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DETRIMENTAL EFFECTS OF REPEATED CYTOKININ APPLICATION ON "RED CREOLE" ONION (*ALLIUM CEPA* L.)

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An experiment was conducted to determine the effects of repeated application of a cytokinin, N-(Phenylmethyl)-1H-purine 6 amine, on the growth and yield of "Red Creole" onion (*Allium cepa* L.). Results showed detrimental effects of the cytokinin as the application frequency was increased. No significant difference was found between control plants and those sprayed with the cytokinin at rates 100 or 200 ppm 15 days after transplant, but in these treatments growth and yield were significantly higher than in plants sprayed every 15 days after transplanting. Treatments every 7 days after transplanting gave results significantly lower than the other frequencies. These results show that the application of this cytokinin to "Red Creole" onion at rates 100 or 200 ppm did not promote growth or yield, and that repeated treatment actually decreased overall growth and yield.

INTRODUCTION

There is abundant literature reporting the effects of many plant growth regulators on different crops, but little information is available about the practical applications of these substances on onions and their effects on the growth and yield of this crop. Research has been concentrated mostly on the aspects of using anti-sprouting products during storage.

Undocumented claims made by onion growers that different hormonelike substances actually increase yield and/or produce quality has created the need to verify these claims. In order to do that, a series of experiment have been and will be carried out. The present paper is an advance of the findings on the effects of the application of a cytokinin (PMPA) to red onion. The main objective of this experiments was to determine the effect of repeated spraying of PMPA on the fresh weight, dry weight and diameter of the bulbs of "Red Creole" onions.

MATERIALS AND METHODS

The experiment was conducted in Santo Domingo, located at sea-level. A completely randomized design with six repetitions was used. The experiment was done twice, obtaining very similar results. Treatments consisted of spraying of the plant growth regulator PMPA, at rates 0, 100 or 200 parts per million (ppm) in water solutions. PMPA was applied to the leaves at three different frequencies: (a) only once 15 days after transplanting (DAT), (b) every 15 days, from 15 DAT to 15 days prior to harvest, (c) every 7 days, from 15 DAT to 15 days prior to harvest.

"Red Creole", the main onion cultivar in the Dominican Republic, was used. Plants were transplanted 30 days after emergence, on plastic containers 15 cm of diameter x 15 cm height with sandy loam soil. Plant nutrition and protection was the same for all treatments, following the technical recommendations for this crop. Plants were harvested 120 DAT. At harvest, the variables bulb fresh and dry weight and bulb diameter were measured.

RESULTS AND DISCUSSION

The highest yield (bulb fresh weight), bulb dry weight and bulb diameter were found in the control and the treatments of 100 or 200 ppm 15 DAT. There was no significant effect due to rates, but frequencies had significant effects on the three variables.

Spraying every 15 days at either rate had a negative effect on all variables, yielding smaller bulbs

with a lower content of dry matter than plants without PMPA treatment or receiving the application just once. The negative effect was even greater when the frequency of application was every 7 days, resulting in bulb diameter and weights significantly lower than in the less frequent spraying. The responses of bulb fresh and dry weight as well as of bulb diameter to the rates and frequencies were consistent, clearly showing that at these rates, this product does not have positive responses in terms of the variables studied when it is applied at these rates on "Red Creole" onion.

CONCLUSIONS

The highest yield, dry matter accumulation and bulb diameter were found in the control and when PMPA was applied only once. No significant difference was found between the rates, but higher frequencies of application decreased the value of all three variables. According to these results, PMPA should not be expected to produce any significant increases in yield and/or bulb size in "Red Creole" onion, at least not when using the rates, frequencies and times of application used in these experiments. Further experiments are being performed, including other cultivars, rates, plant regulators, frequencies and times of application.

EFFECTS OF TWO PLANT GROWTH REGULATORS ON THE EARLY GROWTH OF GARLIC (*ALLIUM SATIVUM* L.) PLANTS

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ABSTRACT

In a replicated container experiment, gibberellic acid 3 (GA_3) and the cytokinin, N-Phenylmethyl-1H-purine, 6-amine (PMPA) were evaluated for their influence on early growth and dry matter accumulation in "La Flor" garlic grown at sea level during the summer season (June-August) in the Dominican Republic. Cloves were treated with either regulator at rates up to 200 ppm and evaluated seven weeks after treatment. The main finding was a significant change in the dry weight accumulated in the bulb at high rates of both regulators, associated with a significant reduction in leaf dry weight at the same rates.

INTRODUCTION

In the Dominican Republic, garlic is a very profitable crop. It is grown in the high altitude valleys of the country because of its climatic requirements of cool temperatures for bulbification. Attempts to grow garlic in the low altitude areas have resulted in low quality and yield, because plants produce abundant foliage but fail to develop bulbs of commercial size. Plant growth regulators can change the pattern of dry matter partitioning in crops, and such approach could be useful in "forcing" the plant to produce larger bulbs under unfavorable climatic conditions.

The objective of this research was to determine the possible effects of gibberellic acid (GA_3) and the cytokinin, N-phenylmethyl-1H-purine, 6-amine (PMPA) on the growth of "La Flor" garlic during its early stages, as an exploratory work for future research.