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Grower Mistakes Can Impact Garden Mum Production

Garden mums are one of the most popular summer and fall crops for greenhouse operations and despite expertly developed production schedules and tech sheets from specialty propagators this seemingly simple crop can still perplex many growers.

The use of Constant Liquid Feed (CLF) for mum production is often central to the production of quality garden mums. In order to ensure that the fertility needs of the mum crop are clearly being met a grower needs to make sure that their fertilizer injector is working properly. After a hectic bedding plant season few growers find the time to evaluate the operation of their fertilizer injector to ensure its accuracy prior to planting the garden mum crop. Unfortunately, over 75% of the fertilizer injectors that I have personally checked over the years for growers have not been functioning properly. Often a malfunctioning fertilizer injector can lead to lower injection rates of acid and/or fertilizer resulting in nutrient and media pH issues.

Garden mums are considered heavy feeders so growers typically will use a constant liquid feed rate of 250-300 ppm nitrogen for their crop. If the fertilizer injector is not working properly and is injecting too low of a rate of nitrogen the garden mum crop may move prematurely from its vegetative state to its reproductive state resulting in the development of crown buds. Before planting your 2019 garden mums calibrate your fertilizer injector to ensure that it is delivering the desired nutrient levels for your crop.

Garden mums are typically grown in a soilless mix with a pH range of 5.8 to 6.4. In areas where water alkalinity and pH are

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The logo for Ball, featuring the word "Ball" in a large, black, serif font with two red dots above the letter "i".The logo for fine, featuring the word "fine" in a lowercase, black, sans-serif font with a green leaf above the letter "i".

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high, growers may need to prescriptively inject acid into their irrigation water to lower both pH and alkalinity levels. When I visit any greenhouse operation I evaluate the irrigation water and the injector system first before I test the growing media.

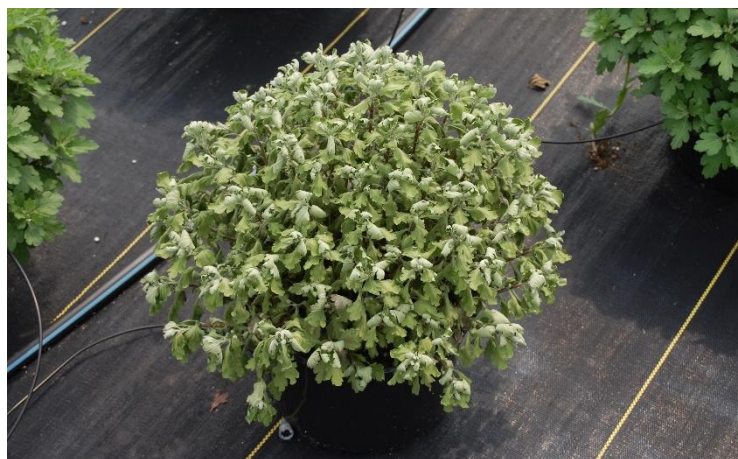
The photo at the top right was from a greenhouse operation that has a history of high water pH and high water alkalinity. The grower at this operation did not regularly test their media or their injector. When the injector function was checked by the educator it was determined that it was delivering less than 125 ppm of Nitrogen with a nutrient solution pH of 6.8 despite a grower target pH of 5.8 and a nutrient goal of 300 ppm nitrogen. Since there were no grower math or mixing errors the injector was clearly malfunctioning.

In a few cases, growers have continued to fertilize their garden mums too late into the production cycle resulting in elevated soluble salts levels in the growing media. As a rule growers should stop all fertilization and finish the crop with plain water when the first hint of color appears to improve post-harvest shelf life and plant quality. If media soluble salts levels are too high the crop can become more susceptible to diseases like Pythium root rot as seen in the middle photo.

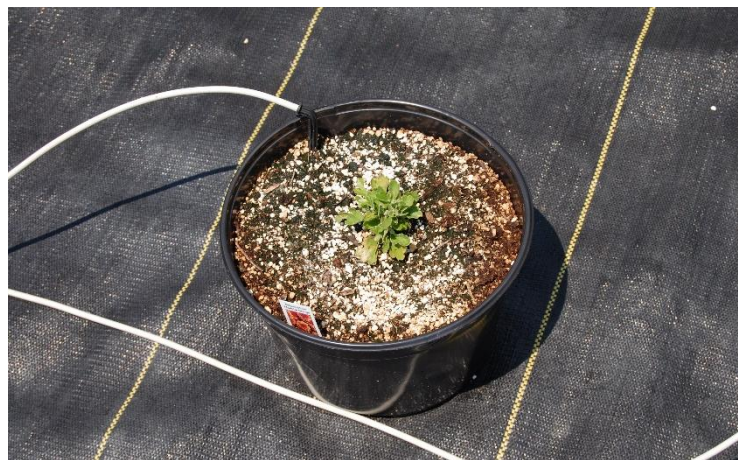
Controlled Release Fertilizers (CRF) are frequently utilized by garden mum growers with great success. However, in some cases growers either over apply the fertilizer (exceeding label recommendations) or mistakenly concentrate all of the slow release fertilizer onto one side of the container. In the photograph to the right the CRF fertilizer is concentrated in one spot directly across from the emitter. As a



Chlorosis in the mum crop was linked to a malfunctioning fertilizer injector. (Photo by: Thomas G. Ford, Penn State Extension)



Pythium root rot is frequently observed in garden mums when the media soluble salts levels are kept too high at the end of the production cycle. (Photo by: Thomas G. Ford, Penn State Extension)



Controlled Release Fertilizers (CRF) are frequently used in conjunction with Constant Liquid Feed (CLF) in garden mums. Placement of Controlled Release Fertilizers on one side of the container can lead to localized soluble salt problems.



Ethephon products like Florel or Collate can be used to encourage branching, prevent premature flower bud formation, and delay flowering. If the pH of the spray water is too high (> 5.0) it can cause these growth regulators to be less effective. (Photo by Tom Ford, Penn State Extension)



Uniformity in a garden mum crop indicates that the PGRs and fertility program have worked flawlessly together to produce a quality plant. (Photo by Tom Ford, Penn State Extension)

result, the media in the container was not being wet evenly causing localized elevated soluble salt issues on one side of the container. When this occurs media soluble salts levels can become too high resulting in reduced plant growth and even plant death.

Many growers have adopted the use of ethephon (Florel or Collate) with their garden mums to eliminate hand pinching. While many growers have enjoyed success using ethephon to encourage branching and to delay premature flower bud formation, some growers have not been particularly successful with these products because of their spray water quality. Plant growth regulators containing ethephon are less effective when mixed in water sources with a pH over 5.0. When ethephon based PGRs are mixed into water sources that have a pH over 5.0 they prematurely release the ethylene into the air as a gas instead of ethephon being absorbed by the plant and then converted to ethylene inside the garden mum.

Garden mum growers wishing to use ethephon-based PGRs like Florel or Collate must maintain the pH of the water in the spray tank between 4.0 and 5.0. Ethephon-based PGRs tend to be acidifying, but if the water source is very alkaline with a high pH the grower may need a spray buffering agent to adjust the water pH to the appropriate range. Water sources with very low alkalinity or poor buffering capacity may need to use a different spray buffering agent to prevent the spray solution from dropping below a pH of 3.0 which could cause plant injury.

Growers in areas where highly alkaline/high pH water predominates often talk about ethephon PGR failures. Growers in these areas see reduced effectiveness of Florel and Collate resulting in premature flower bud formation with few breaks or branching. A slight adjustment in the pH in the spray tank in subsequent years improved ethephon efficacy and crop response to these ethylene generating compounds.

e-GRO Alert

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