Greenhouse TPM/IPM Bi-Weekly Report
University of Maryland Cooperative Extension
Central Maryland Research and Education Center

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September 4, 2009

Check Your Fertilizer Injectors and Tank Solutions

We examined a pansy crop this week that had marginal leaf burn on the foliage. Three times the amount of fertilizer was being put out through the injector than the grower thought. We took a reading of 3.23 millilmohs coming out of the water wand head. As a grower you need to have a good soluble salt and pH meter and calibration solution. I would suggest checking your injectors at least 2 or 3 times in the year for accuracy. Also be sure that the fertilizer concentrate is measured correctly.

Fertilizer Injector Calibration
Chuck Schuster

A Hands-on Approach To Fertilizer Injector Care And Calibration:

Fertilizer injector calibration should be done on a regular basis. Depending on how often it is used, calibration should be done at least once per month. This should be done along with a regular schedule of cleaning and maintenance.

Before any calibration can be done, perform all required and recommended maintenance. This should include:

- Cleaning of the suction tube strainer.
- Determine if the suction tube strainer is located at least 2 inches from the bottom of the stock tank, this prevents the suction of undiluted fertilizer.
- Clean the stock tank out of all settled material.
- Inspect and service all o-rings using no petroleum based lubricants on the o-rings, use silicon based lubricants.

After a thorough cleaning of the stock tank and injector one is ready to start the process of calibration. **Two methods will be discussed and demonstrated.**

Dilution Ratio Method

Items needed

1 -five-gallon bucket
1- large ounce-measuring cup
Calculator

After properly cleaning the injector run water through to remove all air bubbles.
Remove suction tube from the stock tank and place into water filled large measuring cup after filling it with water.
Place output hose into the 5-gallon bucket.
Turn on the water and adjust the flow to the same rate as used in fertilization.
Run the water until either the 5-gallon bucket is filled or the measuring cup is empty, whichever occurs first.

If the five-gallon bucket filled first, measure the amount used from the measuring cup, write this amount down. Note: Amount used, not amount left.

If the measuring cup is depleted first, measure the amount collected in the five-gallon bucket in *gallons*.

$$\text{Injector Ratio} = \frac{\text{Gallons of water collected X 128 ounces per gallon}}{\text{Ounces of water used from the measuring cup}}$$

Examples:
1) Collected 5 gallons of water, used 10 ounces of water from the measuring cup.

$$\text{Ratio} = \frac{5 \times 128}{10} = 64, \text{ the Injector Ratio is } 1{:}64$$

2) Collected 4.5 gallons of water and used 16 ounces from the measuring cup.

$$\text{Ratio} = \frac{4.5 \times 128}{16} = 36, \text{ the Injector Ratio is } 1{:}36$$

After calculating the Injector Ratio, determine how much fertilizer needs to be placed in the stock tank.

Using example 1 - a ratio of 1:64, a 20-10-20-analysis fertilizer and a need to have 200 ppm of nitrogen at each use. How many ounces of concentrate need to be applied to a 5-gallon stock tank?

Use the conversion constant of 75

$$\text{The amount of 20-10-20 fertilizer} = \frac{200\text{ppm of N} * 64}{20\%\text{N} * 75} = \frac{12800}{1500} = 8.54 \text{ oz/gal}$$

8.54 * 5 = 43 ounces of 20-10-20 fertilizer needed for the 5-gallon to meet the requirement of 200 ppm of Nitrogen.

Electrical Conductivity Method
Items Needed

1 Electrical Conductivity Meter
1 Standard Solution for Meter Calibration
1 Plastic Measuring Cup

Calibrate the EC Meter according to the directions included with the meter before use.

Run the irrigation water for at least 5 minutes without any injected fertilizer, this can be done before the fertilizer injector, or after the injector with the injector turned off. Collect a sample of this in the plastic measuring cup. Using the calibrated meter, take the EC reading from this sample.

Collect a sample of fertilizer solution at the output end of the hose after allowing the injector to run for at least 5 minutes in the cleaned and dried plastic measuring cup.

Subtract the EC reading for the clear water from the EC reading for the fertilizer solution. Note this number: _____ = EC of the Fertilizer Solution

Many fertilizer companies list the Electrical Conductivity for various dilutions on the bag or publish this information in literature available from the manufacturer. Compare your EC reading of the Fertilizer Solution with that provided by the manufacturer of the material.

Chrysanthemums

In the Frederick Area greenhouse growers are finding saltmarsh caterpillar, *Estigmene acrea*, active on mums this week. The caterpillars are found in the center of the plants and cluster together feeding on inner growth in early September. They move out to outer foliage later in September.
Control: Acelpryrn, Conserve, Pylon (in greenhouses only) or Orthene.
Saltmarsh caterpillar photo by: Frank Peairs, Colorado State University, Bugwood.org

Pansy

Check foliage for presence of larvae of fritillary butterfly this week. The larvae are spiny, orange and black and feeding heavily on pansy foliage.
Control: Acelpryrn, Conserve, Pylon (in greenhouses only) or Orthene.

Anthracnose on Pansy

We received a pansy sample in the clinic with a severe leaf spot problem. Pansies can have a number of foliage diseases, but this time anthracnose, caused by the fungus Colletotrichum, was the culprit. The black setae (hairlike projections) and orange spore masses of the pathogen are often visible with a hand lens in the center of the lesions. Foliar application of fungicides such as the strobilurins (Heritage and others), chlorothalonil (Daconil), or thiophanate methyl (Cleary's 3336) can protect foliage from anthracnose infection. There are lots of spores in the lesions, and they can be moved by splashing water, so it's always a good idea to avoid overhead irrigation to reduce disease spread. **Photos below by Karen Rane**

Anthracnose on pansy

Close-up of leaf spots caused by the fungus, Colletotrichum

Eriophyid Mites on Echinacea

Steve Algeier, Carroll County Office, University of Maryland Extension, sent in a sample of echinacea last week to the Plant Diagnostic Lab. Karen Rane found loads of eriophyid mites in the flowers. Steve reported that echinacea and aster both had severely distorted flower heads and the florets were not developing.

Eriophyid mites are extremely tiny (0.3 mm in length), microscopic, spindle-shaped mites with elongated bodies. They resemble sausages with the head and legs located on one end of the body. Eriophyid mites only have 4 legs, which is a unique characteristic among mites. All other mites have 8 legs as adults.

These mites are a specialized group of plant feeders. In general, many eriophyid mites feed on a few closely related species or genera of plants. Eriophyid mites feed deep within the plant tissues sucking out plant juices with their stylet-like mouthparts and transferring a substance, which causes deformation of plant growth. Eriophyid mites live and reproduce within the folds of plant tissues. The eggs are spherical and generally laid in groups. They hatch in less than two weeks into young mites that may take approximately two weeks to a month to mature into adults. Several generations may occur throughout the growing season.

Eriophyid mites can easily come in on plant material from a supplier. If you are a grower examine your plants for eriophyid mites in September and make sure you are not selling customers infested plants. Once damage is evident, it is too late because the mites are already

established within the plant. The number of miticides for controlling eriophyid mites is limited. Pest control materials with translaminar properties are your best choices for "managing" eriophyid mites. These would include abamectin (Avid) and chlorfenapyr (Pylon) which can be used in greenhouses only. Additional pest control materials that may work on eriophyid mites, if you can make contact, are pyridaben (Sanmite), fenpyroximate (Akari), and endosulfan (Thiodan).

Many eriophyid mites are on this flower head
Photo by Karen Rane

Close-up of one of the eriophyid mites
Photo by Karen Rane