

IMPACT OF ANGULAR LEAF SPOT ON GRAIN YIELD OF COMMON BEAN LINES

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Our objective was to estimate the effect of angular leaf spot in 36 common bean lines evaluated in 15 experiments in the state of Minas Gerais, Brazil, in 2005 and 2006. The disease severity was evaluated using a 1 to 9 score scale, where 1 indicates no symptoms and 9 totally infected plants. After harvest the grain yield was estimated in kg/ha. Joint analyses for grain yield were performed considering all environments or only the environments with occurrence of angular leaf spot or those where the disease was not found.

In six of the fifteen environments, the occurrence of *P. griseola* was more severe and the lines differed in susceptibility. In these environments the estimates of the linear regression coefficient and the correlation between pathogen severity scores and grain yield were different from zero and negative, indicating that the stronger the disease severity, the greater the grain yield loss. In the mean of the six environments, the grain yield reduced 130.9 kg/ha for the increase of each unit of disease severity, which explained 52% of the grain yield variation. This confirmed that the pathogen can cause considerable yield losses, as mentioned above (Jesus Júnior et al., 2001).

However, the objective was to verify the effect of angular leaf spot severity in the identification of lines to be selected for VCU trials. Considering the mean of all environments, three groups were formed. Eight lines were classified as the most productive (Table 1). In the environments infected with angular leaf spot, four groups were formed and seven lines presented high performance. Of these seven, six ranked among the best in the overall evaluation. In the absence of the pathogen three groups were formed, but 18 lines were classified among those of best performance. It was concluded that the pathogen occurrence allowed a clearer discrimination and a greater safety for better line selection.

The lines with the abbreviation MA were part of a recurrent selection program targeting stronger *P. griseola* resistance; they generally confirmed the success of the ongoing selection (Amaro et al., 2007). The lines with the initials CVII had been taken from a recurrent selection program for grain yield. The *P. griseola* resistance was mostly weak. In the absence of the pathogen several lines were classified in the most productive group. The lines designated BP and RP were selected for best plant architecture and presented weak pathogen resistance. The others were commercial controls.

References

- Amaro, G.B.; Abreu, A. de F.B.; Ramalho, M.A.P.; Silva, F.B. 2007. Phenotypic recurrent selection in the common bean with carioca-type grains for resistance to *Phaeoisariopsis griseola*. **Genetics and Molecular Biology**. (in press).
- Jesus Júnior, W. C. de; Vale, F. X. R. do; Coelho, R. R.; Hau, B.; Zambolin, L.; Costa, L. C.; Bergamin Filho, A. 2001. Effects of angular leaf spot and rust on yield loss of *Phaseolus vulgaris*. **Phytopathology**, v. 92, n. 11, p. 1045-1053.

Table 1. Mean score of angular leaf spot severity (1 to 9) and grain yield (kg/ha) of the lines in environments with and without disease, and in the mean of all environments.

| Lines | Angular leaf spot | Grain yield | | Mean |
|---------------|-------------------|--------------|-----------------|--------|
| | | With disease | Without disease | |
| Ouro Negro | 2.9 | 2535 A | 2421 A | 2467 A |
| MAII-2 | 2.3 | 2659 A | 2268 A | 2424 A |
| MAII-16 | 3.0 | 2460 A | 2252 A | 2336 A |
| MAII-8 | 2.7 | 2402 A | 2246 A | 2308 A |
| MAII-22 | 2.0 | 2532 A | 2136 A | 2295 A |
| MAII-14 | 2.6 | 2332 B | 2264 A | 2292 A |
| MAII-5 | 2.2 | 2390 A | 2211 A | 2283 A |
| CVII-16 | 4.6 | 2278 B | 2251 A | 2262 A |
| MAII-10 | 2.8 | 2225 B | 2247 A | 2238 B |
| CVII-119-4 | 3.9 | 2080 C | 2309 A | 2217 B |
| RP-2 | 4.4 | 2079 C | 2292 A | 2207 B |
| MAII-3 | 2.5 | 2415 A | 2063 B | 2204 B |
| CVII-85-11 | 4.5 | 2138 C | 2236 A | 2197 B |
| CVII-45-5 | 4.8 | 2079 C | 2225 A | 2167 B |
| CVII-215-10 | 3.8 | 2209 B | 2127 A | 2160 B |
| RP-1 | 3.4 | 2240 B | 2102 B | 2157 B |
| BP-31 | 6.8 | 1952 C | 2267 A | 2141 B |
| RP-5 | 2.6 | 2242 B | 2060 B | 2133 B |
| CVII-85-11 | 5.0 | 2025 C | 2183 A | 2120 B |
| CVII-55-3 | 4.1 | 2035 C | 2134 A | 2094 C |
| CVII-39-18 | 5.6 | 1913 C | 2156 A | 2059 C |
| CVII-55-14 | 3.8 | 1987 C | 2090 B | 2049 C |
| BP-28 | 5.7 | 1964 C | 2061 B | 2022 C |
| BP-30 | 5.2 | 1949 C | 2050 B | 2009 C |
| Carioca MG | 6.2 | 1942 C | 2043 B | 2003 C |
| Pérola | 4.2 | 1962 C | 2006 B | 1988 C |
| BP-24 | 6.4 | 1837 D | 2085 B | 1986 C |
| RP-4 | 3.8 | 2059 C | 1919 C | 1975 C |
| BP-16 | 5.0 | 1921 C | 2004 B | 1971 C |
| BP-34 | 5.4 | 1792 D | 2078 B | 1964 C |
| CVII-85-17 | 3.8 | 2120 C | 1818 C | 1938 C |
| MAN-1 | 4.2 | 1805 D | 2015 B | 1931 C |
| BRSMG Talismã | 5.5 | 1963 C | 1874 C | 1910 C |
| MAII-17 | 2.0 | 1995 C | 1775 C | 1863 C |
| Carioca | 5.9 | 1796 D | 1896 C | 1856 C |
| RP-3 | 4.1 | 1605 D | 2022 B | 1855 C |
| Mean | 4.1 | 2109 | 2116 | 2113 |

¹Means followed by the same letter belong to the same group by the Scott-Knott test (1974), at the level of 5% probability.