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POSTER PRESENTATIONS

EFFECTS OF TWO PLANT GROWTH REGULATORS ON GROWTH AND YIELD OF CHIVE (*ALLIUM FISTULOSUM* L.)

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A container experiment was conducted to determine the effects of two plant growth regulators, gibberellic acid 3 (GA₃) and the cytokinin, N-phenylmethyl -1H-purine 6-amine (PMPA), on the growth and yield of "Criollo Rojo" chive (*Allium fistulosum* L.). Both regulators were applied by bulb immersion during 24 hours just before planting, using 0, 1, 10, 100 and 1000 ppm solutions of both regulators. There was no significant effect of the regulators on the number of days from planting to plant emergence. Bulb dry and fresh weight were significantly higher in plants treated with 10 and 100 ppm of GA₃ and 10 ppm of PMPA, as compared to the other treatments tested. Dry weight accumulation in the leaves and plant height were significantly higher at 10 and 100 ppm of GA₃. According to these findings, immersion treatment with these regulators resulted in significant growth and yield improvement at 10 ppm PMPA and 10-100 ppm GA₃. Lower or higher rates were not effective.

INTRODUCTION

In the Dominican Republic, chive (*Allium fistulosum* L.) is a minor vegetable crop in terms of the area under production. However, the country ranks among the world leaders in per capita consumption of this seasoning vegetable. Very little research has been carried out worldwide to determine the effects of plant growth regulators on chive, and the Dominican Republic is not an exception in that matter. Due to lack of high level technology in chive production, yield of this crop is much lower than its apparent potential, and for that reason a series of research works have been conducted with the objective of increasing the productivity of chive.

The specific objectives of the experiments presented in this paper were to determine the effects of gibberellic acid 3 (GA₃) and the cytokinin phenylmethyl purine amine (PMPA) on foliar and bulb growth (yield).

MATERIALS AND METHODS

The experiments were conducted in Santo Domingo, Dominican Republic, using the native variety "Criollo Rojo" of chive (*Allium fistulosum* L.). A completely randomized design with five replications was used. The treatments consisted of 24 hour immersion of the seed-bulbs in 0, 1, 10, 100 and 1000 parts per million (ppm) solutions of the plant regulators one day prior to planting. Bulbs were planted on a sandy loam soil in plastic containers 15 cm in diameter and 15 cm of height. Plant nutrition and protection was the same for all treatments, following the recommendations for this crop. At harvest, the variables plant height, bulb fresh weight and bulb dry matter weight were measured.

RESULTS AND DISCUSSION

Plant height was significantly higher at rates 10 ppm PMPA and 100 ppm GA₃. Height significantly decreased at the remaining rates, with the shortest plants at 1000 ppm PMPA and the control treatments, indicating that maximum response is achieved within the range of rates tested in the experiment, where the low levels (1 ppm of PMPA and 1 to 10 ppm GA₃) do not stimulate growth in a significant way, whereas high rates (100 and 1000 ppm of PMPA and 1000 ppm GA₃) are excessive and limit the plant response. Plant height is considered an important feature in chives, since the leaves are also used as seasoning when the produce is consumed fresh, and abundant foliar growth is usually related to large-sized bulbs.

The main component in chive yield is bulb fresh weight. The highest values for this variable were found in plants receiving 10 ppm of PMPA or 10-100 ppm of GA₃. These were significantly higher than the control, which was not significantly different than the other treatments. Both 100 ppm of GA₃ and 10 ppm of PMPA also resulted in taller plants, indicating that at those rates there seems to be an overall promotion of growth. Bulb dry weight is an important variable, because it has been demonstrated that bulbs having a higher content of dry matter tend to keep better and for a longer time in storage. The treatments of 10 and 100 ppm of GA₃, and 10 ppm of PMPA resulted in the highest content of bulb dry matter, being significantly different than the other treatments. The lowest dry matter values corresponded to the 1000 ppm PMPA treatment, which was significantly lower than all the treatments tested. Again, 10 ppm PMPA and 100 ppm GA₃ resulted significantly superior. The increase in bulb weight (both fresh and dry) might be due to an effect of both regulators on the size and or division of cells in the seed-bulb after treatment.

CONCLUSIONS

Treatment of the seed-bulbs of “Criollo Rojo” chive (*Allium fistulosum* L.) with 10 ppm of PMPA or 100 ppm of GA₃ resulted in significant increase of the three variables studied, namely, plant height and bulb fresh and dry weight. Rates below or above these resulted in suboptimal growth, although some rates were significantly better than the control. According to the results of these experiments, seed-bulb treatment with either 10 ppm PMPA or 100 ppm GA₃ can significantly improve the yield of “Criollo Rojo” chive.