

RESISTANCE TO FUSARIUM WILT IN COMMON BEAN CULTIVARS AND LINES IN PRE-COMMERCIAL STAGE

Helton Santos Pereira, Leonardo Cunha Melo, Thiago Lívio Pessoa Oliveira de Souza, Luís Cláudio de Faria, Adriane Wendland, Mariana Cruzick de Souza Magaldi

Embrapa Arroz e Feijão, Brazil helton.pereira@embrapa.br

Among the diseases that affect common bean (*Phaseolus vulgaris* L.), Fusarium wilt is one of the most deleterious. It is caused by the fungus *Fusarium oxysporum* f.sp. *phaseoli* and is present in the soil in many common bean-producing regions, mainly in areas with successive crops or under center pivot irrigation. Integrated management is the best strategy to control this disease and the use of resistant cultivars is decisive (Costa et al., 2007). The objective of this study was to identify common bean cultivars with resistance to Fusarium wilt.

Thirty common bean cultivars with different grain types were evaluated from 2009 to 2014 in experiments installed in an area infested with the pathogen in Santo Antônio de Goiás, under center pivot irrigation, in the winter growing season, in a randomized block design with two replications. From 2009 to 2012, only one of the replications was assessed and in 2013 and 2014, two replications. The plots were evaluated on a 1-9 scale (1 - completely resistant to 9 - fully susceptible). Analysis of variance was performed in a randomized block design, considering each replication as a block, regardless of the year, totaling eight blocks. Means were compared by the Scott Knott test, at 10% probability.

There were differences among cultivars, indicating variability for resistance to Fusarium wilt, which was confirmed by the variation between cultivars (mean scores 1.9 - 7.1). The experimental precision was satisfactory, as indicated by the coefficient of variation of 23.5%. The most resistant cultivars were BRS Esplendor and CNFP 10794, both with black grain. The cultivars BRS Radiante, BRS Embaixador, BRS Executivo, Jalo Precoco, BRSMG União, BRS Campeiro, BRS Notável, and BRSMG Realce also had a good resistance level and were grouped in the second cluster. A noteworthy cultivar is BRS Notável, the most resistant to Fusarium wilt, with carioca grain. The other cultivars of this group have large grains (over 38 g/100 seeds), which are jalo (yellow), DRK (dark red kidney), cranberry, or striped, native to the Andean origin, except for BRS Campeiro, with black beans. The third group consisted of BRS Ametista, BRS Requite, BRSMG Majestoso, BRS Utopia, and Pérola, all with carioca beans and intermediate resistance to Fusarium wilt. Pérola is not only the cultivar with highest acreage in the country, but also a reference in terms of field resistance to Fusarium wilt. In addition to these, BRS Agreste with mulatinho (cream) and BRS Pitanga with purple grain also have an intermediate resistance level; a fourth group consisting of cultivars with low resistance: CNFC 10762 and BRS Pontal, carioca; BRS Ártico, white; and BRS Vereda, with pink grain. A fifth group was formed by highly susceptible cultivars: CNFC 10467, BRS Sublime, BRSMG Madrepérola, CNFC 10729, BRS Cometa, and BRS Estilo, all with carioca grain; BRS Esteio, VP-22 and BRS Supremo, with black grain. Based on these results, it was concluded that there are common bean cultivars of almost all grain types tested with good levels of Fusarium wilt resistance, which should be preferred for cultivation in areas infested with the disease.

Table 1. Summary of analysis of variance for reaction to Fusarium wilt in 30 common bean cultivars.

SV	DF	MS	F	P-value
Replications	7	6.41	-	-
Cultivars	29	21.97	17.98	0.000
Residue	203	1.22	-	-
Mean (1-9)	4.7			
CV (%)	23.5			

Table 2. Types of grains (TG) and means of 30 common bean cultivars for reaction to Fusarium wilt (FUS).

Cultivar	TG	FUS		Cultivar	TG	FUS	
BRS Esplendor	black	1.9	a	BRSMG Utopia	carioca	4.5	c
CNFP 10794	black	2.0	a	Pérola	carioca	4.6	c
BRS Radiante	striped	2.8	b	CNFC10762	carioca	5.0	d
BRS Embaixador	drk	3.1	b	WAF 75	white	5.3	d
BRS Executivo	sugar bean	3.1	b	BRS Pontal	carioca	5.3	d
Jalo Precoce	jalo	3.1	b	BRS Vereda	pink	5.6	d
BRSMG União	jalo	3.3	b	CNFC 10467	carioca	6.5	e
BRS Campeiro	black	3.3	b	BRS Esteio	black	6.5	e
BRS Notável	carioca	3.3	b	BRS Sublime	carioca	6.6	e
BRSMG Realce	striped	3.3	b	BRSMG Madrepérola	carioca	6.8	e
BRS Ametista	carioca	3.8	c	CNFC 10729	carioca	6.9	e
BRS Agreste	mulatinho	3.9	c	VP-22	black	6.9	e
BRS Pitanga	purple	3.9	c	BRS Cometa	carioca	7.0	e
BRS Requite	carioca	4.0	c	BRS Supremo	black	7.1	e
BRSMG Majestoso	carioca	4.5	c	BRS Estilo	carioca	7.1	e

Means followed by the same letter do not differ from each other (Scott Knott, 10 %)

REFERENCES

COSTA J. G. C. da; RAVA C. A.; PURISSIMO J. D. Obtenção de linhagens de feijoeiro comum resistentes à murcha-de-fusário. Revista Ceres, Viçosa - MG, v. 54, núm. 315, p. 447-452, 2007.