GENETIC INHERITANCE OF ORANGE CORONA CHARACTER IN COMMON BEAN SEEDS OF COMMERCIAL CARIOCA GROUP

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INTRODUCTION: The common bean (\textit{Phaseolus vulgaris} L.) is a normal component of a daily Brazilian diet and it constitutes a main source of proteins. The commercial carioca group, which exhibits cream colored seed coat with light brown stripes, is the most consumed bean type and sometimes it shows in the seeds an orange corona around the hilum ring. Cultivars that show this character have a commercial restriction, with a low price in the bean's market. This way, bean's farmers refuse to cultivate bean varieties with the orange corona. Several researches about the genetic control of seed coat color are found in the literature. Prakken (1970, 1972) revised and made a synopsis about the genetic inheritance of seed coat color of bean. The author concluded that eight loci (\textit{P}, \textit{C}, \textit{D}, \textit{J}, \textit{G}, \textit{B}, \textit{V} and \textit{Rk}) control the seed coat color and a complex epistatic interactions occur between these genes. Disagreements are found in literature about the genetic control of corona color. However, the number of genes that controls the corona character is smaller than the number of genes that controls the seed coat color of bean (Mendonça et al., 1998). The presence of corona around the hilum ring is controlled by the gene \textit{Cor}, but the different colors of corona are controlled by genes \textit{B}, \textit{D} and \textit{G} (Mendonça et al., 1998). Because the economic importance of orange corona character, the purpose of this research was to elucidate the genetic control of this characteristic in the commercial carioca group to give support to the breeding programs.

MATERIAL AND METHODS: Nine crosses between cultivars belong to commercial carioca group (IAPAR 14/Carioca, IAPAR 14/Rudá, IAPAR 14/FT-Pa Paulistinha, IAPAR 57/Carioca, IAPAR 57/Rudá, IAPAR 57/Maichaki, Aporé/Carioca, Aporé/Rudá and Aporé/Maichaki) that differ only in the presence of orange corona, were done at Instituto Agronômico do Paraná (IAPAR), located in Londrina City, Paraná, Brazil. The \textit{F}_2, BC_1P_1F_1 and BC_1P_2F_1 progenies were obtained from \textit{F}_1 progenies derived from crosses between contrasting parents for orange corona character. A random sample of 300 seeds of the \textit{F}_2 generation and 90 seeds of each backcross were sown in the experimental field of IAPAR, Londrina City. Then, a sample of 150 plants of \textit{F}_2 population and 15 plants of backcross populations were selected at random. The progenies were evaluated for the presence or absence of orange corona. A progeny test of the selected individual plants was made and 50 seeds of each plant of the \textit{F}_3, BC_1P_1F_2 and BC_1P_2F_2 were sown in the Experimental Station of IAPAR, located at Ponta Grossa City, Paraná, Brazil. In the physiologic maturation stage a pod of each plant was harvested, which seeds (\textit{F}_4, BC_1P_1F_3 and BC_1P_2F_3) were evaluated for the presence of orange corona. The phenotypic evaluation for the presence of orange corona were done in the subsequent generation because the seed coat is a tissue of maternal origin, then, the character is observed in the seeds of the next generation. The observed phenotypic proportions in the seven generations of each crossing were compared by a chi-square
RESULTS AND DISCUSSION: The observed phenotypic proportions in the F2, BC1P1F1 and BC1P2F1 generations fitted well with the hypothesis that a gene with complete dominance controls the orange corona character in the bean carioca seeds. The homogeneity chi-square tests for each above generations showed that the data are in accord with the expected proportions. In four crosses (IAPAR14/Carioca, IAPAR 14/FT-Paulistinha, IAPAR 57/Carioca and Aporé/Rudá) all seven generations showed a segregation pattern that agrees with the hypothesis of a dominant gene. However, in the crosses IAPAR 14/Rudá, IAPAR 57/Rudá, IAPAR 57/Maichaki and Aporé/Maichaki the chi-square was significant for the F3 and BC1P2F2, showing a distortion of the expected proportions. Then, with the results obtained in this research it is possible to conclude that the orange corona character in the carioca bean group is controlled by two dominant genes (Cor and G). Because the gene Cor is in homozygosis in this commercial group, the observed segregations are corresponding to the action of the gene G. The parent without orange corona has the genotype bbddCorCoGg and the parent with orange corona has the genotype bbddCorCorGG. These conclusions are in line with the results obtained by Leakey (1988), Mendonça et al. (1998) and Bassett et al. (2002).

REFERENCES: