

Identification of *Colletotrichum lindemuthianum* races in *Phaseolus vulgaris* L.

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Introduction

Colletotrichum lindemuthianum variability was first studied by Barrus (1911) who identified the alfa and beta races. Burkholder later identified the gama race (1932), and Andrus and Wade (1942), Blondet (1963), Krüger et al. (1977) and Fouiloux (1975) identified the delta, epsilon, kappa and alfa-Brasil races, respectively. In this study, we report the *C. lindemuthianum* races in some bean producing regions of Paraná State using differential cultivars.

Materials and Methods

Monosporic cultures of each isolate were cut and placed in test tubes containing pods partially immersed in agar-agar culture medium and incubated at 20°C for 14 days. After the incubation the pods were transferred to a becker containing sterilized water, obtaining a spore suspension. Five countings were made for each isolate with the aid of a hemocytometer (Neubauer-Preciss chamber). The concentration were adjusted to a 1.2×10^6 spore ml⁻¹ in sterilized water. The inoculation were made using a paintbrush moistened in the spore suspension. After inoculation, the seedlings were kept in a moist chamber for 72 hours at 20°C with controlled light. The assessments were carried out 10 days after inoculation, and scores of 1 and 2 were given to resistant plants and 3 to 5 to susceptible plants.

Results and Discussion

Nine *C. lindemuthianum* races were identified among the 18 tested isolates (Table 1) showing the genetic variability of the pathogen in Parana State. High frequency of the same race in more than one location was observed. Races 89, 81 and 65 were found more frequently. Other races were less frequent, such as races 7, 31, 69, 73, 87 and 95. Only six of the 12 differential cultivars were resistant to the *C. lindemuthianum* isolates collected in Parana. Among the cultivars of Mesoamerican origin only Michelite, Mexico 222 and Cornell 49242 were susceptible. Of the cultivars of Andean origin, only Kaboon resistant to all the races identified in this study.

Race 31 was virulent in Michelite, Dark Red Kidney, Perry Marrow, Cornell 49242 and Widusa cultivars while race 95 not only infected these cultivars but also Mexico 222. It was virulent in a larger number of differential cultivars. Races 65 and 73 were virulent in differential cultivars of Mesoamerican origin because they had been isolated from cultivars belonging to the Mesoamerican gene pool suggesting the specialization of the pathogen for the gene pool of the host *Phaseolus vulgaris* L. The results obtained in this study showed that races 7, 69, 73 and 87 were recorded in Paraná for the first time although they had been reported previously in other Brazilian states.

The PI 207262, TO, TU, AB 136 and G 2333 cultivars were the main resistance sources to the nine *C. lindemuthianum* races.

The G 2333 cultivar could be used in backcross programs with susceptible cultivars which have desirable traits, to transfer resistance genes which have not yet been broken by races tested in different parts of the world.

Table 1. Reaction of *Colletotrichum lindemuthianum* differential *Phaseolus vulgaris* L. cultivars to 18 isolates collected in Parana State

Cultivar	Binary value	Resistance gene	Races*								
			7	31	65	69	73	81	87	89	95
Michelite ^b	1		S	S	S	S	S	S	S	S	S
Dark R. Kidney ^a	2	Co-1	S	S	R	R	R	R	S	R	S
Perry Marrow ^a	4		S	S	R	S	R	R	S	R	S
Cornell 49242 ^b	8	Co-2	R	S	R	R	S	R	R	S	S
Widusa ^a	16		R	S	R	R	R	S	S	S	S
Kaboon ^a	32	Co-1 ¹	R	R	R	R	R	R	R	R	R
Mexico 222 ^b	64	Co-3	R	R	S	S	S	S	S	S	S
PI 207262 ^b	128		R	R	R	R	R	R	R	R	R
TO ^b	256	Co-4	R	R	R	R	R	R	R	R	R
TU ^b	512	Co-5	R	R	R	R	R	R	R	R	R
AB 136 ^b	1024	Co-6	R	R	R	R	R	R	R	R	R
G 2333 ^b	2048	Co-4 ² /Co-5 Co-7	R	R	R	R	R	R	R	R	R

^a Cultivars of Andean origin, ^b Cultivars of Mesoamerican origin,
R = resistant; S = susceptible.

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