

The Case of the Purpling Geraniums

A spring bedding plant grower in the central Midwest began to notice the development of some lower leaf purpling on their 4-inch zonal geranium crop on February 25 (Photo A). The greenhouse producer's initial reaction was that the crop needed more nutrients, so they increased the liquid feed rate applied at each irrigation from 150 to 250 ppm nitrogen. But 10 days later, the problem was worsening. The purpling was spreading to an increasing number of a plant's leaves and the reddish hue was deepening in color (Photo B).

As the grower carefully defined the symptoms on the plants, patterns of injury, and time-development of damage, she jotted down these notes:

- Mid to lower foliage canopy developing purple coloration; youngest foliage not affected
- Purpling is apparent on both upper and lower leaf surfaces (Photo C)
- Root system is white, but has not vigorously filled out the pot
- Geraniums are being grown in [two greenhouse sections, X and Y], but only geraniums in [one of the greenhouse sections, X] are showing symptoms; disorder occurring uniformly across plants in that section
- Growth of affected geraniums never really took off; geraniums grown in [other greenhouse section] are larger
- Symptoms have been developing slowly and are worsening with time; in particular, leaf margins are turning a deep red/purple color (Photo D)

Here are more details about the crop's nutrient management program:

- The water source is well with enough alkalinity to require sulfuric acid injection to neutralize it; plants in each greenhouse section are fed through a different Dosmatic injector, and acid is added to the fertilizer stock tank (Photo E)
- In previous years, the root medium was a pre-mixed 75 peat : 25 perlite commercial blend to which 25% coir was added, but this year, because of a miscommunication, a 100% coir mix was used. The grower wonders if the new mix is contributing to her problem, but the unaffected geraniums are also growing in it

The grower performed pour-through extracts to get a read on pH and EC from geraniums in both greenhouse sections. She pooled samples from 3 pots for each sample. Results are below.

Sample ID	Pour-through pH	Pour-through EC
Affected geraniums, Section X	6.4	1.9
Affected geraniums, Section X	6.5	1.7
Unaffected geraniums, Section Y	6.7	2.6
Unaffected geraniums, Section Y	6.4	2.8

Assignment: The above thought process and data allowed the grower to get the bottom of her problem. Define the problem and indicate what caused you believe caused it. Support your statements by pointing to specifics in the analyses and/or noted observations. Explain how the problem can be avoided in the future.



Photo A. Lower-leaf purpling on 4-in zonal geranium crop on February 25.



Photo B. Despite increasing fertilizer rate applied, the symptoms were worse 10 days later.



Photo C. Purpling is apparent on upper and lower leaf surfaces.



Photo D. Marginal reddening appeared as the symptoms progressed with time.



Photo E (left). Dosmatic injector used for fertigation in the greenhouse section with the affected plants, Section X. A similar set-up is used to feed the unaffected geraniums in Section Y.