



## CULTIVAR RELEASE

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### CD 1805 - Wheat with flour characteristics for cookie baking

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**Abstract** – CD 1805, indicated for the wheat growing in Regions 1, 2 and 3 in the states of Rio Grande do Sul, Santa Catarina and Paraná. The cultivar has quality standards for cookie production and high yield performance with a mean of 3899 kg ha<sup>-1</sup>, exceeding the controls by 4%.

**Key words:** *Triticum aestivum* L., industrial quality, tolerance to soil aluminum.

### INTRODUCTION

Brazil is globally the second largest producer of cookies, with an output of 1.3 million tons in 2014 and a per capita consumption of 6.3 kg yr<sup>-1</sup> (SINCABIMA 2014). Given these facts, using cultivars that produce grains that meet the quality standards of the cookie industry is essential, thus, the industry is supplied with flour with the desired quality and producers can add value to the harvested wheat.

The production of high-quality cookies is facilitated by the use of flour obtained from wheat cultivars with soft grain. This allows breaking the grains into smaller particles (Labuschagne et al. 1997). For Yamamoto et al. (1996), the size of the flour particles is one of the traits with highest correlation with the quality of produced cookies. Gutkoski et al. (2003) found that wheat cultivars planted in Rio Grande do Sul have functional properties that indicate them for cookie production.

Currently, some wheat breeding programs tried to combine relevant traits for cookie production in a single cultivar. To contribute to this need, COODETEC developed cultivar CD 1805, which has not only has a high yield potential, but also adequate quality standards for cookie production for the Brazilian market.

### BREEDING METHODS

Cultivar CD 1805 was obtained by crossing wheat

cultivars CDF 2040 (EMBRAPA 27 / IOC 8817) with RUBI, by COODETEC, in 2002, in Palotina. The F1 seeds were sown in November of that year in a greenhouse, in Cascavel. At maturation, all spikes were bulk harvested and threshed, resulting in the F2 population. The F2 population was grown in the field Palotina in 2003 applying modified mass selection. This method consists of the selection of the best plants of the population, which are threshed together and a significant sample of seeds is used to grow the following generation. The populations F3 and F4 were grown by the same method as above, in Cascavel, respectively, in 2004 and 2005. In 2006, the F5 population was grown in the field in Palotina by the pedigree method, which consists in selecting plants that are threshed separately and the seeds of each plant sown in the next generation. The F6 population was also conducted by the pedigree method in Cascavel, in 2007, when the traits of several sister lines were fixed. One of these lines was selected, resulting in cultivar CD 1805. The pedigree of this line is CC15916- 0P-00T-00T-8T-0T.

### CHARACTERISTICS AND PERFORMANCE

Cultivar CD 1805 was tested in 2008 in the Preliminary tests conducted in Cascavel and Palotina, performing better than the controls and was then evaluated in Value for Cultivation and Use (VCU) tests from 2009 to 2014,

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labelled CD 0964. The VCU tests were conducted at different locations and seasons in the wheat-growing regions (Table 1). The experimental design was a randomized block design with three replications, in plots of six 5-m long rows, spaced 0.17 m apart. Fertilization and disease, pest and weed control were applied according to official technical recommendations (Comissão 2011). Prior to sowing, the seeds were treated with imidacloprid + Triadimenol.

The measured variables were grain yield, days from emergence to heading, days from emergence to maturity, plant height, lodging, hectoliter weight, 1000-grain weight, pre-harvest sprouting, tolerance to soil aluminum, grain hardness, general gluten strength, yield stability, falling number, tenacity/extensibility ratio, water absorption, and flour color. The latter was determined by the L, a, b system where the values of L (lightness) vary from 0 (black) to 100 (white) and the a and b values (chromaticity coordinates) range from -a (green) to + (redness) to - b (blue) to + a (yellow). At strategic locations collections, the genotypes included in the VCU tests were grown together without disease control, where the diseases leaf rust, leaf spot,

powdery mildew, fusarium head blight, blast and mosaic virus were evaluated, among others.

The crop cycle of cultivar CD 1805 is medium, ranging from 57 to 91 days from emergence to heading and 106 to 150 days from emergence to maturity. In the mean, these traits were 80 and 131 days in the wheat-growing Regions 1 (SR, SC, and PR) and 2 (RS and SC), 76 and 127 days in Region 2 (PR) and 68 and 122 days in Region 3 (PR). The plant height is medium (from 60-95, in the mean 81 cm) and the cultivar was classified as moderately resistant to lodging, moderately resistant to moderately susceptible to pre-harvest sprouting, and moderately resistant to soil aluminum. The mean hectoliter weight is 79 kg hL<sup>-1</sup> and 1000-grain weight 34 grams.

Cultivar CD 1805 was classified as moderately resistant to blast (*Pyricularia grisea*) and wheat mosaic virus (Soil-borne wheat mosaic virus) and moderately susceptible to powdery mildew (*Blumeria graminis* f.sp. *tritici*), scab (*Fusarium graminearum*), leaf spots (*Septoria tritici* and *Bipolar sorokiniana*), glume blotch (*Septoria nodorum*), and leaf rust (*Puccinia triticina*).

**Table 1.** Locations and seasons of the trials of Vaue for Cultivation and Use (VCU) for cultivar CD 1805, in the wheat-growing regions 1, 2 and 3 (RS, SC and PR), from 2009 to 2014

Region/Location	2009	2010	2011	2012	2013	2014
<b>Wheat-growing region 1</b>	6	7	7	7	9	9
Cruz Alta / RS	-	1	1	1	1	1
Não Me Toque / RS	2	2	2	2	2	2
Passo Fundo / RS	-	-	-	1	1	1
Vacaria / RS	-	-	-	1	1	1
Campos Novos / SC	1	1	1	-	1	1
Castro / PR	1	2	-	-	-	-
Guarapuava / PR	2	1	3	2	2	2
Ponta Grossa / PR	-	-	-	-	1	1
<b>Wheat-growing region 2</b>	5	8	5	6	8	8
Santa Rosa / RS	-	1	-	-	1	-
Santo Augusto / RS	1	1	-	-	2	2
São Luiz Gonzaga / RS	-	1	1	1	1	1
Abelardo Luz / SC	1	2	2	2	2	2
Cascavel / PR	3	3	2	3	2	3
<b>Wheat-growing region 3</b>	1	4	3	3	2	4
Palotina / PR	1	4	3	3	2	4

**Table 2.** Means of the general gluten strength (W), yield stability (YST), falling number (FN), tenacity/extensibility ratio (P/L), water absorption (AB), flour color (COL L, COL a and COL b) per wheat-growing region of the trials of Vaue for Cultivation and Use (VCU), from 2009 to 2014

Wheat-growing region	Nº of samples	W (x10 <sup>-4</sup> J.)	YST (min.)	FN (min.)	P/L (ratio)	AB (%)	COL L (89 a 96)	COL a (-1.0 a +1.0)	COL b (6 a 10)
1	11	136	5.0	353	0.49	54.9	94.6	-0.09	7.78
2	12	143	5.3	356	0.45	54.4	94.5	-0.28	7.62
3	7	152	5.3	332	0.40	54.6	94.6	-0.06	7.94
Mean	30	144	5.2	347	0.45	54.6	94.6	-0.14	7.78

**Table 3.** Mean grain yield (kg ha<sup>-1</sup>) of cultivar CD 1805 and of the controls, in the tests of the Value for cultivation and use (VCU), in the wheat-growing regions 1, 2 and 3 (RS, SC and PR), from 2009 to 2014

Wheat-growing region	Cultivar	2009	2010	2011	2012	2013	2014	Mean	%
1	CD 1805	3621	4558	4431	3519	5872	4947	4491	104
	T <sub>1</sub>	3603	4301	3770	3269	5699	4779	4237	98
	T <sub>2</sub>	3423	4411	4328	3294	5779	5096	4389	102
	T <sub>M</sub>	3513	4356	4049	3281	5739	4937	4313	100
2	CD 1805	3510	4525	4115	3887	5342	4235	4269	103
	T <sub>1</sub>	3091	3918	3828	3531	4927	4377	3945	95
	T <sub>2</sub>	3376	4293	4192	4042	5413	4696	4335	105
	T <sub>M</sub>	3233	4106	4010	3786	5170	4536	4140	100
3	CD 1805	2304	3776	3645	2907	2334	2662	2938	105
	T <sub>1</sub>	2298	3574	3327	2800	1981	2641	2770	99
	T <sub>2</sub>	2090	3682	3619	2753	2397	2403	2824	101
	T <sub>M</sub>	2194	3628	3473	2776	2189	2522	2797	100

The controls T<sub>1</sub> and T<sub>2</sub> were, respectively, BRS GUAMIRIM and ONIX, in 2009 and BRS GUAMIRIM and QUARTZO from 2010 to 2014. T<sub>M</sub> = Mean of the controls.

The results of industrial quality analysis of 30 samples of the experiments conducted from 2009 to 2014 in wheat-growing Regions 1, 2 and 3, were a mean gluten strength of 144. This classifies CD 1805 in the group of basic wheat cultivars. CD 1805 has a low tenacity/extensibility ratio, low water absorption and white flour color (Table 2). These traits indicate CD 1805 flour as suitable for cookie production. Currently, other cultivars with these traits are already available on the market (Franco et al. 2010, Marchioro et al. 2011, Marchioro et al. 2013).

Table 3 shows the grain yield means in the wheat-growing Regions 1, 2 and 3, where cultivar CD 1805 produced 4%, 3% and 5% higher grain yields than the mean of the controls, respectively. Due to the good production performance and

quality standards for cookie production, cultivar CD 1805 was indicated for cultivation in the wheat-growing Regions 1, 2 and 3 in the states of Rio Grande do Sul, Santa Catarina and Paraná and registered by the Registro Nacional de Cultivares (no.32710).

## BASE SEED PRODUCTION

The Cooperativa Central de Pesquisa Agrícola - COODETEC (BR 467 - km 98 - PO Box 89 – 85.813-450, Cascavel, Paraná, Brazil), is authorized to license seed companies for the production of protected varieties (law nº 9456/97), to multiply and sell the seed to grain producers. Cultivar CD 1805 was released on the market in 2014, with an availability of 2,500 bags of 40 kg seeds.

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