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A New Wheat Variety Haider-2000 for Rainfed Areas of NWFP

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Abstract: The wheat cultivar, Haider-2000, was first tested at CCRI, Pirsabak in 1996-97 in a nursery of 282 lines. The lines which showed resistance to stripe and leaf rust and gave higher yields were advanced to preliminary yield trials for two years at CCRI. As the ability of the lines regarding grain yield and disease reaction were confirmed, the lines were tested at different locations in the province in the year 1999-2000. As of its comparative advantage over checks the line was evaluated in National Uniform wheat Yield trials during 2000-01 and 2001-02. Haider-2000 has earned 5th position in NUWYT trials (2000-2001, RF) on national as well as provincial level. In 2001-2002 Haider-2000 has achieved 3rd position in national trials and 2nd position in provincial trials NUWYT(RF). Its chapati quality is excellent. The variety was approved by the Provincial Seed Council in 2000 and by VEC (Variety Evaluation Committee) Islamabad in 2002 for rainfed areas of NWFP, for normal sowing.

Key words: Haider-2000, wheat, grain yield, quality

INTRODUCTION

Wheat is the most important staple food of masses in Pakistan. Food requirements of the country are increasing due to rapid increase in population. Wheat productivity enhancement is possible only through increase in yield per unit area as expansion in wheat acreage is not very likely due to rapid urbanization.

Presently the variety Inqilab-91 is sown on 70-80% area of NWFP. Basically this variety was devolved for general cultivation in the Punjab province. Due to monoculture there is always a danger of crop failure if rust epidemic occurs. Other varieties like Bakhtawar-92, Suleman-96 and Nowshera-96 etc. sown in NWFP are also showing mildly susceptible reaction to loose smut and yellow rust which may become susceptible in the near future. This situation calls for an urgent release of genetically different and high yielding wheat variety for rainfed areas of NWFP.

Haider-2000 possess complete resistance against stripe and leaf rusts reported by NARC and CDRI in 2000-2001 and 2001-2002. In 2000-2001 NARC report shows RRI index 6.0 for LR which is desirable and no YR was reported. While in 2001-2002 CDRI report shows RRI index as 6.7 for LR and 6.3 for YR which is desirable.

Cereal Crops Research Institute Pirsabak Nowshera is running a continuous campaign of developing Wheat, Maize and Barley varieties for different agro-ecological zones of NWFP. In this regard the wheat breeding section of this institute has released several varieties of wheat from time to time. However, Pak 81, Pirsabak-85, Khyber-

87 became popular in NWFP (Khan *et al.*, 1990 and 1992). 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).

The objective of this study was to develop and release high yielding, disease tolerant variety for the rainfed areas of NWFP, possessing good chapatti quality.

Botanical description and other characteristics of Haider-2000

| | | |
|---------------|-------------------------------------|-----------|
| Plant | Growth habit at seedling | Erect |
| | Height(from soil to top of the ear) | 90-94 cm. |
| Stem | Waxy bloom | Present |
| | Hairiness of upper most node | Non-hairy |
| Auricle | Hairiness | Absent |
| | Anthocyanin | Present |
| Ear | Emergence | 132 days |
| | Waxy at anthesis | Strong |
| | Colour at Maturity | White |
| | Spike (length and width) | 11-12 cm. |
| | Ear density | Lax |
| | Awn ness | Awn |
| | Shattering | Resistant |
| Awn | Colour | White |
| | Habit | Erect |
| Glume | Glume length | 1.0 cm |
| | Glume width | 0.5 cm |
| | Attachment | Strong |
| | Beak length | 0.6 cm |
| Seed | Colour | Amber |
| | Shape | Ovate |
| | Length | 5.0 mm |
| | Width | 4.0 mm |
| | Size | Medium |
| | 1000 grain weight | 34 gm |
| | Seed ear ⁻¹ | 66 |
| Resistance to | Lodging | Resistant |

MATERIALS AND METHODS

Haider-2000 is a cross between Chil and Wuh3 made at CIMMYT, Mexico. The line was first received with the pedigree, CM95700-45Y-0M-0Y-3M-ORES-0Y as entry no.132 in Semi Arid Wheat Screening Nursery from CIMMYT, Mexico through National Wheat Coordinator Islamabad in 1996-97. The nursery was planted at CCRI with a plot size of 2 rows 30 cm apart and 2 m long. The line was selected (Out of the total 282 lines) as high yielding and disease resistant. In 1997-98 the line was tested in preliminary yield trial (A II Rainfed) as entry no.11 in randomized complete Block Design with 3 replications (Plot size containing 6 rows, 25 cm apart and 5 m long). The line was reevaluated in 1998-99 in B trial as entry No.2 at CCRI. Based on the performance of the line it was promoted to Micro-plot trials where in it was tested at various rainfed locations of NWFP including CCRI as entry No.6. On the basis of its performance the line was selected for evaluation in National Uniform Wheat Yield Trials under rainfed conditions as Entry No.4. The design of the experiment was RCB with four replications. It was reevaluated as Entry No. 7 in 2001-2002 in National Uniform Wheat Yield Trials under rainfed conditions.

RESULTS AND DISCUSSION

The yield performance of Haider -2000 in preliminary yield trials from 1996-1999 is reported in Table 1. Different cultivars (Bakhtawar-92 and Suleman-96) were used as commercial Checks. Haider has shown an edge of 8 to 10% over checks during 1997-98 and 1998-99 respectively.

Table 1: Yield performance of Haider-2000 in SAWSN (Semi Arid Wheat Screening Nursery), A-II and B-II (RF) at Cereal Crops Research Institute Pirsabak Nowshera from 1996-97 to 1998-1999

| Year | Type of Trial | Yield kg ha ⁻¹ | | |
|---------|---------------|---------------------------|----------------|-------------------|
| | | PR 72 | Checks | % Inc. over check |
| 1996-97 | SAWSN | 2067 | 2067 B-92 | 0 |
| 1997-98 | A-II | 3300 | 3067 Sul-96 | 8.0 |
| 1998-99 | B-II | 4267 | 3867 Sul-96 | 10.0 |

These trials were conducted at CCRI, Mingora (Swat), Seri Naurang and Mansehra. Two checks (Suleman-96 and Nowshera-96) were used to compare the performance of Haider-2000 in Randomized Complete Block Design with 3 replications (Table 2.) Haider-2000 gave 12 and 13% higher yields when compared with Suleman-96 and Nowshera-96 at CCRI, Pirsabak. Haider-2000 yielded 13 and 3% higher than checks(Sul-96 and Now-96) at Mingora. At Seri Naurang the yield of Haider-2000 was greater by 24 and 17% over checks, While in Mansehra Haider gave 9 and 12% higher yield than the checks.

Haider-2000 evaluated in National Uniform Wheat Yield Trials under rainfed condition is monitored under the National coordinated wheat Program by the team of breeders from allover the country (Table 3).

Randomized Complete Block Design with four replications was used. Haider out yielded Suleman-96(Check) by 10% at CCRI, Pirsabak. A 12% increase in yield was recorded at NIFA, Peshawar when Chakwal-97 was used as check. In D.I.Khan 11% higher yield of Haider-2000 was recorded when Daman-98 was used as check.

Table 2: Yield performance of Haider-2000 in MPT (Rainfed) during 1999-2000 at four locations in NWFP

| Location | Yield kg ha ⁻¹ | | | | |
|---------------|---------------------------|------------------|-------------------|-------------------|-------------------|
| | PR 72 (Haider2000) | Check I (Sul-96) | % inc. over check | Check II (Now-96) | % inc. over check |
| CCRI Pirsabak | 4367 | 3900.0 | 12.0 | 3867 | 13.0 |
| Mingora | 4230 | 3733.0 | 13.0 | 4100 | 3.0 |
| Seri Naurang | 805 | 650.0 | 24.0 | 687 | 17.0 |
| Mansehra | 2800 | 2567.0 | 9.0 | 2500 | 12.0 |

Table 3: Yield Performance of Haider-2000 in National Uniform Wheat Yield Trials (RF) during 2000-2001

| Location | Yield kg ha ⁻¹ | | |
|----------------|---------------------------|----------------|-------------------|
| | PR 72 (Haider-2000) | Check I | % inc. over check |
| CCRI Pirsabak | 3250 | 2950 (Sul-96) | 10 |
| NIFA, Peshawar | 3917 | 3500 (Chak-97) | 12 |
| D I Khan | 2542 | 2292 (Dam-98) | 11 |

Table 4: Yield Performance of Haider-2000 (PR 72) in NUWYT (Rainfed) during 2000-2001 and 2001-2002 Pooled analysis

| NUWYT No. and Year | Line/Variety | NWFP (3 Sites) average yield (kg ha ⁻¹) |
|---------------------------------|----------------------|---|
| 4 (2000-01) | PR-72 | 3214 |
| 14. (2000-01) | Sul-96 (Local Check) | 3067 |
| % increase over Check (2000-01) | | 5.0% |
| 7. (2001-02) | Haider-2000 (PR-72) | 4069 |
| 10. (2001-02) | Sul-96(Local Check) | 3631 |
| % increase over Check | | 12.0% |

Table 5: Disease Data of Haider-2000 during 2000-01 and 2001-02 from NARC and CDRI Islamabad

| Variety | Terminal Reaction | | | | |
|-----------------------|-------------------|----------|-----|-----------|-----|
| | Year | YR | RRI | LR | RRI |
| Haider-2000 NARC Data | 2000-2001 | TR(NIFA) | -- | 10MS(KCH) | 6 |
| Haider-2000 | 2001-2002 | 0 | 6.3 | 5MS | 6.7 |

The results of the pool analyses of the National Uniform Wheat Yield Trials conducted under rainfed conditions reveal that Haider-2000 has given 5% higher yield than the check (Suleman-96) in the year 2000-2001. While an increase of 12% in yield was recorded when compared with check in the year 2001-2002 (Table 4).

The disease reaction of Haider-2000 to Yellow Rust(YR) and Leaf Rust(LR) are reported in Table 5. YR is the predominant disease of wheat in NWFP, to which it has shown resistance. However it has shown a moderately susceptible reaction to LR, which is within the limits of acceptable range. However LR is not a problem in this region of the country.

The variety has an edge in yield over the check varieties. It is high yielding and suitable for rainfed areas of NWFP. Its genetic composition is different from the existing varieties. Its release as a commercial variety will definitely help in enhancing and stabilizing the wheat production in the province.

As of its comparative advantage over checks the line was evaluated in National Uniform wheat Yield trials during 2000-01 and 2001-02. Haider-2000 has earned 5th position in NUWYT trials (2000-2001, RF) on national as well as provincial level. In 2001-2002 Haider-2000 has

achieved 3rd position in national trials and 2nd position in provincial trials NUWYT(RF). Its chapati quality is excellent. The variety was approved by the Provincial Seed Council in 2000 and by VEC (Variety Evaluation Committee) Islamabad in 2002 for rainfed areas of NWFP to be planted from 25th October to 15th November.

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