

GENETIC PARAMETERS IN CARIOCA TYPE BEANS IN THE EMBRAPA BREEDING PROGRAM - 2006 AND 2008

**L.C. Melo¹, H.S. Pereira¹, M.J. Del Peloso¹, A. Wendland¹, J.L.C. Díaz¹,
L.C. Faria¹, J.G.C. Costa¹, V.A. Pontes Júnior² and W.F. Vieira²**

¹Embrapa Arroz e Feijão, and ²Universidade Federal de Goiás, Brazil
Corresponding author: leonardo@cnpaf.embrapa.br

Genetic parameters estimates allow inferences in genetic population structures being tested, enabling to evaluate its potential for breeding as well as to define strategies to evaluate segregating populations and to anticipate selecting gains. For common beans there are a reasonable number of estimates but insufficient, due to the existence of a huge diversity of cropping conditions and segregating populations used in breeding programs. The objective of this work was to estimate genetic parameters in populations of common bean lines commercial type carioca in the Embrapa Rice and Beans breeding program.

Trials were carried out at Ponta Grossa-PR in the wet season and in Santo Antônio de Goiás-GO in the winter cropping season in 2006 (144 lines) and 2008 (100 lines). The experimental design was a triple square lattice 12x12 in 2006 and 10x10 in 2008 arranged in two four meter rows plot spaced 0.5 m and 15 seeds per meter.

The analysis of variance was applied on each experimental data and effective errors and adjusted means were calculated followed by the joint data analysis. Values of the experimental and genetic coefficients of variance and “b” coefficient were estimated as well as the broad sense heritability, according to Ramalho et al. (1993).

Regarding the genetic parameters estimate from the 2006 individual trials and 2008 the heritability estimates (0.67 and 0.87) and “b” coefficient (0.84 and 1.51) at Santo Antônio de Goiás were higher than those obtained in Ponta Grossa, suggesting that in those years the conditions for bean yield selection in Santo Antonio de Goiás were more favorable than those in Ponta Grossa. Genetic parameters estimates in the joint analyses were 0.72 and 0.86 for heritability, and 0.65 and 1.02 for “b” coefficient in 2006 and 2008 (Table 1). Those estimates were considered satisfactory in view of the complexity of the yield trait, a quantitative trait controlled by a number of genes of low individual effect and highly influenced by the environment with heritability estimates usually very low. The results obtained suggest the existence of adequate genetic variability in the Embrapa Rice and Beans carioca breeding program lines, enabling the obtainment of cultivars superior than those now in use.

Based on grain yield, disease resistance and agronomic traits evaluations, 77 superior lines were identified and selected in 2006 to make up the Lines Preliminary Trial (EPL) in 2007. Selected lines average yield was 358 kg ha⁻¹, higher than the general population average, enabling to estimate the general average of 4,076 kg ha⁻¹, consolidating a gain of 258 kg ha⁻¹, representing 6.75% of the original population average.

Based on grain yield, resistance to disease and agronomic traits evaluations, 40 superior lines were selected to make up the 2009 Preliminary Lines Trial (EPL). Selected population bean yield average was 131 kg ha⁻¹, higher than the general population average. Those lines made up a Preliminary

Trial with a general average of 2,142 kg ha⁻¹, representing a gain of 113 kg/ha and 5.23% of the original population average.

We can conclude that there is adequate genetic variation in the carioca grain type lines in the Embrapa Rice and Beans breeding program to obtain selection gains leading to the obtainment of cultivars superior than those in use.

Table 1: Summary of the joint analyses of variance and bean yield genetic parameters estimate in the carioca progeny test, in Ponta Grossa-PR wet season and Santo Antônio de Goiás-GO winter season, in 2006 (Q.M.1) and 2008 (Q.M.2).

F.V.	G.L.(1/2)	Q.M. 1	Q.M. 2
Treatment (T)	99/143	1628582.69**	462631.92**
Environment (A)	1/1	290872362.66**	2647899.80**
T x A	99/143	740655.59**	291425.08**
Effective Error Mean	342/506	453587.33	63676.69
Genotype Variance		195832.56	66492.53
Phenotype Variance		271430.44	77105.32
Heritability (%)		72.14	86.23
Mean (Kg.ha ⁻¹)		3818	1650
Experimental C.V. (CVe)		17.63	15.29
Genetic C.V. (CVg)		11.59	15.62
“b” - CVg/CVe		0.65	1.02

** Significant at 1 % probability by the F test.

REFERENCE

RAMALHO, M.A.P.; SANTOS, J.B. & ZIMMERMANN, M.J. Genética quantitativa em plantas autógamas. Goiânia, Editora da UFG, 1993. 271p.