PHENOTYPIC AND MOLECULAR CHARACTERIZATION OF COMMON BEAN GENOTYPES FOR RESISTANCE TO ANTHRACNOSE

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Anthracnose caused by *Colletotrichum lindemuthianum* (Sacc. & Magnus) Scrib., is one of the most important diseases that occur in the common bean (*Phaseolus vulgaris* L.) in the main producing regions of the world. This disease can cause losses of up to 100% in the production of common bean (Méndez-Vigo, 2005). This study aimed to perform phenotypic and molecular characterization of cultivars and breeding lines of common bean for resistance to anthracnose.

The experiment was conducted at the National Research Center for Rice and Beans of the Brazilian Agricultural Research Corporation (EMBRAPA-CNPAF), located in the county of Santo Antônio de Goiás, GO, Brazil. Fifty-five common bean genotypes (cultivars and elites breeding lines) were evaluated. The field experiment was carried out during the winter period of 2014 (June to August) in a randomized block design (RBD) with three replications. Each plot had a line of 3 m and spaced 0.5 m each other. In the field, the genotypes were inoculated simultaneously with the races 65, 73, 81, 91, 475 and 1609 (Melo, 2009). Leaf samples of each genotype were collected from bulks (ten genotypes in each access) for DNA extractions according to Doyle & Doyle (1987). The DNA samples for each genotype were amplified using six types SCAR markers.

The results of phenotypic and molecular evaluations are summarized in Table 1. In the field experiments we found 26 resistant genotypes (score < 3.0) and ten were considered immune (score = 1.0). All the controls (Ouro Negro, TO, SEL 1308, TU and AB 136) were resistant and Rosinha G2 cultivar was susceptible (score = 9.0). In the molecular characterization of cultivars and common bean lines, the SH18 markers (*Co-4*^{2}), SAS 13 (*Co-4*^{2}), SAB3 (*Co-5*) and SAZ20 (*Co-6*) were specific for their respective loci, but they did not discriminate alleles. Only the SH18 marker proved to be allele-specific, discriminating *Co-4*, *Co-4*^{2} and *Co-4*^{3}. Of the 55 genotypes studied, 31 had the SF10 brand including cultivars, lines and controls.

REFERENCES

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Table 1. Phenotypic reaction and molecular amplification of common bean genotypes to anthracnose.

Genotypes	Score	Molecular markers					
		$SF10_{1072}$ *Co-3*[4]	$SY20_{830}$ *Co-4*	$SH18_{1100}$ *Co-4*[2]	$SAS13_{950}$ *Co-4*[2]	$SAB3_{400}$ *Co-5*	$SAZ20_{845}$ *Co-6*
BRS Agreste	6.67	+	-	-	-	-	-
BRS Campeiro	7.33	+	-	-	-	+	-
BRS Embaixador	1.33	-	-	-	-	-	-
BRS Esplendor	4.67	+	-	-	-	+	-
BRS Esteio	1.00	+	-	-	-	-	-
BRS Estilo	1.33	+	-	-	-	-	-
BRS Executivo	2.33	-	-	-	-	-	-
BRS Grafite	6.33	+	-	-	-	-	-
BRS Notável	2.33	-	-	-	-	-	-
BRS Radiante	1.67	+	-	-	-	-	-
BRS Realce	1.00	+	-	-	-	-	-
BRS Requinte	6.00	-	-	-	-	-	-
BRS Sublime	1.00	+	-	-	-	-	-
BRS Supremo	2.00	+	-	-	-	+	-
BRSMG Madrepérola	8.00	-	-	-	-	-	-
BRSMG Majestoso	6.00	+	-	-	-	-	-
BRSMG Talismã	7.00	+	-	-	-	-	-
CNFC 10729	1.00	+	-	-	-	-	-
CNFC 15873	7.33	-	-	-	-	-	-
CNFC 15874	7.00	-	-	-	-	-	-
CNFC 15875	8.00	-	-	-	-	+	-
CNFP 10120	4.67	+	-	-	-	-	-
CNFP 10794	5.67	-	-	-	-	-	-
CNFP 15330	5.33	-	-	-	-	-	-
IAC Alvorada	4.67	+	-	-	-	-	-
IPR Uirapuru	6.33	+	-	-	-	-	-
Jalo Precoce	5.33	-	-	-	-	-	-
Pérola	5.00	-	-	-	-	-	-
Rudá	5.67	-	-	-	-	-	-
BRS Valente	7.00	+	-	-	-	-	-
MDRK	2.00	-	-	-	-	-	-
Kaboon	1.33	+	-	-	-	-	-
Perry Marrow	2.00	+	-	-	-	-	-
AND 277	2.00	-	-	-	-	-	-
Widusa	2.00	-	-	-	-	-	-
Cornell 49-242	7.33	+	-	-	-	-	-
Mexico 222	3.00	+	-	-	-	-	-
BAT 93	7.67	+	-	-	-	-	-
PI 207262	1.67	+	+	-	+	-	-
G 2333	1.33	-	+	-	-	+	-
K10	1.00	+	+	-	+	+	+
K13	1.00	-	+	-	+	-	-
K23	3.33	+	-	-	-	+	-
SEL 1360	5.67	+	-	-	-	+	-
H1	5.67	+	-	-	-	-	-
Michelite	7.33	-	-	-	-	-	-
Jalo Vermelh	1.33	-	-	-	-	-	-
Jalo Listras Pretas	1.67	-	-	-	-	-	-
BRS Pitanga	6.67	+	-	-	-	-	-
Rosinha G2[a]	9.00	-	-	-	-	-	-
Ouro Negro[b]	1.00	+	-	-	-	-	-
TO[b]	1.00	+	+	-	-	-	-
SEL 1308[b]	1.00	-	+	+	+	-	-
TU[b]	2.00	+	-	-	-	+	-
AB 136[b]	1.00	+	-	-	-	-	+

[a]Susceptible control; [b]Resistant control; [+]Band presence; [-]No band.