New York State Integrated Pest Management Program

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Strategies for the Biological Control of Root Diseases in Hydroponically-Grown Vegetables

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Hydroponic plant production has been increasing worldwide in recent years. One of the continuing challenges of hydroponics is to keep the microbial load of the system as low as possible through sterilization and disinfestation techniques. This is done mainly to reduce contamination from plant pests. One of the most devastating consequences of microbial contamination in hydroponics is from the introduction of plant pathogenic microorganisms, which, if left uncontrolled, could destroy an entire crop production system in a very short period of time. Because of the closed nature of the system, introduced pathogens are rapidly distributed throughout the hydroponic system, resulting in rapid and often times total crop destruction. Among the pathogens described from plants grown in hydroponics, *Pythium* species have been overwhelmingly the most frequently encountered and most devastating, regardless of the crop grown.

Most strategies to control pathogens in re-circulating nutrient solutions have involved non-specific sanitation approaches, many of which are not entirely effective. Furthermore, fungicides are currently not labeled for use on hydroponically-grown crops in the United States, making few alternatives available for disease control.

Since hydroponic systems are believed to have relatively low levels of microbial activity, biological control strategies should be potentially effective in reducing plant losses, particularly from *Pythium* species. Studies have demonstrated direct relationships between increased microbial activity and reduced activity of *Pythium*. Despite this, however, the biological control of root diseases in hydroponic systems has not been extensively explored.

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