PRODUCTIVITY, ADAPTABILITY AND STABILITY OF PRODUCTION OF BLACK BEAN LINES IN DIFFERENT ENVIRONMENTS OF MINAS GERAIS, BRAZIL

O.G. Brito¹, A.J. de Carvalho^{1*}, J.E. de S. Carneiro², J.A.A. Moreira³, M. Martins⁴, L.C. Melo⁵, L.C. Faria⁵, H.S. Pereira⁵, A.A. de Souza¹, M.L. Lacerda¹, V.B. de Souza¹, T.L.P.O. Souza⁵

¹Universidade Estadual de Montes Claros, ²Universidade Federal de Viçosa, ³Embrapa Milho e Sorgo, ⁴Universidade Federal de Uberlândia, ⁵Embrapa Arroz e Feijão *Corresponding author: abjocar@yahoo.com.br

INTRODUCTION: The black bean is the second most consumed in Brazil, accounting for 18% of the planted area in the country (CTSBF, 2012), and it is also consumed in other countries. The current breeding programs seek to select lines with high productivity, adaptability and stability, to supply a greater number of growing regions. This work aimed to select common bean lines of black commercial class, with higher productivity, adaptability and stability of production between lines evaluated in Value for Cultivation and Use tests (VCU) of common bean in different environments of Minas Gerais State.

MATERIAL AND METHODS: The experiments were set in Sete Lagoas, Uberlândia, Janaúba and Jaíba, in spring-summer (water), summer-autumn (drought) and autumn-winter (winter) crops, from 2010 to 2013, totaling nine environments. The treatments consisted of 12 precommercial lines and four control cultivars of black common bean, selected by agreement between breeding programs of UFV, UFLA, EPAMIG and EMBRAPA Rice and Beans. We used conventional tillage, with plowing and two disking. Bean plants were sown at a spacing of 0.5 m between rows, distributing about 15 plants per meter. The plots consisted of four rows of 5 m long and the useful area included the two central rows, discarding 0.5 m from each boarder of the rows. The crop was fertilized according to the official recommendation for Minas Gerais and all environments had supplementary irrigation by sprinkler. We evaluated the yield of the lines, considering humidity of 13%. Data were subjected to analysis of variance involving all environments. The effects of the lines, when significant, were compared by Scott-Knott test at 5% significance. Moreover, adaptability and stability analyses of the lines were performed by the method of Annicchiarico (1992) using the GENE program (Cruz, 2013). We adopted confidence level of 75%. The selection of the lines regarding adaptability and stability was defined in terms of Wi, which must be greater than 100%.

RESULTS AND DISCUSSION: The CNFP 10793, 10103 CNFP and VP-26 pre-commercial lines and the BRS CAMPEIRO commercial line presented the highest yields. The CNFP 10793 (Wi = 114.18), CNFP 10103 (Wi = 104.08), VP-26 (Wi = 101.88) and BRS CAMPEIRO (Wi = 103.42) lines showed adaptability and satisfactory stability. According to the Wi obtained values, it is possible to say that these lines can produce, with 75% confidence, 14.18, 4.08, 1.88 and 3.44% more than the overall average of the studied lines. In additon the "BRS SPLENDOR", "OURO NEGRO" e "BRS VALENTE" commercial cultivars presented performance below the CNFP 10793, 10103 CNFP and VP-26 pre-commercial lines (Table 1), which reinforces their potential to be released as commercial cultivars suitable for cultivation in the State of Minas Gerais, since they include, besides high productivity, good adaptability and yield stability.

Lines	Yield (kg ha ⁻¹)	Wi ²	Classification ³
CNFP 10793	1942,93 a ¹	114,18	1
BRS CAMPEIRO	1759,22 a	103,42	3
CNFP 10103	1741,04 a	104,08	2
VP-26	1723,74 a	101,88	4
BRS ESPLENDOR	1666,04 b	99,47	5
CNFP 11980	1632,81 b	97,84	6
CNFP 11977	1603,26 b	91,27	9
CNFP 11992	1598,41 b	93,16	7
VP-24	1584,96 b	88,05	11
OURO NEGRO	1576,19 b	84,68	15
VP-27	1556,56 b	92,27	8
BRS VALENTE	1543,04 b	88,04	12
VP-28	1538,41 b	90,02	10
CNFP 11990	1410,26 c	86,22	13
VP-29	1376,96 c	85,41	14
VP-25	1200,07 c	60,66	16

Table 1: Grain yield (GY), genotype recommendation index (Wi) and classification of common bean breeding lines of the "Black" commercial class grown in different environments of Minas Gerais State, Brazil.

¹ Means followed by the same letter do not differ by the Scott-Knott test at 5% of significance. ² Genotype recommendation index by Annicchiarico's method; ³Classification, 1 as the most stable.

CONCLUSIONS: The CNFP 10793, 10103 CNFP, VP-26 and BRS CAMPEIRO lines presented the highest yields, adaptability and yield stability in all evaluated environments.

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