Battle of the Molecular Methods: RFLP and Multiplex PCR in Genetic Detection Accuracy

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As our population increases our Global Food Production has to increase by 70% before 2050 according to the FAO. This goal is very difficult to reach with biotic stresses like pathogens causing 40% yield loss annually. To solve this problem, we need to manage these pathogens, but first we must identify them. Last year I compared two molecular techniques, the Real-time and Conventional PCR in genetic detection accuracy. I concluded that the Real-time PCR is more specific and 100x more sensitive compared to the Conventional PCR in detecting the pathogen Citrus Greening. This year, instead of testing the identification of on pathogen, I decided to test two methods in strain identification. To do this I compared the Restricted Fragment Length Polymorphism (RFLP) and the Multiplex PCR to determine which method is more specific and sensitive in identifying the difference between the strains Lethal Bronzing and Lethal Yellowing. I chose these strains because they are relatively new to Louisiana and aren't differentiable with the naked eye. To test specifically, I ran 9 samples of suspected and known positive palm samples through both methods to see which method could detect more samples accurately. To test sensitivity, I used serial dilution to create lower concentrations of DNA to see how far each method could detect the pathogens. The results showed that the Multiplex PCR was more specific but not as sensitive as the RFLP. However, when it comes to practicality the Multiplex PCR takes four days less to complete and costs 60 dollars less than the RFLP.

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