PRODUCTIVITY, ADAPTABILITY AND STABILITY OF PRODUCTION OF SPECIAL GRAIN COMMON BEAN LINES IN DIFFERENT ENVIRONMENTS OF MINAS GERAIS, BRAZIL

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INTRODUCTION: Minas Gerais is the second largest state producer of common bean in Brazil, with a production over 970 thousand tons per year (EMBRAPA, 2014). Besides commercial classes "Carioca" and "Black", which predominate in the Brazilian market, other ones, as "roxo", "mulatinho", "rosinha", "vermelho" e "manteigão", known as "special grain", supply much of the Brazilian market and represent good alternative for export. The selection of lines with high adaptability and production stability is important for recommending more productive and stable cultivars in different growing regions. Thus, this study aimed to select special grain bean lines with high productivity, adaptability and stability of production, evaluated in different environments of the Minas Gerais State, Brazil.

MATERIAL AND METHODS: The experiments were set in Sete Lagoas, Uberlândia, Janaúba and Jaíba, in spring-summer crops (water), summer-autumn (drought) and autumn-winter (winter), from 2010 to 2013, totaling nine environments. The treatments consisted of 12 pre-commercial lines and four control cultivars of special grains 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 rows. All of the environments had supplementary irrigation by sprinkler. We evaluated the grains yield of all the lines considering 13% humidity. Data were subjected to analysis of variance involving all environments. When significant, the effects of the lines were compared by Scott-Knott test to 5% significance level. Moreover, the adaptability and stability analyses of the lines were performed by the method of Annicchiarico (1992), which is based on genotype recommendation index (Wi). 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%. We used the GENES software (Cruz, 2013) for analyses.

RESULTS AND DISCUSSION: The CNFRx 15275 line showed the highest productivity. The BRS VEREDA, JALO EPP and BRS RADIANT cultivars had the highest yield. The CNFRx 15275 (Wi = 121.12) and VR-18 (Wi = 112.02) pre-commercial lines, and the BRS VEREDA (Wi = 104.43) cultivars showed the greatest adaptability and stability, given their values of genotypes recommendation index (Wi) indicate that they can produce 21.12, 12.02 and 4.43% more than the overall average of the lines studied (Table 1). That indicates they may be released as commercial cultivars in the future.

Table 1: Grain yield (GY), genotype recommendation index (Wi) and classification of special grain common bean lines grown in different environments of Minas Gerais State, Brazil.

Lines	Yield (kg ha^{-1})	Wi[2]	Classification[3]	Commercial Class
CNFRx 15275	2084 a[1]	121,12	1	Purple (Roxo)
BRS Vereda	1836 b	112,02	2	Rosinha
VR-18	1791 b	104,33	3	Red (Vermelho)
Jalo EPP	1731 b	94,31	6	Large-seeded (Manteigão)
RC2RAD-155	1698 b	98,94	4	Large-seeded (Manteigão)
BRS Radiante	1652 b	86,57	9	Large-seeded (Manteigão)
VR-16	1634 b	96,72	5	Red (Vermelho)
PT-68	1629 b	85,85	10	Rosinha
VR-14	1556 c	90,88	7	Red (Vermelho)
BRS Timbó	1543 c	89,11	8	Purple (Roxo)
CNFJ 15288	1534 c	81,99	14	Large-seeded (Manteigão)
VR-17	1468 c	85,24	11	Red (Vermelho)
PT-65	1452 c	79,81	15	Rosinha
Ouro Vermelho	1442 c	84,81	12	Red (Vermelho)
VR-15	1428 c	82,13	13	Red (Vermelho)
RAD/E550-284	1276 c	65,64	16	Large-seeded (Manteigão)

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

CONCLUSIONS: The CNFRx 15275 and VR-18 lines stand out as the most productive and stable ones, with good potential to be released as cultivars of special grain bean for Minas Gerais State, Brazil.

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