

Can Raising the Level (ppm N) of Liquid Organic Fertilizers Optimize Plant Growth Relative to Chemical Water-soluble Fertilizer?

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Many growers and researchers who try organic fertilizers see less growth with the organics compared to chemical water-soluble fertilizer when they applied at the same level (ppm N). The question is, would simply raising the level of the organic fertilizer stimulate plant growth enough to make up for the difference in growth compared to chemical fertilizer? This is an important question because the answer would affect the amount of fertilizer used (cost, waste, nutrient pollution) and the chance of injuring the plants (ammonium toxicity, high EC).

How the plants were grown

'First Lady' marigolds and 'Ringo 2000' seed geranium plugs sown 22 March 2014 were potted on 7 April and 17 April, respectively, in 4½-inch pots of Fafard 3B soilless mix. Plants were fertilized with 225 ppm N from Plantex (20-2-20) chemical fertilizer or Nature's Source (3-1-1) liquid plant extract fertilizer levels of 225, 250, 275 or 300 ppm N. Fertilizer was applied at every other watering or about twice a week. The marigold portion of the experiment ended 3 June and the geranium portion ended on 17 June. Plants height was measured on the day when the experiments ended.

Results

'Ringo 2000' geraniums. The tallest geraniums resulted from fertilizing with Plantex fertilizer (Table 1). Plantex plants were larger than plants fertilized with Nature's Source at the same level, 225 ppm N. Nature's Source plants increased in size with 275 and 300 ppm N, but plants were still markedly smaller than plants in the Plantex treatment. Flower bud development was not greatly affected by Nature's Source and no chlorosis due to ammonium toxicity developed on any of the geraniums.

Table 1. Plant height as affected by fertilizer and fertilizer level.

Fertilizer	ppm N	Geranium	Marigold
Plantex 20-2-20	225	14.3a	11.0 ^{BS}
Nature's Source 3-1-1	225	9.1d	10.4
Nature's Source 3-1-1	250	9.2d	10.7
Nature's Source 3-1-1	275	11.2bc	10.9
Nature's Source 3-1-1	300	10.3cd	11.2

Figure 1. Geranium fertilized with (L to R) Plantex 225 ppm N, Nature's Source 225 ppm N, Nature's Source 275 ppm N.



‘First Lady’ marigold. In past experiments, depending on the organic fertilizer, marigolds were either slightly smaller or significantly so than with chemical fertilizer. Here there were no differences in size between plants fertilized with Plantex and those with Nature’s Source (Figure 2). Also, there were no increases in height or differences in appearance with fertilizer levels above 225. No abnormalities developed on plants fertilized with Nature’s Source. In short, all of the marigolds turned out the same in this experiment.



Figure 2. (L to R). Plantex 225 ppm N, Nature’s Source 225, 250, 275, and 300 ppm N.

Conclusions

In my opinion, the results of this experiment show that it’s questionable practice to try raise the level of organic fertilizer to compensate for the reduced growth compared to chemical fertilizers often observed by growers and researchers. However, if you do it and feels it’s a successful strategy in your greenhouse, carry on! In my work raising the level was partially successful with geraniums and not at all with marigold a plant, like many others, that responds well to Nature’s Source fertilizer. Applying Nature’s Source fertilizer to marigolds at levels above 225 would be a waste of fertilizer.

Another lesson from this experiment is that it’s probably safe to say that how plants respond to current organic fertilizers is species-specific. Look at the difference between geraniums and marigolds in their response to Nature’s Source fertilizer. This emphasizes the importance of trialing these new fertilizers on a small scale with the plants you grow before applying them to your whole crop.