USING COMPOST PRODUCTS TO GROW BEDDING PLANTS

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The use of compost to grow plants is not a new idea. However, when most people think about compost, they envision back yard compost piles filled with leaves, yard waste, and/or kitchen waste. The recent emergence of organized business enterprises that make compost but do not use it has given rise to a new class of compost users who have not been involved in the production of the compost they use (Fitzpatrick et al., 1998).

The greenhouse industry is an ideal user of many commercial compost products because of the large quantities of organic matter it uses in growing substrates. However, there are a wide variety of compost products on the market from a variety of composting facilities. These products can vary in pre-processing, post-processing, feedstocks used to make the compost, and/or composting time. Greenhouse growers demand that substrates they use be consistent, reproducible, available, easy to mix, uniform, cost effective, and have appropriate chemical and physical characteristics. The composting industry is striving to meet these goals by working with researchers at various universities throughout the US.

Numerous researchers have investigated the use of compost products made from biosolids (a.k.a. sewage sludge) because biosolids tend to be a nitrogen rich material. However, common concerns about using more than 50% composted biosolids in a container mix include high soluble salt concentrations, poor aeration, and heavy metal toxicity (Shiralipour et al., 1992). Research conducted at the University of Florida's Fort Lauderdale Research and Education Center on the use of compost made from 1 part biosolids and 1 part yard trimmings (by weight) reported that there was no difference in air filled porosity among substrates containing 0, 30, 60 or 100% compost (Table 1). However, water-holding capacity and moisture content decreased as the percentage of compost increased from 0 to 100% (or as percentage of peat increased) (Table 1). Furthermore, substrate pH was not different, but substrate EC (electrical conductivity) increased as the percentage of compost increased.

Impatiens, snapdragon, and begonia plant growth in these substrates increased as the percentage of compost increased from 0 to 100% with the largest plants being produced in 100% compost (Fig 1). Petunia and dianthus growth, however, was greatest in 60% compost but growth in 100% compost was still greater than growth in 0% compost. Although plants grown in 0% compost were smaller at final harvest, they were still marketable and would have reached similar plant size as plants grown in compost had they received an additional week or two in the greenhouse. In these tests, using compost actually shortened production time.

Because compost products tend to have complex organic compounds that break down slowly to provide a nutrient reserve for plant growth, it might seem logical that fertilization rates could be reduced when compost is incorporated into the substrate. Impatiens growth was compared in substrates containing 0, 30, 60, or 100% compost and top-dressed with 0.5, 1.0, 2.0, or 4.0 g/pot of 13-13-13 Nutricote type 180 with minors. Impatiens plants grown in 0% compost with 4 g/pot (recommended rate) produced plants similar in size to plants grown in 30 and 60% compost with 0.5 g which is less than half the recommended rate (Table 2). This can translate into cost savings on fertilizer for growers using composted biosolids in the growing substrate.

However, an over abundance of growth is not always desirable. The next question addressed was the use of growth regulators applied as a drench. It is well known that the activities of some growth regulators such as Bonzi or Sumagic are reduced when applied as a drench to substrates that contain bark and other organic materials. Impatiens shoot dry mass decreased as the Bonzi concentration increased to 0.25 and 0.5 ppm for all substrates with no further decreases at higher rates (Fig. 2). Bonzi was effective in reducing impatiens growth in 100, 60, 30, and 0% compost (Fig. 3). However, Bonzi reduced growth 31% in 100% compost compared to 17% in 0% compost because there was more plant growth to reduce in 100% compost than in 0% compost.

__Table 1.__ Physical and chemical parameters of substrates containing 0, 30, 60, or 100% compost made from biosolids and yard trimmings.

Percent compost[z]	Air-filled porosity (%)	Water-holding capacity (%)	Moisture content (%)	pH	Electrical conductivity (dS/m)
0	28	56	72	5.8	0.06
30	28	38	63	5.4	0.22
60	18	37	59	6.5	0.49
100	22	24	37	6.6	0.55
Standard	5 to 30	20 to 60	10 to 80	5.5 to 6.5	0.2 to 1.0[y]

[z]Compost was blended with vermiculite (25%), perlite (15%) and/or Sphagnum peat (30 to 60%). The 100% compost was used as a stand-alone substrate.

[y]Based on recommendation from A&L Southern Laboratories who used a Morgan extract.

Table 2. Final impatiens size of plants grown in 0, 30, 60, or 100% compost and fertilized with 13-13-13 Nutricote type 180 with minors.

Percent Compost	Fertilizer Rate (g/pot)	Final Plant Size (cm)[z]
0	0.5	6.67
	1.0	6.54
	2.0	7.94
	4.0	9.53
30	0.5	9.40
	1.0	9.08
	2.0	10.85
	4.0	11.94
60	0.5	9.40
	1.0	10.48
	2.0	12.07
	4.0	14.99
100	0.5	13.14
	1.0	12.19
	2.0	13.65
	4.0	15.75

[z] Plant size is calculated as average of plant height and width.

Compost products made from biosolids and yard trimmings have been successfully used to grow a variety of bedding plants. Further research needs to be conducted with these compost products on the growth of other plants (tropical perennials), post-production longevity, and fate of other chemicals applied. Growers contemplating using compost products in their operations should be aware that there are a variety of these products on the market and that not all compost made from biosolids and yard trimmings are the same. Results can and will vary with the compost product being used. Before a grower agrees to use a compost product, he/she should know: 1) what materials were composted (feedstocks); 2) what if any pre-processing was done; 3) what was the length of the composting time; 4) what if any post-processing was done; and 5) was the compost aged or cured. They should also know the pH and EC of the finished compost product as well as the air-filled porosity and water-holding capacity. The majority of composting facilities will gladly supply this information to growers who ask. They want their end-users to be satisfied with the product.

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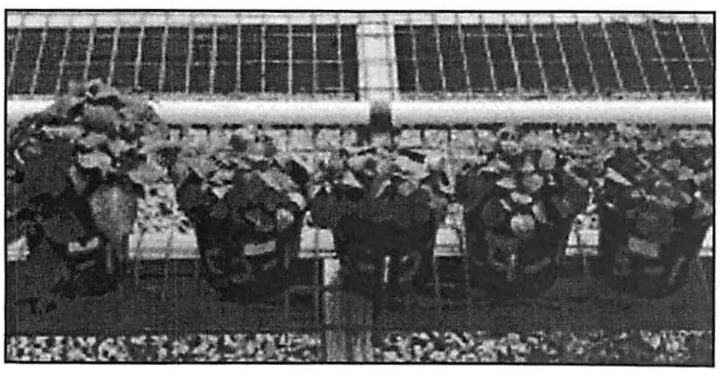

Figure 1. Growth of impatiens in 4" pots filled with Pro-Mix 'HP' or 0, 30, 60, or 100% compost made from bisolids and yard trimmings.

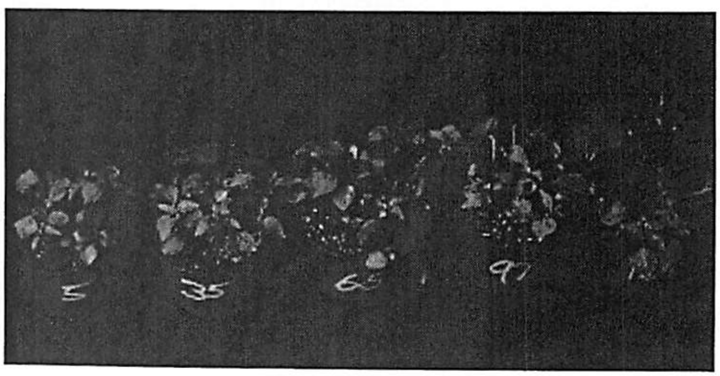

Figure 3. Comparison of the effects of a Bonzi drench on impatiens plants grown in 0,30,60,or 100% compost and drenched with 0.25 ppm of Bonzi. The plant on the right is the un-treated control.

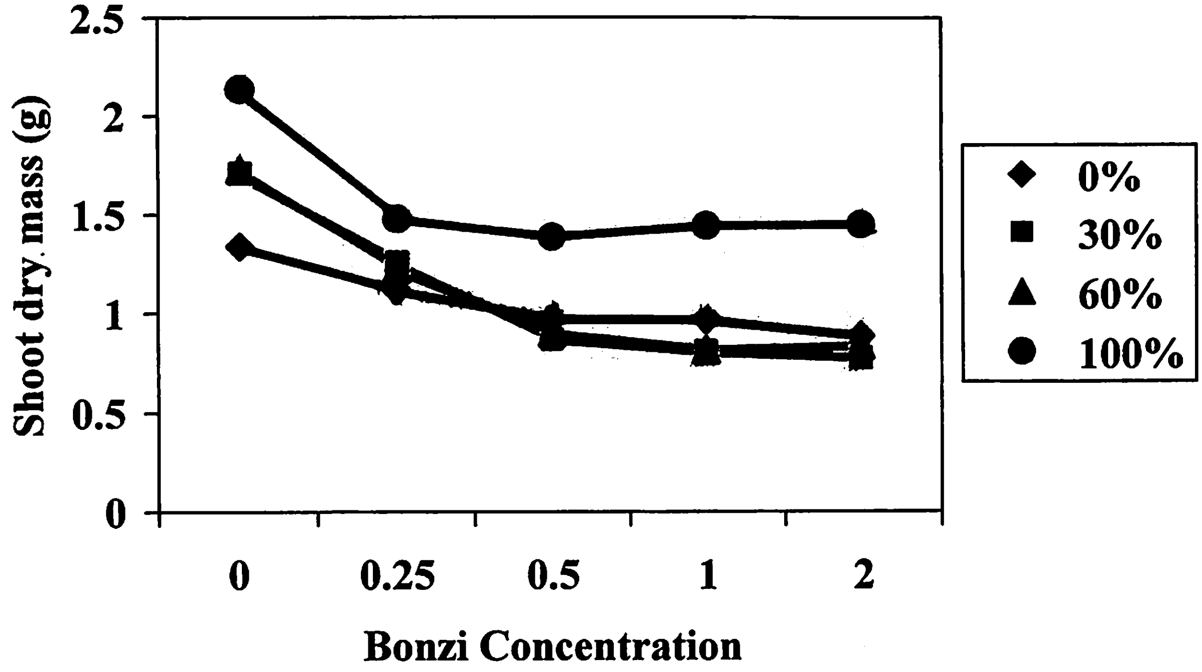

Figure 2. Impatiens shoot dry mass of plants grown in substrates containing 0, 30, 60, or 100% compost and drenched with Bonzi at 0. 0.25, 0.5, 1.0, or 2.0 ppm.