Nutrient availability from organic fertilizers in soilless potting mixes for greenhouse production

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NORTHEAST SARE Sustainable Agriculture Research & Education

INTRODUCTION

Greenhouse production is an integral part of diversified farm operations in the Northeast region. Vegetable farms, especially those using organic practices, often grow their own seedlings for transplant into field production. Conventional practice involves starting seedlings in plug trays with soilless potting media (SPM) and utilizes a wide array of inorganic fertilizers that can be readily applied to provide nutrients as needed. Ample information exists to educate growers on delivery systems and nutritional monitoring practices (Dole and Wilkins 2004).Unfortunately there is a lack of scientific information available regarding the use of organic fertilizers in SPM. In field soil used for crop production, conditions are generally favorable for mineralization, i.e., the hydrolysis of complex reduced forms to ammonium, and subsequent oxidation of ammonium to nitrate. The capacity for mineralization and nitrification in SPM is relatively low and is highly variable among different types of SPM (Elliott 1986). Furthermore, little is known about availability of phosphorus from sources acceptable for organic production. General assumptions about nutrient availability from organic fertilizers are not likely to apply in SPM.

OBJECTIVES

1. To evaluate nitrogen and phosphorus availability from organic fertilizers incorporated in soilless potting mixes.
2. To evaluate seedling growth response to organic fertilization in soilless potting mixes in greenhouse production.

METHODS AND MATERIALS

Lettuce and tomato seedlings were grown in plug sheets in the UConn Floriculture greenhouse. A commercial organic soilless potting mix with lime and wetting agent but no fertilizer was used. Preplant fertilizers were added to the mix prior to filling the plug sheets. Liquid fertilizers were applied at every irrigation using subirrigation to prevent leaching of nutrients. A control treatment consisted of the same soilless media without preplant fertilizer. Media extracts were obtained by the saturated media extraction (SME) procedure immediately after mixing the fertilizer into the media. Nitrate-N, ammonium-N, and phosphate-P concentrations in the extracts were determined using standard colorimetric methods.

RESULTS & DISCUSSION

•N and P availability vary widely among organic fertilizers and are not related to the fertilizer guaranteed analysis.

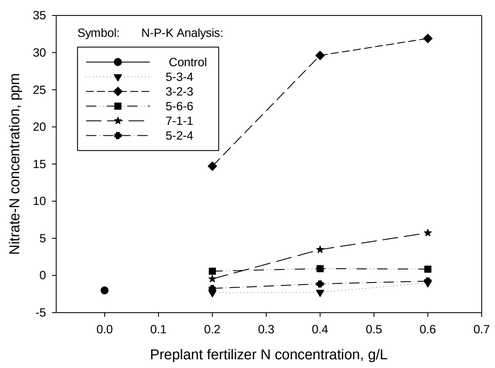


Figure 1. Nitrate-N concentration

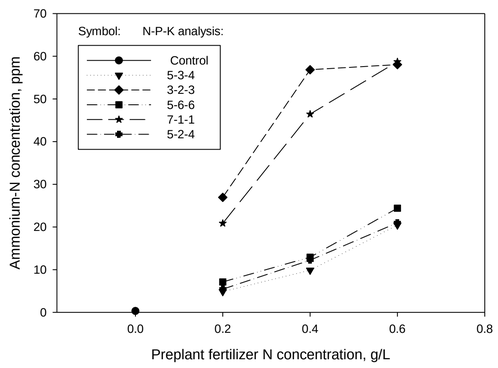


Figure 2. Ammonium-N concentration

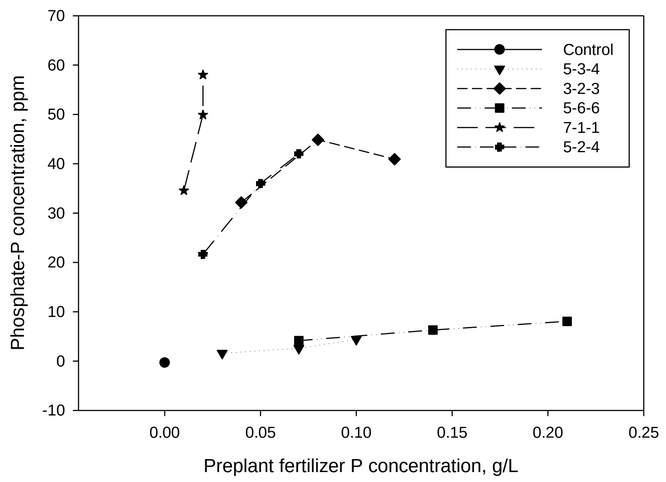


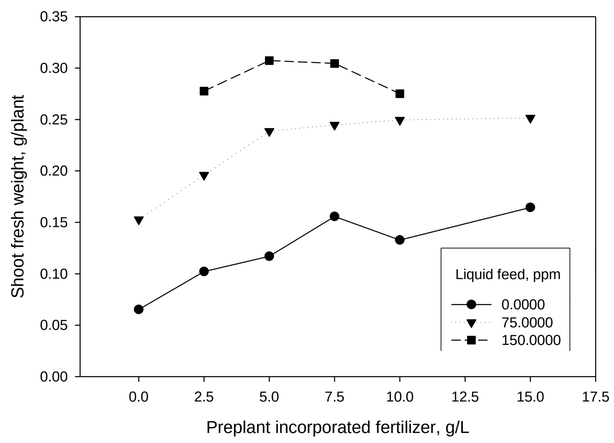
Figure 3. Phosphate-P concentration

RESULTS & DISCUSSION

•Fertilizer source affects both seedling growth and visual quality.

Figure 4. 'Red Salad Bowl' lettuce in 98-cell plug sheets. Lettuce that received preplant incorporated fertilizer on the left half of the flat shows much smaller and redder foliage than the lettuce on the right half that was fertilized with liquid fertilizer.

Figure 5. Shoot freshweights of tomato seedlings in 288-cell plug sheets fertilized with preplant incorporated fertilizer, liquid fertilizer or a combination of both.



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REFERENCE

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