Resumos do III Simpósio Brasileiro de Genética Molecular de Plantas
10 a 15 de abril de 2011 • Ilhéus • BA • Brasil

Genetic diversity by molecular markers in lines of phaseolus vulgaris from VCU experiments at Embrapa Rice and Beans' breeding program

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Palavras-chave: genetic diversity, SSR markers, Phaseolus vulgaris, VCU, plant breeding.

The common bean breeding program from Embrapa Rice and Beans is focused in the continuous claim for cultivars with desirable agronomic traits. All lines, aiming registration and commercialization, must be characterized and studied for the determination of their Value for Cultivation and Use (VCU). The identification and quantification of genetic diversity in VCU experiments, using SSR markers, constitute an additional tool for breeding programs. This study aimed to characterize the diversity and to determine the genetic differentiation within lines and cultivars from VCU 2009/2010, based on a set of SSR markers. Twenty-three lines (10 from "Preto", 12 from "Carioca" and one from special grains group) and nine cultivars (four from "Preto" and five from "Carioca" group) comprised VCU from 2009/2010. The 23 lines and nine cultivars were evaluated in a set of three plants/each. The molecular markers consisted of a multiplex system composed of 37 markers, arranged in nine panels. From the 37 markers, only 24 were polymorphic and offered an adequate genetic profile for each line and cultivar. The set of 24 markers detected a total of 123 alleles, with an average of 5.1 alleles/locus. Within the detected alleles, 40 were private (or exclusive), i.e., a given allele was identified in only one group. The He values ranged from 0.8 (PVBR 163) to 0.21 (BM212), with an average of 0.51. From the 24 markers, 11 showed He values lower than 0.51. The P.I. (Probability of identity) was 1.84x10-12 and the exclusion probability was 0.999. The average Rogers modified by Wright (RW) genetic distance was 0.65 for "Carioca" group and 0.63 for "Preto". Genetically identical lines and highly similar cultivars were identified within VCU 2009/2010. SSR markers allowed the determination and quantification of genetic diversity and genetic relatedness within germoplasm that may be considered as potential cultivars for common bean breeding programs.

Órgão Financiador: Embrapa Arroz e Feijão