Crop Breeding and Applied Biotechnology 6:322-324, 2006
Brazilian Society of Plant Breeding. Printed in Brazil

Malting barley BRS Borema

Euclydes Minella[1*], Marcio So e Silva[1], Gerardo Arias[1], and Aroldo Gallon Linhares[1]

Received 19 December 2005

Accepted 18 October 2006

ABSTRACT - *BRS Borema is an early maturing, two-rowed spring barley registered in 2003 for commercial production in Southern Brazil, bred by Embrapa Trigo. It combines good yield potential with superior malting quality and a reasonable level of disease (net blotch, powdery mildew, leaf rust) resistance. It is well-adapted to all major production regions of malting barley in Brazil.*

INTRODUCTION

BRS Borema is a barley (*Hordeum vulgare* sp. *vulgare*) cultivar developed by Embrapa Trigo. It was released in 2003 for production in the states of Rio Grande do Sul, Santa Catarina and Parana, after intensive yield testing and malting quality evaluation, as inbred line denominated CEV 97047. CEV refers to the formal technical and financial agreement between Embrapa and the malting/brewing companies Antarctica and Brahma (nowadays AmBev), Kaiser and the Cooperativa Agraria Mista Entre Rios Ltda. underlying the development of the line.

BRS Borematraces back to single plant selection in the F_5 population of the cross Alexis/Embrapa 43// MN 607 (Figure 1). Embrapa 43 and MN 607 are locally bred cultivars, whereas Alexis is from Germany. The cross was made in 1990 and the inbred line was selected in 1997. The F_2, F_3 and F_4 generations were advanced in bulk in Passo Fundo under field conditions. The F_5 generation was space-planted in Guarapuava, PR, where several single plants were selected. The F_6 progenies were grown in Passo Fundo, where again several lines were selected and harvested in bulk. These lines were grown in four row plots in Guarapuava where inbred line number 36 was harvested in bulk in 1997, from which line CEV 97047 was derived and advanced to yield trials. Next, the line was yield-tested in local preliminary trials and in 15 environments (in five growing seasons, at three sites of official yield trials). While the official directives on yield testing for barley cultivar registration are still pending at the Ministry of Agriculture (MAPA), the Brazilian Barley Research Commission (Comissão Nacional de Pesquisa de Cevada) decided that new cultivars are approvable for the recommended varieties list for the producing regions of southern Brazil (Região Sul), based on yield testing in at least six environments (three locations in two growing seasons). The Commission further ruled that localities in the surroundings of Passo Fundo, RS, Victor Graeff, RS and

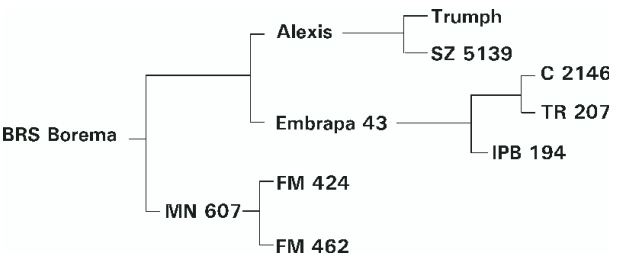

Figure 1. Pedigree of BRS Borema

Embrapa Trigo, Rodovia BR 285, km 294, C.P. 451, 99.001-970, Passo Fundo, RS, Brasil. *E-mail: eminella@cnpt.embrapa.br

Guarapuava, PR, climatically represent all major malting barley producing regions in the states of Rio Grande, Santa Catarina and Parana. Currently, the National Cultivar Registration Service (SNRC) of MAPA grants registration certificates for barley cultivars based on the agronomic performance in the six-environment minimum recommended by the Barley Research Commission. Upon meeting the testing requirements in 2003, CEV 97047 was registered and protected as cultivar BRS Borema, for production in all barley regions of Rio Grande do Sul, Santa Catarina and Parana. Due moreover to the outstanding performance in commercial malting tests (Table 2), the Barley Research Commission included BRS Borema in its list of recommended malting barley varieties for southern Brazil (Comissão 2005).

PERFORMANCE

BRS Borema has a grain yield potential of 5,000 kg/ha (Minella 2004). Average grain yield and kernel plumpness in over 15 environments were 4,420 kg ha^{-1} and 90.2% (Table 1), respectively, in the 1999-2003 growing seasons. The overall mean yield of all locations exceeded that of the check cultivar by 19%, varying from a superiority of 16% in Guarapuava, PR, to 23% in Passo Fundo, RS. The high yield potential of BRS Borema was confirmed in farm-scale evaluations, with yields of over 4,500 kg ha^{-1}. In micro, pilot and commercial malt analyses, BRS Borema met all requirements for malting barley (Table 2).

OTHER CHARACTERISTICS

BRS Borema reaches heading and harvesting maturity, respectively, about 82 and 128 days after plant emergence. It heads two days later than the check MN 698. It has a semi-erect growth habit in the vegetative phase. It grows as tall as 90 cm but is moderately lodging-resistant. BRS Borema carries resistance genes against powdery mildew and net blotch, expressed in a moderately resistant reaction to these diseases (Minella 2005).

SEED MAINTANANCE AND DISTRIBUTION

Breeder seed of BRS Borema is maintained by Embrapa Trigo. Foundation seed is produced and marketed by Embrapa Transferência de Tecnologia, EN Passo Fundo, Caixa Postal 451, 99.x 001-970, Passo Fundo, RS, Brazil.

Table 1. Mean grain yield and kernel plumpness of BRS Borema and check cultivar in the period from1999 to 2003, at three locations in southern Brazil

Location	Grain yield (kg/ ha)			Kernel plumpness (%)[2/]	
	BRS Borema	Check[1/]	% of Ck.	BRS Borema	Check
Passo Fundo	4,161	3,391	123	87.1	94.4
Victor Graeff	3,881	3,255	119	84.8	89.0
Guarapuava	4,278	3,681	116	83.6	84.6
Mean	4,107	3,442	119	85.2	89.3

[1/] MN 698 in Passo Fundo and Victor Graeff, and BR 2 in Guarapuava
[2/] kernels retained in a 2.5 mm diameter sieve

Table 2. Quality analysis of BRS Borema, derived from an industrial/commercial malt cultivar developed by Agromalte-Agraria in Guarapuava, PR, in 2005

Quality trait	Unit	BRS Borema	Brewing requirements
Total protein	%	11.1	10.5-12.0
Extract	%	81.7	> 80.5
Diastatic power	Wk	336	> 220
Beta glucan	mg 100 g^{-1}	133	< 180
Friability	%	85.7	> 75.0
Wort viscosity	mPa.s	1.51	< 1.65

REFERENCES

Comissão de Pesquisa de Cevada (2005) **Indicações técnicas para a produção de cevada cervejeira nas safras 2005 e 2006**. Embrapa Trigo, Passo Fundo, 102p.

Minella E (2004) Desempenho comparativo das cultivares de cevada indicadas para cultivo no sul do Brasil. In: Minella E (ed.). **Anais e ata da 24ª Reunião Anual de Pesquisa de Cevada**. Embrapa Trigo, Passo Fundo, p.156-161.

Minella E (2005) Melhoramento da cevada. In: Borém A (ed.) **Melhoramento de espécies cultivadas**. Editora UFV, Viçosa, p.275-299.