Addendum to SARE Project FNE02-443 Final Report – Production of Nutrient Enhanced Compost and Compost Tea Using Vermiculture Technology

To make this report more meaningful to growers and to increase the potential audience to include growers who think best in ppm, I researched the recommended fertilizer rates using nitrogen as the primary nutrient of concern. As my research source, I used the recommendations found at the University of Massachusetts Extension website (www.umass.edu/umext/programs/agro/floriculture/floral_facts) for bedding plant production. In bedding plant production, fertilizer (soluble nutrients from a synthetic source) rates for soilless growing mixes would typically be in the 200-250 ppm range for N. If a grower was using compost-based grow mixes, as is typically used in organic production, then those rates would be reduced because the nitrogen contained in the growing medium would need to be considered. It is important to note that the recommended fertilization rate should be applied with common sense as well as an applicator. It is recommended to fertilize vigorous cultivars shortly after transplanting. This is not necessary for organic growers because more that sufficient nutrients should be readily available in a quality compost-based growing mix. It is also recommended that small, slow-growing species should receive lower rates or less frequent applications until they are well established. Here is where the application of common sense can be beneficial. The rate of soluble nutrients from a synthetic source should be cut in half at visible bud or about 2-3 weeks from the sale date. A soil test is a good recommendation if there are obvious problems associated with this fertilization strategy. The website referenced above also discusses common nutrient problems that can occur in bedding plants. They include the following problems.

1. Excess soluble salts in seedling or early transplant stage.
2. Iron/manganese toxicity. Marigolds, seed geranium, and common impatiens are most susceptible to this disorder characterizes by bronze speckling to the leaves. This problem is most likely to occur when the growth medium pH is lower than the recommended range of 6.0-6.5.
3. Iron deficiency. Pansy, petunias, "superpetunias", snaps, and vinca are prone to Fe deficiency. These plants should be grown at lower than recommended pH.
4. Boron and calcium (Ca) deficiency in plugs. Abortion of the growing point may indicate low B or Ca.
5. Ammonium toxicity. Pansy, petunia, tomato, and geranium are especially sensitive. Ammonium will not be a problem if "peat-lite" fertilizers are used.

Not listed on the website is the fact that nutrient problems like those listed above can be avoided if a quality compost-based growing medium is used, It is essential that this compost be made from a variety of well blended ingredients and be finished and stable. Unlike peat-based mixes, compost-based media often use waste sources in their production

and are thus more sustainable. The mining of peat is a less sustainable process, as it requires the destruction of vast acres of peat bogs.

In my SARE research project, I collected data on the nitrate-N concentrations of both compost tea and tea produced from compost that has been exposed to the activities of earthworms (earthworm/compost) over time. As is indicated on the graphs that were produced from the collected data and supplied with the final report, nitrate-N concentrations were high during the initiate stages of the research and decreased with time. As compared to the compost tea, the earthworm/compost tea initially contained a very high concentration (1200 ppm) of nitrate-N. Through time, this nitrate-N decreased at a slower rate than nitrate-N content in the tea produced from compost alone. The tea created from compost alone also had nitrate-N concentrations worthy of direct use by growers. Some growers may reason that it is not worth the extra effort associated with the vermiculture aspects of this research. Why not use the compost tea directly? The compost tea analysis on 4/23/02 and 5/7/02 contained high concentrations of nitrate-N. If growers use a compost-based growing mix, then tea collected throughout the research time would more than likely supply adequate levels of nitrate-N to supplement a compost-based growing mix.

In any event, whether a grower produces tea from compost or from an earthworm/compost blend, tea should be collected for a period of time. The collection and storage process will produce a mixture of various concentrations of nitrate-N. This mixture should be kept under cool conditions and used as soon as possible. Prior to its use, the tea should be tested for nutrient content and dilution rates determined based on the recommendations from the University of Massachusetts website listed above.

As relates to the unsustained spike in the nitrate-N levels on 6/4/02, I reviewed both the analysis data and my field notes. The nitrate-N level numbers are the same as I received from the lab. My field notes do not indicate any abnormalities or other suspicions that might lead to a hypothesis about this spike. I would not totally stake my reputation on the consistent validity of the testing services but I recognize that all human activity has unintended consequences.

After review of my field notes, the only event that might explain the drop in nitrate-N levels at the 7/31 and 8/15 sampling is the fact that the drip at the tea collection pipe- as mentioned in the report- dried the control compost to a point that bio-activity in the bin decreased due to the reduction of moisture. To confirm this hypothesis, further research is needed.

There are many questions generated with ever research project. If I so desired, I could research this topic for the rest of my life.