

3). Considering the high (level of) iron concentration in the grains, BRS Parrudo can be classified as a natural biofortified wheat cultivar. BRS Parrudo was registered and protected by the Ministry of Agriculture, Livestock and Supply (MAPA) under the numbers 29434 and 20120242, respectively.

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Table 3. Iron concentration (mg/kg) in grains of BRS Parrudo in comparison with Quartzo and percentage of increase in nine locations in 2013. Quartzo is the most planted cultivar in the South Brazilian Wheat Region. ¹ First sowing date (early June); ² Second sowing date (late June) (RS = Rio Grande do Sul, SC = Santa Catarina, and PR = Paraná states).

Location	Quartzo	BRS Parrudo	% difference of increase
Três de Maio, RS	28.3	41.1	45.2
Passo Fundo, RS ¹	21.5	32.1	49.3
Passo Fundo, RS ²	22.1	31.5	42.5
São Luiz Gonzaga, RS	31.8	46.3	45.6
São Borja, RS	30.5	53.1	74.1
Chapecó, SC	25.5	40.5	58.8
Canoinhas, SC	24.3	37.6	54.7
Campos Novos, SC	26.4	40.4	53.0
Ponta Grossa, PR	28.7	44.0	53.3
Mean	26.6	40.7	52.9

Performance of wheat cultivars in the state of Rio Grande do Sul, Brazil, 2017.

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The Brazilian Commission of Wheat and Triticale Research (BCWTR) annually conducts the State Test of Wheat Cultivars in the state of Rio Grande do Sul (STWC-RS), aiming to support the indications of cultivars. This work had the objective to evaluate wheat cultivar grain yield performance of STWC-RS, in 2017. The grain yield performance of 30 wheat cultivars (Ametista, BRS Guaraim, BRS Marcante, BRS Parrudo, BRS Reponte, CD 1303, CD 1705, Celebra, FPS Certero, Inova, Jadeite 11, LG Cromo, LG Oro, LG Supra, Marfim, ORS 1401, ORS 1402, ORS 1403, ORS 1405, ORS Vintecinco, Quartzo, TBIO Alpaca, TBIO Iguaçu, TBIO Mestre, TBIO Noble, TBIO Sintonia, TBIO Sinuelo, TBIO Sossego, TBIO Toruk, and Topazio) was studied in 12 environments (Coxilha, Cruz Alta, Não-Me-Toque, Passo Fundo – season 1; Passo Fundo – season 2; Vacaria – season 1; Vacaria – season 2; and Augusto Pestana, Ijuí, Santo Augusto, São Borja and Três de Maio), in Rio Grande do Sul in 2017. The experiments were carried out in a randomized block design with three or four repetitions. Each plot consisted of five rows of 5 m in length with 0.2 m spacing between rows. The plant density was approximately 330 plants/m². Grain yield data (kg/ha) were subjected to individual analysis of variance (for each environment) and to grouped analysis of variance (for all environments). The grouped analysis of variance was performed employing the mixed model (fixed cultivar effect and randomized environment effect). The grain yield performance of wheat cultivars was evaluated by analysis of adaptability and stability, employing the method of distance from the ideal cultivar, weighted by the coefficient of residual variation, proposed by Carneiro (1988). In this analysis, the ideal cultivar was considered as the cultivar with high grain yield, high stability, low sensitivity to adverse conditions of unfavorable environments and ability to respond positively to improvement of favorable environments. The general average of STWC-RS in 2017 was 3,544 kg/ha. The experiment conducted in Santo Augusto had the highest average of wheat grain yield: 4,845 kg/ha. The maximum wheat grain yield was 5,610 kg/ha, in Santo Augusto (cultivar CD 1303).

The Inova, FPS Certero, Topázio, ORS Vintecino, and TBIO Mestre cultivars had adaptability and stability in favorable environments (environments with average of wheat grain yield higher than the general average). Cultivars Topázio, FPS Certero, LG Oro, BRS Reponte, and Inova had adaptability and stability in unfavorable environments (environments with average of wheat grain yield lower than the general average). The general average of all environments, cultivars FPS Certero (3,963 kg/ha), Topázio (3,920 kg/ha), Inova (3,948 kg/ha), LG Oro (3,818 kg/ha), and ORS 1401 (3,780 kg/ha) came closest to the ideal cultivar.

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Wheat crop in the state of Rio Grande do Sul, Brazil, 2017.

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The state of Rio Grande do Sul (RS) is one of the main wheat-producing states in Brazil. The objective of this study was to analyze the wheat crop in Rio Grande do Sul state, in the year 2017. In 2017, RS harvested 690,233 ha of wheat (36.4 % of the total area harvested in Brazil), producing 1,192,918 tons of wheat (27.6% of Brazilian production), with an average of grain yield of 1,728 kg/ha (552 kg/ha below the Brazilian average: 2,280 kg/ha). Among the geographical mesoregions of RS (Fig. 2), the Northwest mesoregion harvested the largest wheat area: 550,973 ha (79.8% of the cropped area in the state) and had the largest production: 884,908 tons of wheat grain (74.2% of state production, Table 4). However, the average of wheat grain yield obtained in this mesoregion was the lowest of the state:

1,606 kg/ha (122 kg/ha below the state average, Table 4). The Northeast mesoregion harvested 36,730 ha of wheat (5.3% of the cropped area in the state), produced 115,001 tons of wheat grain (9.6% of state production), and had the highest average of wheat grain yield of the state: 3,131 kg/ha (1,403 kg/ha above the state average, Table 1). The wheat crop in the state of RS in 2017 had unfavorable weather conditions, with (i) lots of rain at the beginning of the sowing period, resulting in delayed sowing; (ii) rain lack in the crop growing period, resulting in the reduction of tillering and plant

density; (iii) late frosts in some regions, especially in the Northwest mesoregion, damaging the grain formation and filling; and (iv) excessive rainfall in spring, resulting in high incidence of *Fusarium* head blight, the most important wheat disease in RS. Comparing the wheat crop data with the results of the State Test of Wheat Cultivars in RS (STWC-RS) in 2017, the average of wheat grain yield of commercial crops was 1,816 kg/ha below the average of STWC-RS (3,544 kg/ha).

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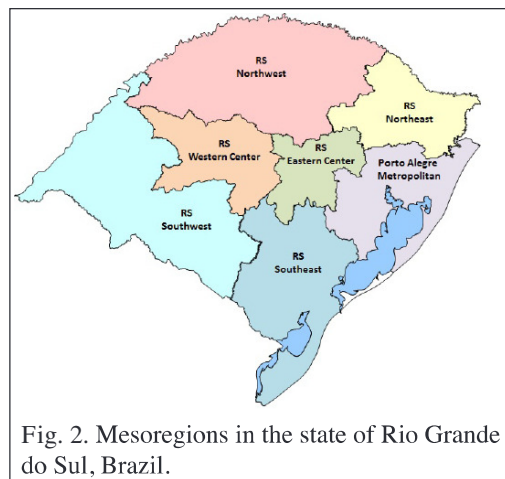


Fig. 2. Mesoregions in the state of Rio Grande do Sul, Brazil.

Table 4. Area harvested, production, and average of grain yield of wheat in each of the mesoregions (see Fig. 1) of the state of Rio Grande do Sul, Brazil, in 2017 (Source: IBGE. 2019).

Mesoregion	Area harvested		Production		Grain yield (kg/ha)
	ha	%	tons	%	
RS Northwest	550,973	79.8	884,908	74.2	1,606
RS Northeast	36,730	5.3	115,001	9.6	3,131
RS Western Center	44,729	6.5	77,948	6.5	1,743
RS Eastern Center	8,591	1.2	14,116	1.2	1,643
Porto Alegre Metropolitan	1,140	0.2	3,075	0.3	2,697
RS Southwest	43,150	6.3	87,154	7.3	2,020
RS Southeast	4,920	0.7	10,716	0.9	2,178
Rio Grande do Sul State	690,233	100.0	1,192,918	100.0	1,728