

CRESCIMENTO INICIAL DE PIMENTÃO FERTIRRIGADO COM DOSES DE POTÁSSIO EM AMBIENTE PROTEGIDO

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RESUMO: O pimentão (*Capsicum annuum* L.), tem grande importância para o Nordeste brasileiro, sendo uma cultura com alto potencial de geração de emprego e renda para pequenos e médios produtores. Objetivou-se neste trabalho estudar os efeitos de diferentes doses de adubação potássica fertirrigadas na cultura do pimentão cultivado em ambiente protegido em condições de clima semiárido. A pesquisa foi desenvolvida em estufa na área experimental do IFCE - Campus Iguatu. O delineamento estatístico utilizado foi de blocos ao acaso com quatro tratamentos e quatro blocos, sendo os tratamentos, referentes a quatro doses de potássio (D1 – 0, D2 – 250, D3 – 500 e D4 – 1.000 kg ha⁻¹), aplicadas via fertirrigação. O cultivo foi realizado em vasos com um sistema de irrigação do tipo gotejamento. Foram avaliadas as seguintes variáveis: diâmetro do caule e altura da planta. As variáveis foram coletadas durante seis épocas de avaliação até o momento de início da colheita. A dose de 250 kg ha⁻¹ da dose recomendada proporcionou melhores resultados para as variáveis analisadas.

Palavras-chave: *Capsicum annuum* L., manejo da fertirrigação, semiárido.

INITIAL GROWTH OF PEPPER FERTIGATED WITH POTASSIUM DOSES IN A PROTECTED ENVIRONMENT

ABSTRACT: The bell pepper (*Capsicum annuum* L.) is highly important for Northeast Brazil and is a crop with high potential for generating employment and income for small and medium producers. The objective of this study was to investigate the effects of different doses of potassium fertilizer fertigation on bell pepper crops grown in a protected environment under semiarid climate conditions. The research was developed in a greenhouse in the experimental area of the IFCE - Iguatu Campus. The statistical design used was randomized blocks with four treatments and four blocks, with the treatments referring to four doses of potassium (D1–0, D2–250, D3–500 and D4–1,000 kg ha⁻¹) applied via fertigation. The cultivation was carried out in pots with a drip irrigation system. The following variables were evaluated: stem diameter and height. The variables were collected during

six evaluation periods until the beginning of the harvest. The dose of 250 kg ha⁻¹ of the recommended dose provided the best results for the variables analyzed.

Keywords: *Capsicum annuum* L., fertigation management, semiarid.

1 INTRODUCTION

The cultivation of bell peppers (*Capsicum*) (*Annuum* L.) has great socioeconomic importance for Northeast Brazil, especially because of its potential to generate employment and income for small and medium-sized producers, in addition to being among the most cultivated and marketed vegetables in the region.

Bell pepper cultivation adapts well to the climatic conditions of northeastern Brazil, provided that it is managed properly, contributing to food security and the sustainable development of agricultural communities. According to Silva et al. (2020), bell pepper cultivation has stood out as a viable alternative in irrigated agriculture in semiarid regions, as it has shown good productive performance and acceptance in the regional market.

Potassium plays a crucial role in irrigated bell pepper cultivation. This nutrient is directly involved in vital physiological processes such as osmotic regulation, stomatal opening and closing, and photoassimilate transport, directly affecting productivity and fruit quality. According to Santos et al. (2018), the application of 80 kg ha⁻¹ of K₂O, combined with irrigation corresponding to 100% of the crop evapotranspiration, resulted in the highest productivity of the 'Rubia' bell pepper hybrid, highlighting the importance of adequate potassium management in irrigated systems in semiarid regions.

Applying potassium through fertigation in a protected environment offers significant advantages for bell pepper cultivation, as it ensures greater precision in terms of nutrient supply and reduces losses due to leaching. Oliveira et al. (2015) reported that using fertigation with soil solution monitoring enabled ideal foliar potassium levels and greater nutrient utilization, optimizing productivity with lower fertilizer consumption. Sousa et al. (2019) reported that applying 363

kg ha⁻¹ of K₂O via drip irrigation resulted in a productivity of 39.2 t ha⁻¹ in a protected environment.

However, they also reported that excessive doses of potassium can cause soil salinization and compromise crop yield, reinforcing the importance of balanced potassium fertilization management via fertigation.

In this context, the objective of this study was to evaluate the initial growth of green bell pepper plants fertigated with different potassium doses in a protected environment.

2 MATERIALS AND METHODS

The experiment was conducted in the Experimental Area of the Federal Institute of Education, Science and Technology of Ceará - Iguatu Campus, located in the Central-South mesoregion of the state of Ceará, at 6° 21' 34" S, 39° 17' 55" W, at an altitude of 217.8 m. The experiment was carried out in a greenhouse, the structure of which consisted of an arched roof covered with 100% virgin low-density polyethylene (PBDE) film, with UV and antioxidant protection and additives that distribute light inside the greenhouse, while the sides of the greenhouse were made of nylon protective mesh (50% shade cloth).

The hybrid green bell pepper crop was grown in 25 L polyethylene pots, with one plant per pot, after prior seedling production. The irrigation system used was a localized surface drip irrigation system, with one lateral line per row of pots and two 4 L h⁻¹ drippers ^{per} pot, operating at a working pressure of 100 kPa. Fertigation was performed using the differential pressure method with direct injection into the pump suction.

The experimental design used was a randomized block design with four treatments and four blocks. The treatments consisted of four doses of potassium fertilizer (D1–0, D2–250, D3–500, and D4–1,000 kg ha⁻¹), applied via fertigation and split according to the

recommendation of Braga and Marouelli (2017). Irrigation was carried out daily with the application of water until drainage began in the pots, with the goal of keeping them close to field capacity.

Plant height and stem diameter were evaluated at 11, 18, 25, 32, 39, and 46 days after transplanting (DAT). The variables analyzed

3. RESULTS AND DISCUSSION

A significant interaction was observed between potassium dose and evaluation time at

were subjected to analysis of variance using the F test at the 1% and 5% probability levels, which was performed using software from the Federal University of Campina Grande ASSISTAT® (version 7.6 beta) and Microsoft Office Excel®.

5% for plant height, whereas stem diameter was statistically influenced by the variation factors in isolation (Table 1).

Table 1. Summary of the analysis of variance for plant height (PH) and stem diameter (SD) of bell pepper plants as a function of potassium dose and evaluation time.

FV	GL	Medium square	
		AP	A.D
Dose	3	218.70 **	5.11 **
Era	5	5025.53 **	112.99 **
D x E	15	13.24 *	0.71 ns
Blocks	3	386.26 **	3.34 *
Residue	69	35.34	0.88
Total	95	-	-
CV (%)	-	14.54	13.96

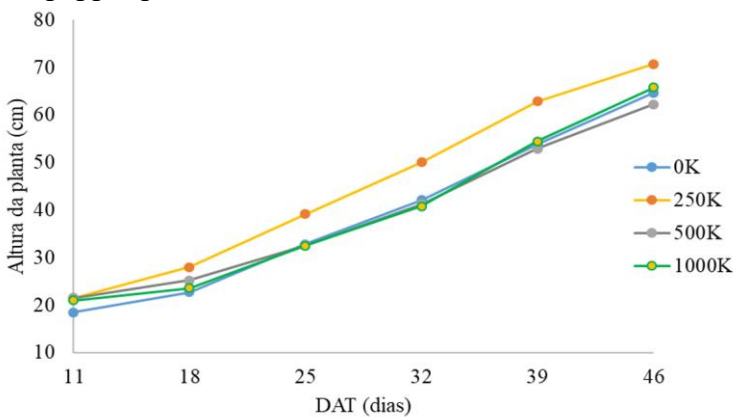
** significant at 1%; * significant at 5% by the F test; (ns) not significant by the F test; FV – source of variation; GL – degrees of freedom.

Source: Authors

With respect to plant height, the dose of 250 kg ha⁻¹ provided the highest values for this variable throughout the evaluation period,

reaching the highest observed value of 70.72 cm at 46 DAT (Figure 1).

Figure 1. Height of bell pepper plants as a function of dose and evaluation time.

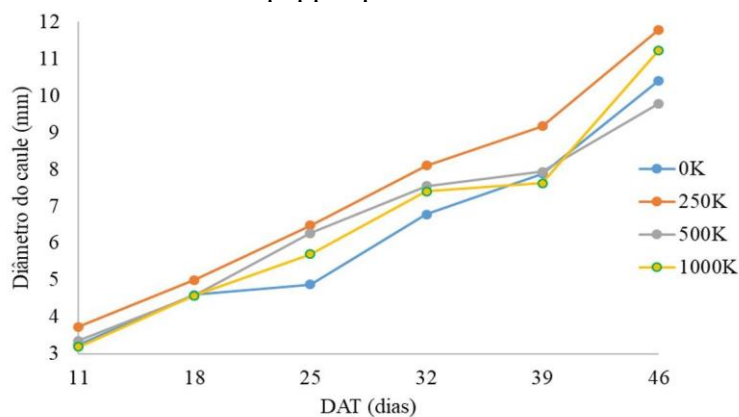


Source: Authors

With respect to stem diameter, it was not possible to fit a model that correlated the variable with the dose of potassium in isolation, so it was decided to present a behavior similar to that of plant height. With respect to stem

diameter, the dose of 250 kg ha⁻¹ also provided the highest values for the variable in question throughout the evaluation period, reaching the highest observed value of 11.79 mm at 46 DAT (Figure 2).

Figure 2 - Diameter of the stem of a bell pepper plant as a function of dose and evaluation time.



Source: Authors

The doses of 500 and 1,000 kg ha⁻¹ were similar to the zero dose, indicating that the treatments had adverse effects. This fact can be justified by the fact that excessive doses of potassium via fertigation can cause an accumulation of salts in the soil solution and significantly reduce the development of the bell pepper crop.

In an experiment conducted in a protected environment, Sousa et al. (2019) reported that as saline concentrations increased with increasing doses of K₂O, plant height decreased, demonstrating that an excessive supply of nutrients can limit the vegetative development of the crop.

In an experiment in which pepper plants were subjected to different salinity levels, Lemos Neto et al. (2012) reported that a reduction in stem diameter occurred at salinity levels starting from 3.5 dS m⁻¹. Thus, it can be inferred that excess potassium in the soil and the resulting increase in salinity compromised the structural growth of the plants.

4 CONCLUSIONS

A potassium dose of 250 kg ha⁻¹ provided the highest values for the variables analyzed, whereas doses of 500 and 1,000 kg ha⁻¹ caused decreases in the variables to levels similar to those of the zero dose, indicating that excess potassium in the soil compromised the structural growth of the plants.

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