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CULTIVAR RELEASE

IPR 109 - Bread wheat cultivar

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ABSTRACT *- Wheat cultivar IPR 109, developed by IAPAR, has important traits including intermediate maturity, and medium hard and red colored kernels. It is moderately resistant to lodging and moderately tolerant to shattering. It also presented moderate resistance to leaf and stem rust diseases. The quality parameters indicated overall high gluten strength, demonstrated by the alveographic W value of 287.10^{-4} J, and Hagberg Falling Number of 383 s, which indicates high quality for bread making or blending purposes. The mean grain yield was 4558 kg ha^{-1} in the northern and 3363 kg ha^{-1} in the center-west region of Paraná State.*

Key words: *Triticum aestivum*, grain yield, strong gluten, good HMW glutenins

INTRODUCTION

IPR 109 is a bread wheat (*Triticum aestivum* L.) cultivar developed by the Agricultural Institute of Paraná State (IAPAR). After an evaluation from 1999 to 2002 under the inbred line denomination IA 993, it was released for cultivation in Paraná in 2003. In the same year, it was submitted to the National Cultivar Registration (RNC) Office, where it received the Reference Number 15445 and to the National Service for Cultivar Protection (SNPC) receiving the Certificate N° 507.

PEDIGREE AND BREEDING METHOD

Cultivar IPR 109 originated from a backcross between the cultivars Pastor (recurrent parent) and Opata in 1989, at the Experimental Station of CIANO in Obregon, State of Sonora, Mexico, by the CIMMYT Program (Figure 1). The applied breeding method was the Pedigree, described as follows: CMBW89Y00835-0T0PM-9Y-010M-010SY-010M-0M-0BR with seasonal selections of individual plants in Mexico. The inbred line was introduced through the 4th SAWYT – Semi Arid Wheat Yield Trial in 1997, re-evaluated in the C2 (Collection of 2nd Year) in 1998 and in the Preliminary Yield Trial of 1998 at IAPAR's Experimental Station located in Londrina. It was bulk-selected and named IA 993 (Riede et al. 2001). Subsequently it was evaluated in the Regional Yield Trial in 1999, and in the State Yield Trials from 2000 to 2002.

Breeder´s seed was obtained at small steps, initiating when IA 993 was evaluated in a Preliminary Yield Trial. After

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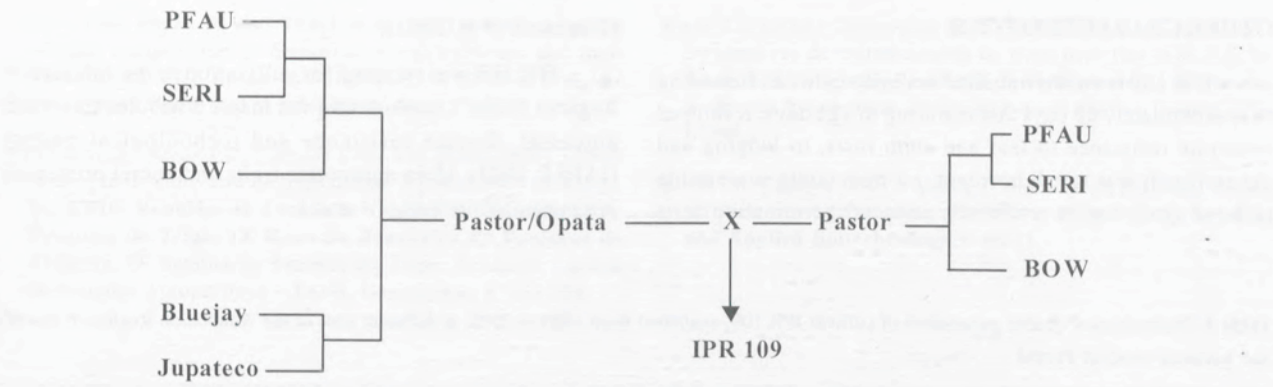

Figure 1. Pedigree of IPR 109

that, the seed stock was increased at medium and large steps, maintaining the original characteristics and genetic purity. Upon cultivar release, the available stock of Foundation Seed was distributed among carefully chosen seed producers. Annually, a quantity of Breeder's seed is produced in order to provide new pure stock.

PERFORMANCE

IPR 109 was evaluated regionally for grain yield and general performance from 1999 to 2002 (Tables 1 and 2), by the Cultivar Evaluation Network headed by IAPAR, Fundação Meridional and Embrapa-Soja. Technological quality evaluations were carried out at the Quality Laboratory of IAPAR. The main evaluated quality characteristics are presented in Table 3. HMW - High Molecular Weight subunit glutenins of IPR 109 are: 1; 7+8; and 5+10, which score 10, the highest possible quality score for strong dough strength (Lukow et al. 1989). After the quality evaluations, IPR 109 was classified as Bread Wheat of high alveografic (W) value, indicating strong gluten properties (Guarienti 1996, Riede 2001).

Table 1. Average grain yield in kg ha^{-1} of cultivar IPR 109 and respective controls, over four years of evaluation in the Adaptation Region 6 (north) of Paraná State

Cultivar	1999	2000	2001	2002	General Mean	% Controls
IPR 109	5499	4509	4793	3428	4557	107
IAPAR 53	5498	4314	4318	3713	4461	105
BRS 49	4840	3940	4433	3035	4062	95
Mean Controls	5169	4127	4376	3374	4261	100

Table 2. Average grain yield in kg ha^{-1} of cultivar IPR 109 and respective controls, over four years of evaluation in the Adaptation Region 7 (center-west) of Paraná State

Cultivar	1999	2000	2001	2002	General Mean	% Controls
IPR 109	3299	2780	4096	3278	3363	106
IAPAR 53	3182	2244	3871	3575	3218	101
BRS 49	3120	2679	4084	2701	3146	99
Mean Controls	3151	2462	3978	3138	3182	100

OTHER CHARACTERISTICS

IPR 109 is an intermediate maturity cultivar, flowering in approximately 69 days and maturing in 121 days. It showed moderate resistance to leaf and stem rusts, to lodging and shattering. It was rated, however, as moderately susceptible to head sprouting in artificially induced germination tests (Okuyama et al. 2003).

IPR 109 was released for cultivation in the Adaptation Regions 6 and 7, considering the major attributes like yield potential, disease resistance and technological quality (IAPAR 2003). Main agronomic traits and kernel properties are presented in Tables 4 and 5.

Table 3. Technological quality parameters of cultivar IPR 109, evaluated from 1999 to 2002, at different sites of the Adaptation Regions 6 (north) and 7 (center-west) of Paraná

Adaptation Regions	W[1]	P/L[2]	PRO[3]	SDS[4]	FN[5]
Mean of Region 6	278	1.33	11.8	12.2	384
Mean of Region 7	297	1.38	11.3	12.1	383
General Mean	287	1.35	11.6	12.2	383

[1]Alveograph value; [2]Relation between gluten tenacity and elasticity; [3]Percentage of protein; [4]Sedimentation value; and [5]Hagberg Falling Number.

Table 4. Agronomic traits of IPR 109 and control cultivars

Cultivar	Plant Maturity (d)	Plant Height (cm)	LodgingResistance	Shattering Resistance	Aluminum Tolerance
IPR 109	121	86	MR[1]	MT[3]	S[5]
IAPAR 53	129	84	MS[2]	T[4]	MT
BRS 49	124	97	MR	MT	T

[1]Moderately resistant; [2]Moderately susceptible; [3]Moderately tolerant; [4]Tolerant; [5]Sensitive.

Table 5. Kernel characteristics of IPR 109 and control cultivars

Cultivar	Kernel Hardness	Sprouting Resistance	Hectoliter Weight (g)	TKW[1] (g)
IPR 109	Medium Hard	MS[2]	79	37
IAPAR 53	Medium Hard	MT[3]	79	40
BRS 49	Medium Soft	MT	77	36

[1]Thousand kernel weight; [2]Moderately sensitive; [3]Moderately tolerant.

MAINTENANCE AND DISTRIBUTION OF FOUNDATION SEED

Foundation seed of IPR 109 is produced and distributed by IAPAR (Rodovia Celso Garcia Cid, km 375, P.O. Box 481). Samples of seed for research and breeding purposes can be obtained at this address.

REFERENCES

Guarienti EM (1996) **Qualidade industrial de trigo.** Embrapa Trigo, Passo Fundo, 36p.

Instituto Agronômico do Paraná - IAPAR (2003) **Informações Técnicas para as culturas do trigo e triticale no Paraná.** IAPAR, Londrina, 202p. (Circular 126).

Lukow OM, Payne PI and Tkachuk R (1989) HMW glutenin subunit composition of Canadian wheat cultivars and their association with bread making quality. **Journal of the Science of Food and Agriculture 46**: 451-460.

Okuyama LA, Riede CR, Campos LAC and Scholz MBS (2003) Avaliação de cultivares de trigo quanto à germinação na espiga. In: **XVIII Reunião da Comissão Centro-Sul Brasileira de Pesquisa de Trigo, IX Reunião Brasileira de Pesquisa de Triticale, IV Seminário Técnico do Trigo**. Fundação Agrária de Pesquisa Agropecuária – FAPA, Guarapuava, p. 191-193.

Riede CR (2001) Estratégias de melhoramento para qualidade e perspectivas do melhoramento de trigo para fins especiais. In: **Anais do I Congresso Brasileiro de Melhoramento de Plantas**. Sociedade Brasileira de Melhoramento de Plantas, Goiânia (CD-ROM).

Riede CR, Campos LAC, Brunetta D and Alcover M (2001) Twenty six years of wheat breeding activities at IAPAR. **Crop Breeding and Applied Biotechnology 1**: 60-71.