New York State Integrated Pest Management Program

Impact of Composts on Disease Incidence in Vegetable Systems

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Summary

One characteristic of compost which might provide greater incentive for use by vegetable growers is suppression of soil-borne diseases in crops grown on compost-amended soils. Integrating compost into commercial vegetable production for diseases suppression represents a long-term approach to enhance soil microbial activity and thereby increasing system resilience to disease pressure. As a preventative disease measure, it is expected that regular additions of a suppressive compost will provide protective benefits which will accrue over multiple crops and seasons. This research represents initial studies to determine if compost effects on disease severity show any residual carry over to subsequent season, and if the disease suppression from compost is caused by changes in soil microbial biomass/activity or improved plant growth as a result of improved nutrient availability. Using a greenhouse disease bioassay with beets and cucumbers, three commercially available compost materials were compared. Composts were sterilized to eliminate microbial activity and isolate nutrient effects. The results from the greenhouse assay were inconclusive due to poor pathogen colonization in the medias. However, two of the tested materials (Wegmans Poultry and MacEnroe Organics composts) enhanced plant emergence rates and growth, particularly if microbial activity was intact (non-sterilized). To examine residual compost effects from previous years, a research site was identified in which compost had been applied to only one portion of all plots, in 1996. Compost was applied to 1/2 of these sections, to determine residual and additive effects of one compost product (Krehers Poultry Compost). The entire research site was planted to snap beans. In this trial, there was some evidence of residual effects of a compost, one year after application, on disease incidence and severity. Composts applied in 1996 only or in both 1996 and 1997 reduced the severity of bean root rots, with recent 1997 applications be most efficacious. Recent compost application increased soil microbial activity and ammonium nitrogen in the top two inches of soil, which may have contributed to the reduced disease incidence and improved plant growth in these plots. However, there were no significant differences in microbial activity between soils composted in the 1996 only or the no-compost control treatment. The different methods of production of the two poultry composts tested in this research (Krehers and Wegmans) indicate significant differences in potential use in either greenhouse or field systems. Future studies will focus on disease suppressiveness of these composts.

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