EVALUATION OF WHITE COMMON BEAN GENOTYPES IN BRAZIL

M.J. Del Peloso[1], H.S. Pereira[1], L.C. Melo[1], J.L.C. Díaz[1], M.C.S. Magaldi[1], L.C. Faria[1], A.F.B. Abreu[1], I.A. Pereira Filho[2], J.A.A. Moreira[1], M. Martins[3], A. Wendland[1] and J.G.C. Costa[1]

[1]Embrapa Arroz e Feijão, [2]Embrapa Milho e Sorgo, and[3]Universidade Federal de Uberlândia, Brazil
Corresponding author: leonardo@cnpaf.embrapa.br

"Carioca" commercial type is the most common bean produced in Brazil, followed by black beans (Del Peloso & Melo 2005); however other less consumed colored types such as purple, pink, red, brawn, jalo (kidney), striped and white are also produced. White grain beans have a great potential in the external market, since grains with that color and large size are well consumed in the United States and Europe. However, the number of cultivars with those characteristics at the farmer's disposal is scarce; therefore the Embrapa Rice and Beans breeding program has been working on the identification of genotypes with desirable characteristics to release new enhanced cultivars. The states of Paraná, Minas Gerais, Goiás and the Federal District of Brasilia are the largest producers of common beans, responsible for 55% of the total produced in the country with an output of 1,563.380 t on an area of 1,072.001 ha (FEIJÃO, 2010). The assessment of genotypes with potential to become a new cultivar is carried out in National Trials (VCU) in various environments representing the diverse conditions a new cultivar would be subjected. Thus, the search for genotypes with improved phenotype characteristics to be released as a new cultivar is our main goal.

In 2007, 2008 and 2009 years, 19 trials were carried out in the states of Paraná (nine at the dry and wet seasons); six in Goiás/Federal District and four in Minas Gerais (at the winter cropping season). The experimental design used was a completely randomized block design arranged in four plots with four meter rows and three replicates. Data were collected in the two central rows. In each trial ten white bean genotypes and two controls (Ouro Branco and BRS Radiante) were used (Table 1). The following characteristics were evaluated: 100 seed mass, plant architecture, lodging and disease resistance (anthracnose, common bacterial blight, angular leaf spot mildew and rust) using 1 (totally favorable) to 9 (totally unfavorable) raking scale. Yield data were submitted to the analysis of variance followed by joint analysis. For mean comparisons the Scott Knott test at 10% was used.

Data joint analysis showed good experimental precision (CV=17%) and significant differences (P<0.01) were detected among genotypes, environment as well as genotype x environment interaction. Regarding genotype performance, control BRS Radiante yielded the most (Table 1). This genotype has striped beans, released for planting in those states. Poroto, Alúbia and Branco Graúdo were the most productive when grouped with Ouro Branco; however Poroto and Alúbia showed inadequate plant architecture with tendency to lodging along with the highest grades for disease resistance, becoming inadequate for cultivar recommendation. Branco Graúdo genotype was graded highest for plant architecture and resistance to common bacterial blight, and intermediate for the other traits. Branco Graúdo genotype was ranked the best for plant architecture and bacterial common blight and intermediate for the other traits. The remaining genotypes were grouped in a third category through the means test. Among them, WAF 170 was ranked medium and low for disease resistance but ranked the best for bacteria common blight and anthracnose. WAF 75 showed good plant architecture, the best tolerance to lodging and larger beans. WAF 141 also presented good plant architecture and resistance to lodging but ranked low for disease resistance. Alubia

Argentina, besides being the worst ranked for plant architecture and lodging was also susceptible to all diseases tested, graded above 6; with 9 as maximum grade for all diseases.

Therefore, based on those observations, genotypes Branco Graúdo, WAF 170, WAF 75 and WAF 141 were selected as promising and will continue to be evaluated with a possible recommendation as a new white bean cultivar.

Table 1. Average yield (PROD) (kg ha^{-1}), average[1] and maximum[2] grades for plant architecture (ARQ), lodging (ACA), common bacterial blight (CBC), angular leaf spot (MA), mildew (OI), rust (FE), anthracnose (AN) and 100 seed mass (M100) of 12 genotypes of white type common beans, evaluated in 19 environments in 2007, 2008 e 2009 in Brazil.

GENOTYPE	PROD	ARQ	ACA	CBC	MA	OI	FE	AN	M100
BRS RADIANTE	2055 a	4[1]/5[2]	4/5	3/6	4/6	2/3	1/2	1/1	41
POROTO ALUBIA	1923 b	5/7	5/8	5/9	4/7	5/9	3/5	2/3	53
BRANCO GRAUDO	1865 b	3/5	4/5	4/7	2/5	5/8	2/8	1/1	49
OURO BRANCO	1798 b	3/4	3/6	4/7	2/3	6/8	1/3	2/4	50
ALUBIA ARGENTINA	1707 c	7/7	6/9	6/9	6/9	6/9	6/9	9/9	43
WAF 160	1698 c	4/5	4/8	5/8	3/4	7/9	1/3	1/1	48
WAF 130	1661 c	4/5	4/6	5/9	3/4	6/9	1/1	1/1	47
USWA 70	1647 c	3/5	3/4	5/8	1/1	7/9	1/1	1/1	65
WAF 170	1640 c	5/6	4/5	3/4	3/6	3/5	1/3	1/1	46
WAF 75	1639 c	3/6	2/4	4/9	3/6	5/8	1/3	2/5	57
WAF 157	1638 c	4/7	3/6	4/7	2/3	5/7	1/1	1/1	45
WAF 141	1587 c	4/5	3/5	3/4	1/2	4/7	1/1	1/1	45

[1]Means followed by the same letter do not differ among themselves (Scott Knott at 10% probability).

REFERENCES

DEL PELOSO, M.J.; MELO, L.C. Potencial de rendimento da cultura do feijoeiro comum. Santo Antônio de Goiás: Embrapa Arroz e Feijão, 2005. 131p.

FEIJÃO: dados conjunturais do feijão (área, produção e rendimento) - Brasil - 1985 a 2008. Disponível em: http://www.cnpaf.embrapa.br/apps/socioeconomia/index.htm. Acesso em: 07 jan. 2010.