Original Article

RESISTANCE OF BEAN GENOTYPES TO BEAN GOLDEN MOSAIC VIRUS (VMDF)

RESISTÊNCIA DE GENÓTIPOS DE FEIJOEIRO AO VÍRUS DO MOSAICO DOURADO DO FEIJOEIRO (VMDF)

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ABSTRACT: The common bean (*Phaseolus vulgaris* L.*)* is a herbal annual plant, which belongs to Fabaceae family, it is grown by small and large farmers alike, in several production systems. It has much economic and social importance. However, the plant is a host to uncounTable fungal, bacterial and viral diseases. Among the viral pathologies there is one known as Bean golden mosaic virus (BGMV), currently spread to virtually every bean production region in Brazil and over the world, causing huge losses season after season. This research's aim was to evaluate the resistance degree presented by fifteen different bean genotypes as to symptomology shown due to infection by the virus on the plants. The experimental design was randomized blocks, with 15 treatments and a witness, Carioca-Pérola cultivar, and compound by four repetitions. Each parcel was compound by four lines of 3,0 meters in length and 0,5m apart, accounting for a total of 60 parcels of 6,0m². The analyzed characteristics were: Emergency, incidence, severity, thousand-bean weight, productivity, and chlorophyll content in the leaves. For characteristic incidence, at both 28 and 38 DAS, the genotypes did not prove to be resistant to the disease. For severity the strains PL 38, from the breeding between IAPAR 57 and IAPAR 72, and 93, from the breeding between ESAL-589 e IAPAR 57, stood out with superior results. For a thousand-bean weight, the genotype UFU Roxo 12, IAPAR 57 X ESAL 589 - PL 48, followed for ESAL 589 X IAPAR 57 - PL 148-1, UFU Preto 29, ESAL 589 X IAPAR 57 - PL 93, IAPAR 57 X IAPAR 72 - PL 25, IAPAR 57 X IAPAR 65 - PL194, CARIOCA PÉROLA-WITNESS, UFU Carioca 14 and ESAL 589 X IAPAR 72 - PL 129 was the one that showed the best result. The highest productivity per hectare was from the genotype IAPAR57 x ESAL 589 – PL48 from carioca group. Concerning the parameter chlorophyll content at 28 DAS, the genotypes ESAL 589 X IAPAR 57 - PL 93, ESAL 589 X IAPAR 72 - PL 129, IAPAR 72 X ESAL 589 –PL49, UFU Roxo 12, ESAL 589 X IAPAR 57 - PL 28, CARIOCA PÉROLA-Witness, UFU Carioca 14 showed less infected area and the highest chlorophyll content, and at 38 DAS there was no significant difference among the genotypes.

KEYWORDS: Bean. Genotypes. Bean golden mosaic virus and resistance.

INTRODUCTION

The bean-cultivar choice (*Phaseolus vulgaris* L.), as well as the environment temperature, can influence on crop cycle, which ranges from 65 to 100 days, suiting the culture for intensive, irrigated, highly technical agronomical systems or low technological systems, specially subsistence systems (EMBRAPA, 2010).

However, the bean plant hosts uncounTable fungal, bacterial and viral diseases. Among the viral diseases there is a pathology called Bean golden mosaic, caused by the Bean golden mosaic virus, BGMV, spread virtually to every bean production region in Brazil and over the world (EMBRAPA 2010).

The golden mosaic virus, *Geminiviridae* family and *Begomovirus* genus, transmitted by the Silverleaf whitefly, *Bemisia tabaci* Gennadius Biotype B (= *Bemisia argentifolii* Bellows & Perring), became one of the most limiting factor to the bean crops (*Phaseolus vulgaris L.*) in Brazil, causing losses from 30% to 100% in productivity (CIAT, 1990; FERREIRA; ÁVIDOS, 1998). It is capable of infecting 100% of plants on most crops of susceptible varieties and it is not transmitted through the seeds (KIMATI et al., 2005). The introduction and dissemination of this virus in the crop happens exclusively through the Silverleaf whitefly, which spreads the virus very effectively.

Among the management alternatives the control through resistant cultivars is of main importance, especially to the small farmer, and it is currently the most effective control (KIMATI et al., 2005).

This research's aim was to evaluate among the bean strains, which ones show the highest resistance degree to Bean golden mosaic, determining the most suiTable strains for breeding.

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MATERIAL AND METHODS

The trial was carried out at Estação Experimental Agrotest, from January 20th to April 13th 2010, in the city Uberlandia-MG, at latitude 19º05'26''S, longitude 48º09'28''W, 952m of elevation and, according to Köppen classification, the climate of the region is Aw, meaning, warm and moist tropical with hot and dry winter (SILVA et al., 2008) (Figure 1)

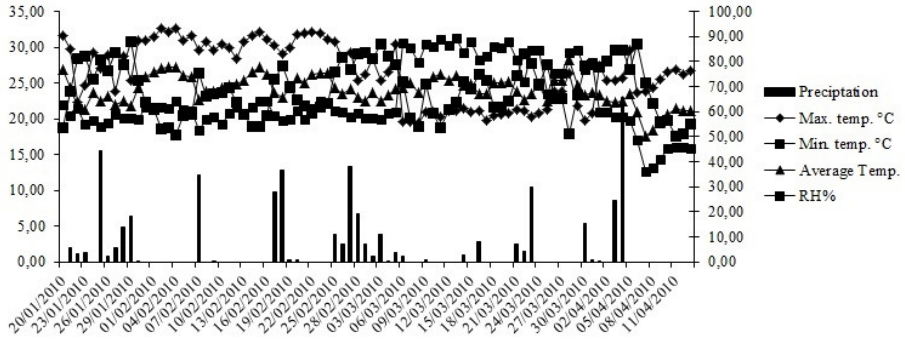


Figure 1. Climograph for Uberlândia/MG during the experimental period.

The tested strains were from the Programa de Melhoramento de Plantas da Universidade Federal de Uberlândia, (Table 1), carioca, black and purple, compared to cultivar Carioca Pérola (standard) and every early cycle genotype.

Table 1. Tested-strain description, offspring, cycle and bean color.

Genotype	Genealogy*	Cycle (Days)	Grain Color
Genotype 1	ESAL 589 X IAPAR 57 - PL 148-1	110	Carioca
Genotype 2	ESAL 589 X IAPAR 57 - PL 93	110	Carioca
Genotype 3	ESAL 589 X IAPAR 72 - PL 129	110	Carioca
Genotype 4	UFU Preto 37	105	Black
Genotype 5	UFU Carioca 14	110	Carioca
Genotype 6	ESAL 589 X IAPAR 57 - PL 148-2	110	Carioca
Genotype 7	IAPAR 57 X IAPAR 72 - PL 25	110	Carioca
Genotype 8	IAPAR 57 X ESAL 589 - PL 48	110	Carioca
Genotype 9	UFU Roxo 12	105	Purple
Genotype 10	UFU Preto 29	105	Black
Genotype 11	IAPAR 57 X IAPAR 72 - PL38	110	Carioca
Genotype 12	IAPAR 57 X IAPAR 65 - PL194	110	Carioca
Genotype 13	ESAL 589 X IAPAR 57 - PL 28	110	Carioca
Genotype 14	IAPAR 72 X ESAL 589 –PL49	110	Carioca
Genotype 15	CARIOCA PÉROLA-Witness	110	Carioca

* Breeding performed in 1990 and offspring evaluated through diallel breeding followed by selection through progeny test (Juliatti et al.,2005.).

The area is over dark, dystrophic Red Latossoil, fertilizing was performed according to recommendations to the culture, 500kg.ha^{-1} of the formula 04N – 14P_2O_5 – 08 K_2O were use, and the area had been previously cultivate with potatoes (*Solanum tuberosum* L.) managed according to recommendations to the culture. The experimental design was of randomized blocks (RBD), with 15 treatments, among them a witness (Cultivar Carioca Pérola) in four repetitions. Each parcel was composed of four lines of 3,0m in length, spaced 0,5m apart, accounting for 60 parcels of 6,0m² each. The final stand amounted to 12 plants per line meter.

The experiment installation and conduction was carried out according to recommendations from Product ion Systems for Bean Culture. Highlighting, in the initial stage, the use of deltamethrin, (2mL.L^{-1}) for the control of Leaf beetle (*Diabrotica speciosa (Gemarr)*), in tree leaf sprayings. No other leaf chemical was used to avoid interference on the population of the Silverleaf whitefly, or any other chemical disturb which could interfere on the population or reduce the number of flies.

From breeding performed on insect-proof greenhouse (DBI – UFLA) in Lavras-MG in 1993, between the strains CARIOCA-MG, IAPAR 72, IAPAR 57 and IAPAR 65, were obtained generations F1 and F through complete diallel scheme (MORES et al., 1999). According to the same author, the cultivars IAPAR 72 ("Carioca" bean) and IAPAR 57 and IAPAR 72 (black bean) were produced in Paraná as resistant to the virus, being used as parental strains in this research. In the place there was abundant population of Silverleaf whitefly due to tomato, cotton and soy bean crops and, virus and begomovirus outbreaks were observed in plants of Sid asp. Genus and Malvaceae family and other native hosts of the Silverleaf whitefly.

Over the experiment, emergence incidence and disease severity were analyzed according to the recommendations of Juliatti et al. 2005. Thousand-bean weight (g) and productivity ($Kf.ha^{-1}$) were also analyzed. The results were obtained through a grading scale developed by Juliatti et al. (2005), (Table 2).

When incidence reached 100%, the severity was evaluated for each parcel. The Bean-golden-mosaic severity evaluations were carried out by two evaluators, according to the general aspect of the parcels on the two central lines, when the plants were between the stages R_1 and R_2 (full bloom and the beginning of pod formation). To evaluate disease progression, grades were assigned by to evaluators to the percentage of affected leaf area through a visual scale of 0% to 100%, and then the average severity was considered.

The disease incidence (%) evaluations started 28 days after sowing (DAS), then when the plants were in V_4 stage at 38 DAS, and finally when the plants reached the V_6 stage (first flowers).

Table 2. Symptom Severity Scale in parcels. Source: Juliatti er al. (2005).

Grade	Pl/Pc%*	Description
1	0	Every plant with no apparent symptom
2	$0 < x \leq 20$	Up to 20% of the plants with mosaic symptoms on the leaves and/or leaf and pod deformation
3	$20 < x \leq 40$	Between 20% and 40% of plants with mosaic symptoms on the leaves and/or leaf and pod deformation
4	$40 < x \leq 60$	Between 40% and 60% of plants with mosaic symptoms on the leaves and/or leaf and pod deformation
5	$60 < x \leq 80$	Between 60% and 80% of plants with mosaic symptoms on the leaves and/or leaf and pod deformation
6	$80 < x \leq 100$	Between 80% and 100% of plants with mosaic symptoms on the leaves and/or leaf and pod deformation

* X= Pl/Pc% = susceptible plant number / total plant number in the parcel x 100%

The quick and inexpensive evaluation of leaf green became easier with recent improvement of the porTable meters (GIL et al., 2002), this devices enable the use of leaf chlorophyll content as a criteria to evaluate plant general condition.

It was used SPAD-502 meter (Soil Plant Analysis Development), which is easy to operate, allow *in situ* evaluation and thus can be used as a tool on the evaluation of disease severity in the plants. The meter evaluates quantitatively the intensity of leaf green measuring light transmissions at 650 nanometers, where the light is absorbed by the chlorophyll molecule, and at 940 nanometers, where light is not absorbed.

With these two values the device calculates a number or index SPAD, which, usually, is highly correlated to leaf chlorophyll content (GIL et al., 2002). The harvest of the parcels happened when the plants were on R_8 stage, at 85 DAS.

The harvest was manual, of the two central lines of each parcel, removing 0,5m of each side considered borders. After the harvest the beans were weighted and the data obtained for each parcel was used to evaluate the production in Kilograms per hectare ($Kg.ha^{-1}$) and a thousand-bean weight in grams (g).

Statistical Analysis

The results were submitted to F test and, when significant, the averages were compared through Scott-Knott test at 0,05 probability. (Sisvar Inc., Brasil), Gomes (1990).

RESULTS AND DISCUSSION

For incidence there was no difference between cultivars. In 28 and also 38 DAS, the genotypes didn't prove to be resistant to the disease incidence. Thus, no genotype showed statistically significant superior results (Table 3).

The first incidence evaluation, carried out at 28 DAS is in conformity with the research of Lemos et al. (2003), where the symptoms arose from 28 DAS. According to Moraes (1999), common-bean BGMV resistance in cultivars IAPAR 57, IAPAR 65 and IAPAR 72 apparently can be controlled through a dominant gene in individual plant level (F2). The results can be found on Table 3, obtained at 28 and 38 DAS where the evaluation was done by the number of affected plants.

Table 3. Averages regarding disease incidence (%) at 28 and 38 DAS respectively.

Genotype	*28 DAS	*38 DAS
ESAL 589 X IAPAR 57 - PL 148-1	20,68 a	18,13 a
ESAL 589 X IAPAR 57-PL 93	16,08 a	15,75 a
ESAL 589 X IAPAR 72-PL 129	16,40 a	17,10 a
UFU Preto 37	13,73 a	14,08 a
UFU Carioca 14	14,65 a	17,45 a
ESAL 589 X IAPAR 57 - PL 148-2	17,43 a	21,20 a
IAPAR 57 X IAPAR 72 - PL 25	16,15 a	21,68 a
IAPAR 57 X ESAL 589 - PL 48	29,50 a	33,63 a
UFU Roxo 12	17,10 a	19,43 a
UFU Preto 29	18,88 a	19,98 a
IAPAR 57 X IAPAR 72-PL38	25,55 a	24,80 a
IAPAR 57 X IAPAR 65-PL194	15,15 a	22,30 a
ESAL 589 X IAPAR 57 - PL 28	23,03 a	20,28 a
IAPAR 72 X ESAL 589 –PL49	29,93 a	30,25 a
CARIOCA PÉROLA-WITNESS	20,88 a	22,10 a

*Averages followed by different letters in the column are different from each other through Scott-Knott test at 0,05 significance. Coefficient of Variation (%) = 47.08% and 40.06% respectively, NMS: 0,05.

Regarding severity the genotype UFU roxo 12 showed lowest average, correlating to smaller damage of the virus on the plants. Lemos et al. (2003), says that plants attacked by BMGV showed decrease in the pod number per plant, beans per pod and in the a hundred-bean mass, being more damage more intensely damaged when infected early. The evaluation was carried out at 45 DAS just after being verified that incidence reached 100% of the plants, in every parcel of the experiment. Thus after 100% of affected plants, we started the evaluation concerning the symptom severity on the bean plants.

Morales e Singh (1991),studying the behavior of several bean strains on the resistance to BGMV concluded that resistance to the virus may be controlled through the addition of genes in resistant strains through successive generations of self-fecundation.

Moraes (1999) highlights that the cultivar IAPAR 65 presented best performance regarding resistance (Table 4).

Regarding a thousand-bean weight (g), Lemos et al. (2003) reports that on the rain season, the genotypes studied in his research, which presented highest mass for 100 beans were, Aporé, Corrente, IAPAR 31 and IAPAR 57. In the conditions of the present experiment, the genotype UFU Roxo 12, IAPAR 57 X ESAL 589 - PL 48, followed for ESAL 589 X IAPAR 57 - PL 148-1, UFU Preto 29, ESAL 589 X IAPAR 57 - PL 93, IAPAR 57 X IAPAR 72 - PL 25, IAPAR 57 X IAPAR 65 - PL194, CARIOCA PÉROLA-WITNESS, UFU Carioca 14 and ESAL 589 X IAPAR 72 - PL 129 was the one that showed the best result for a thousand-bean weight, thus revealing the resistance degree presented by those cultivars, being passed on to descendants, (Table 5).

Moraes (2003) reports that on Carioca group the progenies obtained through breeding with the parental IAPAR 57, presented better performance, with averages estimated based on percentage of plants with symptoms of mosaic on the leaves and/or leaf deformation during its formation period, evidence a higher resistance when compared to groups involving cultivars IAPAR72 and Carioca-MG. The descendent cultivars from group IAPAR65 showed higher susceptibility to the virus. He also reports that for bean-weight per plant (BW) the progenies groups involving IAPAR 65 presented best average performance for BW, when compared

with the groups involving the cultivars IAPAR 72 and Carioca-MG, group descendant from parental IAPAR 57 showed less susceptibility to the disease.

Table 4. Disease Severity Evaluation on the genotypes, carried out at 38DAS with visual grade values.

Genotype	Average
ESAL 589 X IAPAR 57 - PL 148-1	1,55 b
ESAL 589 X IAPAR 57-PL 93	2,05 a
ESAL 589 X IAPAR 72-PL 129	1,18 b
UFU Preto 37	1,50 b
UFU Carioca 14	1,63 b
ESAL 589 X IAPAR 57 - PL 148-2	1,33 b
IAPAR 57 X IAPAR 72- -PL 25	1,50 b
IAPAR 57 X ESAL 589 - PL 48	1,18 b
UFU Roxo 12	1,13 b
UFU Preto 29	1,38 b
IAPAR 57 X IAPAR 72-PL38	2,13 a
IAPAR 57 X IAPAR 65-PL194	1,40 b
ESAL 589 X IAPAR 57 - PL 28	1,70 a
IAPAR 72 X ESAL 589 –PL49	1,58 b
CARIOCA PÉROLA-WITNESS	2,35 a

Averages followed by different letters in the column are different from each other through Scott-Knott test at 0,05 at 0,05 significance. Coefficient of Variation (%) = 28,78%, NMS: 0,05.

Table 5. Data concerning a thousand-bean weight (g), values are given in grams (g).

Genotype	Average
ESAL 589 X IAPAR 57 - PL 148-1	151 a
ESAL 589 X IAPAR 57 - PL 93	150 a
ESAL 589 X IAPAR 72 - PL 129	137 a
UFU Preto 37	115 b
UFU Carioca 14	137 a
ESAL 589 X IAPAR 57-PL 148 – 2	118 b
IAPAR 57 X IAPAR 72 - PL 25	147 a
IAPAR 57 X ESAL 589 - PL 48	154 a
UFU Roxo 12	164 a
UFU Preto 29	151 a
IAPAR 57 X IAPAR 72 - PL38	110 b
IAPAR 57 X IAPAR 65 - PL194	139 a
ESAL 589 X IAPAR 57 - PL 28	119 b
IAPAR 72 X ESAL 589 - PL49	130 b
CARIOCA PÉROLA-WITNESS	139 a

Averages followed by different letters in the column differ from each other through Scott-Knott at 0,05 significance. Coefficient of Variation (%) = 11,36%, NMS: 0,05.

Regarding productivity, the genotypes which showed higher productivity, evidencing also significant difference from the others, were genotype IAPAR 57 x Esal 589 – PL 48 and UFU Roxo 12. Lemos et al. (2003) describe that the genotypes Ônix, IAPAR 57, IAPAR 65, and IAPAR 72 showed good tolerance to Bean golden mosaic virus, the same parental used on the breeding of the genotyped experimented here with highest productivity.

According to Queiroz, (2002), as example, we can quote the strain IAPAR 72 x Carioca-MG as one of the most susceptible and the strain IAPAR 72 – IAPAR 65 pl ≠194 as the most resistant to Bean golden mosaic virus. Those genotypes are the parental in the breeding of the strains used in the present research, and, in carioca group, they presented some resistance to the virus, showing high productivity in this experiment, as genotypes IAPAR 57 x IAPAR 65 Pl194, IAPAR 57 x IAPAR 72 – PL 25 (Table6).

Table 6. Data concerning productivity of the parcels ($Kg.ha^{-1}$).

Genotype	Average
ESAL 589 X IAPAR 57 - PL 148-1	741 c
ESAL 589 X IAPAR 57-PL 93	611 c
ESAL 589 X IAPAR 72-PL 129	1048 b
UFU Preto 37	1027 b
UFU Carioca 14	1423 b
ESAL 589 X IAPAR 57 - PL 148-2	1072 b
IAPAR 57 X IAPAR 72- -PL 25	1173 b
IAPAR 57 X ESAL 589 - PL 48	2070 a
UFU Roxo 12	1806 a
UFU Preto 29	1407 b
IAPAR 57 X IAPAR 72-PL38	717 c
IAPAR 57 X IAPAR 65-PL194	1148 b
ESAL 589 X IAPAR 57 - PL 28	418 c
IAPAR 72 X ESAL 589 –PL49	713 c
CARIOCA PÉROLA-WITNESS	146 c

Averages followed by different letters in the column are different from each other through Scott-Knott test at 0,05 significance Coefficient of Variation (%) = 19.95%, NMS: 0,05.

The use of resistant cultivars in breeding to obtain new resistant and productive genotypes must be used as a tool for breeders. Faria and Zimmerman (1988, quoted by SILVA et al., 2011) point to studies developed in Instituto Agronômico do Paraná (IAPAR) where some cultivars moderately resistant to bean golden mosaic were developed, as IAPAR 57 and IAPAR MD820.

Breeding between bean progenitors with different types of reaction to the Bean golden mosaic virus, lower wrinkling and mosaic intensity and good agronomical characteristics, allowed increasing progeny resistance (MORAES, 1999). Bianchini (1990) reports that in field experiments, bean strains as IAPAR MD806, IAPAR MD807, IAPAR MD808 e IAPAR MD809 showed results of BGMV tolerance in relation to cultivar Carioca, with superior productivity, reaching more than 180% increase

Similar fact happened in the conditions of this experiment where, cultivars of Carioca Group presented low productivity as the commercial cultivar Carioca Pérola used as Witness.

According to Argenta et al. (2002), the soil and plant indicators refer to soil and plant analyses. For both, there are favorable and contrary points. In general, soil parameters predict with higher security the N amount to be applied, for example, and the plant parameter the application time of the nutrient. The same author mentions yet that between the parameters of the plant, the measures related to the leaf (dry matter, leaf area) and the intensity of the leaf green, seem to be the most suited to the decision on the amount of N to be applied in relation to N tests on the tissue due to smaller variation between obtained values.

The chlorophyll index can assist in estimating the nitrogen present in the leaves due to high correlation between chlorophyll index and nitrogen content (MARENCO; LOPES, 2007) and regarding the infection of the virus in the plant, the SPAD index consists in an important factor concerning the area colonized by the pathogen, since it quantifies the area's chlorophyll content and the attacked area.

In the first evaluation, the genotypes ESAL 589 X IAPAR 57 - PL 93, IAPAR 72 X ESAL 589 –PL49, UFU Roxo 12, ESAL 589 X IAPAR 57 - PL 28, ESAL 589 X IAPAR 72 - PL 129, CARIOCA PÉROLA-Witness and UFU Carioca 14, showed less infected area and the highest chlorophyll content, thus being the most resistant to the disease. However, in the second evaluation there was no significant difference among the treatments, meaning, the plants presented similar chlorophyll contents (Table 7).

Table 7. Evaluation of leaf chlorophyll content (index SPAD).

Genotype	28 DAS		38 DAS	
ESAL 589 X IAPAR 57 - PL 148-1	40,73	b	36,68	a
ESAL 589 X IAPAR 57 - PL 93	46,35	a	37,90	a
ESAL 589 X IAPAR 72 - PL 129	42,18	a	35,05	a
UFU Preto 37	40,10	b	31,83	a

UFU Carioca 14	41,13	a	35,35	a
ESAL 589 X IAPAR 57 - PL 148-2	39,13	b	35,88	a
IAPAR 57 X IAPAR 72 - PL 25	36,48	b	34,78	a
IAPAR 57 X ESAL 589 - PL 48	37,30	b	32,35	a
UFU Roxo 12	43,00	a	34.05	a
UFU Preto 29	38,15	b	37.33	a
IAPAR 57 X IAPAR 72 - PL38	39,60	b	33,78	a
IAPAR 57 X IAPAR 65 - PL194	38,55	b	35,78	a
ESAL 589 X IAPAR 57 - PL 28	42,83	a	34,73	a
IAPAR 72 X ESAL 589 –PL49	45,00	a	33,65	a
CARIOCA PÉROLA-Witness	41,63	a	39,38	a

Averages followed by different letters are different from each other through Scott-Knott at 0,05 significance. Coefficient of Variation (%): 7,04 and 10,31 respectively, NMS: 0,05.

CONCLUSIONS

For incidence at both 28 and 38 DAS, the genotypes did not prove to be resistant to the disease incidence.

For severity the strains PL 38, from the breeding between IAPAR 57 and IAPAR 72, and 93, from the breeding between ESAL-589 e IAPAR 57, stood out with superior results. For a thousand-bean weight, the genotype UFU Roxo 12, IAPAR 57 X ESAL 589 - PL 48, followed for ESAL 589 X IAPAR 57 - PL 148-1, UFU Preto 29, ESAL 589 X IAPAR 57 - PL 93, IAPAR 57 X IAPAR 72 - PL 25, IAPAR 57 X IAPAR 65 - PL194, CARIOCA PÉROLA-WITNESS, UFU Carioca 14 and ESAL 589 X IAPAR 72 - PL 129 was the one that showed the best result.

The highest productivity per hectare was from the genotype IAPAR57 x ESAL 589 – PL48 from carioca group.

Concerning the parameter chlorophyll content at 28 DAS, the genotypes ESAL 589 X IAPAR 57 - PL 93, ESAL 589 X IAPAR 72 - PL 129, IAPAR 72 X ESAL 589 –PL49, UFU Roxo 12, ESAL 589 X IAPAR 57 - PL 28, CARIOCA PÉROLA-Witness, UFU Carioca 14 showed less infected area and the highest chlorophyll content, and at 38 DAS there was no significant difference among the genotypes.

RESUMO: O feijão comum (*Phaseolus vulgaris* L.) é uma planta anual que pertence à família Fabaceae, é cultivado por pequenos e grandes agricultores em diversos sistemas de produção no Brasil. Ele tem muita importância econômica e social. No entanto, a planta é um hospedeiro para muitas doenças fúngicas, bacterianas e virais. Entre as patologias virais tem-se vírus do mosaico dourado do feijoeiro (VMDF-BGMV), que atualmente se encontra em todas as regiões de produção de feijoeiro no Brasil e no mundo. A doença causa enormes prejuízos em todas estações de cultivo, notadamente no outono- inverno. Objetivo deste trabalho foi avaliar o grau de resistência apresentado por quinze diferentes genótipos de feijoeiro quanto à infecção (incidência be severidade) pelo vírus nas plantas. O delineamento experimental foi em blocos casualizados, com 15 tratamentos e uma testemunha, cultivar Carioca-Pérola, e composto por quatro repetições. Cada parcela foi composto por quatro linhas de 3,0 metros de comprimento e 0,5m de distância, correspondendo a um total de 60 parcelas de 6,0m². As características analisadas foram: emergência, incidência, severida de sintomas, peso de mil de mil grãos, produtividade e teor de clorofila nas folhas (índice SPAD). A incidência não se mostrou como variável inadequada para avaliar a resistência aos 28 e 38 dias após a semeadura (DAS). Para severidade a linhagem PL 38 se destacou e foi obtida apartir do cruzamento IAPAR 57 e IAPAR 72. Também apresentou menor severidade a linhagem 93, obtida do cruzamento entre ESAL-589 e IAPAR 57. Para peso de mil grãos, destacaram-se os genótipos UFU Roxo 12 (IAPAR 57 X ESAL 589 - PL 48), seguido por ESAL 589 X IAPAR 57 - PL 148-1, UFU Preto 29 (ESAL 589 X IAPAR 57 - PL 93), IAPAR 57 X IAPAR 72 - PL 25, IAPAR 57 X IAPAR 65 - PL194, CARIOCA PÉROLA-testemunha, UFU Carioca 14 e ESAL 589 X IAPAR 72 - PL 129. A maior produtividade por hectare foi do genótipo IAPAR57 x ESAL 589 - PL48 do grupo carioca. Quanto ao índice SPAD (clorofila aos 28 DAS), os genótipos ESAL 589 X IAPAR 57 - PL 93, ESAL 589 X IAPAR 72 - PL 129, IAPAR 72 X ESAL 589 -PL49, UFU Roxo 12, ESAL 589 X IAPAR 57 - PL 28, CARIOCA PÉROLA, UFU Carioca 14 apresentaram maior teor de clorofila aos 38 DAS (maior média numérica), más não houve diferença significativa entre os genótipos pelo teste de Scott & Knott a 5 % de probabilidade.

PALAVRAS-CHAVE: Feijoeiro comum. Genótipos. Vírus do mosaico dourado do feijoeiro. Resistência.

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