of the CIMMYT material has made it possible for researchers to select lines adapted to the climatic and edaphic conditions of many countries. Penjano 62, Lermarojo-64, Mexipak-65, Pak-81, Sarhad-82, Pirsabak-85 and Khyber-87 were selected from the genetic material obtained from CIMMYT for general cultivation in NWFP^[1-6]. These varieties revolutionized the wheat cultivation not only in NWFP but also in the neighboring countries Afghanistan and Iran as well. Recently Saleem-2000 and Haider-2000 also selected from CIMMYT material have proved superior cultivars in the

NWFP^[7-8]. The present variety, named as Pirsabak Barani-04 was also selected from the genetic material obtained from CIMMYT. The variety gave high yield and showed resistance to yellow and leaf rusts in various tests. It will increase the yield of farmers and will bridge the gap between the wheat consumption and production especially in the province of NWFP.

MATERIALS AND METHODS

The first cross was made at CIMMYT Mexico among MUNIA/CHTO/ /AMSEL and the line was received at CCRI for testing in High Rainfall Wheat Yield Trial (HRWYT). The HRWYT comprised of 50 white grain high yielding lines including check was planted at CCRI Pirsabak in RCB design with four replications during 2001-02 for yield and disease resistance. Each plot consisted of six rows 25 cm apart and 5 m long. Out of the 50 entries received from CIMMYT Mexico, 20 were selected for further testing (Table 1). During the season, data on yield, disease reaction and other desirable characteristics were recorded. Disease reaction, plant type and other characteristics of these lines were in acceptable range.

On the basis of high yielding performance and disease resistance, the line (CMSS 93B00729S-23Y-010M-010Y-010M-7Y-1M-0Y) along with other selected lines

was advanced to B-VI test (Advance Screening trial) to compare it with other high yielding lines in 2002-03 (Table 2). This test had 20 lines and was planted in RCB design with 3 replications at two locations, i.e. CCRI Pirsabak and Agricultural Research Institute, Tarnab. The line was further advanced and put in regional testing program on the basis of its over all performance during the year 2003-04 by planting it at three locations i.e., CCRI Pirsabak, Agricultural Research Station, Serai Naurang and ARS, Buffa (Mansehra) (Table 3). Each of the strain/cultivar was replicated three times in RCB design. Each entry was sown in plots having six rows 5 m long and 25 cm apart. Fertilizer was applied at the rate of 120-90 NP in all the trials through out the testing of the line from 2001-02 to 2003-04.

For yield determinations four rows of 5 m lengths were harvested in all tests conducted for the selection of this line. All cultural practices were kept same during the study period of this line in all trials and locations. Statistical analyses were conducted according to the standard procedure using MSTAT-C computer program.

RESULTS AND DISCUSSION

The results (Table 1) of HRWYT demonstrated the yield advantage of this strain was equal to that of the

Table 1: Yield data of wheat lines selected from High Rainfall Wheat Yield Trial (HRWYT) at CCRI, Pirsabak during 2001-02

| Ent.No | Cross | Yield (kg ha ⁻¹) |
|--------|------------------------------------|------------------------------|
| 7 | KVZ/K4500/KAUZ | 4800 |
| 8 | ORL8285 | 4600 |
| 14 | ALUCAN/DUCULA | 5000 |
| 15 | TNMU/6/CEP80111/..... | 4600 |
| 16 | TNMU/MILAN | 5400 |
| 19 | TNMU/3/JUP/BJY//SARA | 5000 |
| 20 | TNMU//CEP 7891/LE805/3/PF8215 | 5400 |
| 22 | DUCULA/TNMU | 4800 |
| 24 | BAU/3/GLEN/MAYA/NAC/4/NL 456/VEE#5 | 5600 |
| 25 | TRAP#1/BOW//VEE#5/SARA | 6600 |
| 27 | PASTOR/MUNIA/ALTAR 84 | 5600 |
| 28 | -DO- | 5600 |
| 29 | OR 791432/ VEE#3.2/ /MILAN | 5200 |
| 30 | MUNIA/ALTAR84/ / AMSEL | 4800 |
| 31 | -DO- | 5400 |
| 32 | MUNIA/CHTO/ /AMSEL | 4900 |
| 34 | PNLU/MUNIA | 5200 |
| 35 | KAUZ/TNMU | 6200 |
| 37 | MILAN/DUCULA | 5000 |
| 39 | TNMU/ATTILA | 4400 |
| 40 | -DO- | 6000 |
| 41 | -DO- | 5800 |
| 42 | MUNIA/ /NL456/ VEE#5 | 4600 |
| 43 | BAU/TNMU | 6400 |
| 44 | -DO- | 4800 |
| 45 | -DO- | 5400 |
| 46 | Check (Bakhtawar-92) | 4900 |

local check variety, Bakhtawar-92^[1,2]. Both the two gave yield of 4900 kg ha⁻¹. The yield of this line was 27 and 4% higher than checks Fakhre Sarhad and Saleem 2000, i.e., 5767 versus 4527 and 5547 kg ha⁻¹, respectively, in B-VI test at CCRI Pirsabak during 2002-03^[1,2,7] (Table 2). The yield of this line was 3 and 48% higher than the checks Fakhre Sarhad and Saleem-2000 i.e., 2813 versus 2733 and 1907 kg ha⁻¹, respectively during the same year in B-VI test at ARI Tarnab (Peshawar) (Table 2). The yield of the strain, average of all the three locations i.e., CCRI Pirsabak, ARS Serai Naurang and ARS Buffa (Mansehra), was 17% higher than the check Haider 2000 by 2957 versus 2533 kg ha⁻¹ (Table 3). The disease reaction recorded at CCRI, Pirsabak indicated that this strain is resistant to yellow and leaf rust.

Because of its yield performance and resistance to disease, the line MUNIA/CHTO//AMSEL, named as Pirsabak Barani-04 is declared a candidate variety for irrigated as well as barani (rainfed) cultivation^[1,2,5-8] and is recommended for sowing throughout NWFP from 1st November to 15th December.

Table 2: Yield response of selected entries from B-VI Trials (normal) planted at CCRI Pirsabak and ARI, Tarnab during 2002-2003

| Ent. No. | Cross | Yield (kg ha ⁻¹) | | Origin and Yield (kg ha ⁻¹) |
|----------|--------------------------|------------------------------|-----------|---|
| | | 2002-2003 | 2001-2002 | |
| 2 | CHUM 18/5*BCN | 5207 | 1947 | 5100 |
| 5 | KAUZ *2 / HAHN//KAUZ | 5760 | 2653 | 4900 |
| 14 | OR791432/VEE# 3.2//MILAN | 5227 | 2293 | 5100 |
| 17 | MUNIA / CHTO // AMSEL | 5767 | 2813 | 4900 |
| 18 | MILAN / DUCULA | 5640 | 2640 | 5200 |
| 19 | CHECK 1 (FAKHRE SARHAD) | 4527 | 2733 | |
| 20 | CHECK 2 (SALEEM-2000) | 5547 | 1907 | |
| | LSD 5% | 1358 | 940 | |
| | C.V% | 16.66 | 24.02 | |

Table 3: Yield performance of PR-83 in MPT (Rainfed) during 2003-04

| Location | Yield (kg ha ⁻¹) | |
|-----------------------|------------------------------|----------------------|
| | PR-83 | Check 1(Haider 2000) |
| CCRI, Pirsabak | 4333 | 4000 |
| ARS S.Naurang | 1470 | 1467 |
| ARS Mansehra | 3067 | 2133 |
| Average | 2957 | 2533 |
| % Increase over check | 17 | |

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