PLANT PATHOGENIC BACTERIA: GENERATING BASIC AND APPLIED KNOWLEDGE TO TACKLE A GLOBAL THREAT TO THE SEED INDUSTRY

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Infested seeds represent an important source of primary inoculum for economically important plant disease epidemics caused by bacteria. Additionally, since seeds are globally produced and traded commodities, they can be highly efficient vectors by which bacteria can be disseminated over long distances. While the threat of seedborne phytopathogenic bacteria is well established, there have been few significant advances in disease management that specifically target the seed-borne phase. This is the case even though there have been major advances in our understanding of the molecular bases of phytobacterial pathogenicity and virulence. As a result, strategies for managing seedborne bacteria continue to include using pathogen-free stock seeds to produce seed crops in regions with cool, dry climates; seed health testing based on representative seed samples and seed treatments that seek to kill bacteria on/in seeds. Unfortunately, even with improvements in seed health testing technology, seedborne bacterial inoculum continues cause sporadic but economically important disease outbreaks worldwide. To reduce the threat of seedborne bacterial diseases there must be a more accurate and detailed understanding of: 1) the seed infection process including pathogen ecology and disease epidemiology in the seed production environment; 2) factors that influence pathogen survival in/on seeds and 3) factors and interactions that contribute to bacterial colonization of germinating seeds and seed-to-seedling transmission of disease. Using bacterial fruit blotch of cucurbits (caused by the gram-negative bacterium *Acidovorax citrulli*) as a model, we have explored details of each of these phases of the disease cycle. Our major goal has been to use basic research approaches to improve our understanding of seed infection, pathogen survival and seed-to-seedling transmission of BFB and subsequently develop specific, knowledge-based management strategies. This presentation will outline the approaches we have taken to improve our understanding of BFB and suggest how similar approaches might be employed to reduce the threat posed by other seedborne phytobacterial diseases.