PHYTOTOXICITY—COMMON CAUSES

When you see a brewing pest or disease problem, treatment with an appropriate insecticide/miticide or fungicide is typically a key step in your best management practices. However, sometimes phytotoxicity (adverse effects on plant growth, physiology or metabolism)—often called "burn" in general terms—occurs after an application and it's not always clear as to why.

Common Causes of Phytotoxicity

There are a multitude of reasons that phyto may occur, and often it's a perfect storm of multiple factors that ultimately cause it. If you've experienced a sudden onset of damage to your crops and can't pinpoint the cause, consider the following:

Genus/Species Sensitivity: Some crops simply do not react well to certain active ingredients in IPM products or other components in the formulation like carriers, emulsifiers, etc. As part of the EPA registration process, manufacturers screen a wide range of common ornamental genera for phyto.

- Documented sensitivities are listed on the product label. Sometimes the label on the bottle or jug is difficult to read, so finding an electronic version on the manufacturer's website is a good place to look if you cannot read the printed label.
- A quick CTRL (or "command" for Apple users) + F search on a PDF version of the label is the quickest way to find this info. Generally, a search using the Latin genus or common name will bring you right to any notes regarding sensitivity of the crop in question to the product you want to apply.

- Keep in mind—if a crop isn't listed in a "sensitive species" section on the label, this does not guarantee phyto won't occur. Always test a small group of plants when you apply a new IPM product or treat a new crop for the first time.

Inappropriate Tank Mixes: Time is a precious commodity for you and your team during spring and many of us like to save a few minutes whenever possible. This is especially true where pesticide applications are concerned, because sprays and drenches are often time-sensitive but also time-consuming.

- When multiple products need to be applied to control spikes in pest and disease pressure, many growers will tank mix (combine multiple products) and apply them together.

- However, not all products are chemically and/or physically compatible with each other. This can lead to phyto and severity can vary greatly, depending on the mix, dosage and other factors.
- Some products mention specific pesticides with which they should not be combined. Oftentimes, these are other products made by the same manufacturer, but it's best to avoid tank-mixing with similar, off-brand chemistries, as well.
- Addition of certain types of spray adjuvants in single-product applications can also cause phyto. For example, there are quite a few products we use in greenhouse ornamental production that specify they should not be used in junction with organosilicone surfactants. If you're ever unsure whether it's safe to add a new surfactant to a spray solution, consult with your chemical distributor or apply the mix to a few plants first to evaluate.

Here's a link to an excellent University of Florida **ARTICLE ON TANK MIXING BMPs**. Be sure to review these steps before the next time you decide to tank-mix pesticides to minimize the chances of phyto or ineffective pesticide applications.

Drought Stress at the Time of Application: One for the first rules to follow when you apply insecticides, miticides, fungicides or plant growth regulators (PGRs) is to *never apply when crops are too dry*.

- This is especially true for any product that is being applied to the rootzone, or if foliage is slightly wilted before a spray. Drought stress lowers the water potential inside plant tissues. Water moves from high- to low-potential systems, so this makes it easier—almost too easy—for drought-stressed tissue to absorb pesticide spray- or drench solution.
- Rapid absorption due to lowered water potential can cause active ingredients, carriers, or other parts of the formulation that might not normally be absorbed by plants to be absorbed rapidly by plant tissues. Excessive concentrations of these different components accumulate in cells, which can wreak havoc on cell function and cause phyto. This effect is like what you might see if the product you use was applied at too high a concentration under more normal conditions.

Avoid this is by ensuring that plants are well-watered at least 24 hours before you apply insecticide, miticide, fungicide or PGRs.