REACTION OF "CARIOCA-TYPE" BEAN LINES TO ANTHRACNOSE, ANGULAR LEAF SPOT AND RUST PATHOGENS

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INTRODUCTION: "Carioca-type" beans are the most popular common bean (*Phaseolus vulgaris* L.) cultivars grown in Brazil. Many of these cultivars have excellent traits, but are susceptible to several pathogens. Foliar diseases caused by *C. lindemuthianum*, *P. griseola* and *U. appendiculatus,* have wide occurrence, and represent a constraint for the culture. The use of resistant cultivars is the most economical form of disease control. However, these pathogens present high variability, which makes it difficult to obtain cultivars with broad and durable resistance. Given the importance to recommend new bean cultivars for the state of Minas Gerais, Brazil, an agreement was signed by the Universidade Federal de Viçosa (UFV), Universidade Federal de Lavras (UFLA), Empresa de Pesquisa Agropecuária de Minas Gerais (EPAMIG) and Embrapa Rice and Beans (CNPAF) aiming to evaluate in national assay trials the elite bean lines developed by the breeding programs of these institutions in various growing regions of the country. The objective of this work was to evaluate the "Carioca" common bean elite lines of the 2005/2006 trials in relation to their reactions to anthracnose, angular leaf spot and rust pathogens.

MATERIAL AND METHODS: A total of 19 lines and 3 controls were evaluated under controlled conditions. For anthracnose and rust inoculation, 12 seeds of each line were sown in plastic trays. For angular leaf spot, 12 seeds of each line were sown in 3 vases. For inoculation with *U. appendiculatus*, a mixture of pathotypes (53.19, 61.3, 63.3 and 63.19) was used. Inoculation was performed in the primary leaves and the plants were incubated in a mist chamber and later transferred to a greenhouse, where they were kept until evaluation according to a scale described by Stavely et al. (1983). For evaluation of resistance to *C. lindemuthianum*, the pathotypes 65, 81, 89 and 2047 were used, with inoculation being performed in the primary leaves 7 days after germination of the seedlings, which were incubated and maintained in a mist chamber until evaluation according to scale described by Pastor-Corrales (1992). For inoculation of *P. griseola*, pathotypes 63.23, 31.23 and 31.15 were used, with inoculation being performed in the first trifoliolate leaves and the plants incubated in a mist chamber, and later transferred to a greenhouse. Evaluation was performed twenty-one days later, according to scale described by Schoonhoven et al. (1987).

RESULTS AND DISCUSSION: Most lines presented resistance to at least one of the pathotypes of *C. lindemuthianum.* The most resistant lines were CV-55, CNFC 10453, VC 7 and VC 12, presenting resistance to three pathotypes, to which cultivar Pérola is susceptible (Table 1). It should be observed that line CNFC 10453 was also resistant to pathotype 2047, which does not occur in Brazil, but has caused significant losses in the USA. Thus, this line may be used as an alternative source of resistance against anthracnose. With regard to angular leaf spot, a greater susceptibility of the lines was observed. For pathotype 63.23, no resistant line was detected while for 31.23, ten resistant lines were identified. As for rust evaluation, only two lines, VC 6 and OP-NS-331, were found to be resistant to the mixture of *U. appendiculatus* pathotypes.

CONCLUSIONS: Some lines showed more resistance to anthracnose than the cultivar Pérola, which was taken as reference. Line OP-NS-331 presented the best behavior regarding resistance to the three pathogens. It should be emphasized that this line is being recommended for the state of Minas Gerais, Brazil.

Table 1. Reaction of "carioca-type" lines included in the national assays (2005/2006), to *C. lindemuthianum, P. griseola,* and *U. appendiculatus.*

Line	Anthracnose				Angular leaf spot		Rust
	65	81	89	2047	63-23	31-23	Mixture[1]
RC-1-8	S[2]	S	S	S	S	R	S
Z-22	S	R	R	S	S	S	S
MAI-2-5	R/S	S	R/S	S	S	R	S
CV-46	S	S	S	S	S	R	S
MAI-18-13	R/S	R	R	S	S	R	S
MAI-8-9	S	R	R	S	S	R	S
CV-55	R	R	R	S	S	S	S
CNFC 10443	S	R	R	S	S	S	S
CNFC 8065	R	S	R	S	S	S	S
CNFC 8059	S	S	S	S	S	S	S
CNFC 10476	S	R	R	S	S	S	S
CNFC 10453	R/S	R	R	R	S	S	S
CNFC 8075	S	S	S	S	S	-	R/S
VC 6	S	R	R	S	S	S	R
VC 7	R	R	R	S	S	S	S
VC 8	S	R/S	R/S	S	S	R	S
VC 9	S	R	R	S	S	R	S
VC 10	S	R	R	S	S	R	S
VC 11	S	R	R	S	S	R	R/S
VC 12	R/S	R	R	S	S	R/S	R/S
OP-NS-331	S	R	R	S	S	R	R
VC 3	R	S	R/S	S	S	R	S
BRS-HORIZONTE*	S	R/S	R/S	S	S	S	S
TALISMÃ*	S	R	R	S	S	S	S
PÉROLA*	S	S	S	S	S	S	S

[1]Mixture of pathotypes (53.19, 61.3, 63.3 and 63.19); [2]S: Susceptibility reactions; R: Resistance reactions; and R/S: Resistant and susceptible plants; - missing datum; *Controls (BRS-Horizonte, Talismã and Pérola)

REFERENCES:

PASTOR-CORRALES, M.A. (ED.). La antracnosis Del frijol común, Phaseolus vulgaris, en América latina, Cali: **CIAT**. p. 86-108, 1992.

SCHOONHOVEN, A. VAN & PASTOR-CORRALES M.A. (Comps.) Standard system for evaluation of bean germplasm. Cali, Colombia: **CIAT**, 1987.

STAVELY, J.R., FREYTAG, G.F., STEADMAN, J.R. & SCHWARTZ, H.F. The 1983 Bean Rust Workshop. **Annual Report of the Bean Improvement Cooperative** 26:iv-vi. 1983.