EVALUATION OF CARIOCA BEAN LINES IN A SAVANNAH AREA OF BRAZIL

Brito, O.R.[1], Otsubo, A.A.[2], Zuffo, N.L.[3], Faria, L.C. de[2], Otsubo, V.H.N.[4], Mercante, F.M.[2] and Brito R.M.[4]

[1]State University of Londrina, PR, Brazil; [2]EMBRAPA, Brazil; and [3]ZF Pesquisa e Consultoria, MS, Brazil; and [4]Graduate student, State University of Londrina

INTRODUCTION

The bean plant (*Phaseolus vulgaris L.*) presents great importance in Brazilian's diet because contributed about 70% of the daily protein ingestion (Machado et al, 2008). The low productivity of Brazilian bean crop results from the low agrosystems technology. The introduction of new breeding lines with high productivity rates is the current tendency (Costa et al, 2008). The objective of this work was to evaluate the performance and the productivity of different carioca bean lines during the drought period, in a savannah area of Mato Grosso do Sul, Brazil.

MATERIALS AND METHODS

The experiment was conducted in a typical savannah area (oxisoil) at São Gabriel do Oeste city, MS, Brazil (latitude: 19°23'S; longitude: 54th 23'W). The commercial Carioca bean lines: CNFC 10703, CNFC 10713, CNFC 10716, CNFC 10721, CNFC 10729, CNFC 10733, CNFC 10742, CNFC 10753, CNFC 10757, CNFC 10758, CNFC 10762, CNFC 10763, CNFC 10813 (derived from the genetic improvement program of EMBRAPA), were used, besides the control cultivars such as Pérola, BRS Cometa, BRS Pontal and IPR Juriti. The experimental design was in randomized blocks with 17 treatments and three replications. It was used the conventional tillage and the sowing was done at 16/03/2007 (the droughts period) with 0.45 m of row spacing and 15 seeds m^{-1}. For soil fertilization was applied 250 and 150 kg ha^{-1} of the 08-20-20 (0 day) and 20-00-20 (30 days after sowing), respectively. The experimental plots were constituted by a group of four lines with four meters length, but only the two central lines were considered in the evaluation. Complementary irrigation was used. The following variables were evaluated: flowering period; crop cycle; height of plants; mass of 100 grains; crop productivity and grains quality (notes: 1= very good to 5=bad). The obtained data were submitted to the variance analysis and the averages compared by the of Scott-Knot test at 5%.

RESULTS AND DISCUSSION

Considering the flowering period, it was observed that there was a variation of six days among the shortest period (41 days) to the slower period (47 days), which demonstrated a certain similarity among the materials (Table 1). The cycle of the culture had an equal tendency, which the most precocious presented physiologic maturation with 88 days and the latest with 97 days. The height of the plants is an important characteristic for mechanical harvest. In this study were not observed significant differences among the tested lines (Table 1).

The irregular precipitations influenced negatively the flowering period and the grains filling. The mass of 100 grains that depends directly of size and grains filling, presented significant variations among the tested lines. The largest values were obtained with the CNFC 10813 (28,43g), followed by Pérola (25,73g) that differed significantly to the others lineages (Table 1). With relationship to the productivity of the cultures was observed the formation of two different groups. Only the lineages CNFC 10762, CNFC 10763, CNFC 10721 and CNFC 10813 presented productivities above 1.000 kg ha^{-1}. This result agrees with Melo et al. (2007) who observed that

interactions among genotypes and environmental conditions affect the productivity of the bean plant. Visual aspects and grains quality are important factors to define the beans acceptance for the consumers and the grains quality varied among the materials (Table 1). According Vieira et al. (2006), the environmental conditions contribute to seed coat integument darkening which means that the consumer confuses it with old bean, which is difficult to cook. The lines CNFC 10763, CNFC 10762, CNFC 10753 and CNFC 10757 have the best scores for grain quality (Table 1).

Table 1. Flowering time (FT), maturity, height of plant, mass of 100 grains, productivity and grains quality of different bean plant lineages of the group Carioca, at São Gabriel do Oeste, MS, Brazil. 2007.

Lineages	FT (days)	Maturity (days)	Height (cm)	Mass of 100 grains (g)	Productivity (kg ha^{-1})	Grain quality (note)
*Pérola	45	93	45,0	25,73 b	1.177,62 a	2,0
*BRS Cometa	44	88	43,3	19,83 d	843,65 b	3,0
*BRS Pontal	46	94	41,7	21,13 d	1.062,34 a	2, 0
*IPR Juriti	44	93	41,0	21,60 d	931,44 b	3,0
CNFC 10703	45	89	41,3	20,30 d	1.042,73 b	2,5
CNFC 10713	47	95	41,3	20,00 d	950,21 b	2,5
CNFC 10716	47	96	40,3	20,53 d	954,10 b	2,5
CNFC 10721	47	92	38,3	20,40 d	1.150,03 a	2,0
CNFC 10729	45	93	46,0	24,17 c	1.004,68 b	2,5
CNFC 10733	46	93	35,3	21,23 d	909,13 b	2,0
CNFC 10742	45	89	37,7	21,73 d	875,47 b	4,0
CNFC 10753	46	94	44,0	23,97 c	1.028,90 b	1,5
CNFC 10757	46	96	43,3	20,93 d	843,90 b	1,5
CNFC 10758	45	97	42,7	23,23 c	830,27 b	3,5
CNFC 10762	45	96	39,3	23,20 c	1.310,59 a	1,5
CNFC10763	45	88	39,3	23,50 c	1.245,32 a	1,0
CNFC 10813	41	91	41,0	28,43 a	1.118,26 a	2,0
CV (%)	--	--	**9,55 ns**	**4,11**	**16,38**	--

* Control cultivars. ns: not significant, for Scott-Knot test at 5%. Averages followed by same letter in the columns do not differ to each other by Scott-Knot test at 5%. Grain quality: 1 = very good and 5 = bad.

CONCLUSIONS

- The appraised lines present homogeneity for maturity, flowering period and height of plants.
- There is great variation among the productivity of different lines.
- The lines CNFC 10762 and CNFC 10763 produced the largest values for productivity and grain quality.

REFERENCES

AGRIANUAL 2006. Anuário da agricultura brasileira. São Paulo: Instituto FNP, p. 308, 2006.

COSTA, J.G. de C. da; RAVA, C.A.; ZIMMERMANN, F.J.P.; MELO, L.C. Yield stability and adaptability of common bean lines developed by Embrapa. Pesquisa Agropecuária Tropical. Goiânia.v.38,n.2, p.141-145, jun., 2008.

MACHADO, C.M.; FERRUZZI, M.G.; NIELSEN, S.S. Impact of the hard-to-cook phenomenon on phenolic antioxidants in dry beans (Phaseolus vulgaris). Journal of Agricultural and Food Chemistry. Washington DC, v.56, n.9., p.3102-3110, 2008.

MELO, L.C.; MELO, P.G.S.; FARIA, L.C.; DIAZ, J.L.C.; PELOSO, M.J.D.; RAVA, C.A.; COSTA, J.G.C. de. Interação com ambientes e estabilidade de genótipos de feijoeiro-comum na região Centro-Sul do Brasil. Pesquisa Agropecuária Brasileira, Brasília, v.42, n.5, p.715-723, 2007.

VIEIRA, E.H.N.; BASSINELLO, P.Z.; MELO, L.C.; MOREIRA, G.A.; PEIXOTO, D. GLODER, E.L. Avaliação da qualidade tecnológica do feijão armazenado em silo bolsa. Santo Antonio de Goiás: Embrapa Arroz e Feijão. 4p. 2006. (Comunicado técnico, 116).