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Resistance Evaluation of Black Bean Germplasm to the Fusarium Wilt Disease

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Abstract

The common bean (*Phaseolus vulgaris* L.) plays a pivotal economic and social role in Brazil, serving currently as the main source of dietary protein. People's preferences for colour and culinary traits of beans greatly vary among regions, but in the South consumers prefer locally produced black beans. However, several diseases can dramatically reduce the yield potential of this crop, and consequently, have an impact on food security in this region. On the other hand, this scenario offers a big challenge for breeding programs searching for resistant cultivars with high yield without losing focus on local market demands. Fusarium wilt (Fw), caused by the soil-borne fungus *Fusarium oxysporum* f. sp. *phaseoli* (Fop), is one of the most important diseases of bean plants and the use of resistance has been considered the main strategy to disease control. Considering that finding new resistance sources is essential for forthcoming breeding programs, this screening work aimed to evaluate the reaction of 17 black bean genotypes to Fop. The tested genotypes were the lines AL9021332, CF22, CF128, CHP97-04, CI96712V, CP9310635, FT84113, FT991159, LP97-04, MD841, TB9401, UFSC-01, and UFSC-02; cv. IPR88 Uirapuru; and the landraces Becker Bela Vista, Negro Bola, and Sogro Daniel. The assays were carried out under outdoor conditions during spring from August to December 2012 and 2013. Bean plants were grown in 20-L plastic pots containing a substrate composed of Fop-infested clay soil (1.3×10^3 colony forming units g^{-1} of soil) and organic compost (3:1; v/v). Fw incidence was assessed at intervals of 4 days (between pod filling until grain filling growth stage) to monitor the incidence of wilt and dead plants during the season. The lines AL9021332, CF128, CP9310635, TB9401 and UFSC-01, and the landrace Becker Bela Vista did not show any Fw symptoms and were classified as resistant. The remaining genotypes exhibited varying levels of disease incidence of 12 to 88% and were considered susceptible. Finding resistance genes against Fop in local germplasm is possible and makes feasible future breeding programs.

Keywords: Fusarium wilt, genetic resistance, landraces, *Phaseolus vulgaris*