ITEMS FROM BRAZIL

NATIONAL WHEAT RESEARCH CENTRE — EMBRAPA TRIGO
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Spring triticale breeding program at EMBRAPA, Brazil.

Alfredo do Nascimento Junior.

Although triticale production costs through the years were slightly lower than wheat, mainly due to a superior resistance to foliar diseases, the rainy environment associated with a no-till system with more humidity and stubble on the soil surface resulted in an increase in disease selection pressure. Many released cultivars previously characterized as resistant to foliar diseases are now moderately susceptible to susceptible. For more than a century, rye and wheat have been bred and grown in Brazil, contributing to the accumulation of favorable genes through natural selection. The adaptive value of these genes and genetic variability should be brought into national triticale-breeding programs. Developing new hexaploid triticales will certainly need improved octoploid types. Crosses among these improved octoploid and hexaploid triticales, rye, or wheat genotypes by backcrosses to hexaploid triticale cultivars need to be made continuously in order to guarantee better selection efficiency. The major challenges for Brazilian triticale-breeding programs are increasing grain yield potential, disease resistance, and nutritional value; reducing preharvest sprouting; and improving or maintaining the adaptation to acid soils.

Each year we make 250–300 crosses between hexaploid triticales. Germ plasm introduction is important for increasing the genetic variability and used to be the main source for developing new cultivars in Brazil but, currently, the genetic basis is increased and new triticale genotypes are developed by crossing wheat and rye cultivars adapted to Brazilian conditions. Field selection for plant type and disease resistance is carried out from the F_2 onwards, followed by severe screening for grain formation. Due to the great environment pressure, selection for disease resistance is possible under natural conditions in early generations. In advanced stages (F_6 or greater), all lines selected are artificially inoculated for evaluation to scab, spot blotch, tan spot, and blast, and for agronomic evaluations and characterizations parallel to the yield and official trials.

The cultivars Embrapa 53 (LT1117.82/Civet//Tatu), BRS 148 (Yogui/Tatu), and BRS 203 (LT-1/Rhino) developed by Embrapa Trigo with CIMMYT's coöperation, represented more than 70% of the available triticale seed in Brazil in 2004. In 2005, BRS Minotauro, the first truly Brazilian triticale cultivar, was registered.

New lines have been improved by crosses and selections to fulfil the requirements of cereal growers aiming at resistance or tolerance to the most important diseases, grain quality, and broad adaptation. The genetic gain of the breeding program for grain yield, since 2000, was 124.6 kg/ha/year.

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BRS Minotauro, the first truly Brazilian triticale cultivar.

Alfredo do Nascimento Junior, Márcio Sóe Silva, Eduardo Caierão, Pedro Luiz Scheeren, and Luiz Eichelberger.

Triticale (X *Triticosecale* Wittmack) is an important crop for the winter growing season in Southern Brazil. The total triticale area in 2005 was approximately 131,000 ha and the same area is estimated for 2006 in Brazil. The average grain yield was 2,200 kg/ha in 2005, without irrigation. Despite this, due to the seed availability, four very similar cultivars are responsible for more than 95% of growing area. Cereal growers have a few cultivars to choose and cultivate annually.

The genetic base of today's triticale in the world and Brazilian-released triticale genotypes is narrow and should be increased; all recommended triticale cultivars originated from a coöperative program with CIMMYT. At Embrapa Trigo, the triticale-breeding program is focused on obtaining triticale cultivars with specific aim at characteristics for adaptation to local climate and increase in genetic variability.

BRS Minotauro is derived from a cross, made at Embrapa Trigo in the winter of 1991, between the Brazilian hexaploid wheat line PF 89358 (BR 35*3//BR 14*2/LARGO) and the Brazilian rye Centeio BR 1, followed by doubling the F_1 plant chromosomes using colchicine to produce the new primary octoploid OCTO 92-3. This octoploid line was crossed with the hexaploid triticale Triticale BR 4 (Beagle/Cinamon//Muskox) in 1995.

Annual selections of individual plants were performed according to the generation in a modified-pedigree method. In 1998, after mass selection, the spring hexaploid line PFT 008 was selected and agronomic evaluation started in 1999. Breeder's seed was increased in 2000 and 2001. In 2002 and 2003, the population was described for 'Distinctness, Uniformity and Stability' according to UPOV and evaluated in field trials under distinct environments.

BRS Minotauro yields 3,790 kg/ha of grain on average, 9% above the check cultivars, and showed an outstanding test weight and Hagberg Falling Number. The new triticale cultivar was registered in 2005. BRS Minotauro has a medium–tall stature and medium ear emergence and maturity cycle; is tolerant to soil aluminum toxicity; resistant to leaf rust, stem rust, powdery mildew and lodging; moderately resistant to spot blotch, Septoria leaf blotch, and BYDV; and moderately susceptible to scab and preharvest sprouting.

BRS Serrano – the first Brazilian dual-purpose rye cultivar.

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Rye has been grown for years in the southern states of Brazil, first introduced in the country by Polish and German immigrants two centuries ago. The cropping area has decreased substantially in the last five decades, but rye still presents important potential in cereal production, mainly as pasture or soil cover and for human food. Our breeding efforts aim at yield improvement (grain and green forage), health, and wide adaptation. **BRS Serrano** is derived from a cross made at Embrapa Trigo during the winter of 1998 between Garcia rye and Bagé rye populations. These populations were selected in a field trial of colonial rye genotypes for agronomic and forage evaluation. After three cycles of open pollination, the population of BRS Serrano was established. The genetic seed multiplication process began in 2000 and continued until 2001. Between 2002 and 2004, the population was described for 'Distinctness, Uniformity and Stability' according to UPOV and evaluated in field trials for dual-purpose (forage and grain production) in seven distinct environments. During this period, BRS Serrano produced 10,700 kg/ha dry matter, 30% greater than the yield of rye BR 1 (check cultivar), and the potential was higher than 120 dt/ha. BRS Serrano is diploid and a spring type, has a high stature, and is medium–late in ear emergence and maturity. BRS Serrano is highly tolerant to soil aluminum toxicity; resistant to leaf rust, powdery mildew, spot blotch, Septoria leaf blotch, and BYDV; moderately resistant to scab and grain shedding; susceptible to stem rust and lodging.