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Chloromequat chloride-induced chlorosis on osteospermum

Chlorosis can be a concerning thing to see in the greenhouse, since it can be a symptom of a variety of biotic and abiotic disorders. In this Alert, we will look at how excessive chlormequat chloride solution can affect osteospermum.

This osteospermum crop started to exhibit chlorosis on leaves. The distribution of the symptoms across the crop as well as individual plants, made it clear this wasn't any nutrient deficiency. It started showing up after an application of chlormequat chloride (Citadel, formerly Cycocel now Altercel) was made.



Figure 1. The chlorosis seen on the foliage of these osteospermum is the result of a foliar chlormequat chloride spray. While chlormequat chloride is a good PGR for osteospermum, phytotoxicity can occur at appropriate concentrations when an excessive volume of solution is applied.

Chlormequat chloride is an active ingredient that is useful in controlling excessive osteospermum growth. Foliar sprays of chlormequat chloride

are effective and recommended plant growth regulator (PGR). In addition to using it as a sole active ingredient, tank-mixing it along with daminozide is another good strategy.

Chlormequat chloride is an effective PGR for many crops but is well-known for causing chlorosis on foliage. Geraniums can be particularly susceptible to yellowing in response to chlormequat at moderate concentrations- and sometimes the "halo" of chlorosis is used as a confirmation sufficient active ingredient was applied. For other crops chlorosis may be more common at concentrations above 1,500 ppm. However, was the chlorosis here caused from an excessive concentration or application volume?

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In looking at the pattern of how the chlorosis is distributed in the crop, there are pockets up front- near the aisle- where chlorosis is more concentrated and prevalent. As you look back towards the back of the block, there is little to no chlorosis. The degree of this chlorosis on affected leaves, combined with the lack of chlorosis in areas around affected areas, is a good indicator the chlorosis was caused by an excessive volume of solution from a less-than-even application and not an excessive concentration.

There are several best management practices for foliar PGR sprays. Among them is to apply 2 quarts of solution per 100 square feet of growing area. Uniform applications require applicators to calibrate their spraying equipment and use of that equipment to get to a point where they are confident in their application volume.

Chlormequat chloride does have root activity- meaning it can be taken up from the substrate. In those spots where excessive solution was applied, it likely ran down the stem into the substrate, potentially causing excessive growth control. Watch for excessive growth control and consider using GA+BA (Fresco, Fascination) to counter any over-regulation.

For modest chlorosis, tissue can regreen by the end of the crop cycle. However, in this instance there was some necrosis on leaf margins at high concentrations- and this won't green up. Instead, promote growth and development of new, unfolding leaves. As they unfold and mature, the new leaves will can cover necrotic tissue if there are enough new leaves that grow to an adequate size. This can become a bigger concern for crops with terminal flowers- like osteospermum- because once flowers have initiated no more leaves will be formed.

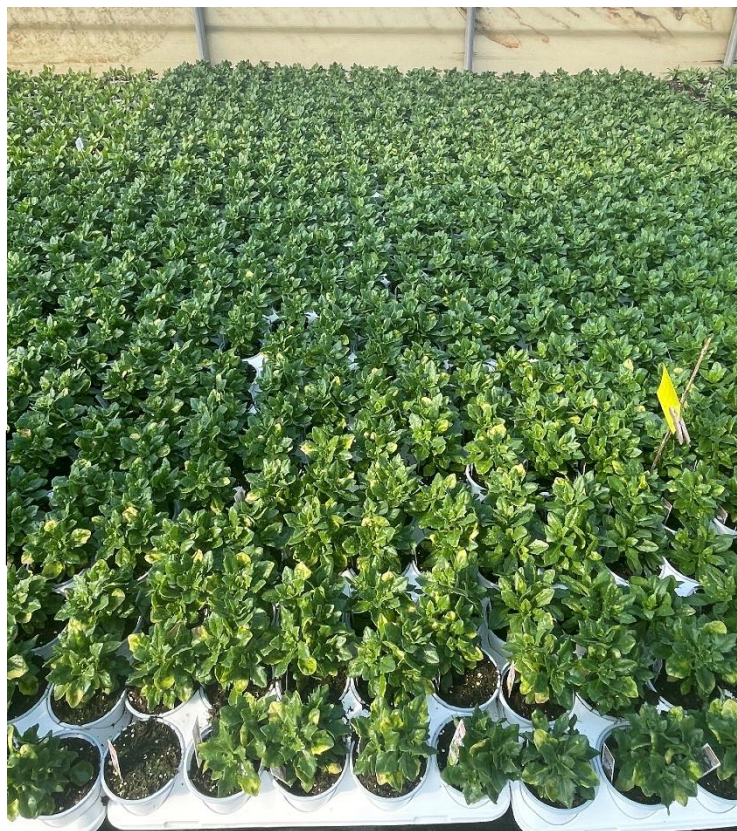


Figure 3. The chlorosis was concentrated near the aisle, and was absent back by the wall. This indicates the likely cause of the chlorosis was non-uniform application resulting in areas with excessive solution on the crop.



Figure 4. Mild chlorosis caused by chlormequat chloride sprays usually greens-up by the time a crop is finished. However, if chlorosis advances to the point of necrosis as seen here, new, healthy leaves must be produced to cover up the damage and maintain the marketability of the crop.

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