SOURCES OF RESISTANCE TO *Colletotrichum lindemuthianum* IN TRADITIONAL CULTIVARS OF COMMON BEAN FROM PARANÁ, BRAZIL

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Introduction: Anthracnose caused by *Colletotrichum lindemuthianum* (Sacc. & Magnus) Lams.-Scrib. is one of the most severe and widespread disease of common beans (*Phaseolus vulgaris*, L.). Given the wide variability of the pathogen and the potential for new virulent races to arise, the use of the genetically resistant cultivars is an effective way to control this disease (Kelly et al., 1994). The genetic resistance of the host to *C. lndemuthianum* is not durable, and the plant breeding programs demand a continuous work and require in a permanent and enlarging form of gene pools, in which new genes can be introduced in new cultivars or in cultivars already existent as a way to increase resistance (Pastor-Corrales et al., 1995; Young and Kelly, 1996). Paraná State is the main Brazilian bean producing State and is an area where highly variable traditional populations of beans can be found (Alberini, 2001). Evaluation of genetic resistance of landrace beans from Paraná to Andean and Mesoamerican races of *C. lindemuthianum* is needed prior to incorporation in new common bean cultivars as possible sources of resistance to anthracnose. The objective of this study was to characterize 26 landrace bean cultivars from Paraná State, for their reaction to a wide range *C. lindemuthianum* races present in the state.

Material and Methods: In the North, Northwest and West regions of the Parana State in Brazil were collected 26 landraces cultivars of common bean belonging to the commercial seed classes: Carioca, Preto, Navy, Rosinha, and Manteigão. The 26 landraces cultivars of common bean were inoculated with Andean (7, 19 and 55), and Mesoamerican (9, 31, 65, 69, 73, 81, 89, 95 and 453) races of *C. lindemuthianum*. The protocol for inoculation was as follows: 14-day-old bean plants with a fully developed first trifoliate leaf were spray-inoculated with a spore suspension (1.2×10^6 spores mL^{-1}) of each race of *C. lindemuthianum*. Twelve seedlings of each cultivar were spray-inoculated with standardized spore concentration (1.2×10^6 spores.mL^{-1}) of each race of *C. lindemuthianum*, using a De Vilbiss number 15 atomizer powered by an electric compressor. Spore concentration was adjusted to 1.2×10^6 spores.ml^{-1} using a hemacytometer. Seedlings were evaluated for their disease reaction (Van Schoonhoven and Pastor-Corrales, 1987) using a scale of 1 to 9.). A virulence index (VI) for each *C. lindemuthianum* race and a resistance index (RI) of each genotype was obtained (Balardin and Kelly, 1998).

Results and Discussion: The general mean virulence index (VI) of the races of C. *lindemuthianum* utilized in this study ranged from 12 to 85 %, where the races 7, 73, 89 e 65 were the most virulent, while the race 31 was least virulent, presenting an VI of 12% (Table 1). The resistance index (RI) of 9 Andean genotypes varied from 8 to 67 %, while the 17 Mesoamerican genotypes showed a RI which amplitude varied from 17 to 83 %. The more resistant Andean genotypes were Jalo Vermelho, Jalo de Listras Pretas, and Roxinho, while the more susceptible genotypes were Jalo Pardo, Jalo Pintado 1, and Bolinha (Table 1). Mesoamerican bean genotypes that showed higher resistance levels were Carioca Pintado 2, Carioca Pintado 1, Carioca 6 and Iapar 31, with values of resistance index were 83, 75, 58, and 58 respectively (Table 1). The results show that both Andean and Mesoamerican bean genotypes evaluated in this study have high genetic variability regarding to their response to different races *of C. lindemuthianum*. This material could be used in bean breeding program as source of resistance genes to *C. lindemuthianum* in the future.

Table 1. Reaction of nine Andean and 17 Mesoamerican genotypes of common bean, virulence and resistance index to Mesoamerican and Andean races of *C. lindemuthianum*[***]

Andean Genotypes	Races												Resistance Index (%)
	Mesoamerican									Andean			
	9	31	65	69	73	81	89	95	453	7	19	55	
Jalo de Listras Pretas	R	R	R	R	R	R	R	R	S	S	S	S	67
Jalo de Listras Vermelhas	R	R	R	S	S	R	S	S	R	S	S	S	42
Jalo Pardo	S	R	S	S	S	S	S	S	S	S	S	S	8
Jalo Pintado 1	S	R	S	S	S	S	S	S	S	S	S	S	8
Jalo Pintado 2	R	R	R	S	R	S	S	R	R	S	S	S	50
Jalo Vermelho	R	R	R	S	S	R	R	R	R	S	S	R	67
Jalo Mulato	R	R	R	S	S	S	S	R	R	S	S	S	42
Bolinha	S	R	S	S	S	S	S	S	S	S	S	S	8
Roxinho	R	R	R	S	R	S	S	R	R	S	S	S	50
Andean Virulence Index *(%)	**33**	**0**	**33**	**89**	**67**	**67**	**78**	**44**	**44**	**100**	**100**	**89**	
Mesoamerican Genotypes	**Races**												**Resistance Index (%)**
	Mesoamerican									**Andean**			
	9	**31**	**65**	**69**	**73**	**81**	**89**	**95**	**453**	**7**	**19**	**55**	
Carioca 1	S	R	S	R	S	S	S	S	R	S	R	R	42
Carioca 2	S	R	S	R	S	S	S	S	R	S	R	R	42
Carioca 3	S	S	S	R	S	S	S	S	R	S	R	R	33
Carioca 4	R	R	S	R	S	S	S	S	R	S	R	R	50
Carioca 5	R	R	S	S	S	R	S	S	S	S	R	R	42
Carioca 6	S	R	S	R	S	R	S	S	R	R	R	R	58
Carioca Claro	R	R	S	S	S	R	S	S	R	S	R	R	50
Carioca Pintado 1	R	R	S	S	S	R	R	R	R	R	R	R	75
Carioca Pintado 2	R	R	R	S	R	R	S	R	R	R	R	R	83
Carioca Pitoko	S	R	S	R	S	S	S	S	R	S	R	R	42
Iapar 31	R	R	S	S	S	S	R	R	R	S	R	R	58
Preto 1	S	S	S	S	S	S	S	S	S	S	R	R	17
Preto 2	R	S	S	S	S	S	S	S	S	S	R	R	25
Preto 3	S	R	S	S	S	R	S	S	S	S	R	R	33
Preto 4	S	R	S	S	S	S	S	S	R	R	R	R	42
Rosinha	R	R	S	R	S	S	S	S	R	S	R	S	42
Navy-UEM	S	R	S	S	S	S	S	S	S	S	S	R	17
Mesoamerican Virulence Index *(%)	**53**	**18**	**94**	**59**	**94**	**65**	**88**	**82**	**29**	**76**	**5,9**	**5,9**	
General Mean Virulence Index (%)	**46**	**12**	**73**	**69**	**85**	**65**	**85**	**69**	**35**	**85**	**38**	**35**	

*R = Resistant, S = Susceptible, * Virulence index = number of genotypes with susceptible reaction/ total number of genotypes; *General mean virulence index = total numbers of genotypes with susceptible reaction/26, the total number of genotypes.*Resistance index = total numbers of genotypes with resistance reaction/12, the total number of races used for inoculation.

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