



## BRS Camboim – Wheat cultivar

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**ABSTRACT** - *Wheat cultivar BRS Camboim was developed by Embrapa (Brazilian Agricultural Research Institution). It resulted from a double cross of Embrapa 27/Klein Cartucho and PF 869114/BR 23. BRS Camboim presents short height and good performance regarding main wheat diseases.*

**Key words:** wheat, cultivar, crop breeding.

### INTRODUCTION

The genetic wheat improvement program of Embrapa aims at making wheat cultivars available to the production chain which are competitive at the agronomic level and suitable for the different segments of the milling industry in quality and use. BRS Camboim is a cultivar released in partnership with the Fundação Pró-Sementes de Apoio a Pesquisa and is included in the process of experimentation, marketing and distribution of the cultivars of Embrapa. Main traits of BRS Camboim are short plant type and good performance regarding the main wheat diseases.

### PEDIGREE AND IMPROVEMENT METHOD

'BRS Camboim' was derived from the crossing of the parent Embrapa 27\*4/Klein Cartucho (generation F<sub>4</sub>) and PF869114/BR23 (generation F<sub>6</sub>),

realized in the nethouse of Embrapa, in 1994. The F<sub>1</sub> generation was nursery-grown in summer 1994/1995, in Passo Fundo and brought forth the seeds of generation F<sub>2</sub>. This segregating population underwent selections up to F<sub>5</sub> generation in field conditions, by the pedigree method. In each one of the generations, the grains were selected visually after threshing. During the segregation process, plants with resistance to powdery mildew and to leaf rust were identified by selection using artificial pathogen inoculation in field conditions. During this period, observations in relation to other wheat diseases, such as leaf spots and fusarium head blight (FHB) were also carried out. In 1998, a population of progenies containing seeds in the F<sub>5</sub> generation was sown on the experimental field of Embrapa to evaluate the performance regarding diseases and uniformity of the population. Among the plots that presented

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uniformity, the one that originated cultivar BRS Camboim was designated line PF 980144. In 1999, this line was evaluated in the 19<sup>th</sup> preliminary trial of wheat lines of Embrapa for grain yield, stability and other agronomic traits of interest, such as plant type and lodging tolerance. BRS Camboim was indexed for cultivation in 2004 for the states Rio Grande do Sul and Santa Catarina (Comissão 2004).

## PERFORMANCE

Table 1 presents the data of grain yield of cultivar BRS Camboim and the controls used in each trial of determination of the Value for Cultivation and Use (VCU) used for the registration of the genotype in MAPA - Ministério da Agricultura, Pecuária and Abastecimento (Ministry of Agriculture, Supply and Animal Husbandry). From 2001 to 2003, 47 trials distributed in the states of Rio Grande do Sul, Santa Catarina, Paraná, São Paulo and Mato Grosso do Sul were performed. BRS Camboim exceeded the mean of the controls in all trials by 4% with a yield of 3334 kg ha<sup>-1</sup>. Only in 12 environments did the cultivar not present relative superiority in percent compared to the control genotypes, which evidences the broad adaptability to the different climatic conditions of the Brazilian wheat regions. The highest mean BRS Camboim obtained was in 2003, with 3565 kg ha<sup>-1</sup>, result of the interaction of the genotype with the excellent cultivation conditions in that year. The highest grain yield was also attained in 2003 at Passo Fundo, with 6606 kg ha<sup>-1</sup>. All considered trials presented acceptable coefficients of variation for the quantitative variable grain yield. In 2004, BRS Camboim produced a mean of 3983 kg ha<sup>-1</sup> in Passo Fundo, RS, earmarked for pre-basic seed production. Despite presenting satisfactory results regarding grain yield for indexing in the states of Paraná, São Paulo and Mato Grosso do Sul the soft profile is not competitive in these regions.

## OTHER TRAITS

BRS Camboim belongs to the bioclimatic group of spring wheat. It has a medium cycle, with emergence date to flowering stage of around 81 days. It is frost-susceptible in the vegetative phase, but

moderately resistant to some problems considered critical for a good acceptance of a cultivar, such as acid soil toxicity, lodging, shattering and pre-harvest sprouting. Regarding the reaction to the main wheat diseases, the cultivar is moderately resistant to powdery mildew (*Blumeria graminis* f. sp. *tritici*), to glume blotch (*Stagonospora nodorum*) and to fusarium head blight (*Fusarium graminearum*). It is moderately susceptible to leaf rust (*Puccinia triticina*), wheat mosaico virus and susceptible to barley yellow dwarf virus. BRS Camboim has a short plant type, 83 cm in the mean in Passo Fundo, between 2001 and 2003, allowing a maximum nitrogen fertilization of 80 kg ha<sup>-1</sup>. Its leaves are predominantly pendant in a 45° angle in relation to the main stem and have colorless or slightly colored auricles. The ear is fusiform, with awns and light yellow at maturation. In trials for determination of the Differentiation, Homogeneity and Stability (DHS), the cultivar presented constant small variations from year to year which was considered intrinsic of the genotype. BRS Camboim was preliminarily classified as wheat of the soft class, with a mean alveography of 147 10<sup>-4</sup>J (variation from 107 10<sup>-4</sup>J to 221 10<sup>-4</sup>J) in the years in which it was included in the VCU trials. It presents the bands n, 2+12 and 7+9 in relation to High Molecular Weight Glutenins. This cultivar has a red hard grain and the mean hectoliter weight is 78 kg hL<sup>-1</sup>.

## MAINTENANCE AND SEED DISTRIBUTION

BRS Camboim is indexed in MAPA, with number 19489. Embrapa is in charge of the genetic seed of the cultivar BRS Camboim, the Serviço de Negócios para Transferência de Tecnologia da Embrapa (SNT) is responsible for the basic seed and the Instituidores of the Fundação Pró-Sementes de Apoio a Pesquisa, in partnership with Embrapa for certified seed.

## REFERENCES

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**Table 1.** Mean grain yield of the cultivar BRS Camboim in the trial for determination of the VCU

State Localization		Year	BRS Camboim (kg ha <sup>-1</sup> )	Controls (kg ha <sup>-1</sup> )			% Relative*	CV %
				C <sub>1</sub>	C <sub>2</sub>	$\bar{C}$		
RS	Inhacorá – Period 1	2001	3135	3054	2592	2823	111	11
RS	Inhacorá – Period 2	2001	1868	2294	2049	2171	86	14
RS	São Luiz Gonzaga	2001	2993	3545	2399	2972	101	14
RS	São Borja	2001	3010	2792	2627	2710	111	13
RS	Piratini	2001	2494	2060	1777	1918	130	17
RS	Tupanciretã	2001	2724	2839	1870	2355	116	11
RS	Tapera	2001	3110	2663	3190	2926	106	14
RS	Passo Fundo – Period 1	2001	3005	2784	2914	2849	105	12
RS	Passo Fundo – Period 2	2001	3328	3462	2792	3127	106	11
RS	Vacaria	2001	4459	4155	3701	3928	114	10
PR	Cascavel	2001	3141	2681	2733	2707	116	10
PR	Guarapuava	2001	3470	2387	4096	3241	107	13
PR	Ponta Grossa	2001	4524	4090	4087	4089	111	13
SC	Campos Novos	2001	4252	4247	4448	4347	98	6
MS	Ponta Porã	2001	2222	2534	2191	2362	94	13
Mean 2001			3182	3039	2898	2968	107	
SP	Manduri	2002	1760	1847	1493	1670	105	15
MS	Ponta Porã	2002	2288	2823	2755	2789	82	13
PR	Guarapuava	2002	1671	1837	1240	1538	109	15
SC	Campos Novos	2002	2513	2847	2233	2540	99	9
RS	Santa Rosa	2002	3437	3248	2821	3035	113	10
RS	Inhacorá	2002	1830	2367	1138	1753	104	16
RS	São Luiz Gonzaga	2002	3313	2895	2913	2904	114	9
RS	São Borja	2002	3459	3230	2764	2997	115	19
RS	Tupanciretã	2002	2173	2273	2232	2253	96	8
RS	Tapera	2002	1854	2037	2210	2124	87	11
RS	Passo Fundo – Period 1	2002	3591	3375	3207	3291	109	5
RS	Passo Fundo – Period 2	2002	3475	3095	3433	3264	106	5
RS	Vacaria	2002	3951	4440	4721	4581	86	8
Mean 2002			2715	2792	2550	2671	102	
RS	Vacaria	2003	5597	4878	4888	4883	115	8
RS	Passo Fundo	2003	6606	6303	5798	6050	109	5
RS	Tapera	2003	3825	3502	3553	3527	108	10
RS	Tupanciretã	2003	4121	3965	3855	3910	105	14
RS	Inhacorá	2003	5164	4806	4858	4832	107	8
RS	São Luiz Gonzaga	2003	3950	3472	4198	3835	103	12
RS	Santa Rosa	2003	4716	4130	4455	4292	110	11
RS	São Borja	2003	4195	3907	3799	3853	109	7
RS	Cachoeira do Sul	2003	4172	4009	4186	4097	102	8
SC	Campos Novos	2003	4423	4286	4548	4417	100	8
SC	Abelardo Luz	2003	3664	2953	3251	3102	118	14
PR	Ponta Grossa	2003	4433	5260	5797	5528	80	11
PR	Campo Mourão	2003	4675	4739	4256	4497	104	7
PR	Cascavel	2003	3667	3596	3346	3471	106	11
MS	Dourados	2003	1756	1840	1944	1892	93	14
MS	Maracajú	2003	2816	2217	2776	2497	113	13
MS	Ponta Porã	2003	1586	1630	2236	1933	82	9
SP	Manduri	2003	3050	3042	2958	3000	102	12
SP	Maracá	2003	1209	1397	1164	1281	94	19
Mean 2003			3565	3419	3585	3502	102	

In 2001: C<sub>1</sub> = BR 23 and C<sub>2</sub> = Rubi, Passo Fundo 2<sup>nd</sup> Period (C<sub>2</sub> = CEP 24), Campos Novos (C<sub>1</sub> = CEP 24), Ponta Porã (C<sub>1</sub> = CEP 27); in 2002: C<sub>1</sub> = BR 23 and C<sub>2</sub> = CEP 27, Guarapuava (C<sub>2</sub> = Fundacep 30); in 2003: C<sub>1</sub> = BRS 179 and C<sub>2</sub> = BRS 194, Inhacorá (C<sub>2</sub> = Fundacep 32), Abelardo Luz (C<sub>1</sub> = CD 105 and C<sub>2</sub> = Fundacep 36), Dourados (C<sub>2</sub> = Ônix), Ponta Porã (C<sub>2</sub> = CD 105).  $\bar{C}$  = Mean of the two controls considered for each localization

\* = Relation in percent between the mean grain yield of cultivar BRS Camboim and the control means