A ROBUST METRIC FOR THE ENVIRONMENTAL QUANTIFICATION OF *FUSARIUM OXYSPORUM* F. SP. *VASINFECTUM* RACE 4

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Abstract

Fusarium oxysporum f. sp. *vasinfectum* (FOV) is a soil-borne fungal pathogen of cotton and the causal agent of Fusarium wilt. Race 4 of this pathogen is distinguished from other races by its ability to infect cotton without the co-infection of the root knot nematode (*Meloidogyne incognita*). In the laboratory, the relationships between inoculum density and Fusarium wilt in cotton have been established, but these are not well characterized in the field. The spatial and temporal variability of inoculum density within a single field adds complexity to variety trials and risk management if unknown. If inoculum density is quantified using a robust metric, it can be used as an estimate of disease pressure and be incorporated into the interpretation of variety trials. To develop such a method, we designed a real-time PCR-based method to detect and quantify genomic DNA of relevant FOV from environmental soil samples. Field soil samples were amended with increasing quantities (mass) of mycelia to test the performance of this method in quantifying FOV inoculum. Calibrated mass estimates derived from real-time PCR were used to predict fungal mass values, and to predict disease incidence and severity in experimental variety trials. Preliminary results demonstrated robust ability of the method to estimate inoculum density, and confirmed that inoculum density correlates with disease incidence. Future work will characterize the inoculum/disease relationship variation between cotton varieties, and it will be used to study temporal variation in inoculum density, and support studies of inoculum movement.