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Extension Newsletter (Lake Plains, NY Vegetable Program)

Can Compost Applications Improve Beet Yields?

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Two important limits to productivity faced by vegetable growers in NY are soil-borne pathogens and declining soil quality (e.g. soil organic matter loss, soil structure degradation, and declining soil productivity). Yield and income loss from these two factors can range from 10-50% in crops such as snap beans, peas, beets, and cabbage. This is particularly true for processing beets, which do best in soils with good structure and little soil disease pressure. Beets grown in soils that do not exhibit surface crusting or contain compacted layers tend to have better stands, higher yields and fewer root disease problems. Biological solutions such as compost additions offer the potential to alleviate the specific problems of soil-borne pathogens and declining soil quality, and may also have added benefits. This approach could improve the economic stability of local farming operations in ways which could also benefit the environment.

We have conducted two years of trials to evaluate the effect of applications of composted chicken manure on processing beets. While growing conditions and disease incidence were very different in 1995 and 1996, both stands and yield were improved by compost applications in both years. Compost was applied at 0, 2 and 4 tons/acre, and the benefits were seen at both the 2 and 4 ton rates.

Nutrient analysis of three compost samples from 1995 varied, with %N ranging from 1.8 to 2.8; %K from 1.0 to 2.1; %Ca ranging from 6.2 to 10.3, and P highly variable (all on a dry weight basis). Results from 1996 are pending.

Compost applications as low as 2 T/A improved yields in both years (Tables 1 and 2), although tonnage differences were not statistically significant in the first year. 1995 was a relatively dry growing season, and very little damping off or root rot disease was found in either the seedling or the harvest stage. The 1996 growing season, however, started off very wet, and then turned quite dry during late July and August, resulting in very stressful growing conditions. This, combined with the lack of rotation out of beets, lowered yields in the second year, and contributed to much higher disease pressure from root rot organisms.

Table 1. 1995 Yield Results

	Compost Application Rate			
Yield Components	0 Tons/Acre	2 Tons/Acre	4 Tons/Acre	*$LSD_{0.05}$
Total (=marketable) Yield, T/A	12.8	16.5	16.8	4.7 (NS)
Number marketable/ft^2	2.0 a	3.2 b	2.7 ab	0.7

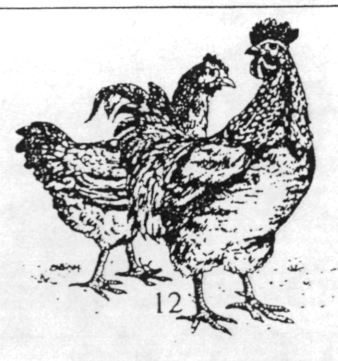

Table 2. **1996 Yield Results (after two years of applications)**

	Compost Application Rate			
Yield Components	0 Tons/Acre	2 Tons/Acre	4 Tons/Acre	*$LSD_{0.05}$
Marketable Yield, T/A	3.9 a	8.2 b	8.9 b	3.7
Total Yield, T/A	7.3 a	12.0 b	12.2 b	3.3
% unmarketable	46 a	32 ab	28 b	17
Number marketable/ft^2	1.6 a	3.4 b	3.5 b	1.8
Total number/ft^2	8.2 a	10.5 b	10.2 b	2.0

Analysis of seedling counts over time and final stands also provided evidence of disease suppression, and possibly soil structural effects. Seedling counts, collected during the first two weeks after planting, indicated that applications of compost resulted in improved stands in both 1995 and 1996. Soil penetrometer readings, taken after the second application of compost in 1996, indicated no differences due to compost applications.

We will be continuing this research next year, in cooperation with several Cornell faculty members. Specifically, we are going to test compost applications on a field scale, and will be trying to determine the mechanisms responsible for the positive effects we have seen so far. These may include: nutrient additions, physical structure changes in the soil surface, and biological or chemical mechanisms of disease suppression.