e-GRO Alert



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Stevia:

Managing EC to Prevent Foliar Damage

Stevia is a popular alternative sweetener and is produced by greenhouse growers as a vegetative plant for garden sales similar to a herb. Stevia plants are produced by either seed or clonal propagation and are very sensitive to high levels of fertility early in the production phase.

Stevia (*Stevia rebaudiana*) has gained popularity as an alternative sweetener due to high glycosides concentrations. In warmer climates (USDA zones 9-11), it is a perennial herb, but it will not overwinter in colder climates, however it is treated like an annual.

Greenhouse growers have been producing stevia as an herb for spring sales as a garden transplant. It can be grown from seed, but there is a wide genetic variation among plants in growth characteristics and overall glycoside concentration. To overcome possible variability, cuttings are also used for commercial plantings. Greenhouse growers should be aware of the possibility of salt stress caused by soluble salts to stevia transplants.

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Soluble salts in irrigation water and substrate are measured as electrical conductivity (EC), where high EC values equate to higher dissolved salt concentrations. Water-soluble fertilizers and mineral acids both contribute to EC when dissolved in the irrigation water. High levels of salts supplied in the irrigation water can build up in the growing substrate and cause high substrate EC and salt stress on plants. These symptoms will appear as stunted growth, wilting (Fig. 1), and burning of leaves (Fig. 2). Dark interveinal spotting was the initial symptom that occurred prior to the wilting of the leaves which eventually turned necrotic (Fig. 2).

High EC is often caused by an over-application of fertilizers or additional soluble salts in the irrigation water. Salt concentration in groundwater can be a problem in certain regions. This can be caused for many reasons including saltwater intrusion or in northern climates the use of salts used to de-ice roadways in the winter. In both cases, salts can leech into the groundwater supply and result in fertility problems for growers. Growers should conduct an irrigation water test to determine a baseline of water quality before the addition of fertilizers to avoid raising the EC to harmful levels. Proper monitoring of irrigation water is recommended to ensure that safe levels of soluble salts are being applied to crops to avoid negative impacts on plant growth. An imbalance in fertility can often result in a change in substrate pH and EC. A PourThru test can easily be conducted for potted plants to determine the pH and EC of a substrate to ensure optimal growing conditions are provided for maximum growth.

Figure 1. A comparison between a plant grown under high EC conditions (left) and a plant grown under optimal EC conditions (right). The plant on the left is exhibiting wilting and leaf burn caused by high EC conditions.

Corrective Procedures:

Excessively high fertilization rates will result in a marginal leaf burn. Check the substrate EC to confirm your diagnosis. Values greater than 6.0 mS/cm based on the PourThru sampling method can be problematic for many plants.

Switch to Clear Water Irrigations.

If the substrate EC is just beginning to increase over time, then leach with a few clear water irrigations to lower EC levels by flushing out the salts.

Clear Water Leaching.

If the EC values are excessively high, leach the substrate twice with back-to-back clear water irrigations. Then allow the substrate to dry down normally before retesting the EC. If EC levels are still too high, repeat the double leach. Once the substrate EC is back within the normal range, use a balanced fertilizer at a rate of 150 to 200 ppm N.

Figure 2. The progression of leaf burn on stevia from least severe (left) to most severe (right).

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