

Common bean lines reaction to the anthracnose pathogen

Fernanda Rausch Fernandes Carrijo; Elaine Aparecida de Souza* and Magno Antonio Patto Ramalho

Departamento de Biologia da Universidade Federal de Lavras, Caixa Postal 37, CEP 37200-000, Lavras, MG, Brazil.
(* Corresponding Author. E-mail: easouza@ufla.br)

ABSTRACT

123 common bean lines including Talismã cultivar, recently recommended for cropping in Minas Gerais state, were inoculated with 65, 89 and 337 races of *Colletotrichum lindemuthianum*. 13,82% of the lines assessed are resistant to all races used. Talismã cultivar presented a high level of resistance to 65 and 89 races.

KEY WORDS: Antracnose; *Colletotrichum lindemuthianum*; common bean.

Anthracnose, whose pathogen is the *Colletotrichum lindemuthianum* (Sacc. & Magn.) Scribner fungus, is one of the most important common bean diseases found in the state of Minas Gerais, Brazil, especially in the Southern and Zona da Mata regions, where frequent high relative humidity and mild temperatures (15-22°C) favor the disease development (Vieira, 1988). When these favorable conditions are associated with infected seeds, the damage caused by the pathogen reaches 100% (Chaves, 1980).

Genetic breeding to obtain cultivars resistant to anthracnose is the most efficacious and economic actions used to control the disease (Rava et al., 1994). However, the wide pathogenic variability of *Colletotrichum lindemuthianum* has reduced the useful life of the resistant cultivars, that is, as the prevailing races change, cultivars resistant in one year or location can become susceptible in other years and/or locations (Garrido Ramirez and Romero Cova, 1989; Menezes and Dianese, 1988). It is important for breeding programs to consider the reaction of the recommended lines and cultivars to the prevalent races and to those with potential to cause damage to the crop in question. This knowledge, along with monitoring of the distribution and frequency of the existing races, contributes to the development of strategies to be used with the cultivars available.

The present study aimed at ascertaining the reaction of the available lines with Carioca type grains, that is, colored cream with brown stripes, to the races 65, 89 and 337 of anthracnose that were identified recently (Talamini et al., 2002) in common bean producing regions in Minas Gerais.

The study was conducted in a greenhouse at the

Laboratory of Plant Resistance To Diseases, located in the experimental area of the Department of Biology at the Federal University of Lavras. Common bean lines were assessed for reaction to *Colletotrichum lindemuthianum* races 65, 89 and 337.

For inoculum production, the fungus was transferred to test tubes with a sterilized pod partially immersed in agar-agar medium incubated in BOD for ten days at 22°C where there was an intense sporulation. The conidia suspension for common bean plant inoculation was prepared by removing the conidia produced with distilled autocleaved water. The inoculum concentration was adjusted to 1.2×10^6 conidia/ml.

To assess the lines, eight seeds from each line and the susceptible control, the Carioca cultivar, were sown on isopore trays with 128 wells. Inoculation was performed after the complete expansion of the primary leaves of the seedlings, approximately 7 to 10 days after sowing, applying the inoculum suspension with 'De Vilbiss', actioned by a compressor. The seedlings were sprayed until the liquid ran off.

After inoculation, the trays were covered with plastic bags to form a damp chamber and placed in a refrigerated growth chamber with the temperature around 20°C, under 12 hours of darkness and 12 hours of brightness, for 72 hours. The trays were later taken to the greenhouse, where they remained for symptom assessment. The assessment was made seven days after inoculation using a scale of scores from 1 to 9 described by Rava et al. (1993). The plants that presented scores from 1 to 3 were considered resistant and those with scores from 4 to 9 were considered susceptible.

The predominance of the *Colletotrichum lindemuthianum* races 65, 81 and 89 has been ascertained in surveys carried out in Minas Gerais state (Abreu et al., 1993; Pereira et al., 2002; Talamini et al., 2002). Race 337 was identified recently in the Zona da Mata (Souza, personal communication) and it can be disseminated quickly. Therefore, races 65, 89 and 337 were used in this study for the assessment of common bean lines. Race 81 was not used because lines which are resistant to race 89 have also shown to be resistant to race 81.

Seventy-one of the 123 lines assessed were resistant to race 65 and 67 lines to race 89, showing the high frequency of resistance to these two races of fungus (Figure 1). Many of the lines assessed were obtained without any direct selection for anthracnose resistance, but a great number of lines resistant to both races was detected (46,34%). These lines probably possess the Co-4 allele that confers resistance to the races mentioned (Kelly and Young, 1996) and is present in the TO cultivar that has been used as a source of resistance in common bean breeding programs.

Only 23 lines were resistant to race 337 (Figure 1), and they probably carry the Co-5 resistance allele. Most of the lines came from recurrent selection programs and were assessed in different locations. Race 337 was detected in one of them. Although direct selection has not been performed for resistance to anthracnose, this was obtained by grain yield because selection indirectly maintains the pathogen-resistant lines (Abreu et al., 1999).

It must be emphasized that the Talismã cultivar (CII-102), recently recommended for cropping in Minas

Gerais state (Ramalho et al., 2002), presented a high level of resistance to races 65 and 89 but the results obtained in this publication showed that it could have a short useful life if race 337 is disseminated rapidly and if this cultivar is widely used by farmers.

It is pointed out that the common bean breeding program has been efficient in obtaining lines resistant to *Colletotrichum lindemuthianum* because 13.82% of the lines assessed are resistant to races 65, 89 and 337 and can be recommended to farmers or used as sources of resistance alleles, because besides resistance, all have grains with good commercial acceptance.

RESUMO

Reação de linhagens de feijoeiro ao agente causal da antracnose

Foram inoculadas 123 linhagens de feijão com grãos tipo Carioca, incluindo a cultivar Talismã, recentemente recomendada para plantio em Minas Gerais, com as raças 65, 89 e 337 de *Colletotrichum lindemuthianum*. 13,82% das linhagens avaliadas foram resistentes as três raças. A cultivar Talismã apresentou alto nível de resistência as raças 65 e 89.

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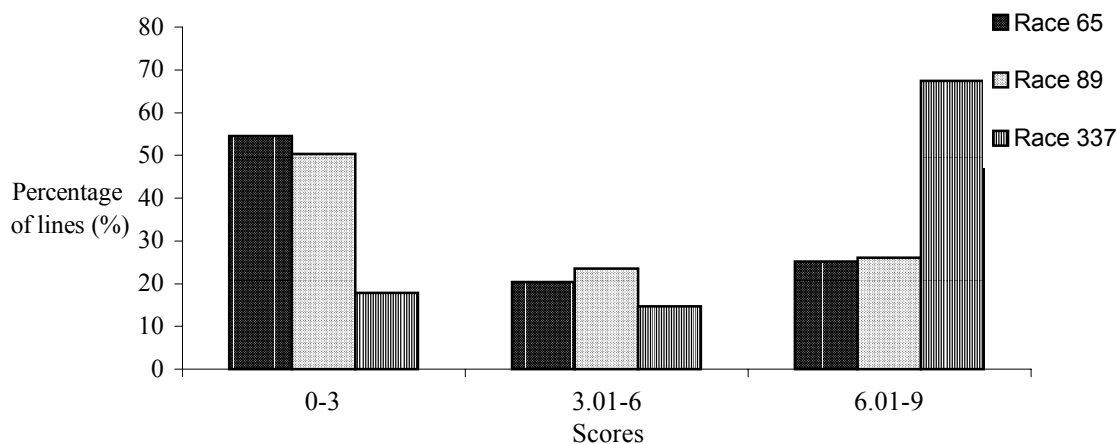


Figure 1. Distribution of the frequency of the scores attributed in the pathogenicity test of the common bean lines to the races 65, 89 and 337.

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