



BRS Saturno – triticale cultivar

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ABSTRACT – *The triticale cultivar BRS Saturno was developed by Embrapa (Brazilian Agricultural Research Corporation) in partnership with the Fundação Pró-Sementes de Apoio à Pesquisa. It is the result of a cross between the genotypes PFT 512 and CEP 28 – Guará, adapted to the environmental conditions of cultivation in southern Brazil.*

Key words: Fusarium, grain yield, southern Brazil.

INTRODUCTION

In Brazil, the area of triticale between 2000 and 2004 stabilized between 109 and 126 thousand hectares, and a maximum area (134,868 ha) was harvested in 2005. From 2007, this area declined. In 2009, 69,350 hectares of triticale were recorded, the smallest area in nine years. In this year, the national average yield of triticale grain was 2,157 kg ha⁻¹, less than in the previous year (2,441 kg ha⁻¹), and significantly below the global average of 2009 of 3,927 kg ha⁻¹ (FAO 2010, IBGE 2010). In the comparison of grain yields, the plant type should however be taken into consideration. In Brazil, triticale cultivars are spring varieties, the same as used in Australia, with similar yields in both countries. In countries such as Germany, France, Poland, Sweden, and others however, triticale is grown in the winter, requiring longer cycles and vernalization, with average grain yields higher than 5,000 kg ha⁻¹.

Currently, triticale is grown in the states of Rio Grande do Sul, Santa Catarina, Paraná, Mato Grosso do Sul, São Paulo, and Minas Gerais. However, the IBGE data do not include Mato Grosso do Sul and Minas Gerais. The largest areas were harvested in Paraná and São Paulo, and average grain yield was also highest in São Paulo in 2009. Together,

Paraná and São Paulo account for 86 % of the national triticale production.

In the south, the occurrence of Fusarium head blight (FHB) is one of the most yield-limiting factors for triticale and other winter cereals. The search for less susceptible genotypes to the disease is constant in breeding programs.

PEDIGREE AND BREEDING METHODS

The cultivar BRS Saturno resulted from the cross of PFT 512/CEP 28 - Guará, made by Embrapa Trigo, in 1995. The line “PFT 512” was derived from the cross “ANOAS/CEP 23 - Tatu” at the International Centre for Maize and Wheat Improvement Center (CIMMYT) in El Batán – Mexico, in 1986. This line was introduced by Embrapa in 1993, into the international yield trial in Passo Fundo – RS; the 26th ITYN (International Triticale Yield Nursery), composed of inbred triticale lines, was sent to several countries for evaluation and selection. The entry number “11” (of the 26th ITYN) with the selection sequence: CTM86.123-17MI-2MI-13BI-2Y-0PAP-1Y-0B was selected. Number “11” was subjected to modified mass selection in Passo Fundo-RS, where atypical and agriculturally inadequate plants were eliminated and superior and

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homogeneous plants selected, resulting in the following selection sequence: CTM86.123-17MI-2MI-13BI-2Y-0PAP-1Y-0B-0F (0F = selection in Passo Fundo-RS) resulting in the line “PFT 512”. The segregating populations were developed and selected in Passo Fundo, by the pedigree method, from 1997 on, leading to the selection of 100 ears from plot 710108. In 1998, all ears were sown in 100 rows, one row per ear, and ears were selected, one ear per plant, from 12 plants of row 7 in plot 820485, which were separately sown in rows (one row per ear) in 1999. In the same year, ears of two sister lines were harvested from the plots 920356 and 920357, of which 12 ears per row underwent phenotypic selection of ears and plant to increase homogeneity. In 2000, the genotype was included in the internal collection of Embrapa Trigo for agronomic and biological evaluation, while it was simultaneously grown in an ear multiplication plot for genetic seed production. In 2001, the genotype was labeled “PFT 112”, for the preliminary triticale trial (EPRTCL) in Passo Fundo. Between 2002 and 2004, seed of the line was multiplied and purified, and selected again in rows (one row per ear) with subsequent mass multiplication. From 2003 to 2010, “PFT 112” was tested in the trials of Value for Cultivation and Use of Triticale (VCUTCL) at various locations in southern Brazil, where it stood out for its grain yield, hectoliter weight and less susceptibility to FHB. The line “PFT 112” was assessed in trials of Distinctness, Uniformity and Stability (DUS) in 2003, 2004 and 2005 by Embrapa Trigo, in Passo Fundo.

PERFORMANCE

The triticale cultivar BRS Saturno is resistant to powdery mildew (*Blumeria graminis*), tolerant to blight, resistant to leaf rust (*Puccinia triticina*), and moderately resistant to leaf spots (*Bipolaris sorokiniana*, *Drechslera* spp. and *Stagonospora nodorum*) and to the soilborne wheat mosaic virus (SBWMV), moderately susceptible to pre-harvest sprouting, to the barley yellow dwarf virus (BYDV) and bacterial leaf streak (*Xanthomonas translucens* and *Pseudomonas* spp.), and susceptible to blast (*Pyricularia grisea*) and fusarium head blight or scab (*Fusarium graminearum*), with a lower susceptibility level to fusarium than other triticale cultivars in Brazil.

BRS Saturno is hexaploid, has a medium cycle (70 - 85 days from emergence to heading and 135 - 150 days to maturity), and tall plant height (117 cm in Passo Fundo). The anthocyanin pigmentation in the coleoptile is strong to very strong, and low to mean in the auricle. Waxiness of the flag leaf sheath is strong. The ears are long, completely awned and light-colored at maturity. The hair density of the stem is high.

This is the second Brazilian triticale cultivar developed by crosses made in Brazil. The lower susceptibility to FHB than of other triticale cultivars, excellent grain quality, higher hectoliter weight than of the recommended varieties, and considerable yield adaptability indicate this cultivar in production systems.

In studies of Value for Cultivation and Use (VCU) conducted in Rio Grande do Sul, Santa Catarina, Parana, Mato Grosso do Sul and São Paulo between 2003 and 2005, the grain yield of BRS Saturno was 3,946 kg ha⁻¹, exceeding the mean yield of the two best triticale cultivars at each site (BRS 148, BRS 203, Embrapa 53 or Iapar 23-Arapoti) used as standards by 12.3 %.

Table 1 shows the mean performance of BRS Saturno for each state, between 2003 and 2010. The grain yield (1,121 kg ha⁻¹) was lowest in Mato Grosso do Sul and highest (8,347 kg ha⁻¹) in Sao Paulo, both in 2006. The mean value was 4,310 kg ha⁻¹. According to field observations, despite the spring growth habit of BRS Saturno, low temperatures during the vegetative growth favor the performance of this cultivar. Thus, environments with drought and high temperatures do not allow the maximum yield expression of the cultivar. However, environments with adequate water availability and lower temperatures during the cycle of cultivar development show the yield potential of BRS Saturno, which exceeds the main indicated varieties in Brazil, especially in years with excessive rainfall with the occurrence of FHB during the reproductive phase, due to the lower susceptibility of BRS Saturno to the disease. This statement can be confirmed by a brief analysis of Table 1, where 17 of the 29 entries that exceeded 4,000 kg ha⁻¹ were obtained in the southern states (RS, SC and PR), with exception of the maximum yield in São Paulo in 2006.

Due to the performance of BRS Saturno and the similarity of climate and cultivation conditions between Santa Catarina and Rio Grande do Sul (southern region) and Paraná, Mato Grosso do Sul and São Paulo (central south region) as well as the currently available cultivation technologies, this triticale cultivar was included in the National Registry of Plant Varieties (no. 26744, on May 21, 2010), for grain production and trade in all wheat growing regions in south and central south Brazil (RS, SC, PR, MS, and SP), under rainfed cultivation in the cold season.

The grain of BRS Saturno can be used in human and animal nutrition and the flour for the production of cookies and pasta food.

Table 1. Grain yield average (kg ha⁻¹) of BRS Saturno, from 2003 to 2010, in experiments of Value for Cultivation and Use in the southern states of Brazil

State/year	2003	2004	2005	2006	2007	2008	2009	2010	Mean
RS	4,203	3,765	4,198	4,221	3,897	4,455	4,420	5,021	4,273
SC	5,517	4,246	2,874	4,871	4,166	5,093	*	*	4,461
PR	3,527	4,784	4,525	7,677	5,654	6,229	*	3,991	5,198
SP	3,231	3,833	3,607	8,347	*	*	*	*	4,755
MS	*	2,988	1,207	1,121	*	*	*	3,317	2,158
General mean									4,310

* No yield trials were conducted at these locations in the respective year.

SEED MAINTENANCE AND DISTRIBUTION

BRS Saturno is a protected cultivar; Embrapa is in charge of basic seed multiplication, by the Serviço de Negócios para Transferência de Tecnologia da Embrapa (SNT), and the multiplication of certified seed in partnership with the Fundação Pró-Sementes de Apoio à Pesquisa.

REFERENCES

- FAO (2010) **Faostat – Forestry**. Available at <<http://faostat.fao.org/site/567/default.aspx#ancor>> Assessed on Jul. 13, 2010.
- IBGE (2010) **Levantamento sistemático da produção agrícola**. Available at <<http://www.ibge.gov.br/home/estatistica/indicadores/agropecuaria/lspa/default.shtm>> Assessed on Jul. 13, 2010.