PHYLOGENY AND VCG ANALYSIS OF VASCULAR COMPETENT AND INCOMPETENT *FUSARIUM OXYSPORUM* F. SP. *VASINFECTUM* PATHOTYPES

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Abstract

Fov isolates belonging to all known races, biotypes, and most of known genotypes were characterized by phylogenetic and VCG analysis. VCGs with multiple members were sequenced for at least two members, and the resulting sequences were always identical except for VCG01111 and VCG0114 members. Five clades consisting of races 1, 2, and 6 lineage (VCG1A, 1B, 1C, 3, 6, 9, 0111, 0112, 0116, Au1, and 18), race 8 lineage (VCG2 and 10), races 4 and 7 lineage (VCG16, 17, 0114, 19), race 3 lineage (VCG7, 14, 15, 0113, 01111, Au2, 20, 21), and the Australian biotype lineage (VCG01111) were observed. Vegetative compatibility test provided a more precise fingerprint of various genotypes than the DNA sequence comparison but it failed to provide any phylogenic relationship among non-complementing groups. Inclusion of nearly 6 kbp of DNA sequences for the phylogenetic tree construction enabled differentiation of most of the VCGs. A total of 21 sequence types (ST) and 23 VCGs were observed within Fov, with just a few cases of multiple VCGs corresponding to a single ST and multiple STs corresponding to a single VCG. VCG6, VCG0116 (race 6), and VCG9 corresponded to a single ST, VCG0111 and VCGAu1 to another ST, and VCG0114 and VCG19 to yet another ST. Only two cases of multiple STs corresponding to a single VCG were observed: a race 3 lineage ST and an Australian biotype lineage ST corresponding to VCG01111, and two different race 4 lineage STs corresponding to VCG0114. Pathogenicity assays indicated that races 1, 3, 6 lineage and race 8 lineage isolates were vascular competent pathotype while race 3, 4, 7 and Australian biotype isolates were vascular incompetent pathotype. Race 7 isolate failed to vegetatively complement with race 4 isolates. However, California race 4 isolates and Chinese race 7 isolate showed similar pathogenicity profiles, which were distinct from that of Australian biotype isolates even though they were all vascular incompetent. The Australian biotype isolates were phylogenetically very close to banana tropical race 4 of *F. oxysporum* f. sp. *cubense* isolate II5 (VCG01213) and were probably introduced into Australian cotton field through Northern Territory as *cubense* tropical race 4 associated isolates. The banana isolates were not pathogenic to cotton in the soil inoculum assay.