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CULTIVAR RELEASE

UFUS Riqueza: a new soybean cultivar for the state of Minas Gerais

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ABSTRACT - *The release of cultivars has ensured higher yield associated with increased tolerance to climatic adversity. 'UFUS Riqueza' is resistant to natural dehiscence and to the diseases: bacterial pustule, downy mildew, frogeye leaf spot, brown stem rot, stem canker and stem necrosis and can reach yields of 3475 kg ha^{-1}, with grain contents of 18 % oil and 39 % protein.*

Key words: *breeding, disease resistance,* Glycine max.

INTRODUCTION

In the search for crop adaptation to the changing climate conditions, plant breeding has developed cultivars that respond better to today's challenges.

The direction of research underlying the release of a new cultivar is towards raising the yield levels of traditional production areas as well as to adapt cultivation to new areas. The indication of new cultivars with differentiated value-adding features has been a major tool to help farmers increase stability and yield. The high yield levels of soybean, with values above 3300 kg ha^{-1} in the major producing regions in the Midwest of the country, has substantiated competitiveness of Brazilian soybean on the international market (Hamawaki et al. 2007).

During the development of a cultivar, it is imperative that the target line be evaluated at different locations and years, due to the genotype - environment interaction, to express the entire genetic potential, minimizing the environmental effects as far as possible. In initial, intermediate and final trials it is possible to obtain important information preceding the release of a cultivar.

The propagation of soybean cultivars recommended for cultivation in each state is intended to inform technicians and businessmen of the productive sector about the annual advances in varietal technology of soybean (Embrapa 2008).

According to Priolli et al. (2004), several breeding programs have contributed to the development of high-yielding cultivars adapted to different agro-climatic conditions of the country. These programs have favored the productive sector with the release of new cultivars, as in the case of common bean, e.g., cultivar IAC - Boreal, with increased tolerance to anthracnose, a major cause of crop losses, aside from higher yields (Chiorato et al. 2008).

The breeding program of the Federal University of Uberlandia (UFU) was initiated in 1995 with a Research Center on the Fazenda Capim Branco in Uberlândia, MG, divided into sub-centers at five other locations: Alto Taquari-MT, Chapadinha-MA, Luis Eduardo Magalhães-

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BA, Bom Jesus-PI, and Uberaba-MG, for experimental studies in genetics and crop breeding. As a result of the research work of the program, the first two varieties were released in 2003, called UFUS Impacta and UFUS Futura, both registered and protected by the Serviço Nacional de Proteção de Cultivares (SNPC) of Ministério da Agricultura, Pecuária e Abastecimento (MAPA). In 2004 and 2005, two other cultivars were released, respectively, UFUS Milionária and UFUS Xavante, both registered and in the final process of protection. Five cultivars are being released in 2009 and 2010, one of which is UFUS Riqueza.

UFUS Riqueza was developed by the UFU, Uberlândia-MG, Brazil, with a view to offer producers and companies an advantage over other cultivars on the market. The cultivar has a high yield potential, resistance to the major crop diseases, determinate growth habit, lodging resistance and a cycle of 129 days from emergence to harvest.

BREEDING METHODS

The cultivar UFUS Riqueza was derived from a biparental cross of cultivars (Cristalina RCH x IAC 100) in a greenhouse of the Fazenda Capim Branco - UFU, in Uberlândia-MG, in 1996. For the segregating generations, the SSD (Single Seed Descent) methodology was used, by which inferior and/or pest and disease-susceptible plants are eliminated over the generations. This cross was called 96UFU90 until selection and harvest of the progenies in the growing season 2000.

First field tests were carried out in the 1999 growing season, giving rise to progenies, where the best genotypes were selected and in the following year the best progenies. In the 2000/2001 growing season began the final tests, in which the line with best performance was selected and subsequently included in VCU trials according to MAPA standards, in 2002/03 and 2003/04, in three counties of Minas Gerais. Throughout the development it was found that the cultivar labeled line 96UFU90-86, then named UFU-502 and later UFUS Riqueza stood out from the other tested lines for disease resistance, yield and yield stability. Genetic seed production was initiated in 2007.

PERFORMANCE CHARACTERISTICS

The new cultivar was evaluated in accordance with the MAPA requirements in tests of Value for Cultivation and Use (VCU) and recommended for cultivation in the state of Minas Gerais, due to the superior performance over the controls 'UFV 19' and 'MD 339' in the growing seasons 2002/2003 and 2003/2004, in the counties of Uberlândia, Araguari and Iraí de Minas in the state of Minas Gerais.

In the yield assessments the cultivar reached an average of 3364.67 kg ha^{-1}, exceeding the controls 'UFV 19' (2,870.00 kg ha-^{1}) and 'DM 339' (2,908.67 kg ha^{-1}) (Table 1).

The grain contains 18 % oil and 39 % protein, serving as an alternative raw material for animal feed production or industrial use. Moreover, the yield potential reaches values above 3470 kg ha^{-1}, provided that all recommended cultural practices for the crop are applied.

Table 1. Mean yield (MY) in kg ha^{-1} and relative yield (RY) of cultivar UFUS Riqueza and the controls, in the growing seasons 2002/2003 and 2003/2004, in three counties in the state of Minas Gerais

Local	Cultivar		
	UFV 19	DM 339	UFUS Riqueza
	----------(kg ha^{-1})----------		
Uberlândia	2,655.00	2,796.00	3,254.00
Araguari	3,040.00	3,060.00	3,365.00
Iraí de Minas	2,915.00	2,870.00	2,915.00
MY(kg ha^{-1})	2,870.00	2,908.67	3,364.67
RY (%)	100	111.3	117.2

CULTIVAR CHARACTERISTICS

The cultivar is characterized by: determinate growth habit, white flowers, light brown pubescence, light brown hilum, maturation of 129 days, average plant height of 80 cm and insertion height of the first pod at 12 cm, good resistance to lodging and to pod dehiscence (15 days after R8) and mean 100-seed weight of 16 g.

To pests and diseases, the cultivar features resistance to: bacterial pustule - *Xanthomonas campestris* pv. *Glycines;* downy mildew - *Pseudomonas syringae pv. Glycine;* frogeye leaf spot - *Cercospora sojina* (races 1 to 15 and race 23), brown stem rot - *Phialophora gregata;* stem canker - *Diaporthe phaseolorum* f. sp. *Meridionalis* and stem necrosis - Cowpea mild mottle virus (CPMMV). However, the cultivar was moderately susceptible to Soybean mosaic virus - SMV; powdery mildew - *Microsphaera diffusa* and sudden death syndrome (SDS) - *Fusarium solani*.

BASIC SEED PRODUCTION

Planting is recommended in accordance with the agroclimatic zoning of Minas Gerais. In view of the determinate growth and relatively tall size, planting density should be around 10-13 plants per meter, equivalent to 210-230 thousand plants per hectare, to ensure excellent production.

These traits make the cultivar an interesting option for soybean growers who wish to diversify and scale their production using a more productive genotype with medium maturity and readily adaptable to the state of Minas Gerais. It is recommended for planting from October 20 to December 12.

The UFUS is responsible for producing seed of this variety. Cultivar UFUS Riqueza was registered by the National Register of Plant Varieties (RNC, number 25277) and protected by the National Plant Variety Protection (SNPC) as of April 08, 2009.

UFUS Riqueza: nova cultivar de soja para o Estado de Minas Gerais

RESUMO - *O lançamento de cultivares tem garantido maior produtividade associada à maior tolerância as adversidades climáticas. UFUS Riqueza apresenta resistência à deiscência natural e as doenças: pústula bacteriana, crestamento bacteriano, mancha olho de rã, podridão parda da haste, cancro da haste e necrose da haste e um potencial produtivo alcançando 3,475 kg ha^{-1}, 18 % de óleo e 39 % de proteína nos grãos.*

Palavras-chave: *melhoramento genético, resistência a doenças,* Glycine max.

REFERENCES

Chiorato AF, Carbonell SAM, Ito MF, Benchiomol, LL, Colombo, CA, Perina, EF, Ito MA, Junior ER, Freitas RS and Pereira CVN (2008) IAC – Boreal and IAC – Harmonia: common bean cultivars with striped grains. **Crop Breeding and Applied Biotechnology 8**: 170-173.

Empresa Brasileira de Pesquisa Agropecuaria (2008) **Tecnologias de produção de soja - região Central do Brasil – 2009-2010**. Embrapa Agropecuária Oeste, Londrina, 262p. (Sistemas de Produção, 13).

Hamawaki OT, Polizel AC, Juliatti FC, Hamawaki LR and Bruneta P (2007) UFUS-Imperial: nova cultivar de soja para o Estado de Mato Grosso. **Pesquisa Agropecuária Brasileira 42**: 137-139.

Priolli RHG, Mendes-Junior CT, Sousa SMB, Sousa NEA and Contel EPB (2004) Diversidade genética da soja entre períodos e entre programas de melhoramento no Brasil. **Pesquisa Agropecuária Brasileira 39**: 967-975.