



Vegetable Pathology and K-12 Outreach

Program Leader:

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Program Objectives:

Working primarily with oomycete and bacterial pathogens, my program helps vegetable growers reduce yield losses caused by disease, while minimizing environmental impact. I also work to increase awareness of agriculture among K-12 and undergraduate students. As the percentage of the population that farms decreases, it is critical to educate the rest of the population about where our food is produced and of the value of agriculture. A long-term goal is to contribute to workforce capabilities in utilizing research-based knowledge to develop and extend innovative solutions for the serious problems facing agriculture and food production.



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Program Summary:

The goals of my extension program are three-fold. The first goal is to work with conventional, transitional and organic growers, seed companies, chemical companies and private consultants to improve vegetable disease management while promoting sustainable agricultural practices. The second goal is to develop and promote partnerships between Cornell University and elementary school educators and students to increase science literacy. The third goal is to increase awareness of plant pathology and applied agricultural studies among undergraduate students. Within these goals, there are four major areas of emphasis:

- Vegetable pathology and disease control specializing in bacterial and oomycete pathogens in both conventional and organic systems
- Detection and identification of vegetable pathogens
- Elementary school science education outreach
- Undergraduate summer internship program



Pumpkin infected with
Phytophthora capsici

Program Justification:

Vegetable production in New York has an annual farm gate value of about \$500 million, and the state is ranked fifth in the nation in the value of our fresh market industry. We are fortunate to have a climate in which a great diversity of vegetables can be grown, and a knowledgeable and engaged group of growers. Unfortunately annual losses due to plant pathogens can be very large. Improved disease management strategies that will increase yield and reduce pesticide applications are critical to the viability of this industry.

Impact to Industry and to Public Engagement:

- Improving disease management for vegetable diseases
 - Developed a 9 acre farm devoted to the study of *Phytophthora* blight, caused by the oomycete pathogen *Phytophthora capsici*
 - Leading a nation-wide extension effort to rapidly disseminate information about late blight of potato and tomato when an outbreak occurs
 - Helped to develop a resource guide for organic insect and disease management <http://web.pppmb.cals.cornell.edu/resourceguide/index.php>
- Increasing understanding of the basic biology, source of inoculum and control strategies for pathogens of vegetables
 - Growers now know that new strains of *Xanthomonas campestris* pv. *campestris* enter NY annually
 - Understanding basic biology of the bacterial pathogens of tomato will lead to improved detection strategies in plants, soil and water
- Enhancing science literacy
 - Effective K-12 science partnership with the Geneva City Schools
 - Undergraduate summer scholars program continues to expand

Program Team Members:

Holly Lange, Research Technician
Amara Dunn, Graduate Student
Lisa Jones, Graduate Student
Carly Summers, Graduate Student
Matthew Tancos, Graduate Student
Many undergraduate researchers

Please visit my program websites:

Lab website

<http://web.pppmb.cals.cornell.edu/smart/lab/>

Elementary education site

<http://web.pppmb.cals.cornell.edu/smart/esop/>



Smart lab, July 2011