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POTASSIUM FERTILIZATION INFLUENCE IN ANTHRACNOSE CONTROL IN COMMON BEAN

Wallysson Nascimento Lima

Universidade Estadual da Região Tocantina do Maranhão

Anatércia Ferreira Alves

Universidade Estadual da Região Tocantina do Maranhão, anaterciaa@yahoo.com.br

Deurimar Herênio Gonçalves Júnior

Universidade Estadual da Região Tocantina do Maranhão

Felipe Ferreira da Silva

Universidade Estadual da Região Tocantina do Maranhão

Alinne da Silva

Universidade Estadual da Região Tocantina do Maranhão

See next page for additional authors

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Authors

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POTASSIUM FERTILIZATION INFLUENCE IN ANTHRACNOSE CONTROL IN COMMON BEAN

Wallysson Nascimento Lima, Anatórcia Ferreira Alves^{1*}, Deurimar Herênio Gonçalves Júnior¹, Felipe Ferreira da Silva¹, Alinne da Silva¹, Wilson Araújo da Silva¹

¹Universidade Estadual da Região Tocantina do Maranhão – UEMASUL. Rua Godofredo Viana, 1300 – Centro. Cep: 65900-100. Imperatriz, MA. Brasil. *e-mail: anaterciaa@yahoo.com.br

INTRODUCTION: The common bean (*Phaseolus vulgaris* L.) crop is affected by more than 200 diseases, capable to narrow the production and decrease the product quality physiological, nutritional and commercial, including anthracnose. The bean anthracnose, caused by the fungus *Colletotrichum lindemuthianum* (Sacc. & Magnus), is one of the most serious bean diseases, affecting susceptible cultivars worldwide (Bianchini et al., 1989). Potassium has a big relation with the incidence reduction and diseases severity in plants, acting in the inoculum potential reduction (Huber and Arny, 1985). Thus, the research objective was evaluating the severity and the bean anthracnose control under different levels of potassium.

MATERIALS AND METHODS: The experiment was conducted in greenhouse with 5 liter pots in the Imperatriz city, in the Maranhão state, Brazil. Three common bean genotypes were used, being the Pérola cultivar (susceptible to anthracnose), BRS Estilo cultivar (moderately resistant to anthracnose) and BRS Madrepérola cultivar (resistant to anthracnose), in a completely randomized design with five treatments (0, 80, 120, 140 And 180 kg.ha⁻¹ as potassium chloride) and 4 replicates. The inoculation was done with a manual sprayer at the end V4 stage at 35 days after emergence, with a 1.2 x 10⁶ conidia.mL⁻¹ inoculum suspension. Severity assessments were made at 9 and 15 days after inoculation (DAI) according to the descriptive diagram scale proposed by Tamayo (1995), which ranges from 1 to 9 and the closer to 1 the lower the severity. For the analysis, was used the statistical program GENES (Cruz, 2013).

RESULTS AND DISCUSSION: There was significant difference ($p > 0.05$) between the treatments applied on the Peróla cultivar and no significant difference ($p \leq 0.05$) between the treatments applied in the BRS Estilo cultivar and BRS Madrepérola cultivar to the severity scores at 9 and 15 days after inoculation. According to the averages in Table 1, a decrease in the disease severity at 9 DAI was observed for the Pérola cultivar as the potassium dose increased, the same was verified at 15 DAI, and for treatment 5 (180 kg.ha⁻¹) this reduction was numerically higher, thus showing that potassium influenced the anthracnose severity, controlling the disease. For the BRS Estilo cultivar (moderately resistant) was observed that at potassium doses of 80 to 180 kg.ha⁻¹ at 9 DAI the severity scores were constant, with 2.2 approaching 3.0 (presence of few small size lesions covering approximately 1% of the leaf area), being that of the dose 120 to 180 kg.ha⁻¹ at 15 DAI it was observed that the severity scores suffered a reduction. In the BRS Madrepérola cultivar (resistant) at doses 80 to 140 kg.ha⁻¹ there was a reduction in anthracnose severity scores at 9 DAI and at 15 DAI and at the dose of 180 kg.ha⁻¹ the severity scores were lower than 1 to 15 DAI (without the disease symptoms presence). Gadaga (2009), evaluating the potassium phosphite effect on the common bean anthracnose control in greenhouse, also observed that there was efficiency in the disease severity.

Table 1: Severity averages at 9 DAI (S. 9 DAI) and Severity at 15 DAI (S. 15 DAI), evaluated in 3 cultivars under different K doses, Imperatriz, MA.

KCl (kg.ha ¹)	Cv. Pérola [*]		Cv. BRS Estilo ^{NS}		Cv. BRS Madrepérola ^{NS}	
	S. 9 DAI	S. 15 DAI	S. 9 DAI	S. 15 DAI	S. 9 DAI	S. 15 DAI
0	5.0	5.0	3.0	3.0	2.2	2.2
80	3.5	4.0	2.2	2.2	1.2	0.7
120	3.0	3.0	2.2	1.7	1.2	1.2
140	1.5	1.5	2.2	1.7	1.5	1.0
180	0.7	0.7	2.2	1.2	1.7	0.7
Averages	2.8	2.9	2.4	2.0	1.6	1.2

* Significant at 5 % probability by the F test; ^{NS} no significant at 5% probability, by the F test

In cowpea, the potassium fertilization use was also efficient in the web blight reduction and severity caused by *Thanatephorus cucumeris*, where the K₂O dose of 100 kg.ha⁻¹ provided a higher number of pods per plant and a higher harvest (Adebengan, 1998). According to Santos (2008), the deficiency, the excess or the imbalance in the nutritional elements combinations can influence the plants reaction to infection by pathogens so to increase the level of defense or favor the occurrence of diseases.

CONCLUSIONS: Potassium fertilization is efficient in the anthracnose control in the Pérola cultivar, reducing the disease severity at the 180 kg.ha⁻¹ potassium dose in KCl form. Mineral fertilization can contribute to the establishment of an integrated management program that allows greater efficiency in the anthracnose control, in addition to the strategy based on escape and protection, in order to reduce the bean anthracnose damage.

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