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Phytotoxicity!! Relative Humidity Affects PGR Uptake

These photos give a graphic example of the impact of environmental conditions on the uptake of PGRs - and other plant protection products - by our plants.

We often caution growers that many of our plant growth regulators (PGRs) are absorbed by leaf tissue relatively slowly and that conditions that extend the drying time will enhance uptake of the PGR active ingredient.

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In a Spring study we evaluated Configure spray application rates up to 1200 ppm on several recently rooted liners of herbaceous perennials, including *Phlox paniculata* 'Star Fire,' *Salvia officinalis* 'Aurea,' *Veronica longifolia* 'First Love' and *Heliopsis helianthoides* 'Lorraine Sunshine.' We were surprised to find little effect of Configure on these crops since they had all been responsive in previous trials. In a followup study during the Summer, we again applied a single, relatively high rate of Configure, 900 ppm, to liners of these same cultivars. [NOTE: We do not recommend rates this high on herbaceous perennials.] We had completely different results which included significant phytotoxicity (Fig. 1).



Figure 1. Phytotoxicity on *Heliopsis helianthoides* 'Lorraine Sunshine' after application of 900 ppm of Configure in humid conditions.

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Upon investigation, we found that the environmental conditions were significantly different between the two application times. All applications were made in the morning hours. In our Spring (April and May) study, the temperatures at the time of the PGR application ranged from 80F to 85F and our relative humidity ranged from 32% to 38% under sunny skies. All of these conditions would contribute to rapid drying of the PGR on the leaf surface; or, in other words, these conditions would limit the uptake of Configure into the plant.

In contrast, during the application of Configure in our Summer (July and August) study, the temperatures ranged from 71F to 72F and our relative humidity ranged from 80% to 92% under cloudy skies. These slow drying environmental conditions were ideal for increasing the uptake of Configure or other products by the leaves.

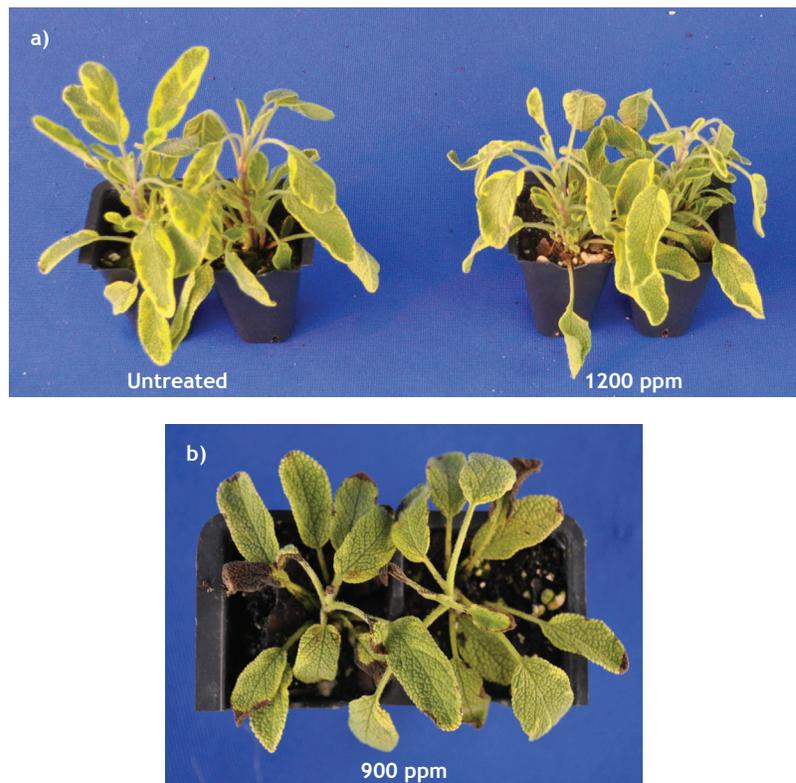


Figure 2. *Salvia officinalis* 'Aurea' after Configure was applied as a foliar spray under a) Spring conditions (low relative humidity) at 0 (left) or 1200 ppm (photo 3 weeks after treatment); or, b) Summer conditions (high relative humidity) at 900 ppm (photo 1 week after treatment).

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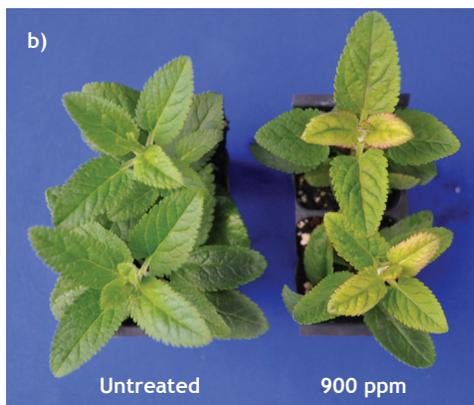


Figure 3. *Veronica longifolia* 'First Love' after Configure was applied as a foliar spray under a) Spring conditions (low relative humidity) at 0 (left) or 1200 ppm (photo 3 weeks after treatment); or, b) Summer conditions (high relative humidity) at 0 (left) or 900 ppm (photo 1 week after treatment).

And, on the *Salvia*, *Veronica* and *Heliopsis*, we had significant PHYTOTOXICITY!! The *Phlox* exhibited no phytotoxicity symptoms with only a slight increase in the number of lateral branches.

In summary, environmental conditions, especially extremes of relative humidity, can significantly impact the uptake of PGRs. We've documented the phytotoxicity caused by excessive uptake of the active ingredient in Configure under high relative humidity, slow drying conditions. [Again, these rates were higher than we would recommend on herbaceous perennials!]

Conversely, under the rapid drying conditions in our Spring study, very little Configure was absorbed by the leaves and we had little improvement in branching. So consider that some of the times that we - or you - say that a PGR "didn't work," it may have been due to the impact of the environmental conditions at the time of application.

So be aware of the environmental conditions at the time of your PGR spray applications. Try to be consistent not only with spray application methods but with the drying conditions in the greenhouse as well. If that's not possible, at least try to avoid making spray applications during the extremes of relative humidity in the greenhouse.

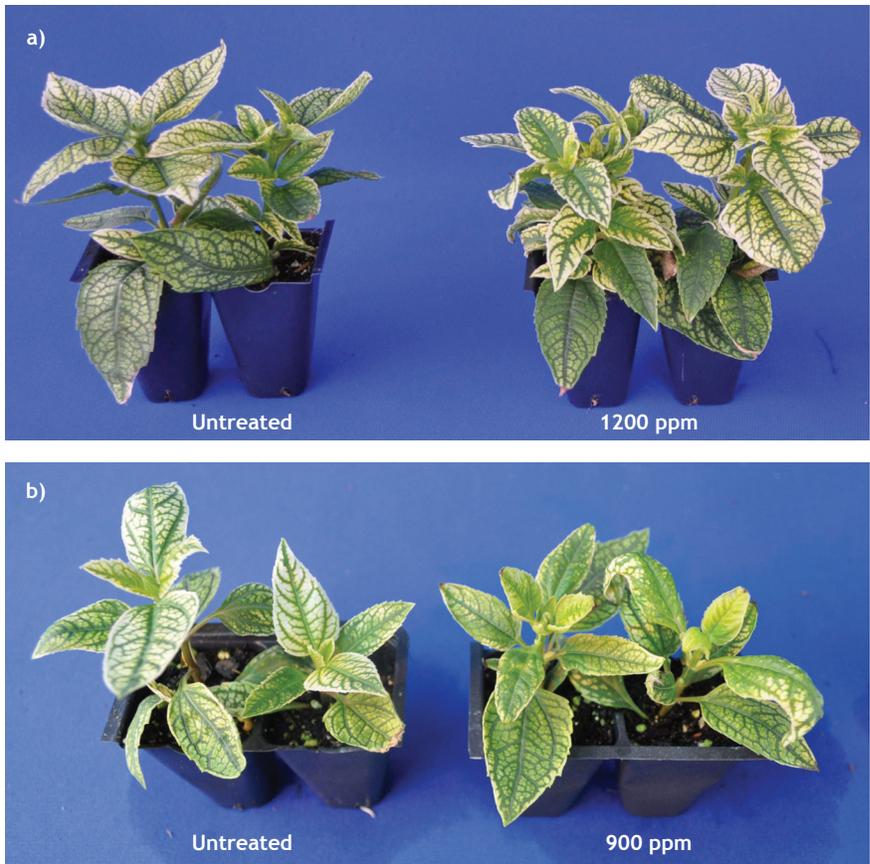


Figure 4. *Heliopsis helianthoides* 'Lorraine Sunshine' after Configure was applied as a foliar spray under a) Spring conditions (low relative humidity) at 0 (left) or 1200 ppm (photo 3 weeks after treatment); or, b) Summer conditions (high relative humidity) at 0 (left) or 900 ppm (photo 1 week after treatment).