

PROTEIN CONTENT IN COMMON BEAN CARIOCA TYPE GENOTYPES EVALUATED IN VARIOUS ENVIRONMENTS

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Common bean commercial type carioca stands out among the many beans consumed in Brazil, with 70% market share (Del Peloso & Melo, 2005). Brazilian breeding programs have been supplying farmers with improved cultivars to increase yield. Besides agronomic characteristics, other traits related to nutritional quality are becoming important. Among them, bean protein content assumes prominent importance considering that common beans are the main vegetable protein source in the Brazilian diet. Therefore it is highly desirable to determine bean protein content, comparing it to adopted standards, during genotype evaluation to aggregate value to new cultivars. Taking into account that the final evaluation of common beans commercial type carioca, developed by the breeding program of the Embrapa Arroz e Feijão is conducted in a large number of locations and environments, there is a possibility of measuring the protein content and to verify the existence of interaction genotypes x environments for that characteristic. Based on the above, the objective of this work was to determine the protein content of common beans carioca type and to verify the presence of interaction genotypes x environments for those traits.

In 2009 four trials were conducted in the state of Goiás: Inhumas, dry season (AMB1); Santo Antônio de Goiás, winter (AMB2); Porangatu, winter (AMB3); and Senador Canedo, winter (AMB4). The experimental design was a completely randomized block arranged in four meter long four row plots, with two replicates. Each trial was composed of 17 genotypes of common beans carioca commercial type (Table 1). Protein content was determined in samples collected from the two central rows. Analyses were performed in grinded beans, using the sulfuric digestion method, where the nitrogen determined was converted to raw protein multiplied by factor 6.25. Data were submitted to the analysis of variance, and the Scott Knott test at 10% probability applied for mean comparison.

Joint analysis showed adequate experimental precision (CV=4.9%) and significant differences (P<0.01) among genotypes and among environments. Genotypes x environments interaction was not significant, showing no change in the relative performance of the genotypes. Therefore, genotypes with the highest protein content were the same in the various environments tested. The general average was 21.1%, varying from 18.3 to 23.7%, depending upon ambient (Table 1). The significant variability observed in protein content of beans from different environments may be related to location specific characteristics (soil; climate; moisture; rainfall). The environment producing beans with the highest protein content was Santo Antônio de Goiás/ winter (23.7%), while the lowest values were observed in Porangatu/winter (18.3%).

Although the analysis of variance was significant among genotypes, differences among them were not very impressive, since the difference between the lowest and the medium average value genotypes (respectively 20.3% and 22.1%) was only 1.8%, representing a relative difference around 9%.

The control genotypes, BRS 9435 Cometa and Pérola, showed the highest protein content values, respectively 22.1% and 22.0% (Table 1). Other six lines were grouped by the mean comparison test with those controls, suggesting they present similar protein content of cultivars already released. None of the lines evaluated surpassed the best controls. BRS Estilo and IPR Juriti were grouped with those of lower protein content, together with other seven lines.

Table 1. Protein content means (PC) of 17 genotypes of common beans carioca type evaluated in four environments in Brazil, in 2009.

Genotype	PC %	AMB1	AMB2	AMB3	AMB4
BRS 9435 COMETA	22.1 a	22.5	26.0	19.5	20.5
PEROLA	22.0 a	23.5	24.0	19.5	21.0
CNFC 11951	21.9 a	24.0	24.0	19.0	20.5
CNFC 11948	21.6 a	23.5	23.0	20.0	20.0
CNFC 11962	21.5 a	23.5	25.0	18.0	19.5
CNFC 11952	21.4 a	24.0	23.5	18.0	20.0
CNFC 10429	21.3 a	22.0	25.5	18.5	19.0
CNFC 11946	21.3 a	21.5	24.0	18.5	21.0
CNFC 11956	21.0 b	23.0	24.0	17.5	19.5
CNFC 11959	21.0 b	22.5	23.5	18.5	19.5
CNFC 11945	20.8 b	22.5	23.0	18.0	19.5
BRS ESTILO	20.6 b	22.5	23.0	16.5	20.5
CNFC 11944	20.6 b	22.0	24.0	17.5	19.0
CNFC 11953	20.6 b	23.5	22.5	18.5	18.0
CNFC 11966	20.5 b	22.0	22.0	18.5	19.5
CNFC 11954	20.4 b	21.5	22.5	18.0	19.5
IPR JURITI	20.3 b	22.5	23.0	17.5	18.0
MÉDIA	21.1	22.7 b	23.7 a	18.3 c	19.7 d

¹Means followed by the same letter do not differ among them by the Scott Knott test at 10% probability.

REFERENCE

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.