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Characterization of the genetic diversity of *Fusarium oxysporum* f. sp. *betae* utilizing phylogenetic analysis and vegetative compatibility grouping.

ABSTRACT

Fusarium yellows of sugar beet, caused by *Fusarium oxysporum* f. sp. *betae* (FOB), can lead to significant reduction in root yield, sucrose percentage, and juice purity. Previous research into FOB, has demonstrated that isolates known to be pathogenic on sugar beet can be highly variable. This diversity is increased further by the wide geographic distribution of isolates. Although genetic resistance provides some control, growers have reported failures when resistant varieties are grown in different parts of the country, potentially due to the variability of local FOB populations. Isolates of *F. oxysporum* can be categorized into *formae speciales* and further into races according to their ability to cause disease on specific host(s), resistance gene interactions, vegetative compatibility grouping (VCG), and phylogenetic sequence alignment. *F. oxysporum* isolates were collected from symptomatic sugar beets throughout production areas in the United States. These isolates were characterized utilizing pathogenicity, phylogenetic analysis, and vegetative compatibility testing. Based on the combination of findings from these studies, the FOB population is highly polyphyletic and most likely cannot be classified into distinct races. However, local clades can potentially be described, which may aid in selecting resistant lines for particular production regions.